Study on the adaptation strategies of the sugar supply chain after the end of the sugar quotas

AGRI/2020/OP/0001

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Areté The Agri-food Intelligence Company

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ABSTRACT

Most of the period that followed the termination of the EU sugar quota system in October 2017 has been affected by a prolonged depression of sugar prices in the EU and global markets, which threatened the economic viability of the EU sugar sector. The study aims at providing a comprehensive analysis of the EU sugar sector's capacity to adapt to its post-quota environment and on its ability to respond to varying market and production conditions. It investigates the consequences of the end of quotas, and assesses whether and to what extent the implemented adaptation strategies and risk management solutions ensure an appropriate level of resilience against current and future threats, also considering the context of the international sugar market and its developments. The study concludes that the resilience of the sector is satisfactory in some Member States, less so in other ones, and affected by some non-negligible weaknesses, which may become serious in certain country- or company-specific situations. Several adaptation strategies and risk management solutions have proved to be effective; other ones appear to be well-designed, but their practical effectiveness is not yet proven due to very limited uptake/no use in the EU sugar sector, or were not applied in the sector in the post-quota period because the conditions for their activation were not met.

RÉSUMÉ

La majeure partie de la période suivant la fin du système de quotas sucriers de l'UE - en octobre 2017 - a été affectée par une dépression prolongée des prix du sucre dans l'UE et sur les marchés mondiaux, menaçant la viabilité économique du secteur sucrier de l'UE. L'étude vise à fournir une analyse complète de la capacité du secteur sucrier de l'UE à s'adapter à son environnement post-quota, et de sa capacité à répondre aux différentes conditions de marché et de production. Il étudie les conséquences de la fin des quotas et évalue si et dans quelle mesure, les stratégies d'adaptation et les solutions de gestion des risques mises en œuvre assurent un niveau de résilience approprié face aux menaces actuelles et futures, compte tenu également du contexte du marché international du sucre et de ses évolutions. L'étude conclut que la résilience du secteur est satisfaisante dans certains États membres, moins dans d'autres, et qu'elle est affectée par des faiblesses non négligeables, qui peuvent devenir graves dans des situations spécifiques à certains pays ou certaines entreprises. Plusieurs stratégies d'adaptation et solutions de gestion des risques se sont avérées efficaces ; d'autres semblent bien conçues, mais leur efficacité pratique n'est pas encore prouvée en raison d'une adoption très limitée/de l'absence d'utilisation dans le secteur sucrier de l'UE, ou elles n'ont pas été appliqués dans le secteur au cours de la période post-quota car les conditions de leur activation n'étaient pas remplies.

SECTION A - INTRODUCTORY PART

1 CONTEXT, OBJECTIVES AND SCOPE OF THE STUDY

Starting from the 2006 reform of the EU sugar regime, and following the termination of the production quota system after the 2016/17 marketing year, the EU sugar sector has undergone a deep restructuring process. An exceptionally abundant EU sugar beet crop in the first marketing year after the quotas (2017/18), combined with a situation of oversupply on the international sugar market, translated into a prolonged price depression on the EU sugar market in the following marketing years, which posed serious threats to the economic viability of the actors in the EU sugar supply chain (sugar beet growers, beet sugar producers and raw cane sugar refiners in particular). The difficult situation briefly outlined above is the context that led to the carrying out of the present study for the European Commission - Directorate-General for Agriculture and Rural Development.

The **overall objective of the study** is the provision of a sound and comprehensive analysis on the EU sugar sector's capacity to adapt to its post-quota environment, as well as on its ability to respond to varying market and production conditions. The study investigates in particular the consequences of the end of quotas for the EU sugar sector, and it assesses whether and to what extent the existing adaptation strategies implemented in the sector ensure an appropriate level of resilience against current and future threats, also considering the context of the international sugar market and its developments.

The study was conceived as **a follow-up to the conclusions of the High Level Group on Sugar** (July 2019)[1], which recommended to the European Commission to initiate a comprehensive review of the possible strategies for improving the market resilience of the sector. This objective is further detailed in the **Joint statement from the Council of the European Union, the European Parliament and the European Commission on the CMO provisions related to the EU sugar sector** (28 June 2021)[2]: "*The current state of the sector and its adaptation strategies will be assessed thoroughly within the framework of a study to be delivered in autumn 2021. The study will analyse the European and national policy instruments available for the sugar sector, the respective roles of the private sector and of the public institutions in responding to the major risks affecting the sector and will identify possible strategies to improve the resilience of the European sugar sector. The Council of the European Union, the European Parliament and the European Commission will consider any appropriate future policy developments in light of the key findings and conclusions made in the context of this study*".

The study is structured into a number of questions grouped under the following **three themes**:

1. **Theme 1** – The structure and competitiveness of the EU sugar sector and its supply chain organisational arrangements.

[1] Final report of the High Level Group on Sugar, July 2019: https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/plants_and_plant_products/documents/final-report-high-level-group-meeting-sugar.pdf

[2] Annex IV to the Results of the super trilogue on 24 – 25 June 2021, Council of the European Union, Brussels, 28 June 2021 (10219/1/21 REV 1): https://data.consilium.europa.eu/doc/document/ST-10219-2021-REV-1/en/pdf

2. **Theme 2 –** The threats to which the EU sugar sector is confronted; the existing risk management strategies, their use and effectiveness.
3. **Theme 3** – The institutional setting of the market and EU policy instruments available for the sugar sector.

The scope of the study can be summarised as follows:

- **Products**: the study covers all the products related to the sugar production chain from sugar beet to refined sugar, by-products and other relevant products (e.g., bioethanol).
- **Geographical coverage:** the study covers the European Union as a whole. Specific topics are investigated at Member State level in the framework of ten national case studies, as well as in the two third countries covered with thematic case studies (i.e., United States and United Kingdom) and in other relevant third countries that are important as sugar producers (i.e., Australia, Brazil, India and Thailand).
- **Economic actors:** the study focuses on sugar beet growers and sugar producers; other relevant actors in the sugar supply chain are also considered in the analysis, namely: refiners of raw cane sugar, the food industry and other industries using sugar (collectively referred to in the report as "industrial users of sugar"[3]), users of by-products of sugar production, sugar traders, wholesalers, packers, retailers, and final consumers.
- **The main period to be covered:** from the end of sugar quotas (i.e., after the 2016/17 marketing year) until today; nevertheless, references to earlier periods are made whenever needed for a more robust analysis of the study topics.

2 STUDY METHODOLOGY

The overall approach to the study is structured around **four main tasks**: **structuring**, **observing**, **analysing** and **reporting**. The study methodology presented in this section was agreed with the European Commission: it is the output of the "structuring" task. The **data collection strategy** used a combination of tools (desk research, mining of relevant datasets, interviews with competent authorities, sectoral stakeholders and independent experts, two surveys targeting sugar beet growers' organisations and individual sugar producers, and an expert focus group) to gather from both primary and secondary sources ("observing") the evidence and insights needed to:

1. Develop the **descriptive part** of the study (section B of this report).
2. Elaborate **answers to the thirteen study questions** under the **three study themes** (section C of this report), by applying the related methodology ("analysing"). The key elements of the methodology for replying to each study question are detailed in the related introductory sections.
3. Draw the **conclusions stemming from the study**, elaborate **possible strategies** aimed at addressing the most serious threats to short, medium and long-term economic viability as well as presenting lessons learned ("reporting": section D of this report).

Ten national case studies allowed a deeper investigation of all the study topics where national specificities have a particular relevance for the assessment, whereas **two thematic case studies** enriched the evidence base needed for replying to specific study questions.

[3] In this report "industrial users of sugar" are all the operators using sugar to obtain food products intended for human consumption and/or non-food products.

The **overall approach for answering study questions** was based on the following elements:

- Interpretation and comprehension of the **key terms** of the study questions and provision of appropriate **definitions** of these terms.
- Indication of the **judgement criteria** allowing to answer each question, and of the related **set of indicators** (as well as, wherever opportune, the quantitative level to be reached by such indicators).
- Explanation of the **validity** of the quantitative and qualitative information used, and indication of the related limitations.
- Description of the **methods used for answering each question** and indication of their limitations.
- Detailed description of the **reasoning followed in the analysis**, indicating in particular the underlying hypotheses and validity limits.
- **Conclusions for each question**, to be drawn directly from the analysis, and to be highlighted in the text of the present study report.

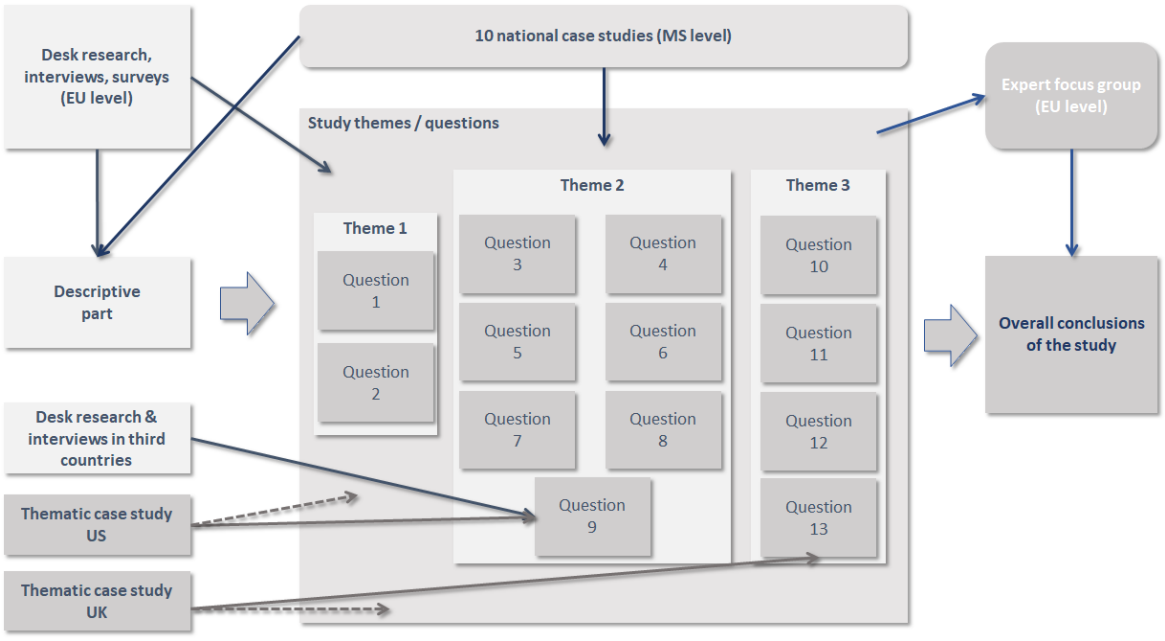
The scope of the study and of individual study questions included a combination of:

- aspects (e.g., sugar prices, trade flows, production volumes, number of processing plants and of producers, market shares, etc.) that can be quantified, within the limits allowed by the availability of suitable data: in principle, the assessment of these aspects relied on quantitative indicators;
- aspects that have a complex and/or "subjective" nature (e.g., perception of the risks/threats affecting the EU sugar sector; preference of the key actors in the sugar supply chain for specific adaptation strategies; etc.), and are hence unsuitable for being evaluated through quantitative indicators.

Therefore, in combination with the application of **quantitative assessment methods**, an **in-depth qualitative appraisal of the perceptions of stakeholders** was also performed, in order to grasp all the specificities and nuances that were relevant for the purposes of the study.

A **schematic outline of the overall approach to the study** is provided in Figure 2.1.

Figure 2.1 - Schematic outline of the overall approach to the study



Source: study methodology agreed with the European Commission

SECTION B - DESCRIPTIVE PART

3 THE REGULATORY FRAMEWORK FOR THE SUGAR SECTOR

3.1 Evolution of the EU sugar regime: from the 2006 reform to the end of quotas

3.1.1 The Common Organisation of the Markets (CMO) for sugar

The **Common Organisation of the Markets for sugar** ("sugar CMO" henceforth) was originally set up in 1968 with the objectives of granting availability of supply to the Community and of ensuring a fair income to Community sugar beet growers. To achieve these goals, a system based on domestic support via guaranteed prices for both sugar and sugar beets was set up, combined with strong import protection (achieved through a system of variable duties) from the competition of low-cost third-country producers. Over time, the system was gradually completed by a number of policy tools aimed at stabilising the Community market through supply management:

- right from its start, the sugar CMO was based on **national production quotas** organised in a **two-tier system** (full support for "A" quota, reduced support for "B" or "specialisation" quota), which were allocated to individual producers;
- the supply management tools came to include alternative outlets for quota sugar that found no adequate placement on the domestic market: i) Community buying-in of sugar at a pre-defined "**intervention price**"; and, ii) subsidised exports on the world market via a system of **export refunds**;
- finally, sugar production exceeding the quota limits (the so-called **"C" sugar**) had to be exported to the world market without export refunds, or could be carried forward to the following marketing year (but only within pre-defined limits).

The scope of the sugar CMO was extended also to the main alternative sweeteners: High Fructose Syrups (HFS), also known as isoglucose, and inuline. In particular, production of these sweeteners in the EU also took place in the framework of a quota system.

The rationale and functioning mechanisms of the sugar CMO remained basically unchanged until the closure of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) and the **formation of the World Trade Organisation (WTO)** at the end of 1994. To comply with the commitments undertaken by the Community in the framework of the WTO, variable import duties for sugar were converted into fixed tariffs (which were set on very protective levels, and could be supplemented by additional duties by virtue of a "safeguard clause"), and both the financial ceiling and the eligible quantities for export refunds had to be reduced, according to a pre-defined time schedule.

3.1.2 The 2006 reform of the EU sugar regime

The **2006 reform of the EU sugar regime** was aimed at **addressing a growing imbalance of the EU sugar market**, which resulted from a combination of:

- the opening of the EU sugar market to **imports from the least developed countries** (LDCs) in the framework of the so-called "Everything But Arms" (EBA) initiative as from 2000;
- increasing sugar imports in the framework of **preferential agreements** made with certain Balkan countries in 2001;

- the 2005 WTO ruling on the maximum allowed volume of EU subsidised exports (set at 1 374 million tonnes), which concluded that both exports of EU "C" sugar and re-export of a quantity of quota sugar corresponding to preferential sugar imports from African, Caribbean and Pacific (ACP) countries were to be considered as cross-subsidised (due to support granted to quota sugar): the EU was found to have **systematically exceeded the maximum allowed volume** to a substantial extent, and had therefore to drastically decrease its subsidised exports of sugar.

The 2006 reform also aimed at **improving the coherence between the sugar regime and the new CAP framework set in 2003**, in particular with respect to the transition from coupled to decoupled support to farmers.

The 2006 reform of the EU sugar regime aimed at maintaining a competitive EU production whilst respecting international commitments, as well as at ensuring greater coherence between the EU sugar policy and the new framework for the Common Agricultural Policy (CAP) set in 2003 (HLG, 2019). Those goals were pursued through:

- the **reduction of domestic prices** to a level that reflected the cost structure of the most efficient undertakings;
- a restructuring scheme allowing **non-viable undertakings to leave the sector** under favourable conditions.

The ultimate goal of the 2006 reform was to help the EU sugar supply chain to get ready to operate without the production quota system in place since 1968: originally intended for 2015, the **termination of the quota system** was subsequently postponed until **2017**.

The 2006 reform **simplified the sugar quota system** by merging the former A and B quotas in a single "basic quota"; what was formerly defined as "C" sugar became known as "out-of-quota" production, and was restricted to industrial uses, supply for the EU's outermost regions, exports on the world market without refunds, or carry-forward to the next marketing year (thus being counted as quota production of that year).

The reduction of EU quota sugar production was pursued through a **restructuring scheme** based on multiple measures, aimed at **incentivising quota renunciation by sugar producers and sugar beet growers**:

- **restructuring aid to sugar producers** who renounced quotas, which was extended to sugar **beet growers** in 2008/2009;
- diversification aid aimed at **encouraging the development of alternatives** in regions affected by the restructuring of the sugar sector;
- **transitional aid to full-time refiners**, allowing them to adapt to the restructuring of the sugar sector;
- **transitional aid to Austria and Sweden**.

Due to lower-than-expected initial uptake, the scheme was modified in 2007 (in the so-called "reform of the reform") to make it more attractive. In the end, the 2006 reform reduced EU sugar production quotas from 17 to 13.5 million tonnes.

As for **measures aimed at providing internal market support and management**, the 2006 reform kept the intervention price for white sugar at the pre-reform level for two marketing years, and subsequently reduced it by 36% in two steps, down to the current reference threshold of EUR 404.4 per tonne. A total 36% reduction was also applied to the reference price for raw sugar, to the price net of levies of the sugar sector and to the minimum beet price. Whereas public intervention for sugar was continued during a transitional period until 2009/2010, the 2006 reform introduced two additional measures:

- The **withdrawal measure** – applied for the first two marketing years after the reform - consisted of fixing a threshold beyond which the production under quota of each undertaking was 'withdrawn' from the market and stored until the beginning of the following marketing year.

- **Private storage** consisted in financing the storage of sugar by undertakings on a voluntary basis, with the aim of reducing the quantities available on the market to support sugar prices.

As for the **sugar import regime**, import duties were maintained at the substantially high levels applied before the reform (EUR 419 per tonne for white sugar and EUR 339 per tonne for raw sugar), which limited imports to preferential arrangements or tariff rate quotas with lower or no duties: the already mentioned ACP protocol (evolved into the Economic Partnership Agreements / EPA), the Everything But Arms / EBA initiative, and the Balkans preferential regimes, plus arrangements under WTO rules (the so-called CXL quotas), and further preferential agreements initialled after 2006 (e.g., with Peru and Central American countries, Ecuador, South Africa, Ukraine, Moldova).

Following the aforementioned WTO ruling, **subsidised exports** were limited to 1 374 million tonnes of out-of-quota sugar per year; export refunds were suppressed as from September 2008.

As for **coupled support to sugar beet growers,** Chapter 1 of Title IV of Regulation (EU) No 1307/2013 provides for the possibility for Member States to use up to a maximum share of their annual national ceiling for direct payments to finance voluntary coupled support (VCS) for a selected number of sectors, also including sugar. The overall amount of support granted as VCS by individual Member States cannot exceed its budgetary ceiling: the extent of the reference area set by each Member State determines the prior estimate for the unit amount (EUR/ha) of coupled support to sugar beet cultivation. Compared to this, the actually paid unit amount is proportionally higher if the actual number of eligible hectares remains below the reference area, and vice versa. Box 3.1 below illustrates the current situation of the implementation of VCS in the EU.

Box 3.1 - Voluntary Coupled Support on sugar beet

VCS is a production limiting support scheme (falling into WTO blue box subsidies) based on (historical) fixed number of hectares/heads. It can only be granted to a selected list of sectors that are particularly important for economic, social or environmental reasons, and which undergo certain difficulties. The following 11 Member States granted VCS to sugar beet cultivation: Croatia, Czechia, Finland, Greece, Hungary, Italy, Lithuania, Poland, Romania, Slovakia, Spain. The reference area covered by VCS for sugar beet, is reported in Table 3.1 below. In 2020, the fixed number of (historical) hectares at EU level for VCS to sugar beet amounted to 507 669 hectares. Most Member States have not changed the applicable quantitative limit for VCS, with the exception of Greece and Romania.

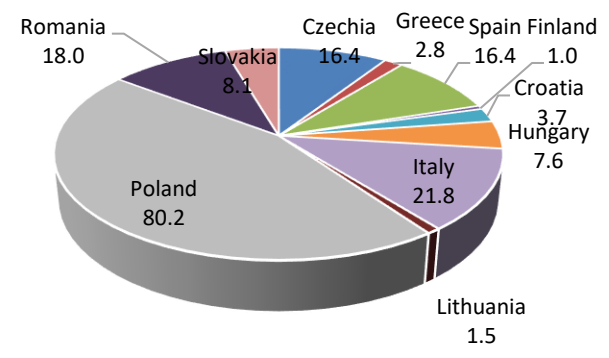
Table 3.1- Applicable quantitative limit (ha) for VCS on sugar beet, 2020

MS	ha	Notes
Croatia	23 000	Unchanged since 2015
Czechia	62 400	Unchanged since 2015
Finland	14 820	Unchanged since 2015
Greece	5 814	-57% from 2015 to 2020
Hungary	20 200	Unchanged since 2015
Italy	62 266	Unchanged since 2015
Lithuania	19 200	Granted to sugar beets from 2017 onwards; unchanged since then
Poland	211 340	Unchanged since 2015
Romania	28 100	- 4% from 2015 to 2020
Slovakia	20 429	Unchanged since 2015
Spain	40 100	Unchanged since 2015
EU total	**507 669**	+ 2% from 2015 to 2020

Source: Areté elaboration on European Commission informative notes "Voluntary coupled support – Sectors mostly supported. Notification of decisions taken by Member States", years 2015, 2017

In the period 2015-2019, the overall amount of VCS for sugar beet has fluctuated around EUR 180 million per year. The total annual payment at EU level amounted to EUR 177 million in 2019, which is roughly unchanged since 2015 (only +4.4 % increase), i.e., 4.3% of the total VCS envelope or 0.4% of the Direct Payments in that year. Data on total payments for 2020 are still not consolidated, but substantial differences are unlikely. In 2019, the total payment at EU level was distributed among the Member States that decided to grant VCS to sugar beet as illustrated in Figure 3.1. Since 2015, total payments of individual Member States remained roughly unchanged, with the exception of Greece (+13.9%); Croatia (+36.2%), Italy (+31.5%), and Lithuania (which has granted VCS to sugar beet only since 2017).
In 2019, total VCS area under sugar beet in the EU amounted to 430 962 ha[4], which is well below the fixed number of (historical) hectares, namely 508 869 ha. The under-utilisation of the maximum reference area suggests that the difficulty in the sugar beet sector in the concerned Member States, due to which the aid is granted, apparently persists. Therefore, according to the support mechanism, the amount per hectare of sugar beet is proportionally higher than the prior estimate (as the envelope earmarked for the VCS is paid to fewer hectares than the fixed (historical) number). To explain this mechanism, the prior estimate for the unit amount (EUR/ha) is calculated on the basis of the envelope and the fixed (historical) number of hectares. However, the final amount per hectare is calculated on the basis of actual eligible sugar beet area. Therefore, as long as the actual support area remains below the (historical) number of hectares, the farmers get proportionally higher payments compared to the prior estimate. Table 3.2 below shows the actually paid unit amounts of VCS for sugar beet in all the relevant Member States from 2015 to 2019.

Figure 3.1 – Allocation by Member State of total VCS payments on sugar beet, 2019 (million EUR)



Source: Areté elaboration on data provided by European Commission.

Table 3.2- Unit amount of VCS per hectare of sugar beet (EUR), 2015 -2019*

MS	2015	2016	2017	2018	2019
Czechia	289	275	248	252	276
Greece	523	721	708	778	1 843
Spain	520	573	493	518	601
Spain	284	353	313	309	371
Finland	79	85	83	96	93
Croatia	201	204	148	234	329
Hungary	522	521	446	502	558
Italy**	442	514	433	487	741
Lithuania	-	-	80	93	104
Poland	502	454	358	345	343
Romania	784	783	797	804	817
Slovakia	370	374	357	365	374

* Actual payments
** Unit amounts for 2018 and 2019 are those reported by the Italian agency for payments in agriculture (AGEA)
Source: Areté elaboration on data provided by the European Commission.

[4] Areté calculation on data provided by the European Commission (total budget and unit amount in EUR/ha).

3.1.3 The EU sugar regime after the end of quotas

The 2017/18 sugar marketing year was the first after the termination of the EU sugar quota system. **With the end of quotas, there are no further limits to EU sugar production or exports**: EU sugar producers are now free to adjust their production to market demand, both within and outside the EU. After nearly 50 years of sugar quotas in the EU, this can definitely be considered as a radical policy change. To help the EU sugar sector to exploit the related opportunities, as well as to address the resulting challenges, a number of policy measures – both sector-specific and cross-sectoral – were maintained, and some new policy instruments were introduced.

The Common Organisation of the Markets (CMO) Regulation (Regulation (EU) No 1308/2013) regulates a number of **management instruments** to tackle difficult market situations in the agricultural sectors. While aid for private storage (see also § 3.1.2) is designed to be specifically available for sugar, some measures are provided in the CMO Regulation for all sectors, including sugar, and other measures are not available for the sugar sector (i.e., public intervention). These instruments are regulated by the following articles of the CMO Regulation: art.219 (Measures against market disturbance); art. 221 (Measures to resolve specific problems); art. 222 (Derogation from Article 101(1) TFEU (art. 222)). Given their potential roles to mitigate market risks, a complete description of these measures is provided under question 4 (§ 7.2).
The termination of the quota system, together with the overall evolution of the EU sugar regime in the framework of the WTO, have **exposed EU sugar producers and sugar beet growers to more serious risks**, mainly deriving from (but not limited to) the increased integration of the EU sugar market into the international one, and the consequent increased exposure of EU sugar producers and sugar beet growers to the remarkable volatility of international prices for sugar. A number of **risk management instruments** (albeit not specific to the sugar sector) are available in the framework of the CAP as a complement to direct payments and market safety net systems to support the EU farmers' income. Such instruments financially compensate farmers for unexpected and significant production/income losses, and are financed through the Rural Development Programmes (RDP) within the so-called "Second Pillar" of the CAP. The following risk management instruments are available for the 2014–2020 programming period: i) subsidised insurance contracts against yield losses; ii) financial support schemes based on mutual funds to compensate for production losses caused by adverse climatic, sanitary and environmental events; iii) the Income Stabilisation Tool (IST) and sector-specific ISTs, aimed at compensating severe drops in farm incomes. A description of these instruments is provided under question 4 (§ 7.2) while the status of Member States' implementation of these risk management instruments as well as their level of uptake by farmers is described under question 6 (§ 7.4).

As for **investments and other forms of supported granted at national level**, as a general rule, as stated in Article 107(1) of TFEU, State aid is not permitted in the EU as it is considered incompatible with fair competition and the internal market. However, according to Article 107(2) of TFEU, certain types of State aid are considered to be compatible with the internal market and have to be authorised by the Commission. This is notably the case with regard to State aid granted by a Member State in order to compensate damages caused by a natural disaster or an exceptional occurrence. Moreover, according to Article 107(3) of TFEU, certain other types of aid may be authorised by the Commission. This is notably the case for State aid to facilitate the development of certain economic activities or of certain economic areas. Therefore, the Treaty leaves room for granting State aid to achieve several policy objectives. As a general rule, in the cases where State aid rules do apply, Member States have to notify in advance to the European Commission their intentions to grant State aid, and wait for an authorisation. In relation to State aids to sugar producers, the database containing

notifications received by Member States has only one request of authorisation of State aid to build a sugar refinery located in Spain[5].

In the post-quota market and competitive environment, the **availability of reliable, up-to-date information on sugar prices and market fundamentals** has even higher importance, also with a view to improving market transparency. According to Commission Staff Document "Market transparency in the EU's food supply chain"[6], increasing market transparency in the food supply chain can result in: increased efficiency and a better functioning of the market; facilitated work of producer organisations; increased trust between operators; effective tackling of unfair trading practices and of asymmetries in bargaining power. In addition, in terms of risk management, market transparency can support better risk management in the agricultural sector through an increase in the availability, and in the better functioning, of insurance and mutual funds, as well as through the facilitation of new or improved contract types (e.g., future contracts), especially through price transparency.

The European Commission had already set up a reporting system of sugar prices in the EU market in the framework of the implementation of the 2006 reform of the sugar regime. With the end of production quotas, the Commission has further enhanced the existing information system for sugar, through - among others - the implementation of a new overarching system for data collection on the food supply chain at EU level also including a price reporting system for the three main regional markets within the EU. This system is established in the Implementing Regulation (EU) 2017/1185, adopted on 1 October 2019 and applying from 1 January 2021. The regulation covers the meat, eggs, dairy, fruit and vegetables, arable crops, sugar, and olive oil sectors. It builds on existing data collection systems and procedures, with a now wider scope, providing new information on the downstream stages of the food supply chain. Each EU Member State is responsible for collecting price and market data which are communicated to the Commission, who makes the information available on its agri-food data portal and EU market observatories.

The main elements of the new reporting system specific to the sugar sector (for both sugar and sugar beets) are briefly described in Box 3.2.

Box 3.2 – Information reporting system for sugar and sugar beets

Member States concerned by the new system of notification for sugar and sugar beet prices are those where, respectively: i) more than 10 000 tonnes of sugar is produced from sugar beet or from raw sugar; ii) with a planted area of more than 1 000 ha of sugar beet in the marketing year in question.

These Member States have to notify the following information on sugar prices and sugar beet prices (Annex II of Implementing Regulation (EU) 2017/1185):

a. **sugar selling prices** (bulk white sugar prices ex-factory for sugar of a standard quality), notified on a monthly basis; starting from January 1, 2021, also selling prices on invoices corresponding to short-term contracts have to be reported;
b. **sugar beet prices** (sugar beet of a standard quality containing 16 % of sugar): notified on annual basis (for the previous marketing year).

In addition, also the following **buying prices** are notified: retailers', food and non-food industry's (other than biofuel) representative buying prices of sugar and molasses, expressed per tonne of product.

[5] The EC decided not to raise any objections to the request, as the investment was deemed compatible with the internal market rules. The case is available at: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_55039

[6] SWD/2019/0360 (final), accompanying the document *Commission Implementing Regulation amending Implementing Regulation (EU) 2017/1185 laying down rules for the application of Regulations (EU) No 1307/2013 and (EU) No 1308/2013 of the European Parliament and of the Council as regards notifications to the Commission of information and documents.*

As regards production and market information (Annex III), the following information items are notified:

a. **sugar beet area** for the current marketing year and an estimate for the following marketing year, broken down by areas intended for production of sugar and those intended for production of bioethanol;
b. **sugar and molasses production and sugar use:** actual production of sugar and molasses (obtained from sugar), by single undertaking; estimate of the total sugar production in each Member State and by each undertaking; total quantities of sugar sold by sugar undertakings and refiners split between those sold for retail sales, to the food industry and to other industries excluding bioethanol;
c. **production of isoglucose;**
d. **stocks of sugar** and **isoglucose** respectively notified at the end of each month (sugar), and at the end of the previous marketing year (isoglucose);
e. contents of **agreements between growers and undertakings** and of collective value sharing clauses.

3.1.4 The evolution of the EU sugar regime at a glance

Table 3.3 provides a synoptic overview of the evolution of the key elements of the EU sugar regime between the 2006 reform and the termination of the quota system, thus summarising the content of § 3.1.1 to 3.1.3.

Table 3.3 – The evolution of the EU sugar regime from the 2006 reform to the end of quotas (MY = marketing year)

Key elements of the regime	**Before the 2006 reform** *(up to MY 2005/06)*	**After the 2006 reform** *(MY 2006/07 to 2016/17)*	**After the end of quotas** *(MY 2017/18 onwards)*
Guaranteed price system	Intervention price (IP): 631.90 €/T	Reference price (RP)*: 631.90 €/T (2006/07; 2007/08); 542.00 €/T (2008/09); 404.40 €/T (2009/10 onwards) Intervention price (IP) = 80% of RP of the following MY (up to 2009/10)	Reference price (RP)*: 404.40 €/T (2017/18 onwards)
Supply management measures	Quota system (A quota + B quota) "C" sugar: carry-forward to the next MY or export on the world market without refunds Market withdrawals: public intervention → national intervention agencies of sugar-producing Member States are required to purchase at intervention price any quantity of white and raw sugar produced under quota	Quota system (A and B quotas merged into a single "basic quota") Out-of-quota sugar: carry forward to the following campaign; specific industrial uses; supply of EU outermost regions; export within the quantitative limits set by the Commission in compliance with the WTO thresholds Public intervention only up to 2009/10 Aid for private storage Firms may be required to withdraw and store at their own expense until the beginning of the following MY a defined % of quota sugar to safeguard market balance	No quotas: producers can freely decide production and export volumes Aid for private storage Non-sector specific market management measures under the CMO Regulation
Import regime	Fixed import duty: 419.00 €/T for white sugar and 339.00 €/T for raw sugar (full third-country most favoured nation (MFN) duty) Additional variable duty: applied automatically if world market price is below a certain "trigger price" Tariff exemption or reduction for imports under certain regimes (ACP, LDCs/EBA, Balkans, CXL), with quantitative limitations	Fixed import duty: 419.00 €/T for white sugar and 339.00 €/T for raw sugar (full third-country most favoured nation (MFN) duty) Additional variable duty: applied automatically if world market price is below a certain "trigger price" Tariff exemption or reduction for imports under certain trade regimes: with (Balkans, CXL, other preferential agreements) or without quantitative limitations (ACP→EPA, LDCs/EBA)	Basically unchanged (except for a few additional preferential agreements, all with quantitative limitations)
Support to exports	Export refunds: granted to quota sugar and re-exports of ACP preferential imports WTO limitation to subsidised exports = 1 374 million T	Export refunds: granted to sugar up to 2007/08 WTO limitation to subsidised exports = 1 374 million T (this includes re-export of quantities corresponding to those imported from ACP countries and exports of out of quota sugar)	No support to exports

Key elements of the regime	**Before the 2006 reform** *(up to MY 2005/06)*	**After the 2006 reform** *(MY 2006/07 to 2016/17)*	**After the end of quotas** *(MY 2017/18 onwards)*
Crop-specific support for sugar beet cultivation	Minimum price for sugar beet (MPB): 46.72 €/T for A beet	Minimum price for sugar beet (MPB): From 32.86 €/T (2006/07) to 26.29 €/T (2009/10 to 2016/17) for in-quota beet Voluntary coupled support for sugar beet cultivation (support decision and implementation at national level) from 2015 onwards	No minimum price for sugar beet Voluntary coupled support for sugar beet cultivation (support decision and implementation at national level)
Contractual relations between sugar beet growers and sugar producers	Compulsory collective negotiations of beet prices → compulsory value-sharing clauses in inter-branch agreements reached in the sugar supply chain	Compulsory collective negotiations of beet prices → compulsory value-sharing clauses in inter-branch agreements reached in the sugar supply chain	Sugar beet purchase prices laid down in delivery contracts between individual beet sellers and each sugar producer → voluntary value-sharing clauses in the context of the agreements within the trade, between associations of farmers and associations of sugar producers

* Strictly speaking, the reference price is not a guaranteed price

3.2 The post-2020 Common Agricultural Policy

Sugar beet production in the EU takes place within the policy framework provided by the Common Agricultural Policy (CAP). On 1 June 2018, the European Commission presented legislative proposals on the CAP for the period 2021-27. However, due to quite lengthy negotiations between the European Parliament and the Council of the EU, the provisional start date of the recently agreed **CAP reform** has been pushed back to 1 January 2023.

In order to allow for continued payments to farmers and other CAP beneficiaries, a transitional regulation has been introduced for the years 2021 and 2022. During these years, funding will be drawn from the CAP's budget allocation for 2021-27, supplemented by an additional EUR 8 billion from the next generation EU recovery instrument (EURI) assigned to the European agricultural fund for rural development (EAFRD).

The transitional regulation will extend most of the CAP rules that were in place during the 2014-20 period, while also including new elements to make a stronger contribution to the **European Green Deal** and to ensure a smooth transition to the future framework of the **CAP strategic plans**.

The Commission anticipates that the transitional period should provide enough time for the European Parliament and the Council of the EU to agree on the legal framework of the future CAP. The period should also provide EU countries with sufficient time to design and prepare for the implementation of their respective CAP Strategic Plans, with the assistance of the Commission.

Part of the reason for the delay is the difficulty caused by the need for the new CAP to deliver on the objectives set out in the EU Green Deal (see § 3.3.3), which was developed after the legislative proposals for the new CAP. This iteration of CAP reform includes **the three key regulations for the CAP's Strategic Plans**, the **CMO Regulation** and the **policy's horizontal aspects**. The proposals aim to achieve nine specific objectives across economic, environmental and social policy spheres. The main elements of the Commission proposals on the new CAP that are of relevance to the sugar sector are:

- **Decoupled "income support"** in the form of an annual direct payment per eligible hectare. At the time of writing, it is not clear what form the modalities of decoupled support might take. However, the Commission's original proposal was for: a mandatory limit ("cap") at EUR 100 000 per farm holding; a progressive reduction of aid to larger beneficiaries (receiving EUR 60 000 to EUR 100 000 per year); a top-up of payments for smaller holdings; and, an equalisation of per hectare payment rates, across and within Member States, by 2026.
- Under pillar 2 (Rural Development), a whole series of **measures to support investments, cooperation, innovation, installation of young farmers, as well as risk management tools**. With the exception of risk management tools, which all Member States are obliged to include in their national plans, the other measures may be included on a voluntary basis. Some 15% of the direct payments envelope can be transferred to the Rural Development budget (i.e., from Pillar 1 to Pillar 2), and vice versa. These measures can be reasonably expected to exert a positive mitigating effect.
- A series of measures to support **practices beneficial to the environment and climate**, including greening measures and voluntary eco-schemes (the proposals stipulate that at least 40% of the CAP overall budget for 2021 to 2027 would contribute to climate action).
- New measures are envisaged under the **sectoral interventions** that cover, *inter alia*, the sugar sector. There are two models: (i) support to Producer

Organisations (PO) and Producer Groups (PG) on their way towards recognition as Producer Organisations; and, (ii) Member State intervention to support farmers and operators directly subject to eligibility criteria to be defined by the Member States. EU financial assistance can be provided to POs and PGs for up to 50% of expenditure (60% in five years after recognition) up to a ceiling of 6% of the value of marketed production.

The above interventions are to be implemented by a new delivery model that envisages National Strategic Plans to be drafted by Member States and approved by the European Commission. Member States are obliged to:

- set up farm advisory services that, *inter alia*, will inform farmers about subsidy-related requirements, conditions and the availability of support for innovation and technologies;
- report annually on the progress made in the implementation using a system of common indicators within a Common Monitoring and Evaluation Framework (CMEF).

The negotiators of the European Parliament, the Council and the European Commission agreed on the reform of the CAP on 25 June 2021. This provisional political agreement should lead to formal approval of the necessary legislation by the European Parliament and the Council in 2021. It remains unclear at the time of writing exactly which measures Member States will choose to implement in order to address the specific challenges outlined in their National Strategic Plans.

3.3 Other relevant EU policies

3.3.1 Quality standards

Annex III (Part B) of the CMO Regulation lays down **standard quality requirements** for **sugar beet**, **white sugar** and **raw sugar**. In addition, Council Directive 2001/111/EC of 20 December 2001 relating to certain sugars intended for human consumption (including semi-white sugar, sugar or white sugar, extra-white sugar) also covers - among others – product names and definitions according to quality standards (Annex to the Directive, Part A); methods of determining some quality parameters, like colour type, ash contents, etc. (Annex to the Directive, Part B); and the related derogations. Article 3 of Directive 2001/111/EC prohibits Member States from adopting national provisions not provided for by the Directive itself for the products defined in its Annex.

3.3.2 Nutrition policies and consumer's awareness

Farm to Fork Strategy notes that European diets are not in line with recommendations for a healthy diet and that obesity is rising with over half of the adult population currently overweight (Eurostat data), contributing to a high prevalence of diet-related diseases. To increase consumer awareness on nutrition and health and facilitate the shift towards healthier diets (also by encouraging food product reformulation), **Farm to Fork Strategy** envisages certain actions which *inter alia* target the consumption of sugar. These actions are to be mainly pursued through two existing policy instruments: i) **front of pack nutrition labelling** and ii) **nutrient profiles on foods bearing claims**. The key aspects of these instruments are respectively described at § 3.3.2.1 and § 3.3.2.2.

3.3.2.1 Front of pack nutrition labelling

As from December 2016, Regulation (EU) No 1169/2011[7] (the 'FIC Regulation') requires the vast majority of pre-packed foods to bear a nutrition declaration - including information on **sugar content** - often provided on the back of food packaging, with the aim to allow consumers to make informed and health-conscious choices. The Regulation also allows voluntary schemes to declare these mandatory elements through other presentation formats (e.g., graphical forms) on the front of the food packaging (so-called 'front of pack' or FOP labelling). In the absence of a FOP nutritional scheme that would be understandable and acceptable for all EU consumers, it was agreed at the time of adoption of the FIC Regulation (2011) that it should be **left to Member States** and food business operators to develop their own schemes, adapted to their consumers, provided they comply with certain criteria. The aim was to gather experiences on the functioning of the various schemes in Member States, in order to take a more informed decision on possible further harmonisation at a later stage.

Against this background, the FIC Regulation required the Commission to provide a report on the use and impact of the various schemes to determine whether further harmonisation would be advisable. The Report by the Commission (May 2020)[8] indicates that FOP labelling is increasingly seen as a tool to support strategies for the prevention of obesity and other diet-related non-communicable diseases; to date, several FOP schemes have been developed and implemented across the EU[9]. Thus, the Report concludes - in the context of the political priority of the Farm to Fork Strategy to put forward actions to help consumers choose healthy and sustainable diets, in particular to give consumers better information on the nutritional value of foods - that ***it seems appropriate to introduce a harmonised mandatory FOP nutrition labelling at EU-level***. In the Farm to Fork Strategy, the Commission announced its ambition to prepare for harmonised mandatory FOP nutrition labelling. Exactly how this will operate will be decided following an impact assessment which will include consultation with Member States and stakeholders, as well as scientific advice.

3.3.2.2 Nutrient profiles on foods bearing claims

Regulation (EC) No 1924/2006 on nutrition and health claims made on foods sets general principles and conditions for the use of claims which include compliance with so-called 'nutrient profiles' to be set by the Commission after consulting EFSA and stakeholders (particularly food business operators and consumers). In this context, the concept of 'nutrient profiles' refers to **maximum acceptable limits of nutrients such as fat, salt and/or sugars in foods bearing claims**. The aim is to restrict the use of claims on foods with a high content of fat, salt and/or sugars, thus avoiding a situation where the positive message of nutrition or health claims would mask the overall nutritional status of a food product, which could mislead consumers when trying to make healthy choices in the context of a balanced diet. Although nutrient profiles were envisaged to be set by 19 January 2009 (Article 4 of Regulation (EC) No 1924/2006), these have not been set to date.

[7] Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, OJ L 304, 22.11.2011, p. 18.

[8] Report from the Commission to the European Parliament and the Council regarding the use of additional forms of expression and presentation of the nutrition declaration. Brussels, 20.5.2020. COM(2020) 207 final. https://ec.europa.eu/food/sites/food/files/safety/docs/labelling-nutrition_fop-report-2020-207_en.pdf

[9] A comprehensive review of FOP nutrition labelling schemes across the EU was provided by the Joint Research Centre (JRC) in 2020. https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/front-pack-nutrition-labelling-schemes-comprehensive-review

According to the Commission's latest assessment of the situation (May 2020)[10], the specific objective pursued by the setting of nutrient profiles is still pertinent and necessary to meet the objective of the Claims Regulation, which is a high level of consumer protection. Therefore, the Commission concludes that the ***setting of nutrient profiles needs to be further considered***; and that this needs to be considered in parallel with the potential introduction of a harmonised mandatory FOP nutrition labelling at EU-level[11]. In the Farm to Fork Strategy, the Commission affirms its intention to set up nutrient profiles to restrict the promotion (via nutrition or health claims) of foods high in fat, sugars and salt.

Across the EU, Member States are currently taking various approaches (e.g., reformulation agreements, marketing restrictions of foods high in fat, salt and sugar, public procurement of healthy food, taxing sugary drinks) as part of their strategies on health promotion and disease prevention. The European Commission is supporting Member States in actions on healthy lifestyles and healthy eating through the implementation of the 2007 EU Strategy on Nutrition, Overweight and Obesity-related Health Issues, the 2011 EU Framework for National Initiatives on Selected Nutrients and the EU Action Plan on Childhood Obesity 2014-2020. Promoting healthy lifestyles is seen as key to allowing Member States to reach the Sustainable Development Goals by 2030 and the WHO targets on non-communicable diseases by 2025. Sugar is one of the nutrients being targeted by all these actions.

3.3.3 Environmental policies

The main environmental policies that impact on sugar beet production in the EU (currently and in the near future) are the Common Agricultural Policy and the EU Green Deal. There are also provisions outside this framework that regulate the use of agrochemicals in sugar beet cultivation (mainly pesticides).

3.3.3.1 The EU Green Deal

The European Commission published on 11 December 2019 the Communication on the 'European Green Deal' (COM (2019) 640), which launched the debate on the new EU sustainable growth strategy. While aiming to make the Union 'climate-neutral by 2050', the strategy emphasises that **sustainability and economic competitiveness** must go hand in hand. The Green Deal comprises several elements, of which the Farm to Fork strategy and the Biodiversity Strategy are key in this context.

3.3.3.2 The Farm to Fork Strategy

The central aim of the ***Farm to Fork strategy***, published on 20 May 2020, is to make food systems fair, healthy and environmentally-friendly. The key actions under the Farm to Fork strategy relevant to this study are to:

- reduce the use and risk of **chemical pesticides** by 50% by 2030;
- reduce the use of **more hazardous pesticides** by 50% by 2030;
- reduce **nutrient losses** by at least 50% while ensuring no deterioration on soil fertility;
- reduce **fertiliser** use by at least 20% by 2030

[10] Commission Staff Working Document: Evaluation of the Regulation (EC) No 1924/2006 on nutrition and health claims made on foods with regard to nutrient profiles and health claims made on plants and their preparations and of the general regulatory framework for their use in foods. Brussels, 20.5.2020, SWD(2020) 95 final. PART 1/2: https://ec.europa.eu/food/sites/food/files/safety/docs/labelling_nutrition-claims_swd_2020-95_part-1.pdf

[11] The Commission's work in both fields (nutrient profiles; FoP nutrition labelling) is based *inter alia* on the results of an external evaluation carried out by Agra CEAS Consulting.

- increase the area of EU farmland under **organic farming** to 25% by 2030

As noted above, these objectives are to be achieved via Member States' National Strategic Plans which will implement the CAP. The Farm to Fork strategy also envisages certain **actions targeting consumers**, including front-of-pack nutrition labelling; the extent to which these actions and other consumer-related policy initiatives may potentially affect the sugar sector is examined under question 13 (see § 8.4).

Amongst the above actions announced by the Farm to Fork strategy, the foreseen reduction in pesticide and fertiliser use (by 50% and 20% respectively, by 2030) are those that *a priori* may be expected to exert a **significant potential impact on the sugar sector**; the intended increase in organic production is likely to be of less significant impact given that, despite growing consumer demand, this remains a niche market for the sugar sector.[12] On this basis, the assessment focuses on the potential impact of these two specific themes:

a. pesticide use (with particular attention to neonicotinoids); and,
b. fertiliser use, including initiatives to reduce nutrient loss.

It is noted that certain crucial aspects of these actions are at present not known. Most crucially, the target percentage reductions are set at the EU level. Member States will translate the key targets into national objectives with their National Strategic Plans demonstrating how they plan to contribute to the EU ambition at the national level. When combined, the national initiatives should deliver against the EU objectives. The Commission will check National Strategic Plans to ensure that this is the case.

The Farm to Fork Strategy also contains support mechanisms which could benefit sugar beet producers. For example, the Strategy notes that, in addition to ***eco-schemes*** under the CAP's second pillar, farming practices which remove CO_2 from the atmosphere contribute to the climate neutrality objective and should be rewarded via payments for public goods under the CAP or through public and private initiatives such as ***carbon markets*** where farmers could be paid by private companies for certified carbon sequestration to offset emissions. Other potential additional income streams for farmers are the ***circular bio-based economy*** and the production of ***renewable energy***.

Even where the Farm to Fork Strategy contains measures which the industry assumes will have a negative impact on sugar beet producers, such as the target to reduce the use of pesticides,[13] there are measures such as ***enhanced provisions on integrated pest management*** which could mitigate this impact. These measures will include access to advice and the facilitation of the placing on the market of pesticides containing biological active substances. Funding may also be available under Horizon Europe to seek alternatives to plant protection products to prevent, detect and control diseases. The new CAP will also contain Knowledge Exchange provisions which can be used to help farmers manage decreases in the use of pesticides. The ***Action Plan for Organic Farming***, published on 25 March 2021, contains measures designed to stimulate demand and ensure consumer trust, as well as to stimulate conversion and reinforce the entire value chain.

Finally, the Farm to Fork Strategy will promote effective ***Agricultural Knowledge and Innovation Systems*** (AKIS) which will require Member States to scale up existing provisions to support the delivery of the Green Deal objectives and targets.

[12] According to CIBE data, only a minor share (0.6%) of EU sugar beet production is certified organic. At global scale, organic sugar cane production represents less than 1% of total sugar cane area.

[13] See for example, Lacoste (2021) EU 27 + UK sugar beet sector beset by production challenges in 2020/21. International Sugar Journal 3 Feb 2021; the role of neonicotinoids in sugar beet cultivation is set out in Hauer, *et al.* (2016).

3.3.3.3 The Biodiversity Strategy

Another key element of the Green Deal is the ***Biodiversity Strategy***. The Strategy, *inter alia*, specifically sets a target of 10% non-productive area. Again, certain crucial aspects of this target are at present not known. Furthermore, it is generally difficult to interpret the impact of a 10% cut in productive area, as this may affect a range of on farm activities, not just sugar cultivation – depending on farm activities and the structures of individual farms.

Again, implementation will take place through the National Strategic Plans, which Member States are expected to start drafting once the legislation has been adopted, i.e., clarity on the above key aspects is only likely to emerge beyond the time frame of the current project. There are important disparities between Member States in terms of the current measures in place, as well as the sugar sector's agronomic situation and economic viability.

The placing of plant protection products on the market

Before **plant protection products (PPPs)** can be placed on the market or used, they must be authorised in the Member State concerned. Regulation (EC) No 1107/2009[14] lays down the rules and procedures for the authorisation of PPPs. The dossiers to be submitted for the approval of active substances (at EU level)[15] and the authorisation of plant protection products (at Member State level) have to comply with the data requirements set under Commission Regulation (EU) 283/2013 and Commission Regulation (EU) 284/2013, respectively.

Article 53 of Regulation (EC) No 1107/2009 allows Member States to authorise the placing on the market of plant protection products, in special circumstances and derogating from the regular authorisation process, for a period not exceeding 120 days and for limited and controlled use, where such a measure is necessary because of a danger which cannot be contained by any other reasonable means. Member States are fully responsible for granting such emergency authorisations.

In 2013, five neonicotinoid insecticides were approved as active substances in the EU for the use in PPPs: clothianidin, imidacloprid, thiamethoxam, acetamiprid and thiacloprid. The same year, based on a risk assessment of the European Food Safety Authority (EFSA) in 2012, the Commission **severely restricted the use of PPPs** and treated seeds containing **three of these neonicotinoids** (clothianidin, imidacloprid and thiamethoxam) to protect honeybees (Regulation (EU) No 485/2013), while monitoring the possible effects of thiacloprid.[16]

During the period under review, some Member States have repeatedly requested ***emergency authorisations for the use of these neonicotinoids in sugar beet***. Following the final EFSA assessment and prohibition of all outdoor uses of the three neonicotinoids (imidacloprid, thiamethoxam and clothianidin),[17] and the non-renewal of approval of the fourth neonicotinoid (thiacloprid) on 3 February 2020, 10 Member States continued to grant emergency authorisations for their use in sugar beets. The Commission sent on 26 October 2020 a second mandate to EFSA, in accordance with Article 53(2) of Regulation (EC) No 1107/2009, to assess whether the emergency

[14] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC. OJ L 309, 24.11.2009, p. 1–50

[15] Active substances can only be approved for use in PPPs at EU level, if they fulfil the approval criteria that are laid down in Regulation (EC) No 1107/2009.

[16] For one of the five neonicotinoids (acetamiprid) EFSA has established a low risk to bees.

[17] EFSA carried out a risk assessment for these three active substances, the conclusions of which were published on the EFSA website on 28 February 2018. The Commission and the Member States have examined the EFSA conclusions and concluded in May 2018 that they confirm the already identified risks for outdoor uses. The approval of clothianidin, thiamethoxam and imidacloprid expired on 31 January 2019, 30 April 2019 and 1 December 2020, respectively.

authorisations granted for the above four neonicotinoids for the 2020 sugar beet growing season by these 10 Member States fulfil the conditions set out in Article 53(1) of the Regulation.[18] The Commission will update this mandate, if further such authorisations are granted by Member States during the time of this mandate. EFSA delivered the results of its assessment in October 2021, concluding that in all the 17 cases reviewed the emergency authorisations were justified[19].

3.3.4 Trade policy and international trade agreements

The EU sugar trade system is composed by a number of different arrangements which have basically remained unchanged in the transition from quota to post-quota period. The following provisions are currently in place:

- The EU grants **unlimited access at zero tariff** to the EU market to developing countries under the "Everything but arms" agreement (initiative for Least Developed Countries) and Economic Partnership Agreements (EPA).
- Under Tariff Rate Quotas (TRQ) resulting from agreements under WTO rules (so-called "CXL quota"), **reduced-duty access** for a limited volume of imported raw sugar is admitted. Imports under the CXL quota are subject to a duty of EUR 98 per tonne. Mainly beneficiaries of CXL quota are Brazil and Cuba.
- The EU has signed **trade deals with a number of third countries/blocs** that in some cases contain specific provisions on sugar Tariff Rate Quotas and can therefore have an impact on the EU sugar market.

Outside these schemes (i.e., for all other imports), the **Most Favoured Nation duties** apply, which amount to EUR 419 per tonne for white sugar, and EUR 339 per tonne for raw sugar.

In addition to the above-listed provisions, Commission Regulation (EC) No 951/2006 of 30 June 2006[20] laying down detailed rules for the implementation of Regulation (EU) 1308/2013 as regards trade with third countries in the sugar sector is also in place. This Regulation lays down the special detailed rules for the application of the system of import and export licences, the granting of export refunds (for some specific products) and the management of imports, in particular the application of additional import duties in the sugar sector.

3.4 Relevant national policies

3.4.1 Nutrition policies

The review of literature and the case studies identify a number of initiatives taken at national level within the national regulatory framework on nutrition policies that have implications for the sugar sector, as they are intended to limit sugar consumption (either direct consumption, or indirect through limit to consumption of sugar-based foods and drinks). These include: sugar taxes; nutrition labelling schemes; advertising to children;

[18] In particular, EFSA is asked to assess the justifications provided by the Member States (including in the original applications for the emergency authorisations and the full evaluations conducted by the Member States) that the authorisations are necessary due to a danger which cannot be contained by any reasonable means and to verify if a research programme is in place to find alternative solutions.

[19] https://www.efsa.europa.eu/en/news/neonicotinoids-efsa-assesses-emergency-uses-sugar-beet-202021?utm_source=EFSA+Newsletters&utm_campaign=c62093342c-EMAIL_ALERTS_NEWS&utm_medium=email&utm_term=0_7ea646dd1d-c62093342c-63949029

[20] Commission Regulation (EC) No 951/2006 of 30 June 2006 is applicable until the end of September 2021. From 1 October 2021, Regulation (EC) 2020/760 and Regulation (EC) 2020/761 will apply.

other relevant initiatives, such as reformulation strategies. Amongst the ten Member States covered by the case studies, only two (Austria and the Netherlands) do not have at present any such initiatives in place at national level.

Taxes on the sugar content of non-alcoholic beverages are the most widespread initiative, with such taxes in place in seven of the ten Member States: Belgium, Croatia, France, Italy, Poland, Portugal, and Catalonia (Spain). These taxes were largely introduced after a 2015 World Health Organization (WHO) report outlined the negative public health effects of sugar consumption and the need to take measures to limit sugar consumption (including through taxes).[21] Thus, these taxes were introduced since the reform of the sugar CMO, and in some cases they have recently been increased. It is noted that a high VAT rate is applied in some Member States for the same purpose, e.g., Portugal; in Spain, at present, the tax on sugar content in beverages is only at a regional level (introduced in Catalonia in 2017), but the country has recently (2021) increased the VAT rate on non-alcoholic beverages containing sugar/sweeteners.

The use of **front-of-pack (FoP) nutrition labelling** schemes on a **voluntary** basis is similarly expanding in several member States. Amongst them, the French Nutri-Score firstly introduced at national level in France, has now been endorsed by government policies in Belgium, Germany and is planned in Spain during 2021.

Finally, some Member States have in place initiatives aiming at restricting **advertising** of sugar-containing foods to children (France, Portugal), and/or other initiatives aiming at encouraging **reformulation** to reduce sugar content in processed foods and drinks (Germany, Portugal).

3.4.2 Environmental policies

Most of the national regulatory framework implements EU legislation with respect to the use of pesticides, targets for the production and use of bio-energy and the reduction of carbon emissions. However, there are cases of differences at the national level. For example, the outdoor use of neonicotinoids in sugar beet (imidacloprid, thiamethoxam and clothianidin) was banned at the EU level in May 2018, and an application to renew the approval of thiacloprid was rejected by the European Commission in January 2020 (see also § 3.3.3). However, several Member States have granted emergency authorisations for their use in sugar beets, including seven of the Member States covered by case studies (i.e., Austria, Belgium, Croatia, France, Germany, Poland and Spain).[22]

The sustainability of biofuels is set out in the Renewable Energy Directive,[23] while the Fuel Quality Directive[24] required a reduction in the greenhouse gas intensity of transport fuels by a minimum of 6% by 2020. Member States are obliged to ensure that suppliers respect the target of 6% after 2020. The use of biofuels in the EU varies among the different Member States, depending on how much each country chose to meet its targets for renewables in transport and for the reduction of greenhouse-gas intensity of fuels under the Fuel Quality Directive. Some Member States set an overall biofuels incorporation target; some others set separate targets for biofuels in petrol or diesel or both; others solely rely on targets for the reduction of carbon intensity in fuels.

[21] World Health Organization. (2017). Taxes on sugary drinks: Why do it?. World Health Organization. https://apps.who.int/iris/handle/10665/260253.

[22] https://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/ppp/pppeas/screen/home

[23] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN

[24] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0030&from=EN

4 INTERNATIONAL AND EU SUGAR MARKET

4.1 World and EU sugar markets

4.1.1 World sugar market[25]

Sugar from sugarcane accounts for around 75% of the world sugar production, while the remaining 25% derives from sugar beet. The world's 2020/21 **production** was approximately 179 million tonnes (Mio T henceforth for the sake of conciseness). The largest six sugar producing countries are Brazil, India, EU, China, the United States and Thailand, which account for nearly 65% of global output. Brazil is historically the world's largest sugar producer, surpassed by India only in the 2017/18 and 2018/19 marketing years.

The world's 2020/21 sugar **consumption** was approximately 182.1 Mio T. The largest sugar consuming countries are India, EU, China, Brazil and the United States. Around 40% of the world's sugar production is **traded**. Raw sugar accounts for almost 60% of internationally traded volumes. The world's 2020/21 sugar trade was approximately 70 Mio T (40.4 Mio T raw and 29.6 Mio T white sugar). The main exporting countries are Brazil, India and Thailand, which together export more than 50% of the total. The EU is historically a net importer of sugar; it assumed a role of net exporter only in the first marketing year following the quota abolition.

Around 30% of the world's sugar **stocks** are held by Brazil and India. Therefore, all the factors that impact on the aforementioned countries' willingness to export can quickly translate into supply shocks.

4.1.2 EU sugar market[26]

The EU is the largest beet sugar producer in the world[27], with a production of around 14.5 Mio T in 2020/21[28]. Most of the **production** comes from the northern part of the EU, where the climate is more suitable to sugar beet farming. Considering the last four marketing years average productions, the largest EU sugar producing countries are France (28%), Germany (25%), Poland (12%) and The Netherlands (6,5%).

When the production quota system was abolished (October 2017), the EU reached a record production of around 21 Mio T, which led in turn to a sharp drop in sugar prices that led farmers to reduce the extent of sugar beet area from the following marketing year. Sugar output dropped by around 17%. EU production continued to decline in the 2019/20 and 2020/21 marketing years, the negative trend being further supported by drought and by the beet yellow virus that affected EU beet crops, and France in particular, since 2020.

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[25] This section refers mainly to F.O. Licht data available on https://statistics.fo-licht.com/. Sugar data are expressed in raw value (October to September marketing years).

[26] This section refers mainly to EU Commission data and forecasts available on https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/markets/overviews/market-observatories/sugar_en, on https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/markets/outlook/short-term_it and on EUROSTAT. Sugar data are expressed in white sugar equivalent. Data from 13/14 marketing year (MY) to 19/20 MY refer to EU27+UK; data for 20/21 MY refer to EU27 (October to September marketing years). Data for the 2020/21 MY are provisional.

[27] A limited production of cane sugar is obtained in the French overseas departments.

[28] The data for the 20/21 MY does not consider the UK production (approximately 0.9 Mio T).

With regards to sugar **consumption**, the EU is the second world consumer after India. The strengthening trend in lower sugar consumption[29] registered during the last years has been partially offset by the increase in population. In the last two marketing years, the EU consumption suffered from the COVID-19 pandemic and sharply decreased. The EU sugar 2020/21 consumption (including both human and industrial use[30]) was approximately 16.3 Mio T.

Despite the EU accounts for almost 10% of the global sugar output, it has always been a **net importer** of sugar since the 2006 reform of the sugar regime. The only exception was the 2017/18 marketing year (i.e., the one immediately after the end of quotas), when the EU became a net exporter of sugar with a net export of around 2 Mio T. The EU, with decreasing production in the three marketing years following the 207/18 one, went back to its imports need. In 2020/21 the net export was approximately -0.7 Mio T.

EU imports sugar (mostly obtained from cane) mainly under preferential trade regimes for least-developed countries. In the 2020/21 marketing year the EU sugar **import** was approximately 1.5 Mio T.

The EU sugar 2020/21 **export** was approximately 0.8 Mio T. In the 2017/18 marketing year, due to a record high production, the EU reached a record level of export of around 3.4 Mio T. EU sugar exports are traditionally almost exclusively refined sugar to North-African and Middle Eastern countries.

4.1.2.1 Sugar beet farming in the EU

Leaving aside the changes deriving from the accession of Croatia to the EU and from the Brexit, i.e., including Croatia also in the 2007-2012 period, and excluding the United Kingdom over the entire 2007-2020 period (the term "current EU-27" will be used henceforth to refer to this group of Member States), the **structure and output of the EU sugar beet farming sector** as a whole has **remained rather stable since the 2006 reform**. Indeed, the total area under sugar beet in the current EU-27 has experienced only a modest increase over 2007-2020[31] (+3%); the increase in total sugar beet production in the current EU-27 over the same period has been just slightly higher (+8%). The main effect of the 2006 reform has instead been a **remarkable redistribution of sugar beet areas and production within the current EU-27**.

Most of the leading sugar beet producing Member States (France, Belgium, the Netherlands, Germany) often achieve **beet yields** beyond 70 tonnes/ha (sometimes even approaching the 100 tonnes/ha mark in France and The Netherlands); yields tend to be lower in Poland and Czech Republic (55-65 tonnes/ha) Among the "minor" producers, Spain often achieves yields of 80-90 tonnes/ha (mainly thanks to systematic irrigation); by contrast, sugar beet yields in Romania and Finland are often lower than 40 tonnes/ha. Sugar beet yields in the EU generally vary in the range of +/-10% around the medium-term historical average. **Sucrose content - measured as polarisation - of sugar beets** harvested in the EU generally varies between 17% and 18% in most Member States and is often above 17% in Spain and Austria. By contrast, it only rarely goes beyond 16% in Italy and (especially) Croatia, and can fall below 13% in Italy, mostly due to pest attacks and loss of leaf apparatus due to drought and extreme heat (see also the reply to question 3 at § 7.1 for details). Among the leading sugar beet producing Member States, **yields in sugar per hectare** are very often above 11 tonnes/ha in France, Germany, the Netherlands and Belgium (yields above 13 tonnes/ha are rather frequent in the Netherlands). Poland has significantly lower

[29] Mainly connected to consumers and health authorities' pressure to reduce sugar food content and to sugar taxes.

[30] Human use includes net exports in processed products; industrial use includes bioethanol production.

[31] In terms of comparison between the 3-year average 2018-20 and the 3-year average 2007-09. The analysis presented here is based on the elaboration of Eurostat data (APRO_CPSH1 dataset).

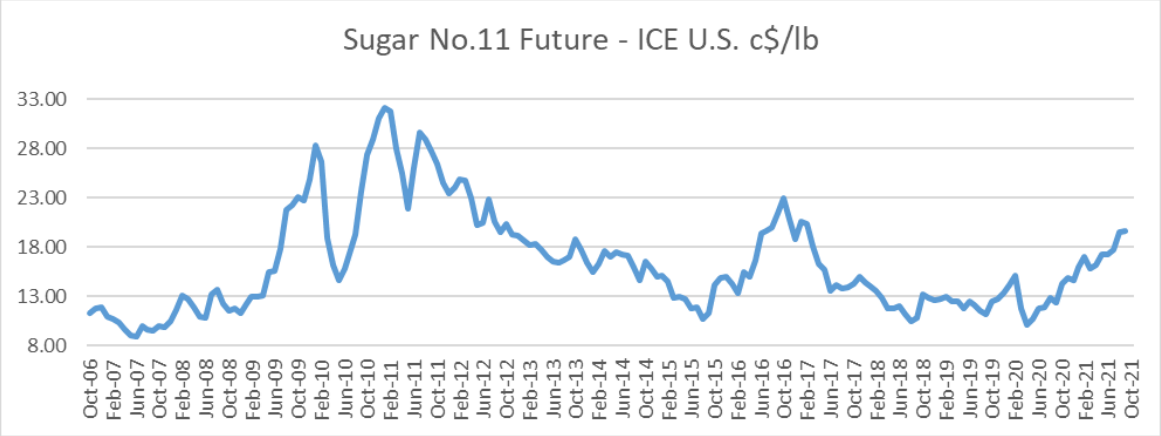
yields (floating around 9 tonnes/ha). Spain often reaches yields of 13 tonnes/ha or more, whereas Croatia and Italy have much lower yields (often below 7 tonnes of sugar per hectare).

4.2 World and EU sugar prices

4.2.1 International prices

The Sugar No. 11 contract is the world benchmark contract for raw sugar trading (Figure 4.1). The contract prices the physical delivery of raw cane sugar, free-on-board the receiver's vessel to a port within the country of origin of the sugar.

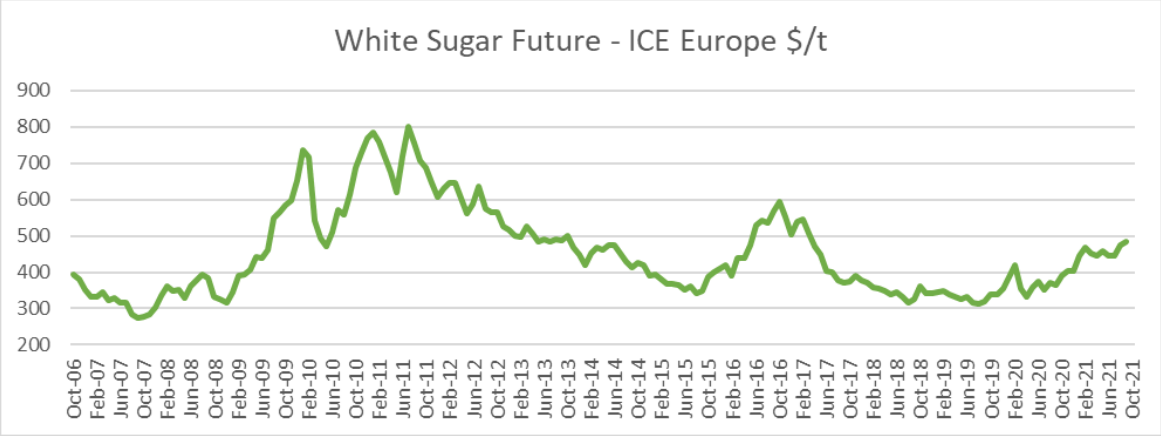
Figure 4.1 – ICE FUTURES U.S. – Sugar No. 11 Futures, 2006/07 to 2020/21



Source: THE ICE

The White Sugar futures contract, also known as London No 5 (Figure 4.2) is used as the global benchmark for the pricing of physical white sugar. It is actively traded by the international sugar trade, sugar millers, refiners, and end-users (manufacturers) as well as by managed funds and both institutional and short-term investors.

Figure 4.2 – ICE FUTURES EUROPE – White Sugar Futures, 2006/07 to 2020/21



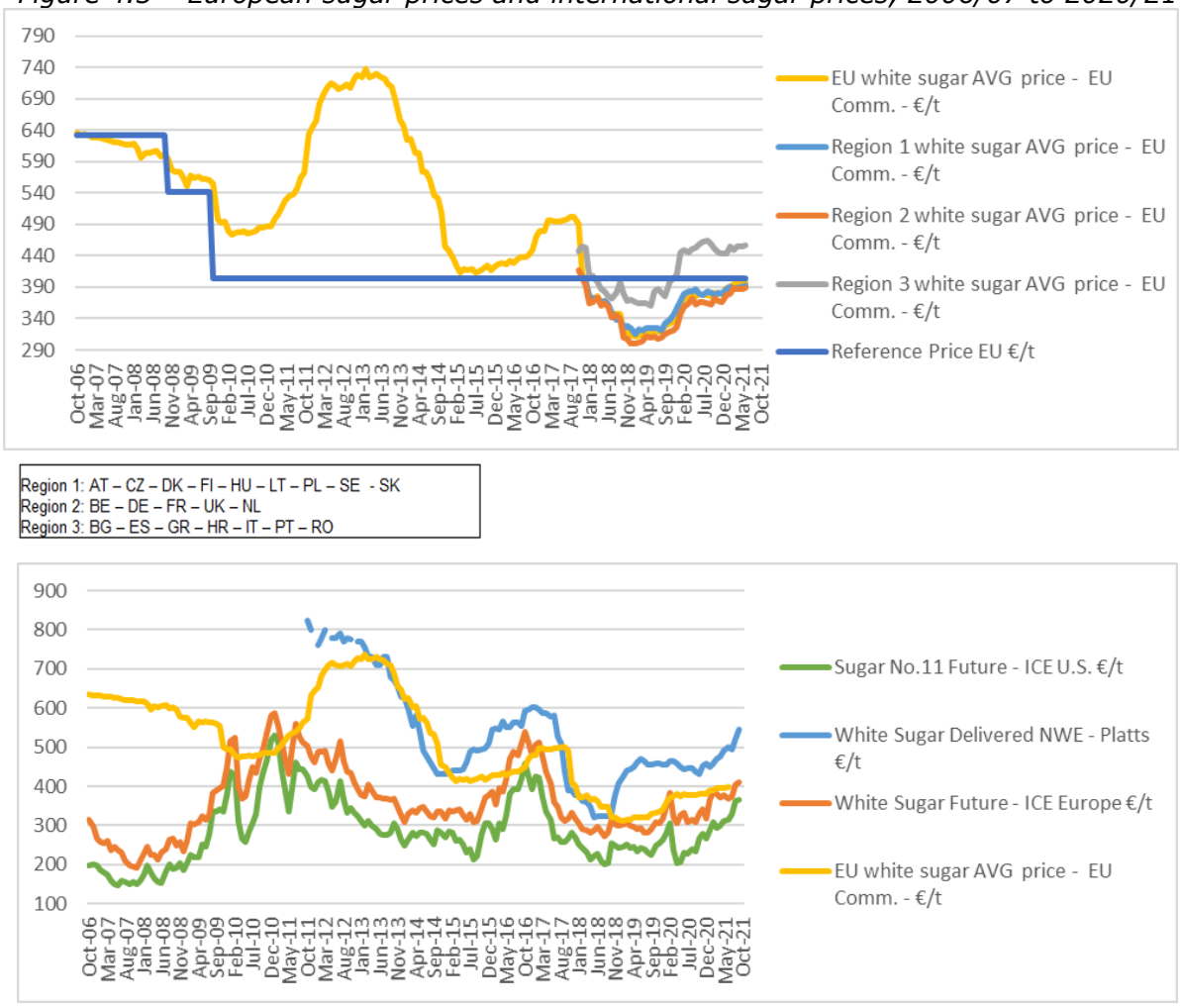
Source: THE ICE

The average prices for white sugar within the community published by the Commission (Figure 4.3) represent the references for the internal market (i.e., the ex-works prices for homogeneous granulated crystal, standard quality, in bulk or big bags).

Region 2 and region 1 prices are lower than region 3 prices because are made by countries with a higher level of self-sufficiency (i.e., less dependent on the import

market). Therefore, region 3 prices include higher logistics and transportation costs. So, in other words, region 3 prices are higher than region 1 and region 2 prices due to the region 3's larger sugar deficit.

Figure 4.3 – European sugar prices and international sugar prices, 2006/07 to 2020/21



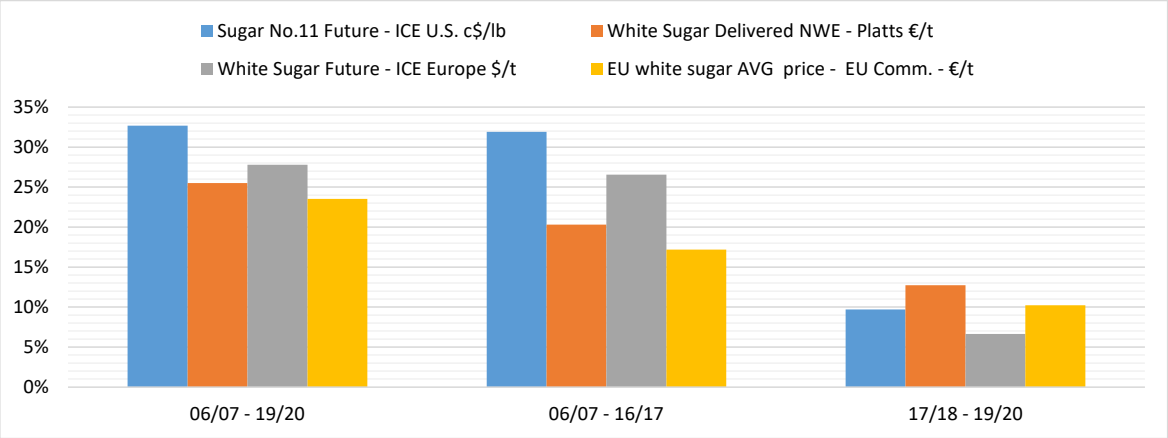
Source: THE ICE, Sugar Market Observatory / EU Commission, Platts

It is important to note that these prices are average prices based on all contracts delivered in a certain month (including forward contracts, e.g., the price given for March 2020 is the average of all sugar deliveries to customers in March 2020, irrespective of whether the contract was sealed two weeks earlier or 12 months earlier): as a consequence, price levels reported by DG AGRI Sugar Market Observatory often do not reflect prices on the spot market. This is why the Commission prices can differ from prices assessed by private companies like Platts.

4.3 Market Fundamentals and prices relation

Supply and demand shocks are one of the main determinants of sugar prices volatility (Figure 4.4). Sugar market fundamentals play indeed a key role in the behaviour of international sugar prices.

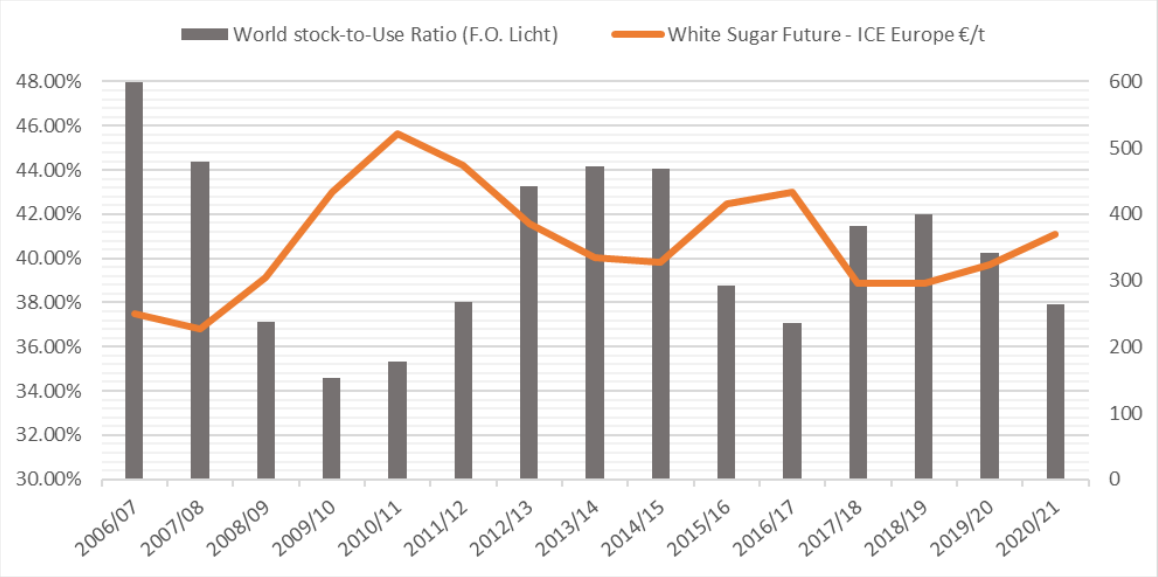
Figure 4.4 – Sugar prices volatility as coefficient of variation



Source: elaboration on THE ICE, Sugar Market Observatory / EU Commission and Platts data

As the global **stock-to-use ratio** (i.e., the level of sugar stocks as a share of total sugar use) increases, the international sugar price decreases and vice versa (Figure 4.5). As a matter of fact, the international sugar price always achieved its highest average levels after a period in which the stock-to-use ratio had decreased.

Figure 4.5 – Stock-to-use ratio and international sugar price

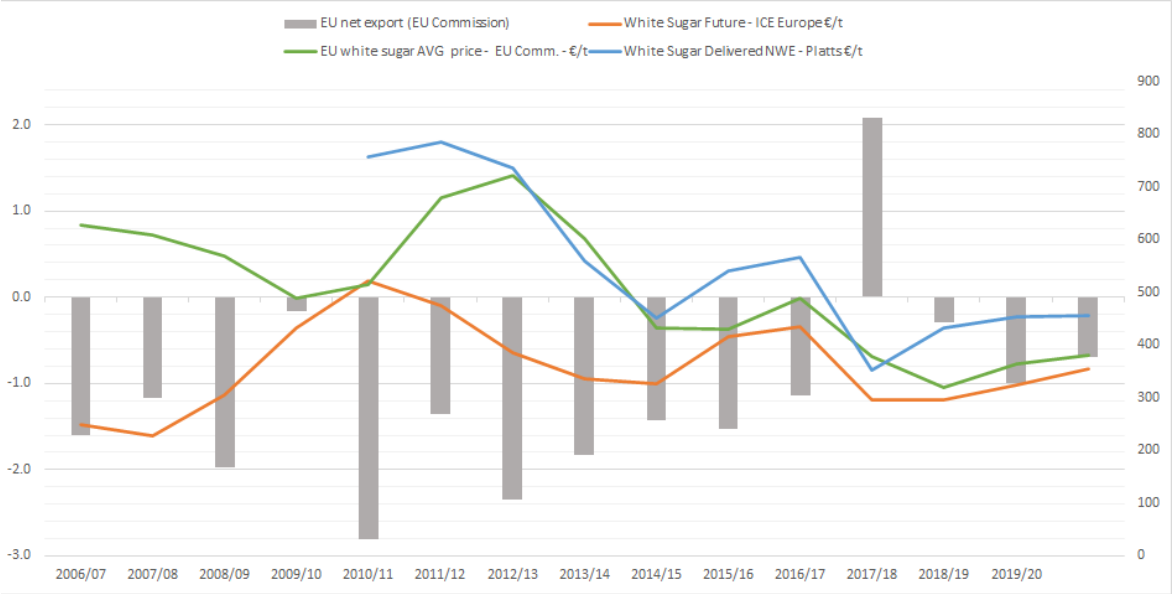


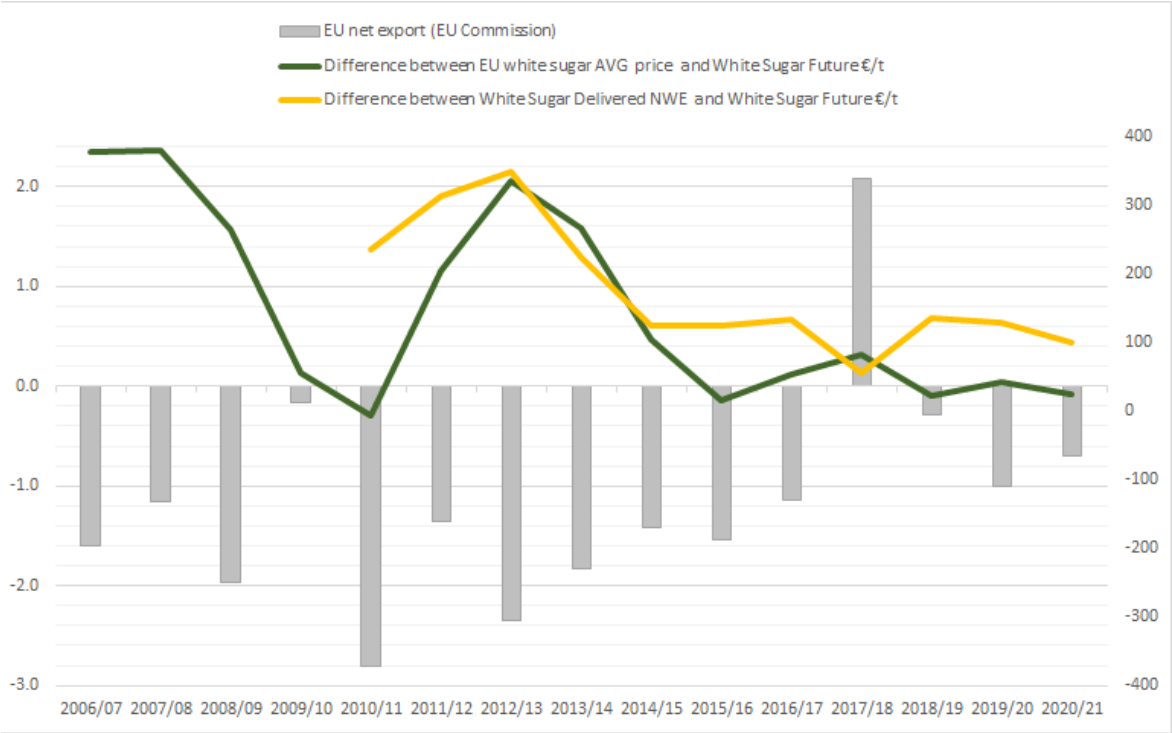
Source: elaboration on THE ICE and F.O. Licht – IHS Markit data

Outside the EU, most of the global sugar output is currently produced in Brazil and India that, together with Thailand, are also among the leading global exporters. Despite the EU accounts for almost 10% of the global sugar output, it has always been a net importer of sugar since the 2006 reform of the sugar regime. The only exception was the 2017/18 marketing year (i.e., the one immediately after the end of quotas), when the EU became a net exporter of sugar.

The EU sugar regime, and in particular its import regulation component is the **main determinant of the existing spread between the international and the EU sugar prices**, i.e., the so-called "basis". In general terms, the higher is the EU sugar import dependency, the higher is the basis between international and EU sugar prices (Figure 4.6 and Table 4.1). As a matter of fact, when the EU is not self-sufficient for sugar, domestic prices tend towards the so-called "import parity" (international sugar price + logistics + market disturbances, mainly import duties), and the gap versus the so-called "export parity" (international sugar price + logistics) increases. This implies that as the EU import dependency decreases, the EU price premium vs. international price decreases, albeit with a certain lag.

Figure 4.6 – EU net sugar exports and relevant sugar prices (upper graph); EU net sugar exports* and relevant price differentials (lower graph)*





* net exports in million tonnes – left axis

Source: elaboration on THE ICE (white sugar future), EU Commission / Sugar Market Observatory (white sugar avg. price) and Short-term outlook (net exports), and Platts data (white sugar delivered North-Western Europe - NWE).

Table 4.1 – EU market fundamentals; EU and international sugar prices (2006/07 to 2020/21)*

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Beginning Stock	6.7	3.1	2.9	2.0	1.6	1.2	2.4	3.2	2.6	4.0	1.9	2.2	2.4	1.8	2.2
Sugar beet production (million tonnes)	**112.1**	**116.0**	**103.6**	**115.0**	**105.2**	**125.0**	**114.1**	**109.0**	**131.0**	**101.9**	**112.4**	**143.1**	**119.6**	**113.1**	**100.0**
Sugar beet yield (t/ha)	**59.1**	**63.1**	**67.1**	**71.5**	**65.3**	**76.0**	**69.0**	**69.1**	**80.3**	**71.7**	**75.0**	**81.5**	**68.9**	**73.8**	**68.0**
Sugar production	**17.0**	**17.3**	**15.5**	**17.7**	**15.7**	**19.0**	**17.5**	**16.8**	**19.5**	**14.9**	**16.8**	**21.3**	**17.6**	**17.5**	**14.5**
Sugar quota	17.7	16.3	13.5	13.3	13.5	13.5	13.5	13.5	13.5	13.5	13.5	0.0	0.0	0.0	0.0
Consumption	**22.2**	**18.7**	**18.4**	**18.3**	**18.8**	**19.1**	**19.1**	**19.2**	**19.5**	**18.6**	**17.7**	**19.0**	**18.5**	**18.0**	**16.3**
Imports	**2.9**	**2.6**	**3.0**	**2.3**	**3.5**	**3.4**	**3.7**	**3.2**	**2.8**	**2.9**	**2.5**	**1.3**	**1.9**	**1.8**	**1.5**
Exports	**1.3**	**1.4**	**1.0**	**2.2**	**0.7**	**2.1**	**1.3**	**1.4**	**1.4**	**1.4**	**1.3**	**3.4**	**1.6**	**0.8**	**0.8**
Ending stocks*	3.1	2.9	2.0	1.6	1.2	2.4	3.2	2.6	4.0	1.9	2.2	2.4	1.8	2.4	1.1
EU net export (1,000 t) (EU Commission)	-1 600	-1 164	-1 969	-159	-2 813	-1 355	-2 352	-1 827	-1 422	-1 532	-1 141	2 074	-292	-1 000	-700
EU white sugar AVG price - EU Comm. - €/t	628	608	568	488	515	679	722	602	432	430	488	380	319	365	380
White Sugar Future - ICE Europe €/t	250	227	305	432	522	474	386	335	328	415	434	296	296	323	355
White Sugar Delivered NWE - Platts €/t					757	787	736	560	452	541	567	352	432	453	456
Difference between EU white sugar AVG price and White Sugar Future €/t	378	381	264	56	-7	205	337	267	105	15	54	83	22	41	25
Difference between White Sugar Delivered NWE and White Sugar Future €/t					235	313	350	225	124	126	133	55	135	129	101

* million tonnes, white sugar equivalent, except where otherwise noted

Source: elaboration on EU Commission, LIFFE, Platts and F.O. Licht – IHS Markit data

When the EU sugar price monitoring system set up in the framework of the 2006 reform started to operate, the EU sugar market was still mostly isolated from the international sugar market; as a consequence, the **EU sugar price was remarkably higher than international sugar prices**. The progressive opening of the EU sugar market to imports (especially from LDCs, ACP and Balkan countries), together with some years of substantial domestic production (especially in 2009/10), started an initial convergence process, which seemed to be fully completed in the 2010-2011 period. However, starting from 2012, the EU sugar price started to rise again, clearly diverging from price trends on the international sugar market, mainly due to a drop in domestic production and the consequent increased dependence on imports. The following price decline in 2014, mainly deriving from increased domestic production (also fuelled by the expansion strategies of the leading EU sugar producers in view of the end of the quota system) and an improved net sugar trade position of the EU, re-started a convergence process towards international sugar prices, and brought the EU sugar price close to the reference price (404.40 Euros) between 2015 and 2016. From 2015 onwards, the EU price seems to follow more closely (albeit with a certain lag) the dynamics of international prices: in general terms, the better the EU net sugar trade position, the closer the alignment between EU prices and international sugar prices.

The **termination of the quota system has resulted in a further decline of EU sugar price**. EU sugar producers were left free to decide their production plans based on foreseen market conditions and their own competitive strategies. Some of the more cost-efficient producers had already opted for expansion strategies, encouraged by still remunerative domestic and international sugar prices, by the fact that farmers had generally accepted lower prices for their sugar beets and/or a bigger share of market risks, and by the expectation that fixed production costs would fall substantially through a better utilisation of capacity (i.e., longer processing campaigns). An increase of the EU sugar production after the end of the production quotas was therefore generally anticipated, but the sharp growth in production in the 2017/2018 marketing year – also due to exceptionally favourable climatic conditions - exceeded expectations. The resulting surge in EU sugar exports brought along a closer alignment between the EU and the world market, characterised at the time by a global surplus and a lengthy price decline that had started in early 2017. The outcome of this combination of factors was a steady decline of the EU average sugar price, that **reached an unprecedented low of 312 Euros per tonne in January 2019** (this COM price does not reflect the "market price" in January 2019, but the price level contracted for January 2019 in previous years as well). At the time the contracts for sugar deliveries in January 2019 were agreed, sentiment was still dominated by the huge 2017/18 crop and so producers were ready to sell at very low prices. In January 2019, however, buyers with spot demand for sugar needed to pay more than 400 Euros per tonne ex-factory, as the 2018/19 harvest eventually turned out to be much lower than initially estimated. The basis between EU prices and international prices slowly started to increase again since the 2019/20 marketing year, due to the Union switching back to its usual net importer status. The average price for white sugar on the EU market is now slightly above the reference price: the latest available report by the Commission's Sugar Market Observatory sets the average price for white sugar at 408 Euros/tonne[32] (September 2021). Further to that, recent forecasts see a tighter sugar supply balance at global level for the 2021/22 marketing year compared to 2020/21[33].

[32] The reference threshold of EUR 404.4 per tonne is fixed under Article 1a of Regulation (EU) No 1370/2013.

[33] According to F.O. Licht data, the 2021/22 global ending stock-to-use ratio is forecast at 36.79%, compared to a 2020/21 ratio at 37.91%.

5 THE EU SUGAR INDUSTRY

5.1 The business model of the EU sugar industry

5.1.1 Beet sugar business model

The analysis of the available evidence and inputs from sectoral stakeholders allowed to define the EU beet sugar sector business model.

Beet sugar production is a **highly capital-intensive** operation. Beet sugar factories need substantial sugar beet processing capacity, due to the relatively low sugar content of sugar beets, which translates into high raw material intensity (at least 6 tonnes of sugar beets are needed to produce one tonne of sugar), to their perishability (they must be processed as soon as possible after harvest) and to the fact that the period over which harvesting can be made is relatively short (3 to 4 months). This implies that processing capacity in a beet sugar factory has to be 3 to 4 times larger than in a year-round running operation. Due to the limited production period (3-4 months to produce the volume of sugar consumed over an entire marketing year) both high storage capacities and substantial stocks are needed. Since sugar beet yields generally vary in the range of +/-10% around the medium-term historical average (see § 4.1.2.1), "reserve" processing capacity to deal with above-average sugar beet crops needs to be in place. In addition to that, sugar beet processing benefits from scale economies at plant level (at least to the extent that these are outweighed by increased logistic costs for collecting sugar beets from too wide catchment areas). This implies that beet sugar producers need substantial financial resources to invest in the construction, maintenance and upgrade of high-capacity production facilities and to finance the working capital. Besides that, in order to lower fixed unit costs, it is particularly critical for beet sugar factories to run at full capacity: this translates into the need to secure adequate supply of sugar beets by offering growers attractive enough sugar beet prices (taking into account competition from other crops). Due to the already mentioned high raw material intensity, it is generally unsustainable from an economic (and environmental) viewpoint to transport beets over distances of more than 100 km, making it also important to secure the availability of an adequate supply of beets as close as possible to the factory. In terms of raw material procurement, beet sugar production is a **regional business, relying on farmers located close enough to sugar factories as natural partners**. It should also be noted that whereas farmers can opt for alternative crops, beet sugar producers can process sugar beets only in their factories. This makes their business model inflexible compared to farmers.

Beet sugar production is characterised by a **quite long production and marketing cycle**. The period between the contracting of sugar beet areas with growers, and the sale of the last tonne of sugar derived from their sugar beet production, may easily reach 30 months. Typically, sugar beet supply contracts are offered to farmers during summer or autumn at the latest in year 1. Beet sowing takes place in the autumn of year 1 (southernmost cultivation areas) or in the late winter/early spring of year 2. Beets are harvested and processed in the summer/autumn of year 2, and the resulting sugar production is sold until the end of the following marketing year (September of year 3) or even beyond. The length of the production and marketing cycle makes business decisions and planning of production and marketing in the sector extremely challenging, and makes it almost impossible for sugar beet farmers and beet sugar producers to forecast the future evolution of the various drivers of competitiveness, and consequently to adjust in due time to their variability/volatility, which is often significant.

It should also be noted that a considerable part of EU beet sugar production is marketed through **annual (but also multi-annual) contracts with customers (especially industrial users)**: this further increases the inflexibility of the business model described above. Most contract negotiations take place over a relatively short period of

time (from June to September of year 2, just before the beet processing campaign starts). At that time, beet sugar producers have already signed contracts with growers: general beet pricing conditions have hence already been set (in the summer/autumn of year 1), but sugar producers still have no clue about the final sugar output, since sugar beet yields may still vary a lot till harvest, mainly due to climate conditions and pests. This implies that price levels set in annual or multi-annual fixed-price sugar supply contracts may not be in line with the actual market dynamics of the following months/years, and may weigh on the profitability of beet sugar producers. On the other hand, the set prices may also be rewarding in case the actual market dynamics worsen after the price has been set.

In synthesis, the **beet sugar business model is capital-intensive, highly regional** and **long-term oriented**. As a consequence, the economic sustainability of the model is highly dependent on a **stable framework** and on a **predictable enough evolution of the relevant drivers**, and, by contrast, **extremely vulnerable to sudden changes (volatility) and unpredictability**, i.e., to **risks and prospective threats**. This implies that **resilience** (i.e., the ability of producers to absorb the impact of the failure of one or more components of their business model, or a significant disturbance in the business environment, and to still continue to provide an acceptable level of service/performance) and the **availability of adequate risk management solutions** (aimed at preventing the occurrence of risks or at reducing their impact) have critical importance for the economic sustainability of the beet sugar business model.

5.1.2 Cane sugar refining business model

The analysis of the available evidence and inputs from sectoral stakeholders allowed to define the main **similarities and differences** of the **cane sugar refining business model vis-à-vis the beet sugar's one**.

Like beet sugar production, raw cane sugar refining is a **capital-intensive activity**, mainly due to the significant scale economies (lower unit costs) that can be achieved at plant level. Similar to beet sugar, full utilisation of refining capacity is important to lower the substantial fixed component of unit production cost: this reduces the room for adapting to unfavourable market conditions by simply reducing the utilisation rate of refining capacity. By contrast, the raw material intensity is definitely lower than for beet sugar (around 1.1 tonnes of raw cane sugar are needed to produce one tonne of refined sugar). Furthermore, differently from beet sugar factories, refineries can source raw sugar globally, or in any case from raw cane sugar producing countries located at a great distance. This ensures greater flexibility in switching from one supplier to another, even though EU-based refiners have significant constraints in that respect (mainly policy-related ones deriving from the EU regime regulating raw sugar imports from third countries; see § 3.3.4 and ESRA, 2017 and 2019). In terms of raw material procurement, raw cane sugar refining is a **global business**, not a regional one.

The economic sustainability of the refined cane sugar business model greatly depends on the extent of the so-called "**white sugar premium**" (ISO, 2021). Traditionally, the white sugar premium is calculated as the arithmetic difference between the front month of the London (LIFFE White Sugar No. 5) and New York (ICE Raw Sugar No. 11) sugar futures contracts[34].

The timing of the refined cane sugar production and marketing cycle is substantially different than the beet sugar's one. Raw cane sugar procurement, processing (refining into white sugar) and marketing take place **year-round** and, at least theoretically, a

[34] Whilst the London contract has five settlement months: March, May, August, October and December; New York has four: March, May, July and October. The nominal white sugar premium is not a perfect representation of the actual return for the refinery, as it does not consider the premiums/discounts offered for physical delivery, nor other costs such as freight, polarisation premiums, processing losses, bagging costs and other operational expenses. Nevertheless, it is a commonly used benchmark (ISO, 2021).

refinery can basically work without interruptions (except those needed for maintenance and upgrading of facilities). The timing that elapses from the bargaining of a raw cane sugar shipment to the sale of the final tonne of white sugar obtained from it can greatly vary based on a combination of factors (raw sugar availability for shipping, timing of transportation from the raw sugar mill to the refinery, and conditions on the refined sugar market), but is surely much shorter than for beet sugar. Together with a more flexible raw material procurement pattern, this reduces the need for substantial storage capacity of both raw and white sugar. Similar to beet sugar, a considerable part of EU refined cane sugar production is marketed through **annual (but also multi-annual) contracts with customers (especially industrial users)**: this adds some rigidity to an otherwise rather flexible business model.

In synthesis, the **refined cane sugar business model is capital-intensive, global** and **medium-to-long-term oriented** (mainly as a consequence of capital intensity, since the production and marketing cycle is shorter than for beet sugar). It hence benefits from a **stable framework** and a **predictable enough evolution of the relevant drivers**, even though it is slightly **less vulnerable to change and unpredictability**, i.e., to **risks and prospective threats**, than the beet sugar sector, due to somewhat higher flexibility in raw material procurement and production. Indeed, the sector is traditionally more exposed to price volatility in the raw material market (raw cane sugar; see § 4.2) and in the product market (refined sugar), which translate into threats, but also business opportunities, through the variable extent of the "white sugar premium".

5.2 The structure of the EU sugar industry

5.2.1 Structural features of the EU sugar industry

From a technical standpoint, three distinct sectors can be distinguished in the EU sugar industry, i.e., the beet sugar sector, the cane sugar sector and the sugar refining sector. From an economic standpoint, however, the boundaries among these three sectors are blurred, because several EU sugar producers (and the leading ones in particular) are active in two of those sectors, or even in all the three ones. For these reasons, it is sensible to analyse in the first place the cross-sectoral structural features of the industry, and then to focus on the specificities of each sector.

5.2.1.1 Structural features of the EU sugar industry as a whole

As extensively discussed in literature[35], the reform of the EU sugar regime in 2006 and further policy instruments (see § 3.1) promoted a radical restructuring of the EU sugar industry. EU sugar producers were offered incentives to renounce production quotas; purchases of additional quotas were also possible, albeit at a high cost (one-off payment of 730 Euros/tonne). Incentives to quota renunciation, combined with other measures aimed at reducing domestic sugar production, had quite straightforward implications on the possibility for sugar producers to pursue scale economies, putting additional emphasis on external growth and rationalisation of production capacity via mergers and acquisition of additional quotas (associated or not to additional production capacity) and/or of competing firms. This in turn implied:

- a more severe selection process of viable sugar producers, based on high-level cost-effectiveness in sugar production;
- increased concentration in the EU sugar sector, from a technical (number of processing plants and average processing capacity) and economic (number of sugar companies and average production quota per company) standpoint.

[35] See for instance High Level Group on Sugar (2019) and Areté (2012).

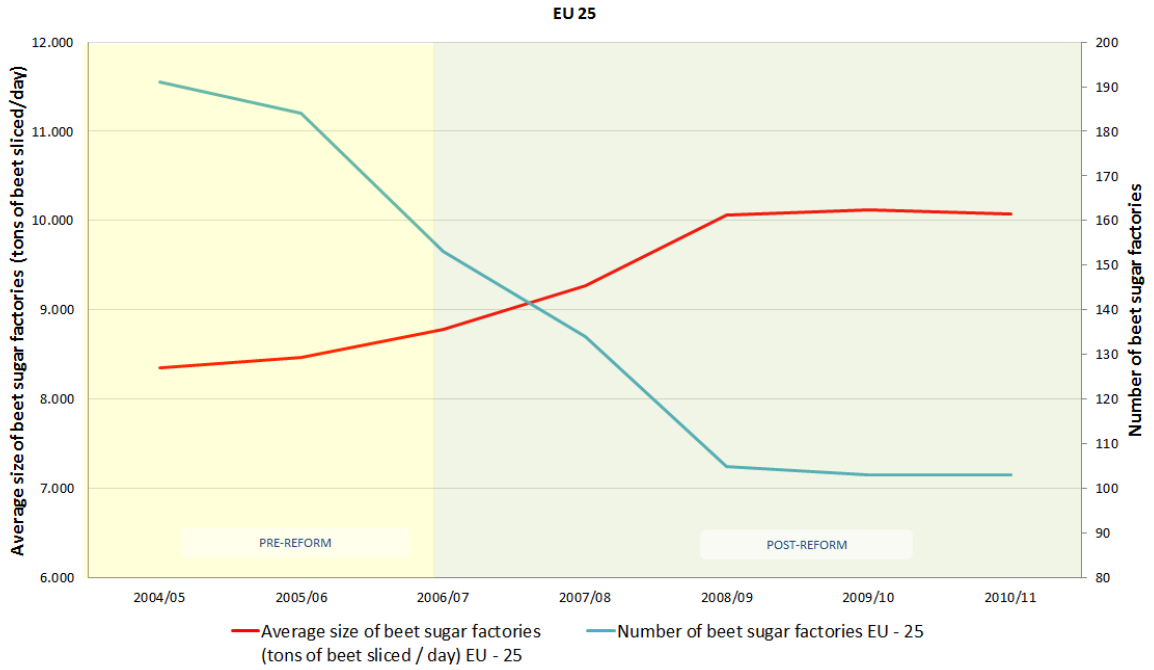
Before the 2006 reform, there were about 300 000 beet growers in the EU, cultivating 2.2 million hectares of sugar beet, which was processed in 189 factories. EU sugar production had reached 20.1 million tonnes in marketing year 2005/06. By 2013, the number of beet growers had dropped to about 149 000, cultivating 1.5 million hectares, whose production was processed in 109 factories. **Around 80 sugar production factories were closed in the restructuring process** promoted by the reform between 2005 and 2013. Sugar quotas were totally renounced in Ireland, Latvia, Slovenia, Bulgaria and mainland Portugal, while quota reduction was substantial in Hungary (-74%), Italy (-67%), Greece (-50%), Spain (-50%), Slovakia (-46%) and Finland (-45%). Quota reductions in the other Member States were all below 20%. The restructuring process resulted in further concentration of EU beet sugar production in the more cost-efficient producing Member States - France and Germany above all - whose share of the overall EU production quota increased significantly. Figure 5.1 clearly shows how **scale economies at plant level were actively pursued by EU sugar producers** in the three campaigns that followed the 2006 reform.

The 2006 reform also resulted in a remarkable increase in the concentration of the EU sugar industry (Areté, 2012). The number of sugar producers in the EU-25 (considering marketing alliances among multiple producers as single producers) dropped from 40 to 27 between the 2005/06 and 2009/10 marketing years, and the HHI concentration index[36] for the EU-25 rose from 796 to 1 323 points (1 357 points for the EU-27, United Kingdom included, Croatia excluded). No Member State in 2009/10 had a national HHI score lower than 2 500 points: this means that, according to the thresholds adopted in EU antitrust investigations, all Member States had a "highly concentrated / oligopolistic" market structure, and the EU-level scores indicated a "moderate concentration".

The structural analysis that follows basically provides an update of the structural analysis presented in Areté (2012), covering the period spanning from the 2010/11 to the 2020/21 marketing years, and focusing on the structure of the EU sugar production system that operated in 2010, 2015 (for technical aspects only) and 2020. The analysis covers two different geographical clusters, i.e., the EU-28 (including Croatia in 2010 and the United Kingdom in 2020) and the "current EU-27" (including Croatia in 2010, and excluding the United Kingdom in any year considered).

[36] The Herfindahl-Hirschman Index (HHI) "score" is given by the sum of the squares of individual market shares of firms; in the cited study, the HHI score is calculated on individual production capacity shares, weighted according to the importance in volume terms of, respectively, sugar production from beets, from cane and from raw cane sugar refining. To allow for comparability among Member States, the different length of the sugar beet processing campaign at national level was considered (by way of example, a 10 000 tonnes per day plant operating for 50 days was considered to have an equivalent capacity to a 5 000 tonnes per day plant operating for 100 days).

Figure 5.1 - Evolution of the number of beet sugar factories in operation and of their average processing capacity (tonnes of beet sliced / day) – EU-25 (2004-2011)



Source: Areté (2012), *Study on price transmission in the sugar sector*, Final report for the European Commission, October 2012.

In the first place, the analysis presented in the following sections covers the evolution of the **economic structure** of the EU sugar industry as a whole, characterised in terms of i) **number of producers** and ii) **concentration**. For the sake of consistency with the results of the study by Areté (2012), the analysis distinguishes between two levels of aggregation:

- An **EU-wide, trans-national level**: this focuses on groups operating in multiple Member States (multinational groups) and independent producers operating in a single Member State; these are collectively referred to as "**sugar producers**" for the sake of conciseness.
- A national level: this focuses on legal and operating entities in activity in each Member State, which may be either independent producers or subsidiaries of multinational groups; these are collectively referred to as "**operating entities**" for the sake of conciseness.

In the second place, the analysis focuses on the evolution of the **technical structure** of the three sectors (beet sugar, cane sugar, refining; the analysis is presented at § 5.2.1.2, 5.2.1.3, and 5.2.1.4, respectively), which is characterised in terms of:

- **total number and production capacity** of beet sugar factories, cane sugar factories and refineries;
- average beet/cane **processing capacity or refining capacity at plant level**.

Number of sugar producers and operating entities

The initial situation in 2010 was the result of a slight increase in the total number of sugar producers due to the termination of an international sugar marketing alliance at the beginning of the year. A total of 36 sugar producers was active in both the EU-28 and the "current EU-27"; the number of operating entities amounted to 56 in the "current EU-27", and to 58 also considering the United Kingdom (former EU-28).

By 2020, the number of sugar producers had dropped to 27 in both the EU-28 and the "current EU-27"; the number of operating entities amounted to 49 in the "current EU-27", and to 51 in the former EU-28.

The **decrease in the number of producers and operating entities** is the result of just two significant acquisitions occurred over the observed period (the targets were

one sugar producer in France and one in Italy), a few subsidiaries of multinational groups ceasing operations (in France and Romania), and a few independent producers going out of business (mostly in Italy and Portugal). Both the aforementioned acquisitions were completed in the quota period; most of the entities that ceased operations did so before the end of quotas.

Concentration in the EU sugar industry

Some information gaps[37] did not permit an updated and methodologically consistent calculation of the concentration indexes presented in Areté (2012) for the post-quota period.

The availability of estimates of such indexes for the EU sugar industry in literature is rather scarce, and limited to the quota period (Řezbová et al., 2015; Smutka and Řezbová, 2015; Maitah et al., 2016). In spite of some weaknesses[38], those estimates should provide a reliable enough indication of the order of magnitude of the HHI index for 2013, i.e., a year where the two last significant takeovers were already completed. These estimates are related to production shares (sugar quotas plus estimated production from raw cane sugar refining), and are hence methodologically non-comparable with those provided by Areté (referred to weighted processing capacity). Indeed, as demonstrated by empirical research[39], the HHI score for a certain industry may vary remarkably according to the dimension considered (production capacity, actual production, marketed volumes, revenues from sales, etc.).

Based on the estimated shares in the work by Smutka and Řezbová (2015), referred to "**alliances**" that are broadly coincident with the definition of "sugar producers" used in the present analysis, a HHI score of 1 250 points can be calculated at industry level for the EU-28 in 2013 (Table 5.1). This figure is broadly in line with (but lower than) the HHI score calculated for the EU-27 (Croatia excluded) for the 2009/10 marketing year in the 2012 Areté study (1 357 points). The calculation of HHI scores at national level in the empirical works by Řezbová et al (2015) and Maitah et al. (2016) confirms the situation emerging from the Areté study (2012), i.e., no Member State had a national HHI score lower than 2 500 points: this implies a high concentration at national level.

In terms of concentration ratios (CR5, CR10, CR15), the aforementioned empirical research (Řezbová et al., 2015; Smutka and Řezbová, 2015; Maitah et al., 2016) reveals that the leading five alliances/companies held a combined share of around 69% of the total EU-28 sugar production in 2013; the combined share of the ten leading alliances/companies amounted to nearly 93% of the total, and the combined share of the 15 leading ones to 97.7%.

Since no significant mergers and acquisitions were completed in the EU sugar industry after 2013, and since there were no significant cases of fragmentation of the leading sugar producers in smaller entities, the order of magnitude of the HHI and CRn concentration indexes estimated for 2013 (quota period) can safely be considered as still indicative of a **moderate degree of concentration of the EU sugar industry at EU level,** and of a **high degree of concentration in individual Member States**, also in the **post-quota period**.

[37] Mainly the unavailability of reliable data on the duration of sugar beet processing campaigns at Member State level, combined with the difficulty of estimating the actual extent of refined cane sugar production in the different Member States in the post-quota period (ISO, 2021).

[38] Mostly deriving from a number of questionable decisions in the "clustering" of producers in trans-national "alliances", which probably overestimate their shares on total compared to those of independent producers, thus inflating the leading alliances' HHI scores, and the overall HHI score.

[39] For a concrete example referred to the Czech and Polish beet sugar sector, see the work of Kotyza P. et al. (2018), *Czech and Polish sugar industry – Concentration of sugar production*, Proceedings of the 2018 International Scientific Conference 'Economic Sciences for Agribusiness and Rural Economy', No 2, Warsaw, 7–8 June 2018, pp. 136–143.

Table 5.1 – Concentration in the EU-28 sugar industry, 2013

"Alliances"/companies	% share of EU-28 total sugar production	HHI score (points)
Südzucker Group	24.1%	581
Nordzucker Group	15.0%	225
Tereos Group	10.9%	119
AB Sugar Group	10.8%	117
Pfeifer & Langen Group	8.0%	64
COSUN Group	7.0%	49
CRISTALCO Group	6.9%	48
ASR Group	5.0%	25
Krajowa Spolka Cukrowa S.A. (KSC)	3.0%	9
SFIR Group	2.0%	4
Finasucre Group - ISCAL Sugar	1.0%	1
Hellenic Sugar Industry	1.0%	1
Eridania-SADAM	1.0%	1
ACOR	1.0%	1
RAR	1.0%	1
Other producers	2.3%	5
EU-28 total	**100.0%**	**1 250**

Source: elaboration of estimates by Smutka and Řezbová, 2015 (based on CEFS and IHS Markit data)

5.2.1.2 Structural features of the EU beet sugar sector

The process of technical concentration of the EU beet sugar sector has continued also in the 2010-2020 period, albeit at a slower pace than in the years immediately following the 2006 reform of the EU sugar regime. The total beet processing capacity has slightly increased over the period in both the geographical areas considered (Table 5.2); thanks to a significant reduction in the number of plants, the average beet slicing capacity per plant has significantly increased (+16%).

There are remarkable differences in the average processing capacity of beet sugar factories across the EU, as revealed by Table 5.3. Substantial or significant increases in the average processing capacity per plant were recorded in most Member States over the 2010-2020 period, with only a few exceptions[40].

[40] In some cases (e.g., in Italy), the need for high-capacity plants is dictated by the relatively short length of the useful period for harvesting sugar beets (mainly due to heavy autumn rainfall and prevalence of clay soils); in other cases, it is the opposite (lower-capacity plants but longer processing campaigns).

Table 5.2 – Evolution of the key structural features of the EU beet sugar sector, 2010-20

Geographical area	Variables	2010	2015	2020	Var. 2010-2020 (%)
"Current EU-27"	Capacity of beet sugar factories (tonnes of beet sliced / day)	1 029 140	1 074 341	1 048 666	1.9%
	Number of beet sugar factories	107	102	94	-12.1%
	Average capacity of beet sugar factories (tonnes of beet sliced / day)	9 618	10 533	11 156	16.0%
EU-28	Capacity of beet sugar factories (tonnes of beet sliced / day)	1 072 640	1 124 441	1 098 766	2.4%
	Number of beet sugar factories	111	106	98	-11.7%
	Average capacity of beet sugar factories (tonnes of beet sliced / day)	9 663	10 608	11 212	16.0%

Source: elaboration of IHS Markit data

*Table 5.3 – Evolution of the average processing capacity of beet sugar factories**, by Member State (2010-20)*

Member States*	2010	2015	2020	Var. 2010-2020 (%)
Austria	12 000	12 700	12 700	5.8%
Belgium	13 000	14 667	14 667	12.8%
Bulgaria	no plants	no plants	no plants	no plants
Croatia	6 333	7 667	7 667	21.1%
Czechia	5 143	5 257	5 821	13.2%
Denmark	11 900	12 500	12 500	5.0%
Finland	7 500	8 000	8 000	6.7%
France	13 165	14 068	15 017	14.1%
Germany	11 825	12 300	13 089	10.7%
Greece	6 167	8 000	8 000	29.7%
Hungary	6 500	7 500	7 500	15.4%
Italy	13 750	15 667	15 500	12.7%
Lithuania	3 600	4 450	4 450	23.6%
Netherlands	16 750	26 000	28 000	67.2%
Poland	5 703	6 465	7 616	33.5%
Portugal	1 250	1 000	no plants	no plants
Romania	3 200	3 200	3 125	-2.3%
Slovakia	4 800	5 500	5 500	14.6%
Spain	9 200	9 240	9 240	0.4%
Sweden	18 000	21 000	21 000	16.7%
United Kingdom	10 875	12 525	12 525	15.2%

* listed in decreasing order of average processing capacity per plant in 2020
** in tonnes of beet sliced per day
Source: elaboration of IHS Markit data

5.2.1.3 Structural features of the EU cane sugar sector

Cane sugar production in the EU over the observed period has been limited to the French Overseas Domains (DOM): Reunion Islands, Martinique and Guadeloupe. The number of active cane sugar mills in the DOM has decreased from five in 2010 to four in 2020 (one mill ceased operations in the post-quota period).

Based on IHS Markit data, the average crushing capacity of French cane sugar mills has increased from 4 700 tonnes of cane/day in 2010 to 4 850 tonnes of cane/day in 2020.

5.2.1.4 Structural features of the EU sugar refining sector

The analysis of the structural features of the EU raw cane sugar refining sector presents a number of challenges that lead to some uncertainty about the reliability of the key metrics. These challenges mainly derive from:

- The fact that the distinction between facilities performing "full-time" refining (dedicated facilities that refine raw cane sugar year-round) and facilities performing "off-crop" or "off-campaign" refining is not always clear-cut[41].
- The fact that several facilities annexed to operational beet sugar factories and performing off-crop refining, plus some coastal refineries, temporarily cease to refine raw cane sugar when the extent of the "white sugar premium" (see § 5.1.2) decreases beyond a certain threshold, since their operation would be unprofitable (ISO, 2021).

The above elements make it rather difficult to have a reliable estimate of the total number of refineries in operation in the EU in a given year, and of the related raw cane sugar daily refining capacity (DRC). Figures in Table 5.4 must hence be taken with some caution; no distinction is made between full-time refining and off-crop refining. That said, the key structural features of the sector do not appear to have changed significantly over the observed period.

Table 5.4 - Evolution of the key structural features of the EU raw cane sugar refining sector (full-time + off-crop refining combined), 2010-20

Geographical area	Variables	2010	2015	2020	Var. 2010-2020 (%)
"Current EU-27"	Total refining capacity (tonnes of raw cane sugar refined / day)	11 730	14 080	12 780	9.0%
	Number of refineries	15	16	15	0.0%
	Average capacity of refineries (tonnes of raw cane sugar refined / day)	782	880	852	9.0%
EU-28	Total refining capacity (tonnes of raw cane sugar refined / day)	14 930	17 480	16 180	8.4%
	Number of refineries	16	17	16	0.0%
	Average capacity of refineries (tonnes of raw cane sugar refined / day)	933	1 028	1 011	8.4%

Source: elaboration of IHS Markit data

Based on IHS Markit data and the cited ISO study (2021), raw cane sugar refining facilities in working order were in place in the following Member States in 2020: Bulgaria, Croatia, Denmark, Finland, France, Germany, Italy, the Netherlands, Poland, Portugal, Romania, Spain. Due to the Brexit, one of the largest refineries of the world (on the Thames River in London, United Kingdom) is now located outside the EU.

[41] In the EU, a few dedicated facilities performing year-round refining are actually located on the same sites of operational beet sugar factories, and also refine raw beet sugar off those factories during the processing campaign. Moreover, the latter facilities are obviously located inland (rather than at seaports, where most of the full-time refineries are located): raw cane sugar must be unloaded from ships at the nearest port, and then transported by truck or rail to the refinery. This situation leads to a techno-economic disadvantage for these factories vis-à-vis coastal ones, that can directly unload bulk shipments of raw cane sugar from vessels thanks to dockside handling facilities.

5.2.2 *Importance of cooperatives and independent beet growers in the EU sugar industry*

The **importance of cooperatives and independent beet growers in the EU sugar industry** was already remarkable in the quota period, and has **increased further with the transition to the post-quota period**.

EU sugar beet growers already controlled a substantial portion of the overall sugar beet processing capacity in the "current EU-27" in 2010 through cooperative sugar producing companies, non-cooperative companies where they hold a majority share, and the related industrial groups, (Table 5.5). The portion increased further over the observed period: the 7 sugar producers controlled by growers represented just 26% of the total number of sugar producers in 2020, but owned and operated 75% of the sugar beet processing capacity and 65% of the beet sugar factories in the EU-27 (United Kingdom excluded) in 2020.

It is also important to consider that the **structural evolution of the "beet growers' cluster"** in the EU sugar industry followed a **growth path**, vis-à-vis **significant downsizing of the other cluster** (i.e., sugar producers on which growers exert no control). Whereas the number of beet sugar factories managed by the "growers' cluster" has remained basically stable over the observed period, the number of factories managed by the other cluster decreased significantly (-25%). Due to acquisitions, some factories managed by the other cluster are currently managed by the growers' cluster. Sugar beet processing capacity owned and operated by growers increased significantly over the observed period (+10%), whereas the contrary occurred for the other cluster (-17%). This implies that sugar producers controlled by growers have pursued scale economies more actively than the other producers: beet sugar factories managed by growers already had a substantially higher average capacity than the factories managed by the other cluster in 2010, and the gap has widened further in the following years.

Table 5.5 - Importance of EU sugar beet growers in the processing stage of the supply chain and evolution of the related structural parameters, 2010-20

Industrial clusters	Variables	2010	2020	Var. 2010-2020 (%)	2010 (% of total)	2020 (% of total)
Controlled by beet growers	Number of sugar producers	7	7	0.0%	19.4%	25.9%
	Capacity of beet sugar factories (tonnes of beet sliced / day)	710 430	785 327	10.5%	69.0%	74.9%
	Number of beet sugar factories	63	61	-3.2%	58.9%	64.9%
	Average capacity of beet sugar factories (tonnes of beet sliced / day)	11 277	12 874	14.2%		
Other	Number of sugar producers	29	20	-31.0%	80.6%	74.1%
	Capacity of beet sugar factories (tonnes of beet sliced / day)	318 710	263 339	-17.4%	31.0%	25.1%
	Number of beet sugar factories	44	33	-25.0%	41.1%	35.1%

Source: elaboration of IHS Markit data and information from company websites and annual reports

Similar considerations apply for the (limited) EU cane sugar sector, where two sugar producers controlled by EU beet growers have managed the bulk of cane crushing capacity over the observed period, and have operated larger cane mills.

By contrast, the raw cane sugar refining sector was already dominated by sugar producers not controlled by growers in 2010, and the gap has widened further over the observed period. In 2020, the growers' industrial cluster managed only 4 refineries (out of a total of 15), and operated less than 30% of the total refining capacity in the EU-27.

5.3 Organisational features of the EU sugar industry

5.3.1 Overall organisation of the EU sugar industry

As already noted at § 5.2, the distinction among the beet sugar sector, the cane sugar sector and the sugar refining sector within the EU sugar industry is somewhat inappropriate from an economic standpoint, since several EU sugar producers (and the leading ones in particular) are active in two of those sectors, or even in all the three ones. Analogous considerations can be made with regard to organisational aspects, as the following sections will reveal. The analysis that follows is mostly based on a bottom-up approach: elementary information at individual company and plant level was collected (mostly from company websites and publications, plus IHS Markit proprietary database of sugar factories), analysed and elaborated to provide a detailed, up-to date picture of the organisation of the EU sugar industry in 2020. A detailed overview of the main organisational features of the EU sugar industry in 2020 is provided in Table 5.6.

Only two sugar producers operating in the EU in 2020 were headquartered in third countries. Most groups combining multiple companies were active in both beet sugar production and full-time refining; none was active in beet sugar production only, whereas one producer was active in raw cane sugar refining only. Marketing alliances or other forms of cooperation among sugar producers (e.g., joint ventures) had a significant diffusion (8 cases). Nearly 45% of producers (12) operated in multiple factories; 8 of these operated in both EU Member States and third countries. Only four producers were involved in beet sugar production in third countries. Over 25% of producers (8) had implemented downstream vertical integration towards sugar-consuming activities (production of sugar-containing food products). As for product and sector diversification, the most common forms were directed towards: i) off-crop raw cane sugar refining in beet sugar factories (10 producers); production and/or marketing of non-sugar containing food products (10 producers) and of non-food products and/or services (9 producers); cane sugar production (8 producers).

Table 5.6 – Overview of the main organisational features of the EU-27 sugar industry in 2020

Items	N.*	**Additional information** *(number of concerned producers in parentheses)*
Sugar producers – EU-27 total	**27**	
- headquartered in the EU	*25*	
- headquartered in third countries	*2*	*United Kingdom (1), United States (1)*
- controlled by growers	*7*	
Related operating entities – EU-27 total	**49**	
- Cooperatives	*4*	
- Other types of company where growers hold a majority share	*3*	
- Other types of company where growers hold a minority share	*7*	
- Other operating entities	*35*	
Groups of sugar companies owned/managed by the same entity	**7**	
- active in beet sugar production only	*0*	
- active in both beet sugar production and full-time refining	*6*	
- active in full-time refining only	*1*	
Marketing alliances or cooperation with other sugar producers	**8**	*Based in: EU (7); third countries (1)*
Marketing alliances or cooperation with traders/wholesalers	**5**	*Based in: EU (4); third countries (1)*

Items	N.*	**Additional information** *(number of concerned producers in parentheses)*
Producers operating in multiple factories ("multi-plant")	**12**	
- operating in a single Member State	3	*Croatia (1), Italy (1), Poland (1)*
- operating in multiple Member States	1	
- operating in multiple Member States and third countries	8	
Producers operating in a single factory	**15**	
Producers involved in beet sugar production in third countries	**4**	*Moldova (2), Ukraine (1), United Kingdom (1); China (1)*
Producers with downstream vertical integration towards sugar-consuming activities	**8**	*Chocolate and sugar confectionery, instant beverages, pastry, biscuits, jams, desserts, fruit preparations*
Producers that implemented product and sector diversification		
- towards cane sugar production	8	*In the EU: Reunion – French DOM (2)* *In third countries: Australia (2); Belize (1), Brazil (1), Mexico (1); DR of Congo (1), Eswatini (1), Kenya (1), Malawi (1), Mozambique (2), South Africa (1), Tanzania (2), Zambia (1)*
- towards full-time raw cane sugar refining *(excluding sugar producers operating exclusively in this sector)*	4	*In the EU: Finland (1), Italy (1), Romania (1)* *In third countries: Bosnia-Herzegovina (1); Algeria (1), South Africa (1)*
- towards off-crop raw cane sugar refining *(in beet sugar factories)*	10	
- towards ethanol production from beets or beet molasses	7	*In the EU: Austria (1), Belgium (1), Czech Republic (1), Germany (3), France (3)* *In third countries: United Kingdom (1)*
- towards cane ethanol production	3	*In the EU: Reunion – French DOM (1)* *In third countries: Australia (1); Brazil (1); Tanzania (1), South Africa (1)*
- towards production of other sweeteners than sugar	4	*Starch-based sweeteners (2), inuline (2), stevia (1), innovative sweeteners (2)*
- towards innovative biobased processes using co-products of beet processing as feedstock to produce food and non-food products	5	*Crystalline betaine, dietary fibres, biorefinery products (ingredients, polymers, etc.), lactic acid derivatives, innovative fermentation products*
- towards production and/or marketing of non-sugar containing food products	10	*Frozen foods, proteins, maltodextrins, potato products, oilseed products, cereal milling products, snacks, baked products, vegetable proteins, salads and herbs; livestock and poultry breeding and crop farming; grain trading*
- towards production and/or marketing of non-food products and/or services	9	*Non-food starch and derivatives, starch-based ethanol, crop seeds, medicinal cannabis, straw pellets, packaging*

* referred to sugar producers (27 in total), except where otherwise specified
Source: elaboration of information from company websites, company publications and annual reports, IHS Markit plant database

5.3.2 Contractual relations between sugar producers and beet growers

The end of the quota system had substantial implications also for **contractual relations between sugar beet farmers and sugar producers**. Before the end of the quotas, the regulated minimum price for sugar beet combined with the compulsory character of value-sharing clauses in inter-branch agreements reached in the sugar supply chain (the so-called *erga omnes* principle) led, in practice, to compulsory collective negotiations of beet prices. The post-quota sugar contractual framework (pursuant to Article 125 and Annex X of the CMO Regulation[42]) provides that sugar beet purchase prices are laid down in the delivery contracts between individual beet sellers and each sugar producer. Those parties can also agree on value-sharing clauses, which are however no longer explicitly part of the agreements within the trade collectively negotiated by growers' and processors' associations: such clauses are now voluntary, and are negotiated between each sugar producer and the beet sellers concerned. A detailed analysis of contractual relations between sugar beet growers and sugar producers, and of their effects on the resilience of the EU sugar sector, is provided under question 2 (§ 6.2).

Sugar beet growers' associations are widespread in the EU. In some Member States (e.g., Austria, Germany, Poland) almost the totality of sugar beet growers are members of a sugar beet growers' association. In some Member States, sugar beet growers are organised in regional associations (e.g., Austria, Germany), while in others there is only one national association (e.g., Italy) or a national association with local/regional branches (e.g., Poland, France). In a few Member States there are no sugar beet growers' associations in place[43].

Sugar beet growers' associations represent and protect the interests of members. Albeit with national specificities, the main tasks of sugar beet growers' associations are: negotiating on behalf of their members the inter-branch agreements; collective purchase of agricultural inputs; controlling the enforcement of contracts; collective management of machinery and other facilities (e.g., beet storage sites and transhipment stations between different transportation modes) owned by the association; dissemination of professional knowledge (e.g., publication of a periodic newsletter; organisation of training sessions, etc.).

5.4 Sugar production costs

5.4.1 Main factors influencing sugar production costs

This section provides the key elements emerged from:

- literature review;
- in-depth investigations in selected Member States;
- inputs from sectoral stakeholders and independent experts.

The main factors influencing sugar productions costs are identified and discussed in the following sections.

5.4.1.1 Sugar beet farming stage

Climatic and agronomic conditions are the main influencing factor, since they determine the need (or lack thereof) for specific production practices to prevent crop failure and achieve satisfactory yields (combination of beet output per hectare and sucrose content of beets). Some of these practices – mainly systematic irrigation and

[42] as amended by European Commission Delegated Regulation (EU) No 2016/1166.

[43] For instance, this is currently the case in: Croatia; the Netherlands, where all sugar beet growers are members of a cooperative; Spain, where sugar beet growers are represented by specific branches of the three main national farmers' unions.

frequent treatments against pests, which are especially needed in the southernmost beet farming areas of the EU – are definitely costly.

Sugar beet is a crop that requires rather **intensive machinery work** throughout its production cycle and at harvest (due to its substantial output volume per hectare). The incidence of the related costs (labour costs, capital costs and energy costs) may vary according to farm-specific conditions (use of proprietary equipment vs. recourse to contract machinery services), but remains substantial.

5.4.1.2 Sugar beet processing stage

The main influencing factors[44] are related to:

- The **high raw material intensity** of the beet sugar production process, which varies significantly according to the sucrose content of beets (mainly) but also of soil tare at delivery. The higher the polarisation and the lower the soil tare, the smaller the sugar beet volume needed to obtain one tonne of refined white sugar, and vice versa. This has a straightforward influence on raw material cost, in combination with **sugar beet price levels**.
- The **capital-intensive nature** of the sugar beet processing sector, which translates into substantial capital costs per tonne of refined sugar. The higher the utilisation of processing capacity, the lower the incidence of capital costs. Scale economies play an important role in sugar beet processing: high-capacity plants tend to have lower capital costs per tonne than low-capacity plants, provided that the available processing capacity is fully exploited over a processing campaign of satisfactory duration.
- The **energy-intensive nature** of the sugar production process, the type of energy source used and its **price** levels (soft coal is generally cheaper than natural gas).
- The **geography of sugar beet procurement areas**, which translates (in combination with raw material intensity and the capacity of processing plants) into higher or lower transportation costs per tonne of refined sugar. The closer the sugar beet farming areas are to processing plants, the lower the related logistic costs, and vice versa. There may be a trade-off between scale economies at plant level and the incidence of logistic costs. Full exploitation of high-capacity plants requires a steady daily flow of substantial volumes of sugar beets: wherever this implies transporting substantial sugar beet quantities from farms located at a **long distance** from the plant (this happens where sugar beet farming areas are scattered over a vast territory, rather than concentrated around the plants), the higher logistic costs may partly offset the scale economies of a high-capacity plant.

5.4.1.3 Raw cane sugar refining

According to ISO (2021) and inputs from sectoral stakeholders, the main factors influencing the cost of raw cane sugar refining are:

- The **price and technological quality of raw cane sugar**; the latter determines the "processing loss" (the higher the impurities, the larger the quantity of raw sugar needed to obtain one tonne of refined sugar).
- The **capital-intensive and energy-intensive nature** of the refining process. The considerations applying here are analogous to those made for sugar beet processing, with the exception of the linkage with the farming stage.
- The (generally very long) **distance** over which raw cane sugar shipments have to be transported from the supplying countries, which, in combination with the level

[44] The layout of sugar factories and the use of specific technologies or solutions (e.g., storage of sugar beet juice for off-campaign processing, or chemical desugarisation of molasses) are extremely plant-specific: these factors surely have an influence on sugar production costs, but no general considerations can be drawn on them. This study will therefore not investigate further on their influence.

of **dry bulk freight rates**, determines the incidence of logistic costs per tonne of refined sugar.

5.4.2 Sugar beet farming costs

In-depth investigations made by the study team in selected Member States, and access to a LMC International proprietary dataset allowed to collect some quantitative evidence on the extent and composition of sugar beet farming costs. The findings of in-depth investigations at national level are generally representative and detailed; however, they are not perfectly comparable across Member States, mainly due to different estimation methodologies, are sometimes related to a specific year, and are often based on confidential information.

By contrast, the study teams' own calculations suffer from some limitations (mainly related to the need of combining data from different sources, the inclusion of haulage costs of beets to sugar factories, and the impossibility to show precise figures for copyright issues), and often diverge significantly from the results of in-depth analyses, but are based on a consistent methodology that ensures wider comparability (at least in indicative terms) both among Member States and between the quota period and the post-quota one. The following sections present a selection of the key elements emerged from the analysis.

5.4.2.1 Indicative comparison among Member States and between the quota and post-quota periods.

Tables from 5.7 to 5.10 show the results of a comparison based on cost figures calculated from:

1. LMC International data for the "**field cost" component of sugar production cost**, i.e., the total cost of planting, cultivating and harvesting sugar beet, <u>including the cost of delivery to the factory gate</u>. The latter component is not made explicit in the available data, and <u>cannot therefore be deducted</u>. LMC field cost is the sum of the following three components:
   a. Field **labour** costs: The cost of labour incurred in planting, cultivating and harvesting sugar beet, including the labour costs associated with haulage to the factory. Farmers' own labour is costed at the prevailing wage rate.
   b. Field **capital** costs: The cost of farm machinery employed in the production of sugar beet. This includes harvesters, and trucks used to haul beet to the factory. This cost is based on the full replacement cost of each machine, each with different depreciation periods. Land rent is also included.
   c. Field **inputs** costs: The cost of fuel, fertiliser and other inputs associated with beet cultivation, harvesting and haulage to the factory.
2. **Yields in tonnes of sugar per hectare** (see § 4.1.2.1), to calculate the area needed to produce the volume of sugar beets needed to obtain one tonne of refined sugar, and through these, the **field cost per hectare of sugar beet**.
3. Yields in tonnes of beet per hectare (see §4.1.2.1), which allow to calculate the **field cost per tonne of sugar beet.**

Two different sets of cost figures were calculated, each split in two subsets (cost per hectare and cost per tonne):

1. The "**total field cost per ha / per tonne of sugar beet**", including labour, capital and inputs costs.
2. The "**field cost per ha / per tonne of sugar beet – <u>capital costs excluded</u>**", which provides a broad indication of the variable cost component.

No calculations were made for Portugal, since domestic sugar beet farming ceased in the post-quota period.

The two sets "field cost per hectare of sugar beet" and "field cost per tonne of sugar beet" have to be intended as "delivered costs to the factory" (they refer to the total beet

output of one hectare in the first case); these costs accrue to the farming stage of the supply chain, but more from the perspective of sugar producers, rather than from the standpoint of sugar beet growers. Nevertheless, they allow for a methodologically consistent comparison (at least in indicative terms) of "sugar beet farming stage costs" both among Member States and between the quota period and the post-quota one.

In general, no remarkable variations in "field costs" emerge from the comparison of the quota period average (2014/15 to 2016/17) and the post-quota period average (2017/18 to 2020/21). The sets of cost figures in Tables 5.9 and 5.10 (that exclude capital costs) allow to exclude from the calculation at least the cost inflation effects related to the high replacement costs of beet transportation equipment (trucks), as well as of farm machinery.

Table 5.7 - Total field cost per ha of sugar beet (€)

Member State	Average quota period (2014/15 - 2016/17)	Average post-quota period (2017/18 - 2020/21)	Var. %*
Austria	2 800-2 900	2 700-2 800	-6%
Belgium	2 600-2 700	2 600-2 700	-1%
Croatia	2 100-2 200	2 100-2 200	-1%
France	2 500-2 600	2 300-2 400	-8%
Germany	2 700-2 800	2 400-2 500	-11%
Italy	2 500-2 600	2 100-2 200	-13%
Netherlands	2 800-2 900	2 700-2 800	-3%
Poland	2 200-2 300	1 900-2 000	-11%
Spain	3 400-3 500	3 200-3 300	-6%

*Based on actual average values for the quota and post-quota periods

Source: elaboration of data from LMC International, DG AGRI, CEFS, Eurostat

Table 5.8 - Total field cost per tonne of sugar beet (€)

Member State	Average quota period (2014/15 - 2016/17)	Average post-quota period (2017/18 - 2020/21)	Var. %*
Austria	38-39	37-38	-2%
Belgium	32-33	29.5-30.5	-8%
Croatia	33-34	33-34	0%
France	28.5-29.5	28.5-29.5	0%
Germany	35.5-36.5	33.5-34.5	-6%
Italy	38.5-39.5	35.5-36.5	-7%
Netherlands	33.5-34.5	32.5-33.5	-3%
Poland	36-37	34-35	-5%
Spain	36-37	36-37	1%

*Based on actual average values for the quota and post-quota periods

Source: elaboration of data from LMC International, DG AGRI, CEFS, Eurostat

Table 5.9 - Field cost per ha of sugar beet – capital costs excluded (€)

Member State	Average quota period (2014/15 - 2016/17)	Average post-quota period (2017/18 - 2020/21)	Var. %*
Austria	1 700-1 800	1 600-1 700	-3%
Belgium	1 450-1 550	1 500-1 600	2%
Croatia	1 200-1 300	1 250-1 350	6%
France	1 400-1 500	1 350-1 450	-3%
Germany	1 550-1 650	1 400-1 500	-7%
Italy	1 400-1 500	1 300-1 400	-7%
Netherlands	1 550-1 650	1 550-1 650	1%
Poland	1 200-1 300	1 100-1 200	-8%
Spain	1 650-1 750	1 650-1 750	-1%

*Based on actual average values for the quota and post-quota periods

Source: elaboration of data from LMC International, DG AGRI, CEFS, Eurostat

Table 5.10 - Field cost per tonne of sugar beet – capital costs excluded (€)

Member State	Average quota period (2014/15 - 2016/17)	Average post-quota period (2017/18 - 2020/21)	Var. %*
Austria	22.5-23.5	22.5-23.5	1%
Belgium	18-19	17-18	-5%
Croatia	18.5-19.5	20-21	6%
France	16-17	17-18	7%
Germany	20.5-21.5	20-21	-2%
Italy	21.5-22.5	21.5-22.5	-1%
Netherlands	18-19	18.5-19.5	2%
Poland	19-20	19-20	0%
Spain	18-19	19-20	6%

*Based on actual average values for the quota and post-quota periods

Source: elaboration of data from LMC International, DG AGRI, CEFS, Eurostat

5.4.3 Beet sugar production costs

Access to the LMC International dataset allowed to analyse the evolution of beet sugar production costs from the quota period to the post-quota one, and the relative cost competitiveness of a selection of 9 beet sugar producing Member States. Due to copyright issues, Tables from 5.11 to 5.13 only present average production cost ranges for the quota and post-quota periods.

The "**nominal beet sugar production cost**" (in Euros per tonne, white value, ex-factory) is the sum of:

1. Total field costs, as defined at § 5.4.2.1.
2. Total factory costs, i.e., the total cost of transforming sugar beets into bulk white sugar, net of the by-product credit. The relevant items for the calculation are defined as follows:
    a. Factory labour costs: the cost of labour incurred in the production of bulk white sugar.
    b. Factory capital costs: the full replacement cost of a sugar factory (based on the average capacity for each industry) depreciated over 22.5 years.
    c. Factory inputs costs: the cost of fuel and other inputs employed in the sugar production process.
    d. By-product credits, to be deducted from the sum of the above cost items. These are given by the value of molasses and beet pulps, expressed per

tonne of bulk white sugar. This value is treated as a credit against factory costs.

3. Administration costs, estimated as 15% of total field and factory costs. This estimate is based on actual data collected from a range of industries.

Tables from 5.11 to 5.13 present three sets of sugar production cost:

1. Nominal beet sugar production cost, defined as above.
2. Nominal beet sugar production cost, overheads excluded.
3. Nominal beet sugar production cost, overheads and capital costs excluded: this approximates the "variable production cost" of sugar, i.e., the "rock bottom" that unit revenues should cover to ensure the operation of sugar factories in the short term.

The analysis of the three datasets reveals a clear advantage in terms of **cost competitiveness** in a group of producing Member States, with the Netherlands as the clear leader; Belgium as a close follower; France, Germany and Poland at a relatively limited distance from the two leaders; a group of less cost-efficient producers (Austria, Croatia and Spain), and Italy in a position of serious disadvantage. In general, the most cost-efficient producing Member States have further improved their cost competitiveness with the transition to the post-quota period (albeit to a different extent), also thanks to additional scale economies and improved efficiency deriving from further restructuring and rationalisation of production capacity; by contrast, most Member States in the trailing group have been negatively impacted by increased production costs after the transition, with rare exceptions.

The consideration of the "variable production cost" of the most cost-efficient producing Member States clearly shows that sugar prices lower than 300 Euros/tonne would seriously narrow their margins or even result in negative margins. The least cost-efficient producing Member States already struggle when prices are lower than 400 Euros/tonne.

Table 5.11 - Nominal Beet Sugar Production Costs (€ per tonne, white value, ex-factory)*

Member States	Average quota period (2014/15 - 2016/17)	Average post-quota period (2017/18 - 2019/20)	Var. %**
Netherlands	300-350	250-300	-12.0%
Belgium	320-370	290-340	-9.0%
Germany	360-410	330-380	-8.5%
France	350-400	330-380	-4.8%
Poland	350-400	340-390	-1.7%
Austria	420-470	430-480	3.2%
Spain	430-480	490-540	11.6%
Croatia	510-560	570-620	11.6%
Italy	560-610	690-740	22.7%

* Total field costs + Total factory costs (labour, capital, inputs, net of by-product credits) + Overheads (administrative costs)
** Based on actual average values for the quota and post-quota periods
Source: elaboration of LMC International data

Table 5.12 - Nominal Beet Sugar Production Costs, overheads excluded (€ per tonne, white value, ex-factory)*

Member States	Average quota period (2014/15 - 2016/17)	Average post-quota period (2017/18 - 2019/20)	Var. %**
Netherlands	250-300	210-260	-12.0%
Belgium	270-320	240-290	-9.2%
Germany	300-350	270-320	-8.6%
France	290-340	270-320	-4.9%
Poland	290-340	280-330	-1.7%
Austria	350-400	360-410	2.2%
Spain	370-420	400-450	10.8%
Croatia	420-470	470-520	10.8%
Italy	460-510	570-620	21.7%

* Total field costs + Total factory costs (labour, capital, inputs, net of by-product credits)
** Based on actual average values for the quota and post-quota periods
Source: elaboration of LMC International data

Table 5.13 - Nominal Beet Sugar Production Costs, overheads + capital costs excluded (€ per tonne, white value, ex-factory)*

Member States	Average quota period (2014/15 - 2016/17)	Average post-quota period (2017/18 - 2019/20)	Var. %**
Netherlands	190-240	170-220	-11.5%
Belgium	200-250	180-230	-10.8%
Germany	220-270	200-250	-9.8%
France	210-260	200-250	-5.5%
Poland	220-270	220-270	-1.6%
Spain	250-300	250-300	0.8%
Austria	290-340	260-310	-8.9%
Croatia	280-330	280-330	-0.3%
Italy	320-370	350-400	8.5%

* Total field costs + Variable factory costs (labour, inputs, net of by-product credits)
** Based on actual average values for the quota and post-quota periods
Source: elaboration of LMC International data

5.4.4 Refined cane sugar production costs

Portuguese consulting firm AGRO.GES' average total production cost estimates for Portuguese sugar refineries (mostly based on information from the annual reports of the two producers), referred to the 2016-2019 period (i.e., mostly falling in the post-quota period) fall in a range of 540-640 Euros/tonne of refined sugar. The cost of procurement of raw cane sugar accounts by far for the biggest portion of total costs, followed by energy and freight costs.

An estimate by LMC International, specifically made for the purposes of the study, and referred to 2020, puts the total production cost of refined cane sugar in Portugal within a 350-400 Euros/tonne range (mainly due to a lower CIF price for raw cane sugar, set at 280-290 Euros/tonne), and broadly confirms the relative importance of individual cost items estimated by AGRO.GES (raw material cost accounts by far for the biggest portion).

Finally, ISO (2021) features no cost estimates for EU-based refineries, but provides a benchmark, i.e., the estimated production cost of the Silverton refinery in London (United Kingdom), one of the biggest in operation worldwide. This would fall within a 390-410 US dollars/tonne range, i.e., rather close to the estimate by LMC International for Portuguese refineries.

5.5 Profitability in the EU sugar industry

This section presents quantitative evidence and qualitative considerations:

- on the evolution of different parameters measuring the "profitability" of sugar beet farming, of beet sugar production and of refined cane sugar production in a period generally spanning from 2014 to 2020;
- on a comparison of profitability levels in the quota and post-quota periods.

In-depth investigations made by the study team in selected Member States, access to a LMC International proprietary dataset, and the analysis of annual reports published by a number of EU sugar producers allowed to feed the related indicators.

5.5.1 Sugar beet growers

As already explained at § 5.4.2, the findings of in-depth investigations on the profitability of sugar beet farming made in selected Member States are generally representative and detailed; however, they are not perfectly comparable across Member States mainly due to different estimation methodologies, are sometimes related to a specific year, and are often based on confidential information.

By contrast, the study teams' own calculations based on the LMC International dataset suffer from some limitations (mainly related to the need of combining data from different sources and the inclusion of haulage costs of beets to sugar factories), and often diverge significantly from the results of in-depth analyses carried out by the study team at national level, but are based on a consistent methodology that ensures wider comparability (at least in indicative terms) both among Member States and between the quota period and the post-quota one. The following sections present a selection of the key elements emerged from the analysis.

5.5.1.1 Indicative comparison among Member States and between the quota and post-quota periods.

The study team calculated a "gross margin" per hectare and per tonne of sugar beet based on the following formulas (VCS = voluntary coupled support to sugar beet):

- "Gross margin" per hectare = *[(Value of production per ha + VCS per ha where relevant) - (field cost per ha, capital cost excluded)]*
- "Gross margin" per tonne = *[(beet price + VCS per tonne, where relevant) - ("field cost" per tonne - capital costs excluded)]*

The calculation was based on LMC proprietary data for "field costs", data on sugar beet yields per hectare and polarisation (see § 4.1.2.1), sugar beet price data from national or company sources, and DG AGRI data on the amount of VCS per hectare. It is important to underline that the figures on **VCS per tonne** are the result of **ex-post calculations by the study team**. By design, **VCS is granted per hectare under sugar beet**, and the extent of the related payments per hectare has **no linkage with actual yields**. This support delivery mechanism is consistent with the need to avoid fully coupled support to production, to ensure compliance with WTO commitments.

Figures in Tables 5.14 and 5.15 reveal:

- A significant decline of "gross margins" in the post-quota period, and in particular in the 2018/19 and 2019/20 marketing years.
- The role of "game changer" played by the substantial amounts of VCS per hectare granted in Italy in the post quota period, which are among the highest in the EU (Table 5.16) and which provide a substantial contribution to the revenues of sugar beet growers.

Table 5.14 - Evolution of the "gross margin" per hectare of sugar beet (€)*

Member States	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Austria	n.a.	832	1 587	581	237	466	n.a.
Belgium	612	612	595	293	191	295	n.a.
France	926	888	1 131	971	483	431	n.a.
Italy - without VCS	n.a.	264	405	598	-126	-144	n.a.
Italy - with VCS**	n.a.	705	919	1 031	361	597	n.a.
Netherlands	2 876	2 012	1 950	2 555	1 166	1 369	1 420

* "Gross margin" = [(Value of production per ha + VCS per ha where relevant) - (field cost per ha, capital cost excluded)]
** Figures for 2018 and 2019 are based on the unit amounts of VCS per hectare reported by the Italian agency for payments in agriculture (AGEA).
Source: elaboration of data from LMC International, DG AGRI, CEFS, Eurostat, national and company sources (for sugar beet prices)

Table 5.15 - Evolution of the "gross margin" per tonne of sugar beet (€)*

Member States	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Austria	n.a.	13.26	19.53	8.29	3.45	6.61	n.a.
Belgium	6.95	7.19	8.22	3.08	2.31	3.35	n.a.
France	9.93	10.20	13.25	10.19	5.88	5.06	n.a.
Italy - without VCS	n.a.	4.60	6.39	9.25	-2.24	-2.42	n.a.
Italy - with VCS**	n.a.	12.31	14.50	15.95	6.39	10.06	n.a.
Netherlands	31.62	24.15	25.07	27.40	15.27	16.32	17.29

* "Gross margin" = [(beet price + VCS per tonne, where relevant) - ("field cost" per tonne - capital costs excluded)]
** Figures for 2018 and 2019 are based on the unit amounts of VCS per hectare reported by the Italian agency for payments in agriculture (AGEA).
VCS per tonne was calculated ex-post by the study team; support is actually granted per hectare under sugar beets.
Source: elaboration of data from LMC International, DG AGRI, CEFS, Eurostat, national and company sources (for sugar beet prices)

Table 5.16 - Voluntary coupled support (VCS) to sugar beet*

Member States	Unit	2015/16	2016/17	2017/18	2018/19	2019/20
Croatia	Euros/ha	201	204	148	234	329
	Euros/T	3.69	2.70	2.23	4.24	5.37
Czechia	Euros/ha	289	275	248	252	276
	Euros/T	4.87	4.06	3.73	4.38	4.46
Italy**	Euros/ha	442	514	433	487	741
	Euros/T	7.71	8.11	6.71	8.63	12.49
Italy - relative weight on revenues/ha**		22.1%	22.8%	18.8%	28.8%	38.9%
Poland	Euros/ha	502	454	358	345	343
	Euros/T	9.65	6.83	5.27	5.76	5.97
Spain - spring	Euros/ha	520	573	493	518	n.a.
	Euros/T	4.69	5.78	4.93	6.56	0.00
Spain - fall	Euros/ha	284	353	313	309	371
	Euros/T	3.12	4.31	3.69	3.36	n.a.

* VCS per tonne was calculated ex-post by the study team; support is actually granted per hectare under sugar beets.
** Figures for 2018 and 2019 are based on the unit amounts of VCS per hectare reported by the Italian agency for payments in agriculture (AGEA).
Source: elaboration of data from DG AGRI, Eurostat, CEFS, national and company sources (for sugar beet prices)

5.5.2 Beet sugar producers

The evolution of the profitability of EU beet sugar producers in the transition from the quota period to the post-quota one was analysed in terms of:

1. **Profitability per tonne of white sugar**, measured through three different sets of sugar price / production cost ratios.
2. **Key profitability indicators at group/company level** featured in the annual reports of a selection EU sugar producers.

5.5.2.1 Profitability per tonne of white sugar

The analysis was carried out for a selection of nine beet sugar producing Member States. It was based on proprietary sugar production cost data by LMC International and on national averages of ex-works prices of white sugar collected by DG AGRI. Due to copyright issues (LMC International dataset) and to the confidential nature of price data provided by DG AGRI, the results of the analysis are presented through three different sets of sugar price / production cost ratios, calculated as follows:

1. **Net profitability ratio** = *(ex-works sugar price)/(nominal beet sugar production costs)*, where the latter are defined as the total cost of transforming sugar beets into bulk white sugar, net of the by-product credit, plus overheads (administration costs). This is the most restrictive profitability ratio, aimed at assessing the capacity to cover all the cost items that are in some way related to refined beet sugar production.
2. **Net profitability ratio, overheads excluded** = *(ex-works sugar price)/(nominal beet sugar production costs, overheads excluded[45])*. This is a slightly less restrictive profitability ratio, aimed at assessing the capacity to cover all the fixed and variable operational cost items.
3. **Gross profitability ratio, overheads and capital costs excluded** = *(ex-works sugar price)/(nominal beet sugar production costs, overheads and capital costs excluded[46])*. Since the ratio aims at assessing the capacity to cover what can be defined as the sum of variable operational cost items, it should be understood as the "rock bottom" profitability ratio. If the ex-works sugar price is unable to cover variable operational costs, the short-term economic sustainability of beet sugar production is at danger, since the operation of sugar factories results in a negative gross margin.

The evolution of the three profitability ratios between the 2014/15 and 2019/20 marketing years is presented in Tables 5.17 to 5.19. The analysis revealed:

- A serious decline of all the three profitability ratios in all the sugar producing Member States in the post-quota period, with particularly disappointing results especially in the 2018/19 and 2019/20 marketing years, when ex-works white sugar prices in the EU experienced a prolonged depression.
- A clear difficulty to cover total production costs (also excluding overheads) in Croatia and especially Italy, which was already apparent in the quota period. A slight recovery in that regard was recorded in the 2019/20 marketing year, compared to the lowest levels recorded in 2018/19.
- That the "rock bottom" of gross profitability was hit in Italy only, and for just one marketing year (2018/2019). This explains why, in spite of non-satisfactory profitability, beet sugar production has not ceased altogether in any of the nine Member States covered by the analysis (indeed, the only Member State that

[45] "Nominal beet sugar production costs, overheads excluded" = Total field costs + Total factory costs (labour, capital, inputs, net of by-product credits).

[46] "Nominal beet sugar production costs, overheads and capital costs excluded" = Total field costs + Variable factory costs (labour, inputs, net of by-product credits).

ceased producing beet sugar completely in the post-quota period is Portugal, whose beet sugar output was already minimal at the end of the quota period).

Table 5.17 – Evolution of the net profitability ratio per tonne of refined beet sugar (2014/15 to 2019/20)*

Member States	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Austria	0.88	0.87	1.30	0.96	0.73	0.92
Belgium	1.18	1.21	1.46	1.35	0.96	0.98
Croatia	0.87	0.71	1.30	0.77	0.59	0.62
France	1.12	1.07	1.31	1.06	0.80	0.94
Germany	1.11	1.02	1.32	1.15	0.86	0.93
Italy	0.81	0.65	0.93	0.67	0.46	0.62
Netherlands	1.47	1.32	1.55	1.48	1.12	1.22
Poland	1.36	1.07	1.46	1.01	0.87	0.92
Spain	0.98	1.05	1.11	0.87	0.64	0.86

* (ex-works refined beet sugar price)/(nominal beet sugar production costs)
Source: elaboration of LMC International and DG AGRI data

Table 5.18 - Evolution of the net profitability ratio (overheads excluded) per tonne of refined beet sugar (2014/15 to 2019/20)*

Member States	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Austria	1.03	1.02	1.53	1.13	0.87	1.09
Belgium	1.39	1.44	1.74	1.60	1.13	1.17
Croatia	1.03	0.85	1.56	0.92	0.72	0.75
France	1.33	1.27	1.56	1.26	0.95	1.11
Germany	1.31	1.22	1.56	1.37	1.02	1.11
Italy	0.97	0.79	1.10	0.80	0.55	0.75
Netherlands	1.73	1.56	1.84	1.74	1.33	1.45
Poland	1.60	1.27	1.72	1.19	1.03	1.09
Spain	1.17	1.26	1.33	1.04	0.77	1.04

* (ex-works refined beet sugar price)/(Total field costs + Total factory costs (labour, capital, inputs, net of by-product credits))
Source: elaboration of LMC International and DG AGRI data

Table 5.19 - Evolution of the gross profitability ratio (overheads + factory capital costs excluded) per tonne of refined beet sugar (2014/15 to 2019/20)*

Member States	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Austria	1.20	1.25	1.84	1.41	1.21	1.52
Belgium	1.75	1.86	2.26	2.04	1.50	1.55
Croatia	1.36	1.32	2.27	1.31	1.17	1.29
France	1.74	1.70	2.10	1.63	1.30	1.50
Germany	1.66	1.64	2.06	1.77	1.38	1.47
Italy	1.30	1.17	1.52	1.24	0.92	1.14
Netherlands	2.09	2.06	2.38	2.15	1.71	1.84
Poland	1.99	1.68	2.20	1.51	1.33	1.40
Spain	1.59	1.77	1.96	1.55	1.22	1.65

* (ex-works refined beet sugar price)/(Total field costs + Variable factory costs (labour, inputs, net of by-product credits))
Source: elaboration of LMC International and DG AGRI data

5.5.2.2 Key profitability indicators of selected EU sugar producers

The analysis focused on the evolution of two key profitability indicators – EBITDA as % of revenues or turnover and EBIT as % of revenues or turnover[47] - of selected EU sugar producers from the 2014/15 to the 2019/20 marketing year, i.e., over the transition from the quota period to the post-quota one.

It should be noted that the profitability indicators presented by EU sugar producers in their annual reports to shareholders (which are also available to the general public) are not systematically and perfectly comparable. The results of the analysis presented in Tables 5.20 to 5.23 should hence be understood as a general overview of the profitability of a rather wide selection of EU sugar producers.

Two different **clusters of sugar producers** were analysed separately:

- "**Core business-oriented sugar producers/operational entities**": sugar producers with limited/no product/sector diversification, together with the sugar business units of diversified producers (wherever unit-specific profitability metrics were available in annual reports) (Tables 5.20 and 5.22).
- "**Diversified sugar producers**" as a whole, i.e., including their business units dealing with other products than sugar (Tables 5.21 and 5.23).

A distinction was also made between operational entities controlled by sugar beet growers, and "other entities" on which growers exerted no control. The different business profiles are indicated in the tables through acronyms (individual producers/operational entities are indicated by numbers, in order to ensure anonymisation); ranges of profitability metrics are considered, to obtain a more immediate overview.

The results of the analyses focused on the EBITDA/revenues % ratio revealed that:

- There was a **serious decline of the profitability of core business-oriented sugar producers/operational entities after the end of quotas** (Table 5.20), in two difficult marketing years: 2019/20 and (especially) 2018/19. Two producers (both controlled by sugar beet growers) recorded negative ratios in both years.
- By contrast, **diversified sugar producers fared much better** also in 2018/19 and 2019/20 (Table 5.21), even though they also experienced a decrease in their profitability in the post-quota period. No diversified sugar producer recorded negative ratios over the entire duration of the period considered.

The considerations suggested by the analysis of the evolution of the EBIT/revenues % ratio of sugar producers (Tables 5.22 and 5.23) are analogous to those made in the analysis of the EBITDA/revenues % ratio. Product and sector diversification generally helped the concerned operators to cope with the poor profitability of their sugar business units even in the toughest conditions, such as those experienced in the 2018/19 and 2019/20 marketing years. By contrast, producers and operational entities heavily focused on the core business (beet sugar production) were hit hard in the post-quota period: none of them recorded a positive EBIT/revenues % ratio in 2018/19, and just one managed to do that in 2019/20.

Geographical diversification did not prove to be an effective stabiliser of profitability in the post-quota period: some of the core business-oriented producers

[47] EBITDA: earnings before interest, taxes, depreciation, and amortisation; measures the performance of the ordinary operational activity of a company, and can be understood as a measure of its economic operational sustainability, since it does not take into account the production structure (e.g., fixed assets) of the company. It is also considered as a good proxy of the company operative cash flow. EBIT: earnings before interest and taxes: measures the overall business performance of a company, including non-ordinary activities and regardless its financial structure (e.g., bank debt vs. equity). It can be understood as a measure of the company's overall economic sustainability, since it assesses its capacity to cover also depreciation and amortisation of fixed assets.

recording negative profitability ratios in 2018/19 and 2019/20 actually produce beet sugar in multiple Member States, and some of them are even involved in beet and/or cane sugar production in third countries. Finally, control of sugar producers by growers (or lack thereof) does not seem to have any clear linkages with profitability.

It is however important to note that thanks to positive developments in the situation of the EU sugar market over the last months (see § 4.3), a number of leading EU sugar producers have recently reported about **improved profitability of sugar production, and more satisfactory financial results for the 2020/21 marketing year**. Indeed, the average price for white sugar on the EU market has slowly but steadily increased from the minimum reached in January 2019 (312 Euros/tonne), and has reached 408 Euros/tonne (Sugar Market Observatory reporting for September 2021), a value above the reference threshold of EUR 404.4 per tonne.

Table 5.20 - Core business-oriented sugar producers and operational entities: evolution of the EBITDA/revenues % ratio (2014/15-2019/20)*

Ranges	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
> +15%		OT-CB-1	OT-CB-1	OT-CB-1		
+10-15%			GR-CB-5	GR-CB-5		
+5-10%	OT-CB-1 GR-CB-5	GR-CB-5 GR-CB-6	GR-CB-1 GR-CB-4 GR-CB-6	GR-CB-1 GR-CB-4 GR-CB-6	OT-CB-1	
+ 0-5%	GR-CB-1 GR-CB-4 GR-CB-6	GR-CB-1 GR-CB-4			GR-CB-5	OT-CB-1 GR-CB-5 GR-CB-6
- 0-5%					GR-CB-4 GR-CB-6	GR-CB-1 GR-CB-4
- 5-10%					GR-CB-1	
- 10-15%						
< -15%						

* GR-CB: controlled by growers; OT-CB: not controlled by growers. Numbers in the identifiers indicate the different producers/operational entities considered for each profile, for anonymisation purposes.
Source: elaboration of data retrieved in company annual reports

Table 5.21 - Diversified sugar producers: evolution of the EBITDA/revenues % ratio (2014/15-2019/20)*

Ranges	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
> +15%						
+10-15%		OT-DIV-1	OT-DIV-1 GR-DIV-3	GR-DIV-3		
+5-10%	OT-DIV-1 GR-DIV-1 GR-DIV-3 GR-DIV-4	GR-DIV-1 GR-DIV-3 GR-DIV-4	GR-DIV-1 GR-DIV-4	OT-DIV-1 GR-DIV-1 GR-DIV-4	GR-DIV-1 GR-DIV-3 GR-DIV-4	GR-DIV-1 GR-DIV-3 GR-DIV-4
+ 0-5%					OT-DIV-1	OT-DIV-1
- 0-5%						
- 5-10%						
- 10-15%						
< -15%						

* GR-DIV: controlled by growers; OT-DIV: not controlled by growers. Numbers in the identifiers indicate the different producers considered for each profile, for anonymisation purposes.
Source: elaboration of data retrieved in company annual reports

Table 5.22 - Core business-oriented sugar producers and operational entities: evolution of the EBIT/revenues % ratio (2014/15-2019/20)*

Ranges	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
> +20%						
+15-20%						
+10-15%						
+5-10%		GR-CB-2	OT-CB-2 OT-CB-3 GR-CB-5	GR-CB-1 GR-CB-5		
+ 0-5%	GR-CB-1 GR-CB-2 GR-CB-4 GR-CB-5 GR-CB-6 OT-CB-3	GR-CB-1 GR-CB-5 GR-CB-6	GR-CB-1 GR-CB-2 GR-CB-4 GR-CB-6	GR-CB-2 GR-CB-4 GR-CB-6 OT-CB-3		GR-CB-2
- 0-5%	GR-CB-3	OT-CB-2 OT-CB-3 GR-CB-4	GR-CB-3	GR-CB-3	GR-CB-2 GR-CB-5	GR-CB-5
- 5-10%	OT-CB-2	GR-CB-3			GR-CB-4 GR-CB-6	GR-CB-1
- 10-15%					GR-CB-1	GR-CB-4 GR-CB-6
- 15-20%				OT-CB-2	OT-CB-3	
< - 20%					GR-CB-3 OT-CB-2	GR-CB-3

* GR-CB: controlled by growers; OT-CB: not controlled by growers. Numbers in the identifiers indicate the different producers/operational entities considered for each profile, for anonymisation purposes.
Source: elaboration of data retrieved in company annual reports

Table 5.23 - Diversified sugar producers: evolution of the EBIT/revenues % ratio (2014/15-2019/20)*

Ranges	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
> +20%						
+15-20%						
+10-15%			OT-DIV-1			
+5-10%		GR-DIV-1 OT-DIV-1	GR-DIV-1 GR-DIV-3	GR-DIV-1 GR-DIV-3		
+ 0-5%	GR-DIV-1 GR-DIV-2 GR-DIV-3 OT-DIV-1	GR-DIV-2 GR-DIV-3	GR-DIV-2	OT-DIV-1 GR-DIV-2	GR-DIV-1 GR-DIV-3	GR-DIV-1 GR-DIV-2 GR-DIV-3
- 0-5%					GR-DIV-2	
- 5-10%						
- 10-15%						OT-DIV-1
- 15-20%					OT-DIV-1	
< - 20%						

* GR-DIV: controlled by growers; OT-DIV: not controlled by growers. Numbers in the identifiers indicate the different producers considered for each profile, for anonymisation purposes.
Source: elaboration of data retrieved in company annual reports

5.5.3 Raw cane sugar refiners

The analysis of profitability ratios of a raw cane sugar refiner that is part of a diversified group (Table 5.24) revealed some findings that are perfectly consistent with those emerged from the analysis of the beet sugar sector (see § 5.5.2.2), i.e.:

- seriously worsened profitability of the business unit focused on sugar refining in the post-quota period (especially in the 2019/20 marketing year);
- a much better and steadier performance of the diversified parent group.

The above findings are further confirmed by the recent analysis of the raw cane sugar refining sector made by the ISO (2021), which revealed worsened key determinants of profitability for sugar refiners in the post-quota period (in particular a very narrow white sugar premium between May 2017 and December 2019).

The results of the study team's in-depth investigations on the profitability of the Portuguese sugar refining sector in the post-quota period confirm the above findings: on average, the two Portuguese sugar refiners recorded negative EBITDAs in most of the years of the post-quota period; the situation improved only in the 2020/21 marketing year.

It should anyway be underlined that no full-time sugar refiner ceased its activity since the end of quotas.

Table 5.24 – Raw cane sugar refiners: evolution of the EBITDA/revenues % ratio (2014/15-2019/20)

Ranges	2016/17	2017/18	2018/19	2019/20
> +15%				
+10-15%				
+5-10%	DIV	DIV	DIV	DIV
+ 0-5%	CB			
- 0-5%		CB	CB	
- 5-10%				
- 10-15%				CB
< -15%				

* CB: business unit focused on sugar refining (core business); DIV: diversified parent group
Source: elaboration of data retrieved in company annual reports.

SECTION C - ANALYTICAL PART

6 THEME 1: THE STRUCTURE AND COMPETITIVENESS OF THE EU SUGAR SECTOR AND ITS SUPPLY CHAIN ORGANISATIONAL ARRANGEMENTS

6.1 Q1: What are the main drivers of the EU sugar sector's competitiveness? And, what is their effect (i.e., strengthening or weakening) on the sector's resilience?

Definition of key terms

"Competitiveness of the EU sugar sector": On aggregate, the competitiveness of the EU sugar sector can be measured by its **capacity to increase its share in the EU market, in the world market and/or in the main non-EU destination markets**. However, the definition of this concept also needs to consider the fact that especially after the 2006 reform of the sugar regime the EU has been a net importer of sugar in some years, and a net exporter in other years. It also needs to consider the fact that a number of key policies[48] may contribute to weaken or strengthen the capacity of EU sugar producers to stay in business and to compete against third country producers on the domestic and international sugar markets. For these reasons, it is advisable to adopt two different definitions of competitiveness, linked with the net sugar trade position of the EU.

When the **EU is a net importer of sugar** (in other words, there is a deficit of EU domestic sugar production vis-à-vis internal demand), the competitiveness of the EU sugar sector is defined as the capacity of operators in the EU sugar supply chain to stay in business at the so-called "**import parity price**": *international sugar price + applicable logistic costs + full import tariff* (third country duty for white sugar, non-preferential duty under end-use for raw cane sugar for refining[49]).

When the **EU is a net exporter of sugar** (in other words, there is a surplus of EU domestic sugar production vis-à-vis internal demand), the conditions ensuring competitiveness are more demanding, since competitiveness must be defined as the capacity of operators in the EU sugar supply chain to stay in business at the so-called "**export parity price**": *international sugar price + applicable logistic costs*.

It should be noted that the **effect of support policies and other factors** (mainly the availability of financial resources to cope with more or less prolonged periods of negative margins) may safeguard the competitiveness of the EU sugar sector even in case the import or export parity price does not fully cover the total sugar production cost (intended as sum of variable costs and fixed costs, excluding overhead costs), even though such a situation would be unsustainable in the medium term. Nevertheless, if the import or export parity price does not fully cover sugar variable production cost, the competitiveness of the affected operators would be at serious risk, since such a critical situation can be sustainable only for a short time.

"Resilience of the EU sugar sector": A general definition of the concept of "resilience" in a business context is the following: the ability of an equipment, machine, or system to absorb the impact of the failure of one or more components or a significant disturbance in its

[48] EU sugar import regime (tariff protection, preferential conditions granted to imports from specific origins, tariff rate quotas); coupled support to sugar beet cultivation; support to investments in the farming and/or processing stages of the sugar supply chain; publicly funded risk management tools; policies aimed at discouraging excessive sugar intake in diets; health or environmental conservation policies limiting or prohibiting the use of specific production inputs and/or techniques; etc.

[49] This is currently set at 419 Euros/tonne for white sugar (NC code 1701 99 10) and at 339 Euros/tonne for raw cane sugar for refining.

environment, and to still continue to provide an acceptable level of service/performance[50]. In the specific context of the study, the key elements of this general definition are defined as follows.

The "**system**" is identified in **the EU sugar sector and all its material and immaterial components**: actors in the sugar supply chain (sugar beet growers, sugar producers, sugar users, sugar traders and distributors, etc.); their relationships (as defined by techno-economic linkages and regulated through contracts, agreements etc.); their business strategies (with particular attention to strategies aimed at addressing instability and external shocks, such as geographical, product and sector diversification); the material assets used in sugar production and distribution (agricultural holdings, processing plants, storage and handling facilities, etc.); the institutional framework in which the system operates (as defined by relevant legislation at EU, national, regional level).

The "**disturbance in the environment**" in which the EU sugar sector operates is identified in any **perturbation caused by a wide range of external factors** (affecting the sugar market, sugar beet cultivation, sugar production including full-time refining, etc.), with particular attention to market disturbance deriving from **price volatility / price shocks in the international sugar market.** Disturbance from such external factors as climate, pest outbreaks, policy changes, etc. is also considered relevant for the assessment.

The "**acceptable level of performance**" of the EU sugar sector, which should be **ensured by its resilience**, is identified in the combination of: i) the **economic viability of its actors** (in terms of adequate income levels for sugar beet growers and satisfactory profitability levels for sugar producers, including full-time refiners), and; ii) the **availability of an adequate sugar supply in the EU** (intended as the combination of domestic sugar production and sugar imports from third countries, where relevant) in terms of sufficient volumes and satisfactory quality.

In practice, the "resilience" of the EU sugar sector can be intended as its capacity to overcome periods characterised by external shocks, and then revert to its usual conditions.

Understanding of the question

The question aims at assessing the effects in terms of resilience:

1. of the main individual competitiveness drivers ("in isolation");
2. of selected meaningful combinations of the main competitiveness drivers.

The assessment is based on the criteria defining the "acceptable level of performance" of the EU sugar production and marketing system, i.e.:

a. the economic viability of its actors;
b. the availability of an adequate sugar supply in the EU.

6.1.1 The evolution of competitiveness drivers over time

This section provides a description of the evolution of the main competitiveness drivers over time (comparing the post-quota period with the quota period). Where such evolution has already been outlined quantitatively and qualitatively in the descriptive part of the report, a synthetic qualitative overview of the main trends is provided here, together with a reference to the relevant section of the descriptive part, to avoid repetitions.

Sugar beet and sugar production costs: evolution and main components

Sugar beet production costs

A detailed quanti-qualitative description has been provided at § 5.4.2 for a selection of 9 Member States. In general, no remarkable variations in sugar beet production costs emerged from the comparison of the quota period average (2014/15 to 2016/17) with the post-quota period average (2017/18 to 2020/21). Average variable costs per hectare in the post-quota period fall in a range of 1 100 (Poland) / 1 750 (Spain) Euros; unit variable costs range from 17-18 Euros/tonne (France and Belgium) to 22.5-23.5 Euros/tonne (Austria and Italy).

[50] Adapted from Business Dictionary: http://www.businessdictionary.com/definition/resilience.html

With regard to the total production cost (fixed + variable costs), the main cost component is generally represented by fixed costs (machinery depreciation), mainly due to the fact that sugar beet farming requires intensive machinery work with costly specialised equipment. The main cost items among variable costs are represented by seeds, fertilisers and pesticides; irrigation costs are another significant component in the southernmost beet farming regions of the EU (Spain, Italy, Greece).

Sugar production costs

A detailed quanti-qualitative description has been provided at § 5.4.3 for beet sugar (for a selection of 9 Member States) and at § 5.4.4 for refined cane sugar produced in Portugal. In the case of **beet sugar**, the most cost-efficient producing Member States (Netherlands, Belgium, Germany, France, Poland) have further improved their cost competitiveness with the transition to the post-quota period (albeit to a different extent); by contrast, most Member States in the trailing group (Austria, Spain, Croatia, Italy) have been negatively impacted by increased production costs after the transition, with rare exceptions. The average full production cost per tonne of sugar in the post-quota period ranges from 250-300 Euros (Netherlands) to 690-740 Euros (Italy). The average variable cost per tonne of sugar (overheads and capital costs excluded) in the post-quota period ranges from 170-220 Euros (Netherlands) to 350-400 Euros (Italy). The main cost component is represented by the cost of sugar beets; fixed costs (mainly depreciation of processing plants) and energy costs are the other main cost items.

The importance of **pursuing scale economies at plant level** for beet sugar producers, in order to **improve their cost competitiveness**, emerges clearly from the analysis of the evolution of the average processing capacity per plant over the 2010-2020 period (Table 6.1). This structural parameter **increased significantly or substantially** in nearly all beet sugar producing Member States over the 2010-2020 period, with the sole significant exceptions of Spain (marginal increase) and Romania (marginal decrease). In most beet sugar producing Member States, most of the increase in this parameter was achieved already in the 2010-2015 sub-period, i.e., in anticipation of the original deadline for the end of quotas. This parameter increased more in the 2015-2020 sub-period only in Poland and Czechia, as well as (to a more limited extent) in Germany. This suggests that sugar producers in most Member States strived to get a more cost-efficient industrial structure well in advance of the end of quotas.

Also thanks to inputs from the consulted sectoral stakeholders and independent experts, it emerged that even though, broadly speaking, high-capacity beet sugar factories tend to be more cost-efficient, there are **significant exceptions** in that regard, which derive from a complex combination of country-specific, company-specific and plant-specific factors. Full and steady utilisation of processing capacity, the length of sugar beet processing campaigns, the average sugar output per factory, and the volume of sugar beets that have to be processed to get one tonne of refined sugar are other key parameters in that regard.

Table 6.1 - Evolution of the average processing capacity of beet sugar factories, by Member State (2010-20) (daily beet slicing capacity in tonnes)

Member States*	2010	2015	2020	Var. 2010-2020 (%)	Var. 2010-2015 (%)	Var. 2015-2020 (%)**
Netherlands	16 750	26 000	28 000	67.2%	55.2%	11.9%
Sweden	18 000	21 000	21 000	16.7%	16.7%	0.0%
Italy	13 750	15 667	15 500	12.7%	13.9%	-1.2%
France	13 165	14 068	15 017	14.1%	6.9%	7.2%
Belgium	13 000	14 667	14 667	12.8%	12.8%	0.0%
Germany	11 825	12 300	13 089	10.7%	4.0%	6.7%
Austria	12 000	12 700	12 700	5.8%	5.8%	0.0%
United Kingdom	10 875	12 525	12 525	15.2%	15.2%	0.0%
Denmark	11 900	12 500	12 500	5.0%	5.0%	0.0%
Spain	9 200	9 240	9 240	0.4%	0.4%	0.0%
Finland	7 500	8 000	8 000	6.7%	6.7%	0.0%
Greece	6 167	8 000	8 000	29.7%	29.7%	0.0%
Croatia	6 333	7 667	7 667	21.1%	21.1%	0.0%
Poland	5 703	6 465	7 616	33.5%	13.4%	20.2%
Hungary	6 500	7 500	7 500	15.4%	15.4%	0.0%
Czechia	5 143	5 257	5 821	13.2%	2.2%	11.0%
Slovakia	4 800	5 500	5 500	14.6%	14.6%	0.0%
Lithuania	3 600	4 450	4 450	23.6%	23.6%	0.0%
Romania	3 200	3 200	3 125	-2.3%	0.0%	-2.3%
Portugal	1 250	1 000	no plants	no plants	-20.0%	no plants
Bulgaria	no plants	no plants	no plants	no plants	no plants	no plants

* Member States listed in decreasing order of average processing capacity per plant in 2020
** calculated as [(variation 2010-2020) - (variation 2010-15)]
Source: elaboration of IHS Markit data and company information

The non-automatic relationship[51] between the average daily slicing capacity of beet sugar factories and the extent of sugar production cost per tonne emerges from the qualitative comparison presented in Table 6.2. In any case, within each Member State, the plants with lower processing capacity are generally the ones that are shut down first in the framework of industrial restructuring.

[51] The most striking exception to the "rule of thumb" is **Italy**, where high-capacity beet processing plants are needed due to local specificities (the length of the campaign cannot be stretched too much, and a larger volume of sugar beets must be processed to obtain one tonne of sugar, due to low polarisation); however, total sugar production costs (overheads excluded) are high, mainly due to the fact that the substantial capital costs deriving from high-capacity plants are spread over a relatively limited sugar output per plant. **Poland** is a clear example of the opposite situation: relatively low-capacity plants, but rather good cost competitiveness.

Table 6.2 - Average processing capacity of plants and beet sugar production costs in selected Member States

Member States*	Avg. beet slicing capacity, 2020 (tonnes/day)	Member States**	Total sugar production cost, overheads excluded, post-quota period (Euros/tonne)
Netherlands	28 000	Netherlands	210-260
Italy	15 500	Belgium	240-290
France	15 017	Germany	270-320
Belgium	14 667	France	270-320
Germany	13 089	Poland	280-330
Austria	12 700	Austria	360-410
Spain	9 240	Spain	400-450
Croatia	7 667	Croatia	470-520
Poland	7 616	Italy	570-620

* listed in decreasing order of average processing capacity per plant in 2020
** listed in decreasing order of average cost competitiveness in the post-quota period (2017/18 - 2019/20)
Source: elaboration of IHS Markit and LMC International data and company information

As for **refined cane sugar**, the available estimates for Portugal diverge significantly: 540-640 Euros/tonne of refined sugar for the 2016-2019 period, 350-400 Euros/tonne of refined sugar for 2020.

The cost of raw cane sugar is by far the main cost component, followed by energy costs and freight costs.

Sugar selling prices: main drivers

A detailed quanti-qualitative description of the evolution of the main supply and demand fundamentals at both EU and global level (sugar supply balance; stock-to-use ratio) has been provided at § 4.3. In general terms, the initial part of the post-quota period was characterised by bearish fundamentals (oversupply and high stock-to-use ratio) at both global and EU level. The EU has structurally been a net sugar importer since the 2006 reform of the sugar regime; it became a net exporter in the 2017/18 marketing year (the first after the end of sugar quotas) for over 2 million tonnes of sugar, due to an exceptionally high domestic production; imports remained modest also in the following marketing year, and got close to 1 million tonnes only in the 2019/20 marketing year.

The other main drivers (price transmission mechanisms; level of horizontal/vertical integration; market structure; integration of the EU sugar market into the world market; quality-related aspects) are discussed in dedicated sections below.

Factors influencing the productivity level of sugar beet growers/sugar producers

A description of the evolution of sugar beet sucrose content (polarisation) has been provided at § 4.1.2.1. The variations in sucrose content over time are generally limited. In the main EU sugar beet producing Member States, polarisation generally varies between 17 and 18%.

A detailed discussion of the influence of climate and pests on the productivity of sugar beet farming is developed under question 3 at § 7.1.1, together with a detailed discussion of the factors influencing the productivity of sugar producers.

Trends in the profitability of the main actors of the sugar supply chain

Sugar beet growers

A detailed quanti-qualitative description of the evolution of the profitability of sugar beet farming has been provided at § 5.5.1. The analysis revealed a significant decline of the profitability of sugar beet farming in the post-quota period, and in particular in the 2018/19 and 2019/20 marketing years. Voluntary coupled support was found to compensate the higher costs of the crop.

Beet sugar producers

A detailed quanti-qualitative description of the evolution of the profitability of beet sugar production has been provided at § 5.5.2. The analysis revealed a serious decline of profitability in a selection of 9 beet sugar producing Member States in the post-quota period, with particularly disappointing results especially in the 2018/19 and 2019/20 marketing years, when ex-works white sugar prices in the EU experienced a prolonged depression.

The results of a detailed analysis of the key profitability indicators (EBITDA and EBIT as % of turnover[52]) of a sample of beet sugar producers with different business profiles (focused on beet sugar production vs. diversified) have been presented at § 5.5.2.2. The analysis revealed a serious decline of the profitability of producers focused on beet sugar production after the end of quotas, particularly in the 2018/19 and 1019/20 marketing years; by contrast, diversified sugar producers fared much better also in 2018/19 and 2019/20, even though they also experienced a decrease in their profitability in the post-quota period.

Raw cane sugar refiners

A detailed quanti-qualitative description of the evolution of the profitability of raw cane sugar refining has been provided at § 5.5.3. The analysis revealed a seriously worsened profitability in the post-quota period, mainly due to a very narrow "white sugar premium"[53] between May 2017 and December 2019.

Price transmission mechanisms along the sugar supply chain; level of integration of the EU sugar market into the world market

No empirical studies on vertical (i.e., along the supply chain) or horizontal (i.e., between different geographical areas) price transmission focusing on the EU sugar supply chain have been carried out after the 2012 study by Areté for DG Agriculture; a further scientific elaboration of the study, based however on the same empirical research, can be found in Aragrande, Bruni, Loi and Esposti (2017). The 2012 study by Areté had concluded that:

1. The **2006 reform** of the EU sugar regime had contributed to improve the conditions for the functioning of price transmission (especially of horizontal price transmission between EU domestic sugar markets and the international market), by removing some remarkable constraints to free variation of domestic sugar prices.
2. Despite significant progress made in the six years following the implementation of the cited reform, the expected **effects of policy changes** on vertical and horizontal price transmission in the sugar sector had occurred only in part at the time of drafting the final report for the study (late summer 2012).
3. Most importantly for the purposes of the present study, **changes in the EU sugar regime** were probably not sufficient to promote full price transmission along the entire sugar supply chain (i.e., down to the final consumption stage) without the contribution of changes in other policies and of favourable non-policy developments. The study had found that the functioning of vertical price transmission in the sugar

[52] EBITDA: earnings before interest, taxes, depreciation, and amortisation; measures the performance of the ordinary operational activity of a company, and can be understood as a measure of its economic operational sustainability, since it does not take into account the production structure (e.g., fixed assets) of the company. It is also considered as a good proxy of the company operative cash flow. EBIT: earnings before interest and taxes: measures the overall business performance of a company, including non-ordinary activities and regardless its financial structure (e.g., bank debt vs. equity). It can be understood as a measure of the company's overall economic sustainability, since it assesses its capacity to cover also depreciation and amortisation of fixed assets.

[53] Traditionally, the white sugar premium is calculated as the arithmetic difference between the front month of the London (LIFFE White Sugar No. 5) and New York (ICE Raw Sugar No. 11) sugar futures contracts. It provides an indication of the extent of the margin for raw cane sugar refiners to cover their refining and marketing costs, and to gain a profit.

sector was remarkably affected also by the state of competition in the downstream levels of the supply chain (food industry, distribution), over which the EU sugar regime had (and still has) no direct influence. The evident asymmetry towards price increases highlighted by the assessment, with retail prices reacting to increases in ex-works prices more often than to decreases, implied that operators in the downstream sectors are in a position to adopt such pricing behaviour, and that it was unlikely that they would change it in absence of any pressure in that respect.

The short time span elapsed since the end of sugar quotas (around four years since October 2017) does not allow to come to robust conclusions about any possible changes in the vertical or horizontal price transmission mechanisms of interest for the EU sugar markets in the post-quota period through empirical (i.e., econometric) research[54]. Nevertheless, visual observation of the time series for the relevant prices, as presented at § 4.3, suggests that:

- the average ex-works price for white sugar monitored by the European Commission (Sugar Market Observatory) has started following more closely the dynamics of London No. 5 white sugar futures price after since 2013, albeit with a significant time lag;
- the North-western Europe white sugar delivered price monitored by Platts (spot market) has also started to follow more closely the dynamics of London No. 5 white sugar futures price since 2013, also in this case with a certain time lag.

It is finally important to note that the report by the High Level Group on Sugar (HLG, 2019) underlined the need to increase the EU sugar market's transparency by having the European Commission collect and make available more information on the sugar sector, in particular the price transmission in the downstream part of the food supply chain, i.e. to processing industries, the retail sector and consumers. The recent entry into force of the so-called "market transparency Regulation" (Implementing Regulation (EU) 2017/1185, adopted on 1 October 2019 and applying from 1 January 2021) definitely constitutes an important step in that direction.

Geographical distribution/concentration of sugar production capacity

Since sugar beets cannot be transported over long distances and must be processed as soon as possible after harvest, the geographical distribution of sugar beet processing capacity, and hence of **beet sugar production capacity**, is consistent with the geographical distribution of sugar beet farming areas. The analysis presented at § 5 revealed further concentration of sugar beet farming, and of beet sugar production capacity, in three Member States - France, Germany and Poland - in the post-quota period. These three Member States alone accounted for over two/thirds of the total EU-27 (United Kingdom excluded) beet sugar output in the post-quota period. After the exit of United Kingdom (an important producer of both beet and refined cane sugar) from the Union, the Netherlands, Belgium and Czechia are the other most significant producers of beet sugar in the EU-27.

Tables 6.3 and 6.4 show the evolution of, respectively, total sugar beet processing capacity and total number of beet sugar factories by Member State in the 2010-2020 period, highlighting the dynamics in two sub-periods: 2010-2015 (original deadline for the termination of sugar quotas) and 2015-2020. The latter period reveals the dynamics of industrial restructuring that can be related to the final deadline for the termination of quotas (end of 2016/17 marketing year) and any further restructuring made in the post-quota period. If the entire 2010-2020 period is considered, a significant **reduction of processing capacity** occurred in Greece, Italy and Romania only. By contrast, the **number of factories** decreased significantly in Greece, Italy, Romania and, albeit to a

[54] It should be considered that the robustness of the results of the 2012 study by Areté already suffered from some limitations derived from the relatively short period following the 2006 reform (six years, i.e., around 70 monthly price observations, at the time of finalising the study). The number of monthly price observations for ex-works sugar prices in the EU for the post-quota period (less than 40 at the time of drafting this report) is indeed limited for a robust application of econometric methods.

lesser extent, in France and Germany. This reveals that further technical concentration, i.e., operation of fewer and higher-capacity factories, took place in France and Germany, as it will be discussed in more detail below. A reduction of both processing capacity and number of factories in the 2010-2015 sub-period, i.e., in anticipation of the original deadline for the end of quotas, occurred only in Greece; in Poland, only the number of factories slightly decreased in the first sub-period, but processing capacity increased significantly. Most of the reduction in processing capacity in Italy and Romania and, to a lesser extent, France and Germany, occurred in the 2015-2020 sub-period, i.e., in relation with the final deadline for the end of quotas and in the post-quota period. Analogous considerations apply for reductions in the number of factories in the 2015-2020 sub-period. More or less significant expansion of sugar beet processing capacity was implemented in several Member States (it was particularly substantial in the Netherlands), especially in the 2010-2015 sub-period; only in Poland and Czechia most of the expansion in sugar beet processing capacity was implemented in the 2015-2020 sub-period.

Table 6.3 - Evolution of sugar beet processing capacity, by Member State (2010-20)(daily beet slicing capacity in tonnes)

Member States*	2010	2015	2020	Var. 2010-2020 (%)	Var. 2010-2015 (%)	Var. 2015-2020 (%)**
France	329 130	337 630	315 350	-4.2%	2.6%	-6.8%
Germany	236 500	246 000	235 600	-0.4%	4.0%	-4.4%
Poland	102 660	109 911	129 466	26.1%	7.1%	19.0%
Netherlands	33 500	52 000	56 000	67.2%	55.2%	11.9%
United Kingdom	43 500	50 100	50 100	15.2%	15.2%	0.0%
Spain	46 000	46 200	46 200	0.4%	0.4%	0.0%
Belgium	39 000	44 000	44 000	12.8%	12.8%	0.0%
Czechia	36 000	36 800	40 750	13.2%	2.2%	11.0%
Italy	55 000	47 000	31 000	-43.6%	-14.5%	-29.1%
Austria	24 000	25 400	25 400	5.8%	5.8%	0.0%
Denmark	23 800	25 000	25 000	5.0%	5.0%	0.0%
Croatia	19 000	23 000	23 000	21.1%	21.1%	0.0%
Sweden	18 000	21 000	21 000	16.7%	16.7%	0.0%
Romania	16 000	16 000	12 500	-21.9%	0.0%	-21.9%
Slovakia	9 600	11 000	11 000	14.6%	14.6%	0.0%
Lithuania	7 200	8 900	8 900	23.6%	23.6%	0.0%
Finland	7 500	8 000	8 000	6.7%	6.7%	0.0%
Greece	18 500	8 000	8 000	-56.8%	-56.8%	0.0%
Hungary	6 500	7 500	7 500	15.4%	15.4%	0.0%
Bulgaria	0	0	0	no plants	no plants	no plants
Portugal	1 250	1 000	0	no plants	-20.0%	no plants

* Member States listed in decreasing order of total beet processing capacity in 2020
** calculated as [(variation 2010-2020) - (variation 2010-15)]
Source: elaboration of IHS Markit data and company information

Table 6.4 - Evolution of the number of beet sugar factories by Member State (2010-20)

Member States*	2010	2015	2020	Var. 2010-2020 (%)	Var. 2010-2015 (%)	Var. 2015-2020 (%)**
France	25	24	21	-16.0%	-4.0%	-12.0%
Germany	20	20	18	-10.0%	0.0%	-10.0%
Poland	18	17	17	-5.6%	-5.6%	0.0%
Czechia	7	7	7	0.0%	0.0%	0.0%
Spain	5	5	5	0.0%	0.0%	0.0%
Romania	5	5	4	-20.0%	0.0%	-20.0%
United Kingdom	4	4	4	0.0%	0.0%	0.0%
Belgium	3	3	3	0.0%	0.0%	0.0%
Croatia	3	3	3	0.0%	0.0%	0.0%
Austria	2	2	2	0.0%	0.0%	0.0%
Denmark	2	2	2	0.0%	0.0%	0.0%
Italy	4	3	2	-50.0%	-25.0%	-25.0%
Lithuania	2	2	2	0.0%	0.0%	0.0%
Netherlands	2	2	2	0.0%	0.0%	0.0%
Slovakia	2	2	2	0.0%	0.0%	0.0%
Finland	1	1	1	0.0%	0.0%	0.0%
Greece	3	1	1	-66.7%	-66.7%	0.0%
Hungary	1	1	1	0.0%	0.0%	0.0%
Sweden	1	1	1	0.0%	0.0%	0.0%
Bulgaria	0	0	0	no plants	no plants	no plants
Portugal	1	1	0	no plants	0.0%	no plants

* listed in decreasing order of total number of factories in 2020
** calculated as [(variation 2010-2020) - (variation 2010-15)]
Source: elaboration of IHS Markit data and company information

As for the geographical distribution of **refined cane sugar production capacity** in the EU, after the exit from the Union of what has traditionally been by far the leading refined cane sugar producer in Europe, i.e., the United Kingdom, the Member States hosting the most significant raw cane sugar refining operations are Bulgaria, Italy and Portugal (Bulgaria and Portugal currently have no domestic beet sugar production).

A detailed quanti-qualitative description of the **structural evolution of the EU cane sugar refining sector** has been provided at § 5.2.1.4. The main structural features of the sector have not varied significantly over the 2010-2020 period. The most noteworthy aspect characterising the refining sector in the post-quota period has been the substantial idle/not fully utilised refining capacity, due to a prolonged period of narrow "white sugar premium", an economic parameter that has key importance for the profitability of raw cane sugar refining. Further analysis of the influence of the extent of the "white sugar premium" on the EU raw cane sugar refining sector is developed under question 3 (see § 7.1.1).

Ownership structure of sugar companies

A detailed quanti-qualitative description of the evolution of the ownership structure of sugar companies has been provided at § 5.2.2, with a particular focus on the importance of cooperatives and independent beet growers in the sector. The control of beet sugar production capacity by growers was already extensive in the quota period, and has widened further after the transition to the post-quota period. The structural evolution of the "beet growers' cluster" in the EU sugar industry followed a growth path between 2010 and 2020 (in terms of increased processing capacity and average processing capacity per plant), vis-à-vis significant downsizing of the other cluster (i.e., sugar producers on which growers exert no control).

The 7 sugar producers controlled by growers represented just 26% of the total number of sugar producers in 2020, but owned and operated 75% of the sugar beet processing capacity and 65% of the beet sugar factories in the EU-27 (United Kingdom excluded).

By contrast, operators on which growers exert no control have prevailed in the cane sugar refining sector in both the quota and-post-quota periods.

Level of horizontal/vertical integration within the sugar sector

In both the quota and post-quota periods, all the leading beet sugar and refined cane sugar producers in the EU have been organised as groups of operational entities (sugar companies) owned and/or managed by a single entity (parent company). All these groups operate in at least two different Member States, but the biggest ones operate in up to 9 different Member States, plus a number of third countries, where they are active in beet and often also cane sugar production. A detailed quanti-qualitative overview of the main organisational features of the EU-27 sugar industry in 2020 has been provided at § 5.3.1.

A number of EU sugar producers has participated to alliances, partnerships and joint ventures in the 2010-2020 period. These forms of horizontal coordination are usually focused on sugar marketing, but also on the operation of raw cane sugar refineries (two of the largest sugar refineries in operation in the EU are controlled by joint ventures). After a major transnational marketing alliance terminated in 2010, no comparable entities were formed in the following period.

Out of the 27 sugar producers (considering all the three subsectors: beet sugar, cane sugar milling, raw cane sugar refining) in activity in the EU-27 in 2020, eight had implemented downstream vertical integration towards sugar-consuming activities (chocolate and sugar confectionery, pastry, biscuits, jams, desserts, fruit preparations). In all those cases, control over sugar-consuming activities pre-dates 2010, and hence the end of quotas.

EU sugar market structure

A detailed quanti-qualitative description of the evolution of the structure of the EU sugar sector over the 2010-2020 period has been provided at § 5.2. The **number of sugar producers**[55] in the "current EU-27" (i.e., including Croatia in 2010 and always excluding the two producers operating in the United Kingdom) decreased from 36 in 2010 to 27 in 2020 (-25%). As for **concentration levels** in the sector, the HHI concentration index[56] for the EU as a whole was estimated at 1 357 points for the EU-27 (United Kingdom included, Croatia excluded) in 2010; by 2013, after the last significant mergers and acquisitions that concerned the sector over the 2010-2020 period, the HHI was estimated at 1 250 points for the EU-28 (Croatia included). As for concentration at national level, no Member State had a national HHI score lower than 2 500 points over the entire 2010-2020 period. This reveals a moderate degree of concentration of the EU sugar sector at EU level, and a high degree of concentration in individual Member States, also in the post-quota period.

A European Commission 2018 staff working document[57] provides an overview of the most noteworthy **anti-trust investigations targeted at operators of the EU sugar sector** made by National Competition Authorities (NCAs). A synthetic description of the most significant cases over the quota period (2010-17), out of a total of 8 investigations

[55] This term includes two different profiles of operators: i) groups of companies active in sugar production in multiple Member States (multinational groups); ii) independent sugar producers operating in a single Member State.

[56] The Herfindahl-Hirschman Index (HHI) is given by the sum of the squares of individual shares of producers; shares can be referred to total production volume, value of sales, processing capacity, etc.

[57] European Commission (2018b), available at: https://ec.europa.eu/competition/sectors/agriculture/staff_working_paper.pdf

targeted at the sector, is provided in the boxes below. No significant antitrust investigations targeted at the sugar sector were completed in the post-quota period.

In **2013**, the NCA in **Poland** investigated a complaint from sugar beet growers about an alleged abuse of dominant position by a sugar producer. According to the complaint, the producer had abused its dominant position by stipulating in the supply contract that ***growers could only use seeds purchased from the sugar producer for sowing sugar beets***. The NCA closed the case during the preliminary proceedings after having found that there were no indications that the seed requirements were exploitative, since the growers could obtain a fair commercial margin and that Regulation (EC) No 707/2008 allowed written agreements within the trade (AWT) between sugar beet growers and sugar producers ("undertakings") to include seed specifications.

In **2014**, the NCA in **Germany** fined the three major German sugar producers for forming a "***territorial cartel***", which meant that they would limit their sales of sugar in Germany to their respective home sales areas. They also agreed on prices and quantities to be sold. Each producer participating in the cartel exported sugar to other countries rather than selling it to customers in its competitors' sales areas. The aim of the cartel was to get the highest possible prices for sugar.

In **2017**, in an investigation initiated by a complaint, the NCA in **France** expressed concerns that a ***sugar producer´s procurement contracts with sugar beet farmers could foreclose the sugar beet procurement market***. In response to the NCA's concerns, the sugar producer committed to amend its articles of association to limit the delivery obligation to the producer, to limit the duration of the contracts, to reduce an advance notice period from twelve to three months and to give its mangers training in competition law. The NCA concluded that these commitments would open up the procurement contracts and allow sugar beet growers to benefit from greater freedom to choose which sugar producer to supply.

Logistical aspects in the sugar supply chain

Publicly available information on the logistical aspects of sugar production, especially as far as raw material procurement is concerned, is relatively scarce. Nevertheless, in-depth research carried out in a selection of sugar producing Member States, combined with inputs from some of the consulted sectoral stakeholders, allowed to characterise – at least in broad terms – the key logistical aspects in beet sugar production, raw cane sugar refining, and sugar trading/distribution.

The key logistical aspect in the **beet sugar sector** is related to sugar beet transportation to processing plants. In each Member State, this depends on the location of processing plants vis-à-vis the geography of beet cultivation areas. Sugar beets are generally transported to factories:

- by the farmers themselves with their own equipment (tractors and trailers), where holdings are located close to sugar factories;
- by truck or – much less frequently – train over longer distances.

The average length of beet transportation moves and the average extent of beet transportation costs was found to vary remarkably among Member States and, in each country, across companies and plants. The average distances covered by sugar beets can range from less than 30 kilometres to 100 kilometres and beyond, and the related costs vary accordingly. Rail transportation can reduce the cost of transporting sugar beets over longer distances, but requires costly dedicated infrastructure and equipment. It is interesting to note that organic sugar beets (see below) can bear the higher costs of long-distance moves to processing plants thanks to the high price premium for organic beet sugar.

In the raw **cane sugar refining sector**, as well as in **international sugar trading**, the distances that have to be covered are generally very long, and maritime transportation prevails. Raw cane sugar for refining is generally transported in bulk cargo vessels, since most stand-alone refineries are located in ports, have dockside bulk handling and storage capacity, and make use of high-capacity unloading equipment. Raw cane sugar destined to inland off-crop refineries annexed to beet sugar factories is unloaded from vessels in the nearest ports, and transported in bulk by tanker trucks or

railcars ("hoppers") to refineries. Operators performing physical sugar trading rely on similar transportation patterns and solutions. The logistic costs of raw cane sugar refiners and international sugar traders are hence highly influenced by the dynamics of dry bulk freight rates and containership service rates.

Bulk shipments of refined sugar to industrial customers travel by tanker trucks or railcars, whereas palletised shipments of packed sugar (for direct consumption or to small industrial customers) usually travel by truck or – where the distances to cover are longer and where maritime transportation is also involved – by train or vessel in insulated standard containers.

Quality aspects

The analysis of the available evidence and the consultation of sectoral stakeholders allowed to identify the most significant quality aspects that can be related to the resilience of the EU sugar sector.

With regard to the **technological quality of beets**, **sucrose content (polarisation)** of sugar beets emerged as the key quality parameter. The higher the sucrose content of beets:

- the higher the price per tonne and the revenues per hectare for growers;
- the lower the "raw material intensity" of the beet sugar production process (quantity of beets needed to obtain one tonne of refined sugar), with positive implications on the logistics of sugar beet procurement (smaller volumes of beets have to be transported to factories), and on the processing costs of beets (in particular, the substantial capital costs of beet sugar factories are spread over a larger sugar output obtained from a smaller processed volume of beets).

With the exception of some Member States where the polarisation of beets is often lower than 16% (e.g., Italy, Croatia), growers in the leading beet sugar producing Member States often harvest sugar beets with a sucrose content in the 17-19% range (see § 4.1.2.1).

As for the **quality of sugar**, the key elements emerged from the investigations made are the following:

- Sugar is a **highly standardised product**; the different sugar typologies marketed in the EU comply with quality specifications that are very precisely defined by international, EU-level and national standards. On top of those specifications, customers often add their own specific requirements.
- The **quality of sugar marketed in the EU** is generally very high, does not vary significantly over time, and is not influenced by the price of sugar or by other drivers. Quality standards and customer specifications must be met even when sugar prices are depressed: failure to comply with quality standards would result in dissatisfied customers, that will accept the affected shipment only upon the granting of substantial discounts on price. In case of repeated quality issues, there is a serious risk of losing customers.
- **Sugar quality issues** (e.g., those that may affect some "end of silo" shipments) are not the result of intentional practices aimed at cost reduction. Less accurate sugar production, storage and handling techniques would result in negligible cost savings (if any), but would surely disappoint customers and damage the reputation of producers.

Production of specialty sugars

An extensive analysis of company websites revealed that EU sugar producers (including several smaller independent ones operating in a single Member State) have traditionally been producing a wide range of specialty sugars, including raw cane sugar for direct consumption, liquid sugars, icing sugars, caramel, etc.

The most noteworthy development in the production of specialty sugars occurred over the 2010-2020 period has been the launch of **organic beet sugar** (Table 6.5). EU production nearly doubled between 2016/17 and 2020/21; producers in additional Member States (e.g., Belgium) are about to start commercial production of organic

sugar. At global level, EU organic beet sugar production is dwarfed by organic cane sugar production, obtained for the most part in Brazil and Paraguay.

Organic beet sugar is reported (F.O. Licht, 2020e) to benefit from a sizable price premium over standard white sugar (from 3 to 7 times the price of the latter); however, the extent of such premium is rapidly decreasing (in Italy and Germany in particular) as additional volumes are marketed, since demand is not picking up at the same pace than supply. In any case, the still sizable price premium makes, as already seen, organic beet farming and processing economically viable in conditions that would be absolutely unsustainable for standard sugar beets and sugar.

Table 6.5 – Production of organic sugar in the EU and in the world, 2016/17 – 2020/21 (1 000 tonnes)

Country/area	2016/17	2017/18	2018/19	2019/20	2020/21	Var. 2010-2020 (%)
Austria	9	9	4	10	11	22.2%
Denmark	0	0	0	4	4	n.c.
France	0	0	1	5	5	n.c.
Germany	10	11	7	8	9	-10.0%
Italy	0	0	0	8	9	n.c.
Sweden	0	0	0	1	2	n.c.
European Union	**19**	**20**	**12**	**36**	**40**	**110.5%**
Brazil	181	220	234	247	240	32.6%
Paraguay	111	86	75	65	75	-32.4%
WORLD	**390**	**411**	**408**	**460**	**483**	**23.8%**

n.c. = no calculation possible
Source: elaboration of data from F.O. Licht (2020e)

Nature and quality of customer service provided by sugar producers, wholesalers and traders

The analysis of the available evidence and the consultation of sectoral stakeholders allowed to characterise the nature and quality of customer service provided by sugar producers, wholesalers and traders. Service is often tailored – at least to a certain extent - to the specific needs of individual customers. The terms of service are generally formalised by operators very precisely, and are strictly complied with. The considerations previously made for the quality of sugar generally apply also to the quality of service provided to customers. The quality of service provided by EU sugar producers, wholesalers and traders to their customers is generally very high, does not vary significantly over time, and is not influenced by the price of sugar or by other drivers. The quality of services must be satisfactory even when sugar prices are depressed: poor service or unavailability of operators to address specific needs of their customers would result in negligible cost savings (if any), but would surely disappoint customers and damage the reputation of producers.

Social and environmental responsibility of EU sugar production

Strong industrial relations between EU sugar processors and their employees have been sustained by longstanding social dialogue at European and national level. The **EU Sugar Sector Social Dialogue** was established in 1969, shortly after the entry into force of the Common Market Organisation (CMO) for sugar; official recognition by the European Commission was formalised in 1999 with the creation of the **Social Dialogue Committee for the sugar industry**. Social dialogue has been of paramount importance to ensuring a socially adequate transition in difficult times, such as those following the 2006 EU sugar policy reform[58]. In 2003, the social partners in the dialogue,

[58] By contributing to a sense of co-ownership, the Social Dialogue contributes to the EU sugar industry's competitiveness (CEFS and EFFAT, 2011 and 2018; EESC, 2017). The Sugar Sector

CEFS and EFFAT, voluntarily became engaged in Corporate Social Responsibility (CSR), and agreed on a **Code of Conduct** – in effect since 1 January, 2004 - which sets **eight compulsory minimum social standards and basic rights** (CEFS and EFFAT, 2018). Since 2003, a joint annual CSR report[59] is presented by the two social partners to the European Commission, concerning the Code implementation and updating of examples of good practice. Besides ordinary industrial relationships and collective bargaining, social dialogue in the sugar sector at EU and national level is focused on addressing the **social implications of industrial restructuring** in the sector (loss of jobs, relocation of workers, re-training, etc.)[60], and the **progressive ageing of the workforce** in EU sugar factories (CEFS and EFFAT, 2015).

As for **environmental sustainability in the EU sugar sector**, an extensive analysis of company websites and of the available literature, including the already mentioned sectoral social partners' CSR reports and EU BSSP[61] (2015) for the sugar beet farming stage, revealed that the EU beet sugar sector is generally very attentive to the environmental sustainability of sugar beet farming and processing, also because it entails significant economic benefits in the form of cost reduction and additional revenue streams from the use of residues of sugar beet farming and processing as feedstock for innovative biobased value-adding processes. In 2015 CEFS and EFFAT, together with the International Confederation of European Beet Growers (CIBE), launched the **EU Beet Sugar Sustainability Partnership** (EU BSSP)[62], focusing on enabling good social and environmental performance from field to factory, and working to meet the expectations of sugar customers, regulators, thought leaders, local communities and society at large. This joint initiative is implemented – among others - through the **identification of good practices from an environmental and social standpoint** (EU BSSP, 2015). The leading EU beet sugar producers aim at implementing a **fully circular, zero-waste business model**, where all the materials find a valuable use in the form of finished products, inputs for sugar beet farming and processing, or feedstock for value-adding processes other than beet sugar production (from beet ethanol, to biogas, to biomaterials and bioproducts). Some EU cane sugar refiners are also focused on energy generation from residues and use of renewable energy sources.

Forms of diversification implemented by EU sugar producers

A detailed description of the forms of diversification implemented by EU sugar producers has been provided at § 5.3.1.

The most noteworthy development has been the **loss of interest by EU sugar producers for further geographical diversification within the sugar sector** after the end of quotas. Very few acquisitions of third country sugar producers were made by EU sugar producers over the 2010-2020 period, all of them by multinational groups. By contrast, the **interest for product/sector diversification remained rather high**, as also the results of the survey of sugar producers presented at question 6 (see § 7.4) confirm.

Social Dialogue has had the organisations representing EU sugar producers (CEFS) and trade unions in the food industry (EFFAT) as social partners since its beginnings.

[59] The reports, as well as additional information and documentation on the Sugar Sector Social Dialogue, are available on the dedicated website https://sugardialogue.eu/

[60] With specific respect to point 7 "restructuring", the Code of Conduct states that "employers in the sugar sector endeavour to keep employees and their representatives aware on a regular basis of the situation of the enterprise. Further, sugar sector employers commit to keep employers informed and consulted on planned restructuring measures in due time. In the case of restructuring and of investments with a potential social impact" (as provided by the Code of Conduct), "the sugar industry commits to act in a socially responsible way. The European sugar industry commits to take steps to improve the employability of employees".

[61] EU Beet Sugar Sustainability Partnership (2015), *Sustainability Review – Challenges & achievements*.

[62] Further information and documentation on the EU Beet Sugar Sustainability Partnership is available on the dedicated website http://www.sustainablesugar.eu/

All the **three leading EU sugar producers** in 2020 were controlled by sugar beet growers, and were all characterised by:

1. Operation of multiple beet sugar factories in at least two Member States (often more, and sometimes also in third countries; for two out of three producers, also of cane sugar mills).
2. Operation of (full-time or off-crop) raw cane sugar refining capacity.
3. Product/sector diversification.

The analysis made at § 5.5.2.2 revealed rather clearly that **at the peak of the sugar price depression on the EU market** (2018/19 and 2019/20 marketing years), **diversified sugar producers fared much better in terms of profitability than non-diversified producers** heavily focused on the core business of beet sugar production.

Policy-related drivers of competitiveness

EU and national policies of relevance for the EU sugar sector have extensively been described at § 3. An in-depth assessment of the effect on the EU sugar sector's resilience of the current regulatory framework at EU and national level is developed under question 10 (see § 8.1).

6.1.2 Effect in terms of resilience of the main competitiveness drivers ("in isolation")

This section presents the results of the assessment of the influence on the resilience of the EU sugar sector exerted by the individual competitiveness drivers analysed at § 6.1.1.

For each driver, a description is provided of its capacity to affect, directly or indirectly, the two essential components of the resilience of the EU sugar sector, i.e.:

- the key determinants of the economic viability of the main actors in the EU sugar supply chain;
- the availability of an adequate sugar supply in the EU.

Sugar beet and sugar production costs

Their **effect on the economic viability of actors** is direct and straightforward: the lower the costs, the stronger the viability of the involved actors (sugar beet growers and sugar producers), and vice versa. It should be noted that the bulk of EU beet sugar production is obtained in the Member States that generally have the lowest sugar beet farming and processing costs.

As for the effect of production costs on the **availability of an adequate sugar supply in the EU**, it is an indirect one: through its improvement of the economic viability of actors, cost competitiveness contributes to keep in operation sugar production capacity, with positive implications on the availability of domestic sugar on the EU market.

The effect of technical concentration at plant level (high-capacity sugar factories) on the **economic viability of actors** and on the **availability of an adequate sugar supply in the EU** is an indirect one: to the extent that the related scale economies allow to improve cost competitiveness, the effect on the economic viability of actors is positive, and this has positive implications also in terms of adequacy of sugar supply (see above). Generally speaking, high-capacity processing plants tend to prevail in the main beet sugar producing Member States, even though there are exceptions to that, mainly deriving from national specificities.

The consulted sectoral stakeholders underlined that **cost competitiveness in the farming and processing stages** has **critical importance** in determining the overall resilience of the EU beet sugar sector. The analysis made at § 5.4 revealed that **cost competitiveness of sugar beet farming and processing varies remarkably across the EU**.

Sugar selling prices: main drivers

The effect of supply and demand fundamentals on the **economic viability of actors** is an indirect one: in conditions of oversupply, the depressive effect on sugar prices negatively affects the profitability of sugar beet growers, beet sugar producers and raw cane sugar refiners, endangering the sustainability of their operations.

As for the effect of supply and demand fundamentals on the **availability of an adequate sugar supply in the EU,** the more the supply exceeds demand, the wider the safety margin.

It should be noted that in this specific case, the situation improving the economic viability of actors (relatively tight supply and higher selling prices) reduces the safety margin in terms of supply security, and vice versa: there is hence a **potential conflict**. Only **balanced supply/demand conditions** can ensure the availability of an adequate sugar supply in the EU without putting the **economic viability of actors** at risk.

Factors influencing the productivity level of sugar beet growers/sugar producers

The factors allowing higher productivity in the farming and processing stage contribute positively to the **economic viability of actors** through the combined effect of reduced costs and increased revenues. In this way, they contribute indirectly to the **availability of an adequate sugar supply in the EU**, through the mechanisms discussed above. An assessment of the combined effect of the most important technical factors determining productivity on the cost competitiveness of beet sugar production is performed at § 6.1.3.

Profitability of the main actors of the sugar supply chain

Profitability is clearly the key factor to ensure the **economic viability of actors** in the medium-long term. As already observed, by ensuring the economic viability of actors, profitability contributes to keep in operation sugar production capacity, with positive implications in terms of **adequate availability of domestic sugar on the EU market**. It is evident that the overall combination of techno-economic conditions ensuring profitability should be investigated in order to define the conditions that ensure the strongest economic viability: the assessment of two meaningful combinations of factors will be assessed at § 6.1.3.

Price transmission mechanisms along the sugar supply chain; level of integration of the EU sugar market into the world market

The effect of a well-functioning vertical and horizontal price transmission on the **economic viability of actors** in the EU sugar sector clearly depends on the direction (downstream or upstream, international → domestic or vice versa), sign (increase or decrease of the price whose variation is transmitted) and intensity (extent of the variation) of price movements. Price decreases that are transmitted towards sugar producers and, through these, sugar beet growers, from the downstream stages of the supply chain, or from the international market to the EU market, clearly affect negatively their economic viability; the opposite happens in case of price increases.

As for the effect of a well-functioning vertical and horizontal price transmission on the **adequate availability of domestic sugar on the EU market**, this is extremely difficult to determine because of the complex interplay of the supply and demand dynamics that price signals cause in the concerned markets and sectors, in particular with regard to the balance among EU domestic beet sugar production, refined sugar production from imported raw cane sugar, and white sugar imports from third countries.

In general, however, it can be assumed that a well-functioning vertical and horizontal price transmission should provide operators with non-distorted signals, which would help them to better adapt their production to supply and demand conditions. This can

be considered as a desirable condition to achieve improved resilience of the EU sugar sector.

Geographical distribution/concentration of sugar production capacity

A rational geographical distribution of production capacity at national and regional level, and its concentration in the most productive sugar beet farming Member States and regions, positively contributes to the **economic viability of the involved actors** through the combined effect of improved cost competitiveness (also through reduced logistic costs), higher productivity and hence better profitability. Once again, the improved economic viability of those actors, by contributing to keep sugar production capacity in operation in the EU, has positive implications in terms of **adequate availability of domestic sugar on the EU market**.

Ownership structure of sugar companies

The analysis made at § 5.5.2.2 revealed no clear linkages between the ownership structure of sugar companies and their profitability. Nevertheless, it also revealed that the "growers' industrial cluster" has better structural parameters (in particular, higher average processing capacity per plant), which should positively contribute to improve its **economic viability**. Since the "growers' industrial cluster" controls the most part of sugar production capacity in the EU, its economic viability contributes positively to an **adequate availability of sugar on the EU market.**

Level of horizontal/vertical integration within the sugar sector

The EU sugar sector sees a prevalence of multinational sugar producers operating multiple production facilities in two or three subsectors (beet sugar production, cane sugar refining, sugarcane milling) and in several Member States (and often also in third countries). These conditions have favoured industrial restructuring through technical and economic concentration, in order to pursue scale economies at plant and company level and, through these, improved cost competitiveness and, in the end, **stronger economic viability**. As already observed, the economic viability of the core part of the EU sugar sector contributes positively to **adequate availability of sugar on the EU market**, albeit mainly through domestic production: very few EU operators have diversified geographically towards third countries whose sugar exports enjoy access at zero or reduced duty to the EU market (the only producer operating in the EU that boasts an important industrial presence in those countries is controlled by a non-EU parent company, and only controls a single, relatively minor sugar producer in the EU).

EU sugar market structure

Higher or lower concentration in a sector, *per se*, have no straightforward linkage with the economic viability of its actors. However, the situation that determines the current concentration levels at EU and national level, i.e., the prevalence of a rather limited number of large-sized producers operating in several Member States, has clearly positive implications in terms of **stronger economic viability** of the core part of the sector, as discussed above. As for the linkage between the very high concentration of the sugar sector at national level (few operators controlling large market shares), on the one hand, and **adequate availability of sugar,** on the other hand, this mainly derives from the conduct of the operators themselves, and in particular from the possible incentives for collusion among operators aimed at extracting economic benefits from supply control and the artificial creation of sugar supply shortages. The fact that only one major case of collusive conduct (related to the quota period) was discovered and sanctioned by National Competition Authorities in the EU between 2010 and 2020, suggests that the risk of inadequate availability of sugar on the EU market deriving from anti-competitive conduct in concentrated markets is likely to be rather limited.

Logistical aspects in the sugar supply chain

The investigations made in a selection of sugar producing Member States revealed very different situations in terms of logistic costs in the EU sugar sector. In principle, having ample sugar beet supply within a rather limited radius from processing plants helps to

keep transportation costs down, a condition which contributes to **stronger economic viability** for operators and, through that, to **adequate availability of sugar**.

Quality aspects

The generally good technological quality (high sucrose content) of sugar beets in the Member States where the bulk of EU beet sugar production is concentrated, combined with the absence of significant sugar quality issues, contributes to ensure a satisfactory **economic viability** for the involved operators and, through that, **adequate availability of sugar in the EU.**

Production of specialty sugars

Through the premium prices and the additional revenue streams that it ensures to operators, the production of specialty sugars (including organic sugar) contributes to improve their **economic viability**. Most EU sugar producers (including several smaller independent ones operating in a single Member State) have traditionally been producing a wide range of specialty sugars. By expanding the variety of the assortment of products available to consumers, widespread production of specialty sugars in the EU directly contributes to **adequate availability of sugar in the EU in terms of quality**.

Nature and quality of customer service provided by sugar producers, wholesalers and traders

The absence of significant issues in the quality of services provided to customers by these actors contributes to ensure a satisfactory **economic viability** to them and, through that, **adequate availability of sugar in the EU.**

Social and environmental responsibility of EU sugar production

By ensuring smooth industrial relationships between EU sugar producers and the workforce in sugar factories, and by addressing the social issues that the sector has faced and is facing (mostly related to industrial restructuring and ageing of workers), social dialogue in the EU sugar sector contributes to improve the **economic viability** of operators. In addition, the strong focus of sectoral actors on environmentally sustainable sugar beet farming and processing, and their efforts towards the implementation of zero-waste, fully circular business models, also contribute to their economic viability, thanks to a combination of cost reductions, improved productivity and additional revenue streams. As often underlined, stronger economic viability of EU sugar producers translates into better conditions to ensure an **adequate availability of sugar in the EU**.

Forms of diversification implemented by EU sugar producers

The investigations made revealed that at the peak of the sugar price depression on the EU market, diversified sugar producers fared much better in terms of profitability than non-diversified producers heavily focused on the core business of beet sugar production. This leads to conclude that diversification - especially towards products/sectors that are not, or at least less, influenced by the dynamics of sugar prices – contributes positively to **stronger economic viability** of the concerned producers. By helping to keep temporarily unprofitable sugar production capacity in operation, diversification also contributes to ensure **adequate availability of sugar in the EU**.

In the operational reality of the EU sugar sector, **geographical diversification, product/sector diversification and large size are often found combined in the leading sugar producers**: for this reason, an assessment of the aggregated effect of this combination of competitiveness drivers on the profitability of sugar producers (through a comparison with the relevant metrics for non-diversified, small-scale producers) will be made at § 6.1.3, in order to determine the contribution of that combination of drivers on the economic viability of sugar producers.

6.1.3 Effect in terms of resilience of meaningful combinations of competitiveness drivers

This section presents the results of the assessment of the influence on the resilience of the EU sugar sector exerted by two meaningful combinations of the competitiveness drivers previously analysed "in isolation" at § 6.1.2.

For each combination, a description is provided of its capacity to affect, directly or indirectly, the two essential components of the resilience of the EU sugar sector, i.e.:

- the key determinants of the economic viability of the main actors in the EU sugar supply chain;
- the availability of an adequate sugar supply in the EU.

Combined effect of technical parameters determining productivity levels in the farming and processing stages on the profitability of beet sugar production in the EU

The assessment was performed for a selection of 9 beet sugar producing Member States, which were ranked according to the profitability of beet sugar production (excluding overheads) in the two marketing years where ex-works prices of sugar in the EU reached the lowest levels (2018/19 and 2019/20). For each Member State, the assessment considered the pre-quota situation for the **key technical factors determining productivity levels in the farming and processing stages of the beet sugar supply chain**, i.e.:

Agricultural productivity factors:

- average sugar beet yield in tonnes/ha (2014/15 - 2016/17);
- average sucrose content (polarisation) of sugar beets, in % (2014/15 - 2016/17);
- average sugar yield in tonnes/ha (2014/15 - 2016/17)

Industrial productivity factors:

- average beet slicing capacity per plant in tonnes per day in 2015;
- average length of the beet processing campaign in days (2013/14 - 2015/16).

For each factor, the assessment considered whether it fell around the average value for the selection of Member States, above such average, or below such average. The results of the assessment (Table 6.6) revealed that:

1. the Member States (Netherlands and Belgium in particular) where profitability remained satisfactory also in the worst phase of the price crisis tended to have "above average" values for most of the technical parameters considered;
2. the Member States (Croatia and Italy in particular) that recorded the worst profitability metrics at the height of the price crisis tended to have "below average" values for most of the technical parameters considered[63] .

The situation for the "middle group" of Member States is of less straightforward interpretation, but the case of Poland (satisfactory profitability even with some average or below-average productivity determinants) suggests that the **key technical factors determining productivity levels in the farming and processing stages** of the beet sugar supply chain can **explain only a part of the profitability of beet sugar production in the EU**. Besides a wide array of other country-, company- or factory-specific technical parameters (e.g., beet processing technology), the **remaining part of the profitability of beet sugar production in the EU** is the result of a **complex combination of economic and organisational factors**, which may themselves be country-, company- or factory-specific. For this reason, the study team carried out an assessment of the effect of another meaningful combination of drivers of competitiveness, this time of economic and organisational nature, on the profitability of

[63] with the already discussed notable exception of the high average beet slicing capacity per plant in Italy, which is dictated by national specificities.

sugar production in the EU. The results of this second assessment are presented and discussed in the following section.

Combined effect of size and diversification on the profitability of EU sugar producers

Four basic economic/organisational profiles were considered to assess a selection of sugar producers for which the availability of time series of profitability indicators (EBITDA/revenues % ratio; EBIT/revenues % ratio) allowed to follow the evolution of company performances over the quota and post-quota periods, including at the height of the market crisis (2018/19 and 2019/20 marketing years). The profiles were defined as follows: i) large diversified producers; ii) large but non-diversified producers; iii) small diversified producers (no data to feed profitability indicators could be found for this specific profile, which is quite rare in practice in the EU sugar sector); iv) small and non-diversified producers. Producers operating with 1-2 plants in a single Member State were considered "small"; producers operating multiple plants in more than one Member State (or also in third countries) were considered "large". As for diversification, only producers also operating in segments/sectors that are not strictly related to sugar production (e.g., starch-based products, or food products not containing sugar) were considered "diversified".

The results of the assessment (Tables 6.7 and 6.8) confirmed those of the previous analysis (see § 5.5.2.2) on the **importance of diversification to smoothen the variations of profitability in marketing years where the sugar business is negatively affected by adverse conditions**: only two diversified producers recorded negative ratios at the height of the crisis[64]. Besides that, it also revealed that **size also plays an important role in ensuring less variable economic performances for sugar producers**; the profitability of small, non-diversified sugar producers is heavily influenced by sugar production performances and by the dynamics of sugar price. At the height of the market crisis in the EU (2018/19 and 2019/20 marketing years), the profitability of small, non-diversified sugar producers was hit definitely hard, without any exception.

[64] One of them is a "borderline" diversified producer, with relatively minor operations in segments and sectors not strictly connected with the sugar business.

Table 6.6 - Combined effect of technical parameters determining productivity levels (farming and processing stages) on the profitability of beet sugar production in the EU at the peak of the price depression (marketing years 2018/19 and 2019/20)

Member States	Net profitability ratio (overheads excluded)* per tonne of refined beet sugar		Ranking	Agricultural productivity factors			Industrial productivity factors	
	2018/19	2019/20		Avg. sugar beet yield (2014/15 - 2016/17) tonnes/ha	Avg. polarization (2014/15 - 2016/17) %	Avg. sugar yield (2014/15 - 2016/17) tonnes/ha	Avg. processing capacity per plant (2015) tonnes of beet / day	Avg. length of processing campaign (2013/14 - 2015/16) days
Netherlands	1.33	1.45	1	64.5	16.9	13.7	26 000	116
Belgium	1.13	1.17	2	81.9	17.8	12.9	14 667	111
Poland	1.03	1.09	3	84.0	17.5	9.7	6 465	95
Germany	1.02	1.11	4	88.5	17.7	12.5	12 300	108
France	0.95	1.11	5	65.8	18.1	13.1	14 068	105
Austria	0.87	1.09	6	76.0	16.9	10.5	12 700	145
Spain	0.77	1.04	7	62.2	17.3	14.9	9 240	95
Croatia	0.72	0.75	8	64.5	14.8	8.3	7 667	74
Italy	0.55	0.75	9	76.1	14.6	8.7	15 667	65

Above the average
Around the average
Below the average

* = [ex-works refined beet sugar price] / [(Total field costs) + (Total factory costs (labour, capital, inputs, net of by-product credits))]

Source: elaboration of data from LMC International (production costs), national sources (beet prices), Eurostat (beet yields), CEFS (polarisation of beets and average length of the processing campaign), DG Agriculture (beet sugar production), and IHS Markit (processing capacity of sugar factories).

Table 6.7 - Combined effect of size and diversification on the profitability of EU sugar producers: assessment based on the evolution of the EBITDA/revenues % ratio (2014/15-2019/20)

Ranges	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
> +15%						
+10-15%		**LA-DIV-1**	**LA-DIV-1** **LA-DIV-3** LA-CB-1	**LA-DIV-3** LA-CB-1		
+5-10%	**LA-DIV-1** **LA-DIV-2** **LA-DIV-3** **LA-DIV-4** LA-CB-1	**LA-DIV-2** **LA-DIV-3** **LA-DIV-4** LA-CB-1 *SM-CB-1*	**LA-DIV-2** **LA-DIV-4** *SM-CB-1*	**LA-DIV-1** **LA-DIV-2** **LA-DIV-4** *SM-CB-1*	**LA-DIV-2** **LA-DIV-3** **LA-DIV-4**	**LA-DIV-2** **LA-DIV-3** **LA-DIV-4**
+ 0-5%	*SM-CB-1*				**LA-DIV-1** LA-CB-1	**LA-DIV-1** LA-CB-1 *SM-CB-1*
- 0-5%					*SM-CB-1*	

* **LA-DIV**: large diversified producers; LA-CB: large but non-diversified producers; *SM-DIV*: small diversified producers; *SM-CB*: small and non-diversified producers. Numbers in the identifiers indicate the different producers considered for each profile.
Source: elaboration of data retrieved in company annual reports

Table 6.8 - Combined effect of size and diversification on the profitability of EU sugar producers: assessment based on the evolution of the EBIT/revenues % ratio (2014/15-2019/20)

Ranges	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
+10-15%			**LA-DIV-4**			
+5-10%		**LA-DIV-1** **LA-DIV-4** LA-CB-1	**LA-DIV-1** **LA-DIV-3** *SM-CB-3* *SM-CB-2* LA-CB-2	**LA-DIV-1** **LA-DIV-3** LA-CB-2		
+ 0-5%	**LA-DIV-1** **LA-DIV-2** **LA-DIV-3** **LA-DIV-4** LA-CB-1 LA-CB-2 *SM-CB-1* *SM-CB-2*	**LA-DIV-2** **LA-DIV-3** LA-CB-2 *SM-CB-1*	**LA-DIV-2** LA-CB-1 *SM-CB-1*	**LA-DIV-4** **LA-DIV-2** LA-CB-1 *SM-CB-1* *SM-CB-2*	**LA-DIV-1** **LA-DIV-3**	**LA-DIV-1** **LA-DIV-2** **LA-DIV-3** LA-CB-1
- 0-5%	LA-CB-3	*SM-CB-3* *SM-CB-2*	LA-CB-3	LA-CB-3	**LA-DIV-2** LA-CB-1 LA-CB-2	LA-CB-2
- 5-10%	*SM-CB-3*	LA-CB-3			*SM-CB-1*	
- 10-15%						**LA-DIV-4** *SM-CB-1*
- 15-20%				*SM-CB-3*	**LA-DIV-4** *SM-CB-2*	
< - 20%					LA-CB-3 *SM-CB-3*	LA-CB-3

* **LA-DIV**: large diversified producers; LA-CB: large but non-diversified producers; *SM-DIV*: small diversified producers; *SM-CB*: small and non-diversified producers. Numbers in the identifiers indicate the different producers considered for each profile.
Source: elaboration of data retrieved in company annual reports

6.1.4 Key findings

This section presents an overview of the results of the assessment in the form of two synoptic tables that contain a synthetic description of the influence of each relevant competitiveness driver (Table 6.9), or meaningful combination of competitiveness

drivers (Table 6.10), on the two essential components of the EU sugar sector's resilience, i.e.:

- the economic viability of the main actors in the EU sugar supply chain;
- the availability of an adequate sugar supply in the EU.

Table 6.9 – Overview of the influence of each relevant competitiveness driver on the two components of the EU sugar sector's resilience

Drivers	Effects on the economic viability of the main actors in the EU sugar supply chain	Effects on the availability of an adequate sugar supply in the EU
Sugar beet and sugar production costs	**Strengthening**: bulk of beet sugar production in the EU from cost-competitive Member States	***Strengthening*** – indirect effect via economic viability of actors
Sugar selling prices: main drivers	Supply/demand balance has a **variable indirect effect on the economic viability of actors**, exerted through its influence on sugar prices; oversupply → depressed prices → weakening effect on economic viability, and vice versa	Supply/demand balance: **variable direct effect;** oversupply vs. shortage; need to achieve a balance to avoid conflicts with the need to ensure economic viability of actors
Factors influencing the productivity level of sugar beet growers/sugar producers	**Strengthening**: bulk of beet sugar production in the EU from highly productive Member States (farming and processing stages)	***Strengthening*** – indirect effect via economic viability of actors
Profitability of the main actors of the sugar supply chain	**Variable direct effect**	**Variable indirect effect**
Price transmission mechanisms along the sugar supply chain; level of integration of the EU sugar market into the world market	**Variable direct effect** according to direction (downstream or upstream, international → domestic or vice versa), sign (increase or decrease of the price whose variation is transmitted) and intensity (extent of the variation) of price movements	**Undetermined**: complex interplay of the supply and demand dynamics that price signals cause in the concerned markets and sectors
Geographical distribution/concentration of sugar production capacity	**Strengthening**: bulk of beet sugar production in the EU concentrated in the most productive and cost-competitive Member States	***Strengthening*** – indirect effect via economic viability of actors
Ownership structure of sugar companies	***Possibly strengthening***: "growers' industrial cluster" in the EU sugar sector boasts structural robustness	***Possibly strengthening*** – indirect effect via economic viability of actors
Level of horizontal/vertical integration within the sugar sector	**Strengthening**: multinational sugar producers operating multiple production facilities in two or three subsectors and in several Member States prevail in the EU	***Strengthening*** – indirect effect via economic viability of actors and domestic sugar production (limited diversification towards sugar exporting third countries with zero- or reduced-duty access on the EU market)
EU sugar market structure	***Strengthening***: indirect effect via the structural situation that determines concentration → prevalence of a rather limited number of large-sized producers operating in several Member States	**Variable** according to the conduct of sugar producers (non-collusive vs. collusive); infrequent major cases of anti-competitive conduct by EU sugar producers → positive effect
Logistical aspects in the sugar supply chain	**Variable**: very different situations in terms of logistic costs in the EU sugar sector	**Variable** - indirect effect via economic viability of actors

Drivers	Effects on the economic viability of the main actors in the EU sugar supply chain	Effects on the availability of an adequate sugar supply in the EU
Quality aspects	**Strengthening**: generally good technological quality of sugar beets in the Member States where the bulk of EU beet sugar production is concentrated; absence of significant sugar quality issues	***Strengthening*** – indirect effect via economic viability of actors
Production of specialty sugars	**Strengthening** via premium prices and additional revenue streams	**Strengthening** via expanded variety in the assortment of products available to consumers
Nature and quality of customer service provided by sugar producers, wholesalers and traders	**Strengthening**: absence of significant issues in the quality of services provided to customers in the EU sugar sector	***Strengthening*** – indirect effect via economic viability of actors
Social and environmental responsibility of EU sugar production	**Strengthening**: effective social dialogue that helps to address the key issues; strong focus on environmentally sustainable sugar beet farming and processing, and zero-waste, fully circular business models	***Strengthening*** – indirect effect via economic viability of actors
Forms of diversification implemented by EU sugar producers	**Strengthening**: product/sector diversification by leading EU sugar producers effective in smoothening variations in profitability	***Strengthening*** – indirect effect via economic viability of actors

Source: assessment made at § 6.1.1 and 6.1.2

Table 6.10 - Overview of the influence of two meaningful combinations of competitiveness drivers on the two components of the EU sugar sector's resilience

Combinations of drivers	Effects on the economic viability of the main actors in the EU sugar supply chain	Effects on the availability of an adequate sugar supply in the EU
Combined effect of ***technical parameters determining productivity levels*** in the farming and processing stages on the ***profitability of beet sugar production*** in the EU	**Variable**; key technical factors determining productivity explain only part of the profitability of beet sugar production in the EU	**Variable** - indirect effect via economic viability of actors
Combined effect of ***size and diversification*** on the ***profitability of EU sugar producers***	**Strengthening**: effective in smoothening variations in profitability	***Strengthening*** – indirect effect via economic viability of actors

Source: assessment made at § 6.1.3

6.2 Q2: What are the supply chain organisational arrangements and the types of contractual relations between the main actors? And, what is their effect (i.e., strengthening or weakening) on the sector's resilience?

Definition of key terms

"(Sugar) supply chain organisational arrangements and types of contractual relations": The following main typologies of arrangements and contractual relations are covered by the assessment under question 2:

- Vertical integration between sugar beet farming and processing, i.e., control of the processing stage by sugar beet farmers (cooperatives and companies where sugar beet growers hold a majority share).
- Vertical integration between raw cane sugar production and refining (ownership of raw cane sugar mills by refiners or vice versa).
- Vertical integration between sugar production and sugar-consuming downstream activities (i.e., integration between sugar producers and industrial users of sugar).
- Sugar beet supply contracts between individual farmers and sugar producers (including the related value-sharing agreements, as well as additional revenue elements for beet growers that are linked to the technological quality of delivered sugar beets).
- Raw cane sugar supply contracts between individual producers and refiners.
- Inter-branch agreements between sugar beet growers' organisations and sugar producers/their organisations (including the related value-sharing agreements and quality-related incentives, where relevant).
- Business alliances among sugar producers (including full-time refiners).
- Sugar supply contracts between sugar producers (including full-time refiners) and industrial users of sugar, wholesalers/traders of sugar, packers, retailers.

"Resilience of the EU sugar sector": see the definition provided at § 6.1.

Understanding of the question

A substantial share of EU sugar production takes place in industrial facilities that process a single agricultural raw material, sugar beet, into sugar. Due to the highly specialised nature of those plants, ensuring adequate supply of sugar beets has been of paramount importance since the infancy of the beet sugar industry.

Two other factors concur to further increase the importance of such condition: i) the continuous nature of the production process: interruptions in the operation of beet sugar factories have extremely negative operational and economic implications; ii) the fact that whereas farmers can choose among multiple crops, beet sugar factories cannot switch to other agricultural raw materials. For these reasons, contracts between farmers and processors (as well as inter-branch agreements between the organisations representing the interests of those parties), aimed at ensuring continuous supply of adequate volumes of sugar beets to plants during the entire duration of the processing campaign, have always been a key element in the operation of the beet sugar industry.

Over time, these contracts and agreements have become more and more complex, covering a wide range of aspects that concur to determine the technical efficiency and the overall profitability of the concerned activities (sugar beet farming and processing). Research on contract farming (Eaton and Shepherd, 2001; Vavra, 2009) distinguishes marketing contracts/arrangements from production contracts/arrangements.

- Marketing contracts refer to sales conditions: they contain estimates of the production under the contract and of delivery times and quantities. Farmers retain control over assets and production decisions, and receive a price for farm output, negotiated before or during production.
- Production contracts refer to sales and production specifications. Farmers agree to deliver an agricultural commodity produced in a manner set forth in the contract. The contractors exercise some control over production decisions and/or farm enterprise assets; farmers are paid a fee for farming services rendered in the production of the commodity.

In principle, sugar beet supply contracts/agreements combine both marketing and production elements, and fall under the wider conceptual framework of supply contracts, which is also relevant for the relationships between raw cane sugar producers and refiners, as well as for those between sugar producers and their customers. Scientific research (see Krishnan and Winter, 2011, for an extensive review) generally defines supply contracts as intermediate forms

of supply chain coordination between two extremes: perfect competition in all the markets along the chain, and complete vertical integration within a single firm. In real-world conditions, prices cannot be the only coordination mechanism due to the so-called market failures, which cause distortions in the incentives that influence the conduct of actors.

The most important market imperfections derive from:

- market (or bargaining) power that firms have in setting prices (as well as other conditions regulating transactions); firms rarely take prices as outside their control (this issue is discussed in more detail below);
- uncertainty: demand and costs are never entirely predictable;
- asymmetric information: downstream actors may take advantage from better knowledge of the final market than upstream actors, or the latter may take advantage from better knowledge of production technology and the related costs.

Contracts between actors (or groups of actors) at different levels of the supply chain are a way to address market failures. Where market failures are determined by a complex combination of factors, contracts need to cover a wide range of aspects to provide an effective solution to those failures: besides price and volume, in practice supply contracts cover such aspects as duration, timing for performance of contract obligations, revenue elements other than price, product quality, use/supply of specific production inputs and/or technologies, variation of conditions influencing production and/or revenues, etc.

Business alliances

Scientific research on business alliances (see Jarratt, 1998; Townsend, 2003; Pedada, Arunachalam and Dass, 2019) defines them as solutions aimed at increasing the competitiveness of the participating firms through cooperation. Business alliances are formalised arrangements among two or more firms that focus on upstream and/or downstream value chain activities, and in which the participating firms pool skills and resources to achieve competitive advantage in the marketplace. Alliances may help to address a wide range of problems in production and/or marketing deriving from limited firm size, scarcity of resources, lack of critical know-how, complexity and/or uncertainty of the competitive environment, etc. Inter-firm alliances can have a local, national or international geographical scope; from a structural standpoint, they may take the form of non-equity partnerships, equity exchanges, and joint ventures. The success of an alliance can be measured in terms of sustained competitive advantage for participants, longevity of the alliance, and performance of the activities covered by the alliance. It is worth noticing that the formation of business alliances may determine imbalances in bargaining power or even anti-competitive practices, and is therefore carefully monitored by antitrust authorities.

Bargaining power along the supply chains

The topic of bargaining (or market) power along supply chains has been extensively discussed – together with its multi-faceted implications – within the scientific community. The most recent contributions specifically dealing with bargaining power along agribusiness supply chains (for a review, see Sorrentino, Russo and Cacchiarelli, 2018, and Garrone, 2017) allow to characterise:

- The determinants of imbalances in bargaining power, such as differences in the size and/or endowment of resources and know-how of market participants, coordinated behaviour by firms in a certain stage of the chain vis-à-vis uncoordinated behaviour in the immediately upstream or downstream stages, etc.
- The observable phenomena that may signal the presence of such imbalances, such as non-perfect vertical price transmission (see for instance Areté, 2012, and Aragrande, Bruni, Loi, Esposti, 2017, for the specific case of the sugar supply chain), unfair trading practices (see for instance Areté, 2016, and European Commission, 2018), etc.: these phenomena constitute also the main economic implications of imbalances in bargaining power.
- The solutions aimed at addressing imbalances in bargaining power and the related implications, such as coordination among the weaker parties (discussed above under "business alliances"), promotion of agreements safeguarding the weaker parties from unfair trading practices (see above under "supply contracts, inter-branch agreements"), ad hoc policy measures (see for instance European Commission, 2018, and Velázquez and Buffaria, 2016 and 2017), etc.

It should be noted that contracts and arrangements along the supply chain can be a way to address imbalances in bargaining power, but can also allow the strongest parties to take advantage from existing imbalances, and to consolidate the imbalances themselves. For this reason, the possible presence of imbalances in bargaining power along supply chains is carefully monitored by antitrust authorities.

6.2.1 Sugar beet supply contracts between sugar beet growers and processors

The **contractual framework** between sugar beet growers and sugar beet processors rapidly changed after the end of the quota period. Prior to 2017, the negotiations between these two stages of the sugar supply chain were relatively simple due to: i) the **production limits** set by sugar quotas); ii) the relatively high **domestic sugar prices**; iii) the presence of a **regulated minimum price** for sugar beets. The latter factor, combined with compulsory value sharing clauses, led to a situation where the contractual negotiations among parts were mainly related to the definition of rules to allocate any differences between the reference threshold and the actual selling price of sugar (HLG, 2019).

The minimum price for sugar beets ended together with the end of the quota period, and a new contractual framework entered into force with the amendment of Article 125 of Regulation (EU) 1308/2013 ("CMO Regulation") and of the related Annex X. Such framework establishes that the purchasing prices of sugar beets must be regulated by written delivery contracts between sugar beet growers and "sugar undertakings". Both parties can be represented by their organisations/unions, therefore an **inter-branch agreement** can also be negotiated. The results of the survey of EU sugar producers reveal that most of them operate in the framework of an inter-branch agreement, which sets out the general conditions governing sugar beet supply contracts with individual farmers. Inter-branch agreements are signed in several Member States between sugar beet processors (or their organisations) and the organisations representing sugar beet growers. Negotiation of sugar beet supply contracts takes place at company or factory level; the interests of sugar beet growers are usually represented by their reference organisations at national or regional/local level. 71% of the surveyed sugar producers indicated that they operate in the framework of an inter-branch agreement, and 76% indicated that they set up individual contracts with sugar beet growers. It should be considered that no inter-branch agreement is in place in a number of Member States, due to:

- **Impasses in the negotiation between the concerned parties**, which can hinder the settlement of an inter-branch agreement[65].
- The fact that all sugar beet growers are members of a **cooperative sugar company**; non-member farmers cannot supply sugar beets to the cooperative. In such a situation, an inter-branch agreement would be redundant, given that the internal rules of the cooperative provide the framework to regulate sugar beet supply[66].
- The fact that there is a **single beet sugar producer** that directly negotiates sugar beet supply contracts with growers[67].

In some Member States an inter-branch agreement is in place even though there is a single beet sugar producer[68]. This can happen because the processor is a cooperative that is also supplied by non-member sugar beet growers (which are covered by the inter-branch agreement), or because the overall bargaining framework still needs to be adapted to recent developments (e.g., there is only one beet processor left due to the recent exit of other processors from the sector).

The specific conditions (including the definition of sugar beet pricing mechanisms) applying between individual growers and sugar beet processors are set out in sugar beet supply contracts, which are generally negotiated at company level. Therefore,

[65] This is, for instance, the reason behind the current absence of an inter-branch agreement in Spain. This exceptional situation is caused by the disagreement between the parties on sugar beet price levels.

[66] Such a situation can be found, for instance, in the Netherlands.

[67] Such a situation can be found, for instance, in Denmark and Finland.

[68] Such a situation can be found, for instance, in Italy.

contractual conditions for sugar beet supply vary across the EU, and may also vary within Member States (i.e., across regions). Nevertheless, the essential elements that have to be included in the sugar beet purchase agreements, as laid down in Annex X of CMO Regulation, should always be present, irrespective of the type of entities that carry out the negotiation. These elements are the following[69]:

- Quantity to deliver and pricing conditions, including mechanisms to adjust price increases or reductions to allow for deviations from the standard quality.
- Contract duration, which can be pluriannual.
- Conditions for the supply of additional sugar beet quantities.
- Sugar beet delivery conditions, including the shares of costs for each part.
- Sugar beet quality requirements: use of specific varieties, minimum sugar content and management of soil residues ("tare").
- Arrangements for beet pulp management, which can fall under the following typologies:
    - fresh pulps can be delivered free of charge to the beet seller, ex-factory;
    - part of the pulps, pressed, dried, or dried and with molasses added, can be delivered free of charge to the beet seller, ex-factory;
    - pressed or dried pulps can be delivered to the beet seller, ex-factory; in this case, the sugar undertaking may require beet growers to pay for pressing or drying costs;
    - beet sellers can receive a compensation for pulps by processors, which may take into account the available market outlets and/or value adding possibilities for the pulps themselves.
- Terms of delivery of sugar beets to processing plants, and setting of premiums for early and late deliveries.
- Payment terms.

Value-sharing clauses can also be agreed between each sugar undertaking and sugar beet sellers. These clauses determine how any gains or losses deriving from the evolution of sugar market prices (or of other relevant commodity markets) are allocated between sugar beet growers and sugar beet processors. The value-sharing clause enables beet growers and sugar undertakings to secure their supplies on pre-defined purchase terms, with the certainty of sharing the profits and costs generated by the supply chain. The inclusion of value sharing clauses in sugar beet supply contracts is optional, even though point (6) of *res considerata* in Regulation (EU) 2016/1166 (amending Annex X) states that "in the absence of the preservation of the value sharing clauses, the position of beet growers in the food chain could be compromised. When losing the possibility of negotiating value sharing clauses, and especially in a situation of low prices, beet growers could be in a clear economic disadvantage".

Besides the aforementioned essential contractual elements, a wide variety of specific **contractual conditions** is included in sugar beet supply contracts. These conditions were found to concern, among others:

- The **duration of contracts**: most of them are signed on an annual basis, i.e., for each sugar beet processing campaign; however, several sugar producers provide some forms of economic incentive to growers who sign multi-annual contracts (of duration generally up to three years). Multi-annual contracts provide stability and security of sugar beet supply to processors in the medium term. Although multi-annual contracts may also be in the interest of growers (certainty of sugar beet supply conditions in the medium term translates into a form of risk prevention), they also reduce the flexibility for growers to adapt to changing market conditions.
- **Sugar beet pricing methods**: there is an extensive variety of price-setting mechanisms implemented by beet sugar producers. In general, sugar beet price is composed by a basic payment for sugar beets and by a number of variable

[69] Synthesis of the key elements of Annex X of Regulation (EU) No 1308/2013.

items which can either increase or decrease the final payments to beet growers. The key variable items concern, or are related to:

- The **quality of sugar beets**: the variation of the basic price component is linked with the quality of sugar beets, measured by their sucrose content (polarisation), which mostly depends on the climatic conditions during the sugar beet crop cycle, and on the agricultural practices applied. Sugar beet price decreases/increases proportionally when sugar beet polarisation is less/more than 16° polarimetric degrees. Other sugar beet quality parameters are also taken into account, including soil residues in delivered sugar beets ("soil tare"). Each company defines its own parameters, as well as the measurement methods and the mechanisms determining the system of bonus and malus accordingly.
- **Timing of sugar beet delivery to processing plants:** some contracts include a mechanism to regulate that. As a general rule, sugar beet price gradually increases for deliveries that are closer to the end of the processing campaign. In some cases, a system of price premiums provides additional rewards to growers who deliver sugar beets to factories late in the processing campaign. This system of incentives is aimed at ensuring an even flow of sugar beet deliveries to factories over the entire duration of the processing campaign, by persuading growers to assume some production and price risks.
- **Cost of transportation of sugar beets to processing plants:** in most cases, at least a share of this cost is covered by growers. In other cases, the cost of transportation is totally borne by sugar producers; in some cases, the basic price for sugar beets in areas located far from the factory is lower than the basic price for sugar beets coming from the closest areas. According to the High Level Group on Sugar, the share of transport costs borne by sugar beet growers increased in the post-quota period (HLG, 2019).
- **Sugar price:** the use of fixed beet prices has become less widespread after the end of the quota period. Sugar beet prices have become increasingly linked with the prices of beet sugar: when they fall within a certain price range, sugar beet growers receive an additional payment. Some sugar producers also offer growers the possibility to choose between two price formulas (or a combination of them): fixed price versus flexible price linked to sugar price. There is a variety of models for adjusting beet prices to the selling price of sugar. According to the High Level Group on sugar, in some of these models the beet price can only fluctuate within a limited range, while in most cases the beet price can deviate from a central pivot level without any limitations (HLG, 2019). The linkage between sugar prices and sugar beet prices also affects the timing of payments, given that at least the final payments to growers are made after sugar beet processing has ended, and often after the last tonne of sugar obtained from the delivered beet quantities has been sold.
- **Value of sugar beet pulps:** according to the CMO Regulation, sugar beet pulps belong to growers, who have the right to decide what to do with them. This means that growers have to receive a separate allowance to transfer to sugar beet processors the management of beet pulps. In alternative, pulps should be returned to growers without any additional cost, and growers may decide to sell them to downstream processors, or use them for on-farm value adding activities (e.g., use as feed, in biogas plants, etc.). The calculation of the trade-off between the different end-uses of pulps pertains to growers. According to some stakeholders, beet pulp management could also be considered as a risk management tool, as they normally represent up to 10% (or even more, in those cases in

which the sugar beet price is particularly low) of the revenue from sugar beet farming.

  - **Value of sugar beets delivered above the agreed quantity**: in some cases, sugar producers may also process quantities of beets exceeding the contracted levels. Despite the provisions in Annex X clearly indicate that the delivery contracts should clearly define a price also for these exceeding quantities, evidence suggests that in most of these cases the product value is defined with each grower individually, and only once the processing campaign has already started. This contributes to weaken the position of growers in the negotiation of prices for surplus beets, which are usually paid less than the initially contracted quantities.

- **Rights to plant:** growers can decide not to cultivate beets if their price is considered unattractive compared to alternative crops. However, this choice generally implies negative consequences (especially in the case of a cooperative) on the growers' right to cultivate sugar beets and to sign beet delivery contracts in the following years. In some cases, penalties and reductions in the rights to cultivate sugar beets for the following years are foreseen for those growers who fail to deliver the contracted quantities of beets in a certain year.
- In terms of the **period for negotiations**, beet supply contracts are usually signed before sowing the crop. In any case, sugar beets need to be processed as soon as possible after harvest: farmers cannot store them for a long time, so they need to have supply contracts and the related conditions agreed well in advance of the harvesting period.
- Most contracts also regulate the **agronomic and technical aspects** of the cultivation of sugar beets, in order to ensure that they meet adequate quality standards when entering the processing stage. In this regard, the most common elements regulated by the contracts are: the use of specific sugar beet seed varieties; a list of forbidden agricultural practices or, on the contrary, a list of allowed agricultural practices; information on cleaning and harvesting protocols to be followed; other technical requirements.

6.2.2 Vertical integration between sugar beet farming and processing, i.e., control of the processing stage by sugar beet growers

As already discussed at § 5.2.2, vertical integration between sugar beet farming and processing has a prominent role in the EU sugar sector. Cooperatives and other legal forms that allow sugar beet growers to hold a majority share (as members of a cooperative or as investors into a non-cooperative sugar company) are widespread in some Member States (for instance in France, Germany, the Netherlands and Italy). Results from the surveys of sugar beet growers' associations and sugar beet producers confirm the diffusion of vertical integration formulas, which are indicated by 65% of respondents in the case of associations, and 48% of respondents in the case of sugar beet processors.

The most common type of vertical integration takes the form of cooperative sugar companies, with sugar beet growers as members. European agribusiness cooperatives are major actors within the EU agri-food and forestry sectors. According to Cogeca, the EU association representing EU agribusiness cooperatives, in Europe there are more than 22 000 cooperatives owned and controlled by some 7 million farmers. There is a vast available literature about the benefits of the cooperative system for the agri-food sector, and about their contribution to a more competitive farming system. However, for the purposes of this study it is worth focusing on the specificities of cooperatives operating in the sugar sector, and of other forms of vertical integration between the farming and the processing stage in the sugar supply chain. In fact, some peculiarities of the sugar sector increase the importance that the related arrangements have in ensuring a mutually beneficial relationship between sugar beet growers and sugar beet

processors. More specifically, the main **reasons behind the importance of the forms of vertical integration in the sugar sector** can be found in the following:

- **The need to ensure an adequate and stable sugar beet supply to processing plants.** It should be noted that beet sugar factories not only need to be adequately supplied, but also the distance between farms and processors should be limited enough, to avoid a too high incidence of sugar beet transportation costs from farms to processing facilities, which would finally determine a reduction of margins for both farmers and processors.
- Despite growing competition from alternative crops in terms of profitably for farmers, **sugar beet cultivation** and the inclusion of beet in the crop rotation routines is also sustained by its positive impacts on soil fertility and on the yields of the crops that follow sugar beet in the rotation. However, since sugar beets have no other end-uses than processing into sugar and the related co-products, vertical integration forms help to secure the certainty of an outlet for sugar beet production, leading to more stable revenues for farmers, and promoting environmental benefits for the farming system as a whole.
- The need to ensure a **consistent quality of the sugar beets delivered to processing plants.** Cooperatives and other forms of vertical integration facilitate the transfer of agronomic and market knowledge from processors to farmers, and eventually allow some control on the quality of the agricultural raw material for sugar production. Most sugar companies, both cooperative and non-cooperative ones, provide their members with technical assistance in all the stages of sugar beet farming, from the selection of sugar beet seeds to the choice and implementation of good agricultural practices (e.g., soil preparation, use of specific machinery and practices for harvesting, etc.)[70].

The **governance model of cooperatives** and of other forms of vertical integration varies across the EU. It should be noted that, besides some traditional cooperatives, some hybrid types of organisation also exist, combining characteristics that are typical of non-cooperative companies with others that are instead typical of cooperatives. Examples of these hybrid models are joint-stock companies having a cooperative of sugar beet growers as the majority shareholder. Different governance models entail that also in cooperatives the distribution of shares, as well as of voting rights, can deviate from the traditional "1 man, 1 vote" principle[71]. At least from a theoretical standpoint, the degree of control on business decisions should be higher in cooperative sugar companies than in non-cooperative companies, in which growers are investors, not members. The **level of control of the members over the Managing Board** anyway also differs – within the cooperative system – based on the composition of the Board itself, which in some cases is mainly made up of elected members (thus ensuring a higher control capacity for beet growers) and in some others mainly includes professional managers (the latter being a condition highly limiting the beet growers' actual control on the Board's decisions).

In the cooperative system, beet growers generally receive a defined price for sugar beets, plus an additional price element in the form of a share of the profits resulting from the overall business performance of the cooperative. The distribution of a share of

[70] Filippi, M., et al., "Support for Farmers' Cooperatives. Case Study Report. Internationalisation of Sugar Cooperatives: Cosun, Südzucker/ Agrana, Tereos", projects commissioned by EC DG AGRI, 2012.

[71] Some evidence suggests that in the post-quota period more formal and informal obstacles exist to the possibility for growers to become members of a cooperative, a condition which might be related to the downsizing of sugar beet areas in the EU after the bumper crop of the 2017/18 marketing year. In any case, if a cooperative member decides not to cultivate sugar beets, this generally implies the loss of the membership condition, and some difficulties to regain it in the future.

the profits may also represent one of the sugar beet price elements for those growers who are direct investors in non-cooperative sugar companies.

Most of the elements of the contractual negotiations identified for inter-branch agreements and for sugar beet supply contracts for individual farmers (see § 6.2.1) are included also in the sugar beet supply terms agreed between a cooperative and its members. However, some specificities of the pricing mechanisms of sugar beet, as well as of other aspects of the agreements between cooperatives and their members, were identified in the following:

- **Duration of the contracts and obligations for the cooperative members**: in most cases, growers who apply to become members of a cooperative are asked to sign contracts of engagement according to which they deliver all their beet production to the cooperative itself, thus implying the impossibility for them to sell their sugar beets to any other sugar producer. The duration and the strictness of these obligations largely varies[72].
- **Pricing methods and negotiation mechanisms:** there is an extensive variety of sugar beet pricing methods applied among cooperatives, which basically include the same items described at § 6.2.1 in relation to the pricing mechanisms of inter-branch agreements and individual contracts with growers. Most of these methods foresee a basic beet price based on polarisation, and include several types of premia, based on the duration of contracts, the quality of the delivered sugar beets, and other elements. At the same time, there are some deviations from that model in the price-setting mechanisms for the cooperative's members. Most cooperatives fix the full pricing mechanisms before the campaign starts, while in others pricing conditions can evolve based on the Board's decisions during the marketing year, thus implying a higher degree of uncertainty until its end.
- Some cooperatives have introduced **mechanisms to shield, at least partially, their members from the increased market volatility of the post quota period**. For instance, a cooperative offered its members a guaranteed minimum price per tonne of beet for the first two post-quota campaigns, aiming at protecting them against the risk of falling sugar prices and encouraging the stability of sugar beet sowings. However, due to economic difficulties, the pricing method changed, and is now based on a formula indexed on the selling prices of sugar, with a price supplement depending on the company's performances, and the payment of annual dividends to the growers arising from the overall business activities of the cooperative (which also operates in other business segments than beet sugar). In addition, since the end of the quota period, some cooperatives introduced the possibility for members – in case of positive business performance of the cooperatives themselves - **to convert part of their price-related earnings from delivered beets into shares** of the cooperative. Since cooperative sugar producers often allocate beet delivery rights to members according to the number of shares that they hold, those additional shares allow members to increase the volume of their sugar beet deliveries (and hence also the area under sugar beet in their farms). In some cases, it has been reported that contracts which include clauses that allow growers to buy options on the sugar futures market (a tool to address volatility in world sugar prices, which will

[72] Examples are reported where the duration of these obligations may arrive up to ten years, with a tacit renovation after a period of five. It is worth noticing that obligations concerning exclusive beet delivery to cooperatives were the object of a 2017 investigation by the French National Competition Authority (NCA) (see question 1, § 6.1.1). The French NCA expressed concerns that such obligations could foreclose the sugar beet procurement market, and the association agreements were modified by the involved cooperative in a way to soften the delivery obligations imposed on members.

be discussed in detail in the reply to question 4 at § 7.2) have also been introduced.

- Some cooperatives are also open to buy sugar beets from growers **other than their members**. In these cases, the cooperative negotiates agreements (inter-branch ones or individual ones) allowing farmers to supply sugar beets at conditions that are generally similar to those of the cooperative's members, of course excluding access to dividends. In other cases, cooperatives only accept beet deliveries from their members; in order to grow beets for those cooperatives, farmers need to become members.
- The members of the cooperatives are in some cases not in the position to negotiate the quantity of delivered sugar beets, which might be based on the so-called **member delivery certificates**[73].
- In some Member States, the supply contracts based on inter-branch agreements also apply to the cooperatives' members, who may therefore receive also a price supplement foreseen in those agreements. In other cases, these agreements only apply to the cooperative's beet suppliers other than its members.

There is an important final consideration to make on the extensive control exerted by sugar beet growers on beet processing capacity in the EU. The 2006 sugar reform and the subsequent reforms to liberalise the EU sugar sector offered an incentive to EU sugar companies, including sugar cooperatives, to expand their international presence by cross-border entry into numerous European markets. According to Filippi et al. (2012), the leading sugar cooperatives operating in France, Germany and the Netherlands acquired foreign companies without integrating the farmers that supplied sugar beets to them into their own cooperative membership systems. Those cooperatives (parent companies) operated their foreign subsidiaries like investor-owned companies, with local farmers merely acting as suppliers, rather than also as investors and members. All the involved parent cooperatives did not transfer their business model to their foreign subsidiaries, and did not integrate their new foreign sugar beet suppliers as cooperative members. The reason behind this approach is that all the foreign acquisitions made by those cooperatives were non-cooperative companies; the parent cooperatives hence saw no need to integrate the local sugar beet growers as members. This basically implies that the substantial beet processing capacity controlled by the "growers' industrial cluster" in the EU (see § 5.2.2) is actually controlled for the most part by a group of French, German and Dutch sugar beet growers that are members of the cooperatives that control the leading multinational sugar groups in the EU, not by the much wider group of growers actually supplying sugar beets to the concerned subsidiaries in several Member States.

6.2.3 Arrangements for raw cane sugar supply to refiners

As explained at § 5.1.2, the business model of raw cane sugar refiners is radically different from that of beet sugar producers, especially for what concerns raw material procurement. A number of factors (volatile conditions in the raw cane sugar international markets, faster pace of the production and marketing cycle, possibility to switch suppliers albeit within the limits allowed by the EU sugar import regime, etc.) tend to **favour flexibility in raw cane sugar procurement solutions**. For this reason, EU raw cane sugar refiners are not particularly inclined to establish long-term supply arrangements, and have not pursued upstream vertical integration through control of raw cane sugar producers.

According to the results of the survey of sugar producers, and based on insights from interviews with sectoral stakeholders, no form of **vertical integration between raw**

[73] In a specific case analysed for the study, beet delivery rights, in the form of member delivery certificates, are derived from the shares that members had before the abolition of quotas, and growers cannot deviate from them when planning their sugar beet production.

cane sugar production and refining (ownership of raw cane sugar mills by refiners or vice versa) has been implemented among EU sugar producers, and only a few cases of vertical coordination (raw cane sugar supply contracts) between **individual raw cane sugar producers and refiners** were identified.

Details about supply contracts between EU sugar refiners (both full-time sugar refiners and sugar producers with off-crop refining capacity) and raw cane sugar producers are not publicly available, and are considered by operators as sensitive information. However, evidence from in-depth investigations made in selected Member States hosting refining facilities suggests that these agreements are generally negotiated on an annual basis, or for shorter periods, while multi-annual supply arrangements are rare, given the high volatility of the world raw cane sugar market.

For the same reason, **the use of hedging instruments is widespread**, compared to what happens in the EU beet sugar market. Raw sugar futures contracts also allow to cover the price risk deriving by a market in which the price established in contracts with the downstream level of the supply chain (i.e., contracts to deliver white sugar to customers), is defined before setting the price of raw sugar (i.e., contracts to deliver raw cane sugar to refiners). The use of futures contracts in hedging techniques allows the company to purchase raw sugar at a price compatible with the selling price of white sugar negotiated with the end customers (see the reply to question 4 at § 7.2.1 for a more detailed analysis of hedging techniques).

In the case of refining companies controlled by large multinational groups, negotiations concerning raw cane sugar supply contracts are often centralised, i.e., carried out by the parent company on behalf of its subsidiaries. This allows to leverage on the bargaining power of the group as a whole, and on its wider geographical reach.

Raw cane sugar supply contracts are generally agreed with international traders/brokers, rather than with individual cane sugar producers, or associations of cane sugar producers. However, some beet sugar producers that also manage refining operations in the EU control raw cane sugar producers in both the French Overseas Departments and third countries. Similar to contracts negotiated in the beet sugar sector, raw cane sugar supply contracts can cover multiple years.

As regards **the origin of raw cane sugar supplies,** the EU's traditional raw sugar suppliers are in the Africa, Caribbean and Pacific (ACP) regions. Producers from rather few third countries supply most of the raw cane sugar processed in the EU, due to the possibility to import raw cane sugar at zero or reduced import duties mostly from a relatively small group of EBA/EPA countries, plus other raw cane sugar exporting countries (Brazil above all) whose access to the EU sugar market is however constrained by tariff rate quotas (see § 3.3.4 for a detailed description of import conditions established by free trade agreements between the EU and third countries).

6.2.4 Vertical integration between sugar production and sugar-consuming downstream activities (i.e., integration between sugar producers and industrial users of sugar).

As reported at § 5.3.1, out of 27 sugar producers in operation in the EU in 2020, eight controlled companies producing sugar-containing products (chocolate and sugar confectionery, instant beverages, pastry, biscuits, jams, desserts, fruit preparations). This business model aims at retaining the profits from production and marketing of higher value-added sugar-containing products within the parent company. In practice, this happens when the margins from use of sugar as ingredient in the controlled processing activities are higher than those from sale of sugar to industrial users operating in the same market segments.

6.2.5 Business alliances among sugar producers (including full-time refiners).

As already discussed under question 1 (see § 6.1.1), a number of EU sugar producers has participated in alliances, partnerships and joint ventures in the 2010-2020 period. The analysis that follows is based on company sources. These forms of horizontal coordination have mostly focused on sugar marketing, but also on the operation of raw cane sugar refineries (two of the largest sugar refineries in operation in the EU are controlled by joint ventures). After a major transnational marketing alliance terminated in 2010, no comparable entities were formed in the following period.

Some of these alliances and joint ventures are based on the cooperation between a producer operating in one of the leading sugar-producing Member States (such as Germany, France, the Netherlands), and a producer operating in "deficit" sugar producing Member States (such as Italy and Spain). Other alliances have seen the involvement of third-country sugar producers (sugar refiners or cane sugar producers).

After the 2006 reform of the sugar regime, which led to an increased sugar refining capacity in the EU, a number of partnerships in the sugar refining sector, mainly in the form of joint ventures, started. However, the number of these partnerships is currently limited. By contrast, most stand-alone sugar refineries in operation in the EU are owned by large multinational groups, often headquartered in non-EU countries (United Kingdom, United States).

6.2.6 Sugar supply contracts between sugar producers (including full-time refiners) and their customers (industrial users of sugar, wholesalers/traders of sugar, packers, retailers).

Detailed information on supply contracts between sugar producers and sugar users is not publicly available. In addition, sugar companies prefer not to disclose the terms of the agreements in place with industrial sugar users, which are considered an extremely sensitive topic. Nevertheless, the limited available information allows to draw some general considerations on this type of contractual arrangements:

- Contracts are agreed on an individual basis, meaning that **contractual conditions are tailored to the specific needs of each customer,** in terms of pricing, service provided, specific quality requirements, etc.
- The **duration of contracts** varies according to the different customers' needs. Annual contracts (which usually follow the sugar marketing year) are quite common, but in some less frequent cases also multi-years contracts are adopted. Contracts with large food processing companies are generally made for a longer period and entail longer negotiations. On the contrary, spot contracts do not play a significant role in the negotiations with large food companies. Small customers and retailers usually prefer to negotiate short-term contracts, which, in the case of retailers, may also be on a weekly or monthly basis. In these cases, "umbrella contracts" are often established, in which the conditions are defined for a longer period. Under these "umbrella contracts", orders are placed (spot contracts) in which only price and quantity are established.
- A wide **variety of packaging** (e.g., silo tanks, big bags, tank trucks, small-size packaging for retailers), taking the customer demands into account (e.g., food industry, gastronomy sector) is used for these types of contracts. The size of deliveries largely depends on the buyers' needs; however, as a general rule, the larger the negotiated volume, the more favourable are the terms agreed for buyers.
- **Geographical dimension** also plays an important role in the negotiations between sugar producers and sugar users. Generally speaking, industrial users and retailers purchase sugar from companies located in the same Member State. However, a few notable exceptions to this general principle have been identified: i) sugar users that are located close to the border with another Member State

can decide to purchase sugar from sugar companies of that Member State, rather than from domestic suppliers, if better conditions are provided; ii) multinational food groups usually have long-term agreements with sugar companies irrespective of their geographical location. It should also be noted that only a limited number of sugar companies across the EU have a size in terms of production volume that allows them to negotiate with large multinational food groups. In these cases, the negotiations usually involve the marketing and procurement central offices of both parties.

- **Quality parameters**, which are in any case detailed in the agreements, seem to have a limited influence in the negotiations, due to the high standardisation in the quality of sugar. In this respect, it seems that from the customer's perspective no significant product differentiation actually exists among different companies.

The **mechanisms to set the purchasing price** vary from case to case, and are influenced by the bargaining power of the actors along the supply chain. Large retailers and multinational food companies are able to negotiate more favourable price conditions in the contracts, given the substantial volumes of sugar that they regularly have to purchase. The key difference in terms of price is the use of a fixed or flexible pricing system. Fixed price contracts, which were more frequent during the quota period, foresee that the agreed price does not change for the whole duration of the contract, even if it is a multi-annual contract. The main reason for the frequency of this type of contracts in the quota period was the presence of a minimum sugar price usually aligned with the sugar market price. During negotiations, both sugar producers and sugar users/retailers were aware of this reference price, and sugar purchasing prices were generally aligned with it. On the contrary, some forms of indexed correlation with the dynamics of a suitable reference sugar price are more frequent in the post-quota period, given the higher correlation between European prices and international prices registered after the end of quotas. In this framework, sugar users preferred to progressively link the price of contracted sugar to international prices. The diffusion of this type of indexed contracts largely varies across the EU[74].

6.2.7 Effects in terms of resilience of the relevant arrangements and contracts

The different typologies of organisational arrangements and contractual relations discussed in the previous paragraphs have different implications on the two dimensions of resilience considered for the assessment, i.e., economic viability of actors in the EU sugar sector and availability of an adequate supply of sugar (in both quantitative and qualitative terms) on the EU market. This section highlights the main effects on resilience of each typology of organisational arrangements and contractual relations considered.

Sugar beet supply contracts between growers and processors

As discussed at § 5.1.1, the beet sugar business model greatly benefits from stability and predictability. By allowing effective planning of production (in terms of adequate availability of raw material for processing plants, timing of harvest and delivery to factories, incentives to producing sugar beets of satisfactory technological quality, etc.), sugar beet supply contracts contribute to establishing conditions that ensure a smooth operation of beet sugar factories and satisfactory utilisation of their processing capacity. As discussed in question 1 (see § 6.1), these conditions contribute to the profitability of beet sugar production and, through that, to the **economic viability** of sugar producers.

[74] For instance, in the case of France it was reported that it now covers between 10% and 40% of the volumes of sugar sold by sugar producers. In Italy, by contrast, the consulted sugar producers reported about a difficulty in persuading Italian customers to stipulate supply contracts where prices have a variable component linked to the dynamics of a reference international sugar price.

The increasing diffusion of multi-annual inter-branch agreements and beet supply contracts in the EU, together with internal arrangements within cooperatives aimed at favouring long-term commitments in the supply of sugar beets, has also positive implications in terms of stability and predictability, and can hence contribute to the economic viability of:

- sugar beet growers, in terms of certainty of an outlet for their sugar beet production and of stability of the underlying conditions (pricing, delivery, etc.);
- beet sugar producers, in terms of security of sugar beet supply and of stability of the underlying conditions.

However, multi-annual agreements and contracts between growers and processors also have some downsides, mainly in terms of reduced flexibility for both parties, which may result in less effective prevention of, and reaction to, unforeseen and adverse developments. These downsides are reduced or eliminated where the multi-annual agreements and contracts include provisions aimed at addressing unforeseen developments (e.g., flexible pricing formulas).

Through their positive effects in terms of improved economic viability of the key actors in the beet sugar supply chain (growers and processors), inter-branch agreements and beet supply contracts contribute indirectly to an adequate supply of sugar on the EU market.

Vertical integration between the sugar beet farming and processing stages

The (extensive) control of sugar beet processing capacity by growers (vertical integration) in the EU beet sugar sector can contribute to the **improved economic viability** of the concerned actors, mainly through more effective planning, smoother operation of processing plants, and reduced transaction costs vis-à-vis non-integrated production. As already observed, improved economic viability of growers and producers contributes to an **adequate availability of sugar on the EU market**.

It is worth recalling here what has been underlined at § 6.2.2: in the multinational groups controlled by growers currently in activity in the EU, control is actually exerted by a group of growers in the Member States where the parent companies are based, not by all the growers supplying sugar beets to those groups. Indeed, those groups generally operate in other Member States through fully owned subsidiaries, or companies where local growers only have a minority share. This implies that the growers of Member States where multinational groups operate through subsidiaries generally exert no control whatsoever on the operation of the processing plants that they supply, and sugar production takes place according to a non-integrated model.

According to a consulted independent expert, cooperative sugar companies (or other companies where sugar beet growers control the processing stage) have flourished in the EU sugar sector mainly because of their ability to offer a solution to the needs of vertical integration in the sector (as discussed above), given that they generate a stable alliance between growers and processors, ensuring a constant supply of sugar beets to processing factories. However, over the severe market crisis experienced in the post-quota period, even the cooperative system showed some limits in its capacity of securing adequate supply of sugar beets to the processing plants that it operates. In fact, the price of sugar beet dropped as a consequence of depressed sugar prices, and the profitability of sugar beet farming increasingly worsened when compared to the profitability of alternative crops. Whenever processors are forced to offer lower beet prices to cope with depressed sugar prices, it gets more difficult for sugar beet to compete with other crops in terms of profitability, and it gets more difficult for processors to secure an extent of beet catchment areas allowing an efficient and profitable operation of their processing plants. Despite the advantages of the cooperative model, also farmers who are shareholders of a cooperative sugar company tend to turn to other crops when the cultivation of sugar beets is deemed less profitable.

Raw cane sugar contractual arrangements

The same considerations made for inter-branch agreements and sugar beet supply contracts apply also in this case. However, since the EU raw cane sugar refining sector operates through a more flexible business model (see § 5.1.2), and is exposed to the volatility of the international raw cane sugar market (see § 4.3 and the reply to question 3, § 7.1.1), the duration of contractual arrangements is generally much shorter than in the EU beet sugar sector, and pricing formulas are usually indexed to a reference price (typically ICE contract No. 11 for raw cane sugar). In any case, arrangements for the supply of raw cane sugar contribute to a smooth and profitable operation of refineries, and hence to improved **economic viability of refiners**. Similar to the beet sugar sector, refined cane sugar production of economically viable EU sugar refiners contributes to ensure **adequate availability of sugar** on the EU market.

Vertical integration between sugar production and sugar-consuming downstream activities

The underlying economic rationale for this type of integration (which has a certain diffusion in the EU) has been explained at § 6.2.4. Whenever this business model achieves the expected results (higher margins from internalised production and marketing of sugar-containing products than from sale of sugar to industrial users), it contributes to the improved **economic viability of the concerned sugar producers**. As for its implications in terms of **adequate availability of sugar** on the EU market, the quantities of sugar used in the framework of the internalised value-adding processes are clearly not available anymore as such on the EU sugar market.

Business alliances among sugar producers

As explained at § 6.2.5, business alliances among sugar producers in the EU sugar sector are typically focused on marketing and raw cane sugar refining. The influence of such alliances on the **economic viability** of the concerned producers clearly depends on the profitability of the related operations; in any case, business alliances can contribute to improved resilience of the concerned producers mainly thanks to:

1. Lower investment needed to implement geographical and/or product/segment diversification strategies - and to reap the related benefits in terms of additional revenue streams - compared to direct investments (internal development) or acquisitions.
2. Improved efficiency and wider geographical reach of marketing activities.

Through the above processes, business alliances can indirectly contribute to adequate availability of sugar on the EU market.

Sugar supply contracts between sugar producers and industrial users of sugar, wholesalers/traders of sugar, packers, retailers

As discussed at § 5.1.1, the beet sugar business model greatly benefits from stability and predictability. If compared to spot sales or short duration contracts (weekly/monthly), sugar supply contracts of longer duration (annual or multi-annual) have the main benefit of ensuring to producers (customers) the certainty of an outlet (supply source) for substantial sugar volumes, at pre-defined conditions and over a time span that allows for long-term planning. These benefits may contribute to improved economic viability for the concerned parties (and for sugar producers in particular), provided that the agreed price is economically sustainable for both parties.

Similar to multi-annual sugar beet supply contracts, the main downside of longer-term sugar supply contracts is the reduced flexibility that they entail for both parties, which may result in less effective prevention of, and reaction to, unforeseen and adverse developments. These downsides are reduced or eliminated where the multi-annual agreements and contracts include provisions aimed at addressing unforeseen developments (e.g., flexible pricing formulas). However, according to the consulted sectoral stakeholders, the diffusion in the EU of multi-annual sugar supply contracts

allowing for some flexibility (especially as far as price definition is concerned) is still relatively limited.

Some EU sugar producers communicated in their annual reports that at the height of the sugar market crisis they had to sign also loss-making sugar sales contracts, also known as "onerous sales contracts" (see the reply to question 3 at § 7.1.1 for a more detailed discussion). These are basically sugar supply contracts concluded at prices that do not cover sugar production and marketing costs. Of course, the longer the duration of, and the more substantial the volumes covered by loss-making contracts, the worse the adverse effect on the economic viability of the concerned sugar producers.

Besides the indirect positive contribution of sugar supply contracts on the adequate availability of sugar in the EU, achieved via improved economic viability of the concerned producers, sugar supply contracts can contribute directly to adequate sugar supply on the EU market by virtue of:

- The formal and detailed definition of quality requirements and conditions for handling and delivery of the product.
- In the case of multi-annual sugar supply contracts, the longer-term stability that they confer to the availability of sugar for customers, and the related price conditions (in the case of fixed price formulas).

6.2.8 Influence of the relative bargaining power of the different actors along the sugar supply chain on the relevant arrangements and contracts

Generally speaking, the contractual relationships between sugar beet growers and sugar producers worsened in the transition from the quota to the post-quota period, mainly due to tougher negotiations on sugar beet prices after the removal of the legislation-based minimum beet price, especially in a prolonged depression of sugar prices on the EU market. The balance of bargaining power between sugar beet growers and processors largely depends on the structural features of the EU sugar sector (concentration, geographical distribution of processing plants, etc.). It is also directly influenced by: i) the provisions that regulate the negotiation of sugar beet delivery agreements contained in Annex X of the CMO Regulation; ii) the level of organisation of sugar beet growers.

The relative bargaining power of sugar producers and their customers (traders/wholesalers, retailers, industrial sugar users) mainly depends on: i) the relative economic dimension of the parties, which often translates also into differences in their geographical outreach; ii) the availability of alternative options to the parties. The balance of bargaining power between sugar producers and their customers reportedly changed since the abolition of quotas: large food manufacturers and retailers would now be able to negotiate with sugar producers in a more favourable position. However, the situation is likely to be different for smaller customers.

The **balance of bargaining power** was found to have an **influence on relevant arrangements and contracts** in both the upstream (beet growers vs. processors) and downstream (sugar producers vs. customers) parts of the sugar supply chain. The elements that were found to be most influenced in the **upstream part of the chain** are: i) duration of sugar beet delivery contracts; ii) determination of the value of sugar beet pulps. From a theoretical standpoint, cooperatives and other forms of vertical integration, have often been indicated as a solution to balance the bargaining power between farmers and processors. According to the consulted stakeholders, however, this is not always the case in the sugar sector. As for the **downstream part of the chain**, the balance of bargaining power was found to influence: i) payment terms; ii) pricing formulas (fixed vs. variable ones); iii) the duration of sugar supply contracts (which is however determined mostly by the different customers' needs).

6.2.9 Key findings

This section provides an overview of the key findings of the assessment made for each relevant typology of supply chain organisational arrangements and contractual relations (§ 6.2.1 to 6.2.7), through a synoptic table (see Table 6.11 below).

Table 6.11 - Effect of the supply chain organisational arrangements and contractual relations on the EU sugar sector's resilience

Organisational arrangements and contractual relations	Effects on the economic viability of the main actors in the EU sugar supply chain	Effects on the availability of an adequate sugar supply in the EU
Sugar beet supply contracts between growers and processors	Allow for effective planning of production → ensure improved stability and predictability → ***strengthened*** economic viability of sugar producers. Multi-annual inter-branch agreements and beet supply contracts: have **pros and cons** *(further improvement in stability vs. reduced flexibility to adapt to changing conditions)*	***Positive*** indirect effect via economic viability of actors
Vertical integration between sugar beet farming and processing	Allows for more effective planning, smoother operation of processing plants, reduced transaction costs vis-à-vis non-integrated production → ***strengthened*** economic viability of processors and growers *There have been difficulties also for integrated producers in offering attractive enough sugar beet prices during the price depression*	***Positive*** indirect effect via economic viability of actors
Arrangements for raw cane sugar supply to refiners	Allow for smooth and profitable operation of refineries → ***strengthened*** economic viability of refiners	***Positive*** indirect effect via economic viability of refiners
Vertical integration between sugar production and sugar-consuming downstream activities	**Variable:** in case of higher margins from internalised production and marketing of sugar-containing products than from sale to industrial sugar users → *strengthened* economic viability of the concerned producers; weakened viability in the opposite case	***Negative***: the quantities of sugar used for internalised value-adding processes are not available anymore as such on the EU sugar market
Business alliances among sugar producers	**Variable**, depending on the profitability of the operations that are the object of the alliance (especially where they would not have been activated without an alliance) **Pros**: i) lower investment to implement diversification strategies; ii) improved efficiency and wider geographical reach of marketing activities	**Variable** indirect effect via economic viability of the concerned actors
Sugar supply contracts between sugar producers and their customers	Allow for improved stability and predictability → ***strengthened*** economic viability of the concerned parties. Multi-annual sugar supply contracts: have **pros and cons** *(further improvement in stability vs. reduced flexibility to adapt to changing conditions)*	***Positive*** indirect effect via economic viability of actors ***Positive*** direct effect via improved quality and stability of supply

Source: assessment made at § 6.2.1 to § 6.2.7

7 THEME 2: THE THREATS TO WHICH THE EU SUGAR SECTOR IS CONFRONTED; THE EXISTING RISK MANAGEMENT STRATEGIES, THEIR USE AND EFFECTIVENESS

7.1 Q3: What are the main existing risks affecting the EU sugar sector as well as the most important threats expected to occur in the short, medium and long term?

Definition of key terms

"Risks affecting the EU sugar sector": The definition of this concept needs to consider the fact that the study covers all the stages of the EU sugar supply chain (not only sugar beet farming, but also processing/refining and sugar distribution to industrial users and retailers), and that not all the main risks that can theoretically affect agribusiness activities are relevant for sugar production in the EU. For a business, risk can be defined in general terms as a *negative occurrence that is caused by external factors or internal weaknesses, and that may be addressed through opportune action* ("risk management": see § 7.2).

"Relevant threats to the EU sugar sector *(expected to occur in the short, medium and long term)***"**: Whereas risks are negative events that have already occurred in the past (more or less frequently), and that are likely to occur also in the future, the concept of "threat" is broader, insofar it also covers negative events that have never occurred in the past, but that may occur in the future. For instance, Brexit should be considered a threat, since it is the first time that a Member State leaves the EU. Like risks, threats to businesses can come from external factors or internal weaknesses, and may be addressed – to some extent at least – through opportune measures.

Understanding of the question

In principle, all the **risks** affecting business operators involved in the EU sugar supply chain (and in particular sugar beet farmers, beet sugar producers, and full-time refiners) are considered to be relevant for the study: those risks are classified based on their importance and probability of occurring, in order to identify the main ones. Question 3 mainly focuses on the evolution/occurrence of the risks affecting the EU sugar sector after the end of sugar quotas; however, the risks existing before the end of the sugar quotas also need to be considered, to the extent that they are still relevant in the post-quota period. Two broad categories of risks are considered in the assessment:

1. "**sector-specific risks**": these are exclusive to, or anyway especially significant for, the sugar sector in general, and the EU sector in particular (e.g. exposure to price volatility in the international sugar market);
2. "**systemic risks**": these affect the EU agribusiness system as a whole, including the sugar sector (e.g. credit risks, exposure to energy price volatility, etc.).

The main focus of the assessment under question 3 is on sector-specific risks.

In principle, all the **threats** to business operators involved in the EU sugar supply chain (and in particular sugar beet farmers, beet sugar producers, and full-time refiners) are considered to be relevant for the study. However, the focus of question 3 is mainly on prospective threats to the EU sugar sector coming from future developments of processes that are currently ongoing: changes in policies that are relevant for the sector, and the already mentioned Brexit. The influence of those specific future developments on the resilience of the EU sugar sector is assessed under question 11 (§ 8.2) and question 13 (see § 8.4).

For each risk/threat identified as relevant for the assessment, the analysis includes:

1. Classification of the risk/threat as **sector-specific** or **systemic**.
2. **Identification of the linkages with the end of quotas** (if any). Each identified risk/threat is classified as:
   - directly linked to the end of quotas;
   - not directly linked to the end of quotas, but possibly influenced by the end of quotas;
   - not directly linked to the end of quotas, and not influenced by it.

The description of relevant risks/threats also includes the **stage of the supply chain** which is more likely to be affected by each of them (e.g., sugar beet growers; beet sugar producers; cane sugar refiners; industrial users and retailers; etc.).

7.1.1 Main risks and threats for the EU sugar sector

Production risks

The conceptual framework for the analysis of production risks is outlined in Box 7.1. The following sections provide a characterisation of the main production risks identified as relevant for the EU sugar sector, and a synthetic analysis of their root causes.

Box 7.1 -Conceptual framework for the analysis of production risks

Risks related to planning of sugar production and sugar beet cultivation (see below) are the **main root causes that determine situations of oversupply or undersupply on the market**, mainly due to the fact that **actual sugar beet yields** (in terms of beet quantity per hectare and sucrose content of beets/polarisation) **vary significantly**, and **cannot be planned**.

Risks related to **planning of sugar production**. Production plans of beet sugar producers are actually based on the extent of sugar beet areas under contract. The actual beet production volumes, and the final output volumes of sugar, by-products and other technologically related products (e.g., ethanol, where relevant) are known at the end of the processing campaign only. In particularly favourable years, beet yields may be much higher, and beet production volumes may be much larger than expected ("bumper crops"). This poses notable operational challenges in terms of: i) organising beet deliveries and processing; ii) deciding the destination of excess beet production, within the limits allowed by pre-existing arrangements with growers (if any); iii) storing and marketing excess sugar production. The solutions to address those challenges entail additional costs for sugar producers; furthermore, larger-than-planned sugar production by multiple sugar producers in the EU may determine a situation of oversupply, with depressive effects on sugar prices. By contrast, in marketing years characterised by very limited areas under sugar beets, exceptionally low sugar beet yields or particularly unfavourable weather conditions during the beet harvesting period, it may be difficult to ensure continuous supply of sugar beets to all processing plants, or processing campaigns may be exceptionally short: these conditions usually entail additional costs for producers.

Risks related to **sugar beet cultivation**. A complex combination of factors determines the final beet output at farm level, in both quantitative and qualitative terms. Climate (including exceptional events like flooding or drought), pest outbreaks, beet farming technology and practices concur to determine beet yields, beet quality (polarisation, technological parameters for processing), beet output and, in the end, the economic results of sugar beet farmers. Risks related to sugar beet cultivation may be further aggravated by restrictions in the use of certain farming inputs or techniques introduced by environmental or sanitary legislation (see the section "policy risks and threats").

Risks related to **sugar production**. In certain years, the technological quality of sugar beets (polarisation, purity of thick juice, etc.) may be significantly lower than usual. Besides implications in terms of lower-than-planned sugar output, poor technological quality of sugar beets may require *ad hoc* technological solutions, which translate into additional costs for sugar producers.

Risks related to planning of sugar production

Several sugar producers and beet growers' organisations underlined that the **business model of the beet sugar sector requires stability and predictability for optimal planning of production**, due to a number of specificities (capital-intensive sector, need to process sugar beet as soon as possible after harvest, relatively low sugar content of beets, relatively low spatial density of sugar beet farming due to rotation requirements, etc.). Long-term stability in the extent and (preferably also) spatial distribution of sugar beet catchment areas is deemed to be an important condition for profitable beet sugar production. **Frequent and substantial variations in the extent and geography of sugar beet catchment areas** pose **serious challenges for a smooth and profitable operation of processing plants**. The analysis of the business

model of the beet sugar sector revealed that the interplay of two decisional processes concurs to determine the final extent of sugar beet areas in each processing campaign in a certain Member State:

1. Business strategies and production decisions by sugar producers, which take into account supply and demand conditions in the sugar market (and the extent of sugar stocks from the previous marketing year in particular), and which may also be driven by the pursuit of specific strategic goals (in particular gaining market shares at the expense of weaker competitors).
2. Production decisions by farmers, which are mainly driven by perceptions about the relative profitability of sugar beet farming vis-à-vis alternative crops.

Since the structure and output of the EU sugar beet farming sector as a whole has remained rather stable since the 2006 reform of the sugar regime (see § 4.1.2.1), the analysis of the variability of the extent of sugar beet areas at Member State level was performed by taking the simple average over the entire 2007-2020 period as reference. The analysis revealed that **substantial variations** (i.e., variations falling outside a +/- 10% range) **in the extent of sugar beet areas** have been **relatively infrequent in the leading sugar beet producing Member States** (in decreasing order of importance: France, Germany, Poland, the Netherlands, Belgium and Czechia) **in both the quota and post-quota periods**. The most significant downward deviations occurred in the quota period (2008 and 2015 processing campaigns), whereas the most significant upward deviations occurred at the start of the post-quota period (2017 and 2018 processing campaigns). These results confirm both the rationale stemming from the business model outlined above, and the fact that the end of quotas initially encouraged the leading producing Member States to expand their sugar (and hence sugar beet) production. Production risks related to **variations in the extent of sugar beet areas** are **clearly linked to the end of quotas**, and are also related to the **termination of minimum sugar beet prices** that accompanied it (the analysis of the related implications has been performed under questions 1 and 2, at § 6.1 and 6.2, respectively).

It is worth noticing that producers in some Member States (France and the Netherlands in particular) were reluctant to reduce the extent of sugar beet areas immediately after the 2017/18 bumper crop, in spite of already low sugar prices on the EU market at the beginning of 2018. The only significant reductions in the extent of sugar beet areas occurred in the 2019 and 2020 processing campaigns. This basically confirms that the most cost-efficient EU beet sugar producers pursued a rather expansive competitive strategy right after the end of quotas, and changed strategy only after the prolonged depression of sugar prices on the EU and world markets started to endanger the economic sustainability of their business.

The analysis of variations in the extent of sugar beet areas in "minor" producing Member States is complicated by the fact that some of them (Italy, Spain, Austria, Greece and Portugal in particular) experienced a drastic downsizing of their beet sugar sector after the 2006 reform (Portugal ceased producing beet sugar altogether in 2018). Other Member States (Slovakia and Lithuania in particular) experienced instead a remarkable expansion of sugar beet areas, which continued in the post-quota period in Slovakia. Among the "minor" producing Member States, only Denmark is characterised by a relative stability in the extent of sugar beet areas over the 2007-2020 period.

Another important condition for a smooth and profitable operation of beet sugar factories and for the economic sustainability of sugar beet farming is the **stability and predictability of sugar beet yields** (tonnes of beet per hectare), since it translates into **stable and predictable supply of sugar beets for processing**, and into **stable and predictable sugar beet output at farm level**. Adequate supply of sugar beets is particularly important to ensure satisfactory utilisation of processing capacity and duration of processing campaigns. As it will be seen in more detail below and in the reply to question 4 (see § 7.2), the root causes of sugar beet yield variability (mainly climatic conditions and pest outbreaks), and hence of production risks in sugar beet farming, can be controlled to a certain extent through opportune farming techniques (seedbed preparation, choice of beet varieties, fertilisation, irrigation, crop protection).

However, inadequate farming techniques and/or the specific nature and/or exceptional severity of some adversities (e.g., prolonged drought where systematic irrigation is unfeasible, or outbreaks of pests that are still difficult to control at the current state of the art) or, by contrast, very intensive farming techniques and/or particularly favourable climatic conditions / absence of significant pest attacks, may determine substantial variations of sugar beet yields. The nature of the root causes implies that production risks deriving from the **variability of sugar beet yields** are **not linked with the end of the quota system**, and are **not influenced by it**. However, whenever substantial variations in sugar beet yields are combined with remarkable variations in the extent of sugar beet areas of the same sign (which are instead tightly linked with the end of quotas), drastic upward or downward variations in total sugar beet production can be experienced.

For the reasons explained above, also the analysis of the variability of sugar beet yields at Member State level was performed by taking the simple average over the entire 2007-2020 period as reference. The analysis revealed that **substantial variations** (i.e., variations falling outside a +/-10% range) **in sugar beet yields** have been **relatively infrequent in the leading sugar beet producing Member States** (France, Germany, Poland, the Netherlands, Belgium and Czechia) **over the observed period**. The most notable exceptions have been the substantial downward variations experienced in several Member States particularly in the 2007 campaign (to a lesser extent also in the 2012 campaign), and the exceptionally high yields achieved in several Member States in the 2014 and 2017 campaigns. The drastic and unprecedented decline in sugar beet yields experienced in France in 2020 is mostly related to difficulties in controlling a pest - yellowing virus - deriving from the ban on neonicotinoids, as it will be discussed in more detail below.

It is also worth noticing that **sugar beet yields tend to be more variable in several "minor" producing Member States**: in particular Croatia, Lithuania and Portugal have experienced both exceptionally low and exceptionally high yields over the observed period.

The interplay between the variability of sugar beet areas and the variability of sugar beet yields determines the **variability of sugar beet production**. For the reasons explained above, also the analysis of the variability of sugar beet production at Member State level was performed by taking the simple average over the entire 2007-2020 period as reference. The results of the analysis are broadly in line with the results of the analysis focusing on sugar beet areas, i.e., the leading sugar beet producing Member States tend to have a lower variability than "minor" Member States; however, variability of sugar beet production is higher than that of sugar beet areas. The most significant and widespread downward variations were experienced in the 2008, 2010 and 2015 campaigns (France experienced a drastic reduction in sugar beet output in 2020, mainly due to the aforementioned problem of viral yellowing control); by contrast, the most remarkable "bumper crops" were recorded in the 2014 and 2017 campaigns (the 2017 campaign was the first after the end of quotas). Being related to variations in the extent of sugar beet areas, **variations in sugar beet production** are **tightly linked with the end of quotas**.

The analysis of the beet sugar sector business model revealed that **stability and predictability of the technological quality of sugar beets**, mainly linked with their **sucrose content (polarisation)**, is another important condition for a **smooth and profitable operation of beet sugar factories** and for the **economic sustainability of sugar beet farming**. The combination of stable sugar beet yields and stable polarisation **translates into stable and predictable yields expressed in sugar output per hectare**, which make sugar production planning much easier for processors; furthermore, since sugar beet prices are linked with polarisation (see the reply to questions 1 and 2 at § 6.1 and 6.2, respectively), the combination of stable polarisation and sugar beet yields ensures stability of revenues for sugar beet growers.

Similar to what observed for sugar beet yields, the root causes of variability in sucrose content of beets (mainly climatic conditions and pest outbreaks), which concur to determine production risks in sugar beet farming, can be controlled to a certain extent

through opportune farming techniques. The nature of the root causes implies that production risks deriving from the **variability of polarisation** are **not linked with the end of the quota system**, and are **not influenced by it**. However, whenever significant variations in polarisation are combined with remarkable variations in the extent of sugar beet areas of the same sign (which are instead tightly linked with the end of quotas), remarkable upward or downward variations in total sugar production can be experienced.

For the reasons explained above, also the analysis of the variability of beet sucrose content at Member State level was performed by taking the simple average over the entire 2007-2020 period as reference. The analysis focused on a selection of 9 Member States: five out of the six leading sugar beet producers, and four "minor" producers. The analysis revealed that **polarisation is much less variable than yields in sugar beet output per hectare**. Substantial variations (i.e., variations falling outside a +/- 10% range) in polarisation were experienced only in Austria and Croatia (2014/15) and in Italy (for two consecutive processing campaigns in the post quota period, 2018/19 and 2019/20).

The interplay among the variability of sugar beet areas, sugar beet yields and sucrose content of beets concurs to determine the **key variable for production planning by sugar beet processors**: **sugar production per hectare**. For the reasons explained above, also the analysis of the variability of sugar production per hectare at Member State level (Table 7.1) was performed by taking the simple average over the entire 2007-2020 period as reference. The analysis focused on a selection of 9 Member States (five out of the six leading sugar beet producers, and four "minor" producers), and had to consider the fact that the EU sugar regime in the quota period allowed to count as national production of a certain Member State also sugar produced in other Member States from domestic sugar beets, in the framework of specific agreements between sugar producers ("*travail a façon*").

The analysis revealed that **substantial variations** (i.e., variations falling outside a +/- 10% range) **in sugar beet yields over the observed period** have been **relatively less frequent in the leading sugar beet producing Member States** (France, Germany, Poland, the Netherlands, Belgium and Czechia) **than in "minor" Member States**. The most notable exceptions have been the significant downward variations experienced in several Member States particularly in the 2007/08, 2008/09 and 2010/11 campaigns, and significantly above average performances achieved in several Member States in the 2014/15 (quota period) and 2017/18 (post-quota period) campaigns. The drastic and unprecedented decline in sugar production per hectare recorded in France in the 2020/21 campaign is mostly related to the already mentioned difficulties in controlling viral yellowing (due to the ban on neonicotinoids); Poland also experienced a significant drop in sugar output per hectare in the last campaign, which was partly related to viral yellowing.

The **perceptions of stakeholders about the relevance of risks related to planning of sugar production** (from smaller than planned area under sugar beets, yield variability, etc.) were found to be basically consistent with the factual analysis presented above. Nearly all the consulted sugar producers, and an ample majority of sugar beet growers' organisations, deemed that these risks are still very relevant in the post-quota period. The only significant diverging perceptions were expressed by EU-based raw cane sugar refiners: this is mainly due to the very limited upstream vertical integration with raw cane sugar production in the French Overseas Domains and (above all) in third countries. EU full-time refiners and beet sugar producers that diversified their activities into sugar refining are generally not involved in raw cane sugar production, and are hence not directly affected by the related risks. These operators mostly source raw cane sugar for refining through the market and/or arrangements with independent suppliers in third countries, and are hence strongly focused on the related market and price risks. They are only indirectly affected by production risks in sugar cane farming and raw cane sugar production.

Most of the consulted sugar producers and sugar beet growers' organisations deem at least fairly likely, or very likely, that risks related to planning of sugar production will affect their business in the future.

Risks related to sugar beet cultivation

The most significant risks related to sugar beet farming that emerged from the assessment derive from:

1. **Variation of climatic conditions**, both within the crop cycle and from one year to another.
2. **Pest outbreaks**.

Systemic risks related to climate change – which affect the EU agribusiness system as a whole, with some specific impacts on sugar beet farming – are discussed in detail in a dedicated section; this section focuses on crop-specific impacts caused by the variation of climatic conditions.

Both climatic variations and pest outbreaks were found to significantly affect sugar beet yields, sucrose content of beets and, in the end, sugar production per hectare. They are hence among the main **root causes of variability in the production performance of sugar beet farming**. Due to their nature, these root causes are **clearly unrelated to the end of sugar quotas**, and are not influenced by it.

Stakeholder consultation and in-depth investigations in selected Member States (also based on the review of scientific and technical literature) allowed to identify a number of key specific climate-related and pest-related root causes of yield and/or sucrose content variability.

As for the variation of climatic conditions within the crop cycle and from one year to another, **prolonged periods of drought** in the early stages of development of sugar beets and during the summer were found to have serious impacts in terms of crop failure, reduced sugar beet yields and/or polarisation. These impacts are potentially more serious in Member States (Italy in particular) where systematic irrigation of sugar beets may be economically unsustainable or outright unfeasible.

*Table 7.1 - Variability in sugar production per hectare: values by marketing year vs. 2007/08-2020/21 period average (%)**

Member States	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21**
France	100%	104%	106%	99%	105%	99%	92%	110%	104%	99%	112%	96%	100%	75%
Germany	88%	88%	102%	84%	94%	101%	98%	118%	104%	108%	118%	95%	99%	103%
Poland	99%	88%	95%	82%	108%	104%	106%	114%	94%	114%	111%	102%	95%	88%
Netherlands	82%	90%	104%	93%	103%	100%	98%	110%	102%	100%	117%	97%	103%	100%
Belgium (A)	80%	94%	104%	91%	107%	94%	99%	106%	106%	89%	118%	102%	105%	104%
Italy (B)(C)	101%	105%	106%	114%	95%	84%	91%	141%	95%	101%	104%	82%	79%	102%
Austria	79%	127%	82%	94%	111%	90%	96%	96%	89%	113%	104%	99%	104%	115%
Spain (D)	88%	89%	87%	84%	101%	110%	95%	110%	113%	109%	112%	106%	94%	101%
Croatia (E)	n.a.	n.a.	n.a.	88%	103%	90%	81%	88%	81%	135%	125%	88%	94%	128%

* Member States are listed in decreasing order of importance in terms of average extent of sugar beet area over the 2007-2020 period; "2007/08" indicates sugar production per hectare of sugar beets harvested in 2007, and processed into the sugar production of the 2007-08 marketing year (MY) (October to September)

** provisional

Sources: elaboration of CEFS data 2007/08 to 2008/09; DG AGRI data 2009/10 to 2020/21 (except where otherwise noted)

Notes:

(A): net of production obtained in other MS ("travail a façon") in MY 2014/15, 2015/16, 2016/17 (source: DG AGRI)

(B): net of production obtained in other MS ("travail a façon") in MY 2011/12 (source: ABSI), 2012/13, 2013/14, 2014/15, 2015/16, 2016/17 (source: DG AGRI)

(C): results based on DG AGRI data diverge significantly from results based on ABSI data for MY 2014/15 (smaller upward variation = 115%) and 2016/17 (larger downward variation = 78%)

(D): net of production obtained in other MS ("travail a façon") in MY 2014/15 (source: DG AGRI)

(E): net of production obtained in other MS ("travail a façon") in MY 2013/14, 2014/15, 2015/16, 2016/17 (source: DG AGRI)

Extreme temperature variations may also seriously impact the production performance of sugar beet, especially in the southernmost producing Member States, even more so where systematic irrigation is not practiced. The sudden change of temperatures from the seasonal average to temperatures well above the normal level can severely damage the leaf apparatus of sugar beets. The decomposition of the leaves leads to the drying out of a high percentage of the leaf bouquet. The deterioration of the leaves mainly compromises the phase of accumulation of sucrose in the roots, which leads in turn to a lower polarisation index. Damage can be further aggravated by heavy rainfalls and a milder climate after most of the original leaf bouquet has been lost, since these conditions cause the growth of a new leaf bouquet ("retrovegetation"), at the expense of sucrose content in beets (sucrose is used by the plant to develop the new leaf bouquet).

Prolonged periods of heavy rainfall may delay seedbed preparation and/or seeding, with negative implications for the crop cycle; they may also delay harvesting, or lead to high soil tare in sugar beet deliveries to processing plants (especially in clay soils), thus negatively affecting the technological quality of delivered sugar beets.

Last but not least, **climatic conditions** often can also **promote pest outbreaks**.

The assessment revealed that some pests (*Cercospora beticola* in particular) can still be very challenging and costly to control in the current state of the art of crop protection techniques and products, even more so in the climatic conditions of the southernmost producing Member States, often characterised by hot and humid summers. Serious attacks of **Cercospora** can severely damage the leaf apparatus of sugar beets, with negative implications in terms of sugar beet yields and sucrose content that are similar to those observed for extreme temperature variations.

A pest that has become a major threat to the production performance of sugar beets in the post-quota period is **viral yellowing**, which is transmitted by aphid vectors. Viral yellowing has become a major cause of variability of sugar beet yields and polarisation mainly as a consequence of the ban on neonicotinoids imposed by EU legislation. These active substances were used to treat beet seeds, and provided cheap and effective protection from the development of viral yellowing. Viral yellowing has been the main root cause of the serious decline in sugar beet yields experienced in France in the 2020/21 campaign, and has significantly impacted sugar beet farming also in the Netherlands. Moderate viral yellowing can lower beet productivity by around 25% at local level; serious viral yellowing can lower beet productivity up to 40% at local level, but decreases up to 80% in sugar beet yields at individual farm level were reported by some stakeholders. Besides the negative implications in terms of reduced revenues, attempts at controlling viral yellowing through alternative crop protection techniques are costly, and often ineffective. Sugar beet growers hit by severe viral yellowing attacks are negatively affected in terms of both reduced revenues and increased costs, and the overall impact of widespread lower productivity of beet farming is a lower-than-planned supply of sugar beets to processing plants, which negatively affects the operations of beet sugar producers in the concerned Member States.

Consistently with the factual evidence presented above, the near-totality of consulted beet sugar producers and sugar beet growers' organisations deem that risks related to sugar beet cultivation (from drought, pests, etc.) are still very relevant in the post-quota period, and will very likely affect their operations also in the future.

Market risks, including price risks

The conceptual framework for the analysis of market risks is outlined in Box 7.2. The following sections provide a characterisation of the main market risks identified as relevant for the EU sugar sector, together with an analysis of their root causes.

Box 7.2 -Conceptual framework for the analysis of market risks

Risks related to **sugar price volatility.** Due to their perceived importance and the complexity of the analysis of their root causes, the conceptual framework for the analysis of price risks is provided in a dedicated Box (Box 7.3).

Risks related to the **extent of the sugar refining premium**. The related risks affect all the operators that refine purchased raw (cane) sugar. The sugar refining premium is measured by the extent of the difference between purchase price of raw sugar and ex-works price of refined (white) sugar. In aggregate terms, the extent of the premium is measured by the spread between the international prices for white sugar (London contract No. 5) and raw sugar (New York contract No. 11). The tighter the refining premium, the narrower the room to recover refining costs for operators. In some periods, the refining premium can even be negative (white sugar prices lower than raw sugar prices): this usually happens when tight raw sugar supplies are combined with oversupply of white sugar.

Risks related to **reduction/diversion of sugar consumption**. These risks can derive from: i) changes in consumer preferences (related to cultural/social/economic factors: ageing of population, increased awareness of health risks related to excessive sugar consumption, emerging lifestyles, etc.); ii) nutrition policies aimed at contrasting excessive sugar consumption ("sugar taxes"); their effect is investigated under question 13 (see § 8.4); iii) product innovation (development of alternative sweeteners; use of alternative sweeteners as ingredients to replace sugar; launch of "reduced sugar" or "sugar free" products; etc.).

Price risks, with particular regard to sugar price volatility on the EU and international markets

An in-depth investigation is performed for price risks (in particular those deriving from price volatility on both the EU and the international sugar market), since stakeholder consultation revealed that the near-totality of business stakeholders operating along the EU sugar supply chain perceive this specific risk as highly likely and particularly serious in the post-quota period, also in perspective. The conceptual framework for the analysis of price volatility and of its root causes is outlined in Box 7.3.

Box 7.3 – Conceptual framework for the analysis of price volatility in the sugar market and its root causes

In the framework of the study, **price volatility in the sugar market** is analysed for the **prices that are most relevant for EU sugar producers**: besides the average monthly price reported by the European Commission, the North Western Europe delivered spot price reported by Platts, and the international prices for white sugar (London No. 5) and for raw sugar (New York No. 11). **Two main dimensions of price volatility** are analysed:

1. **from one marketing year to another** (annual average prices);
2. **within marketing years** (the level of detail is determined by the frequency of the available time series: daily, weekly, monthly).

It should be noted that the scope for a comparative analysis of price volatility between the post-quota period and the previous period is rather limited, especially for the analysis at point 1 above: the last marketing year (2020/21) is just the fourth one after the end of quotas.

The analysis of price volatility is performed through **statistical analysis of the available time series of price data**. In particular, volatility concerns the tendency for individual prices to depart from average values. The used key indicator in assessing price volatility is the coefficient of variation of the price level, i.e., the ratio between the standard deviation of prices and the mean price. Particular attention is devoted to the analysis of means, in order to adjust for possible distortions generated by higher average prices on variance. The coefficient of variation is used to allow meaningful comparisons across different prices. Others measures for the volatility, such as the standard deviation of the changes in prices or the variance of log-returns, tend to return similar results than those returned by the coefficient of variation.

As for the **analysis of the root causes of sugar price volatility**, the following **main clusters of potential causes** are investigated:

1. **Interplay between supply and demand**, synthetically expressed by the stock-to-use ratio. The **main supply-side and demand-side factors determining the interplay** are analysed, as further specified below.
2. **Unpredictable/non-coordinated behaviour of key actors in the international sugar trade**, such as state intervention agencies, single desk sellers and (less frequently) leading international sugar traders. Whenever these actors suddenly release on the market substantial volumes of sugar, often with limited/no prior notice and over short time spans, they may cause significant turbulence of sugar prices. This behaviour is often dictated by shortage of storage capacity, by the need to free it up to

make room for incoming sugar volumes, or by deterioration of the quality of stored sugar to a point where the product is at serious risk of becoming unmarketable.

3. **Speculative conduct by non-commercial operators on the sugar market**, mainly targeted at futures for white sugar (London No. 5) and for raw sugar (New York No. 11).

The following main clusters of root causes are analysed.

Supply-side factors

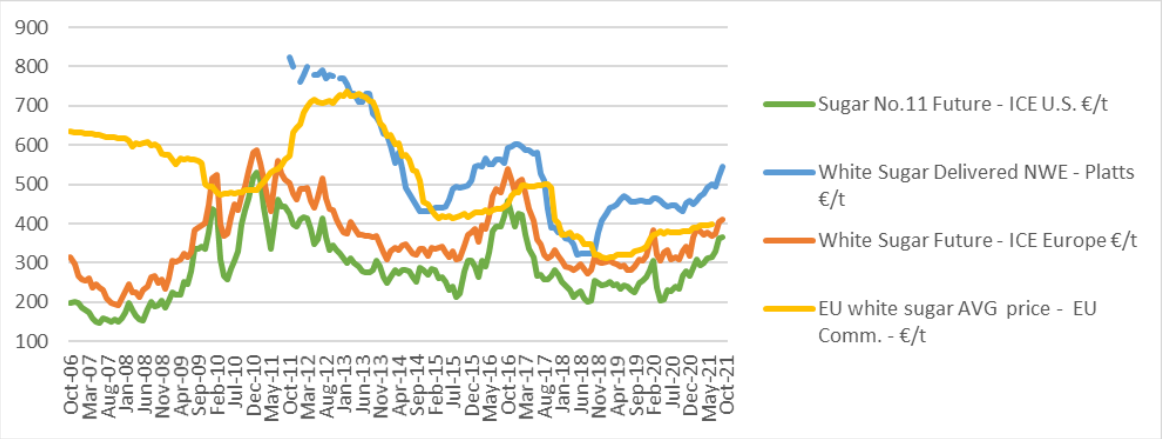
- Unpredictable weather conditions, extreme climatic events, pest outbreaks etc., which determine significant variability of sugar beet and sugar cane yields.
- Non-coordinated behaviour of sugar producers in terms of production decisions, especially in terms of extent of sugar beet / sugar cane areas under contract in each processing campaign.
- Policy-related factors, mainly in terms of support measures promoting the expansion/contraction of sugar production.

Demand-side factors

- Dynamics of the macro-economic factors influencing the demand for sugar (for both direct consumption and industrial use): exchange rates, interest rates, household income, etc.
- Substitution of sugar with alternative sweeteners (HFS/isoglucose, inuline, low-calorie sweeteners, etc.) in both direct consumption and industrial use.
- Policy-related factors, mainly in terms of measures (e.g., sugar taxes) promoting the expansion/contraction of direct sugar consumption and of industrial use of sugar beets (e.g., for bio-ethanol production) and/or sugar.

Agricultural commodity markets have always been affected by a significant price volatility. Unanticipated changes in supply and demand often result in large price fluctuations: this is mainly due to the inelasticity of market fundamentals in the agricultural sector. Price volatility is one of the main sources of risks for the agri-food sector, and leads to a certain level of uncertainty about different factors (e.g., farmer income, production choices, investments). Sugar prices are no exception: in the last decade, European white sugar average prices, for instance, ranged in between a maximum of 738 Euros/tonne and a minimum of around 312 Euros/tonne, with fluctuations either within a marketing year or across marketing years. Substantial fluctuations characterised international markets as well (see Figure 7.1).

Figure 7.1 – Trends of the relevant sugar prices



Source: data from ICE, EU Commission, Platts.

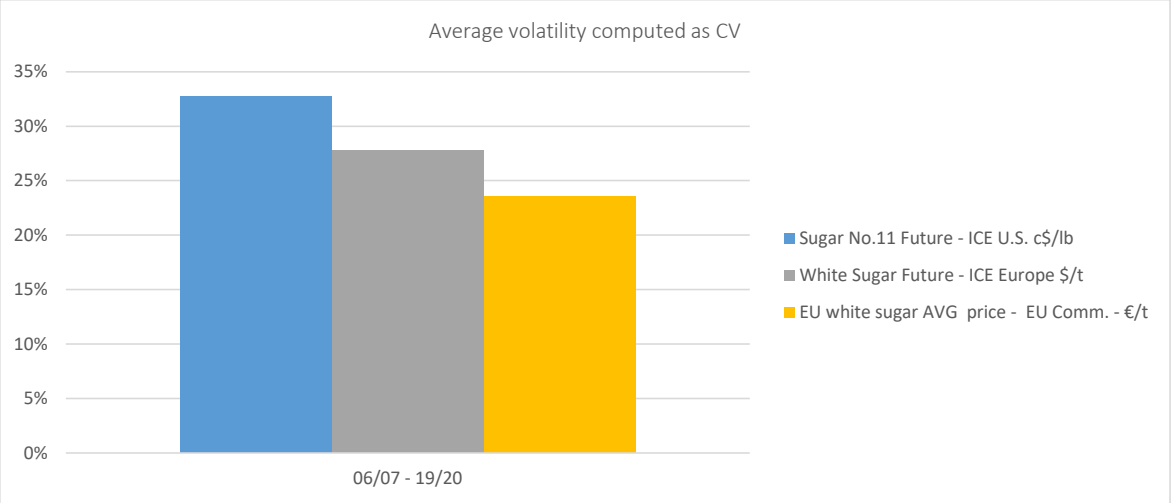
Before moving to the definition and the understanding of the main root causes of prices volatility, it is sensible to analyse the volatility of international and European sugar prices itself. In such analysis, price volatility refers to the variation of price changes around their mean value, i.e., the tendency for individual price observations to vary far from the mean value. In particular, volatilities are evaluated by the coefficient of variation of the level of prices (CV), i.e., the ratio of the standard deviation to the mean.

Figure 7.2 shows the volatility of international prices (New York No. 11 raw cane sugar futures, and London No. 5 white sugar futures) and of EU white sugar average prices for the period that extends from the 2006/07 marketing year to the 2019/20 marketing year[75]. Prices have been characterised by a substantial level of volatility. In particular, the price exhibiting the higher degree of volatility is the No. 11 raw sugar future, with a CV of around 33%. On the other hand, the price exhibiting the lower degree of volatility is the EU white sugar average price, with a CV of around 24%.

On average, international prices seem to have a higher historical volatility compared to European prices. However, the prices CV hierarchy varies across different marketing years, as shown in Figure 7.3. For instance, for the 2011/12, 2013/14 and 2017/18 marketing years the EU white sugar average price had a higher volatility than the international white sugar future.

The European prices CV can be distorted by the fact that EU white sugar average prices are determined by contractual sales, including long-term contracts, and thus do not reflect spot prices. Therefore, for completeness of analysis, Figure 7.3 also includes the CV for the white sugar NWE prices quoted by Platts[76].

Figure 7.2 – Volatility of sugar prices: coefficient of variation (CV) for the 2006/07 – 2019/20 period (October to September marketing years)

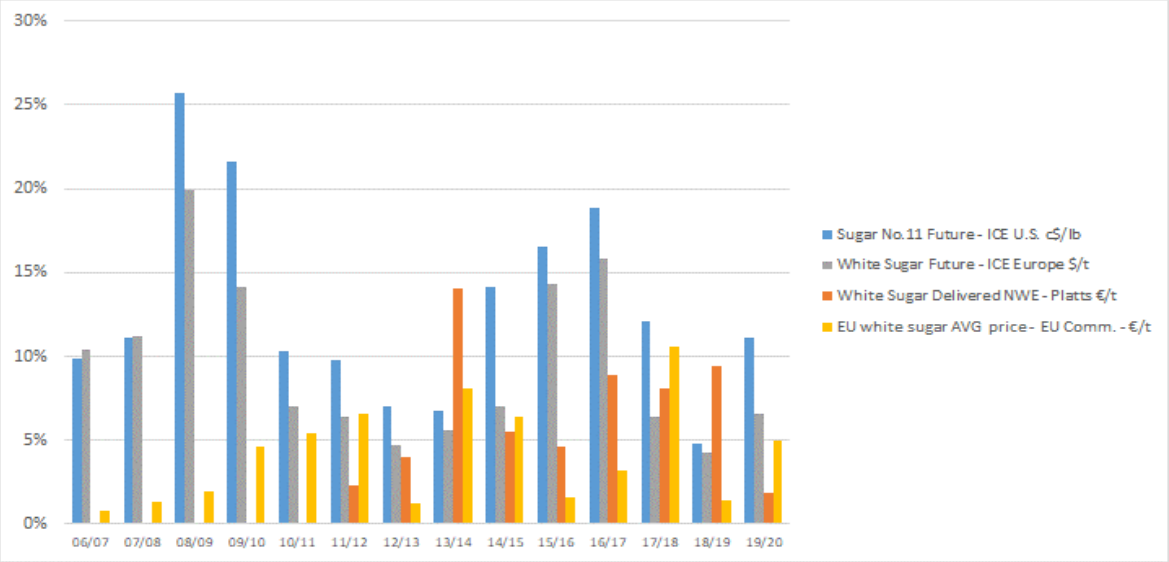


Source: elaboration of data from ICE, EU Commission, Platts.

[75] For simplicity of analysis, coefficients of variation have been computed looking at monthly average prices for each series. Marketing years refer to the October to September period.

[76] The white sugar delivered NWE price series by Platts is available since the 2011/12 marketing year.

Figure 7.3 - Volatility of sugar prices: coefficient of variation (CV) by marketing year



Source: elaboration of data from ICE, EU Commission, Platts.

The main root causes of the volatility of sugar prices are identified in the following sections. In particular, the following clusters of potential causes are investigated and discussed:

1. supply and demand dynamics;
2. speculative conduct by non-commercial operators on the sugar market, mainly targeted at international futures.

Supply and demand dynamics

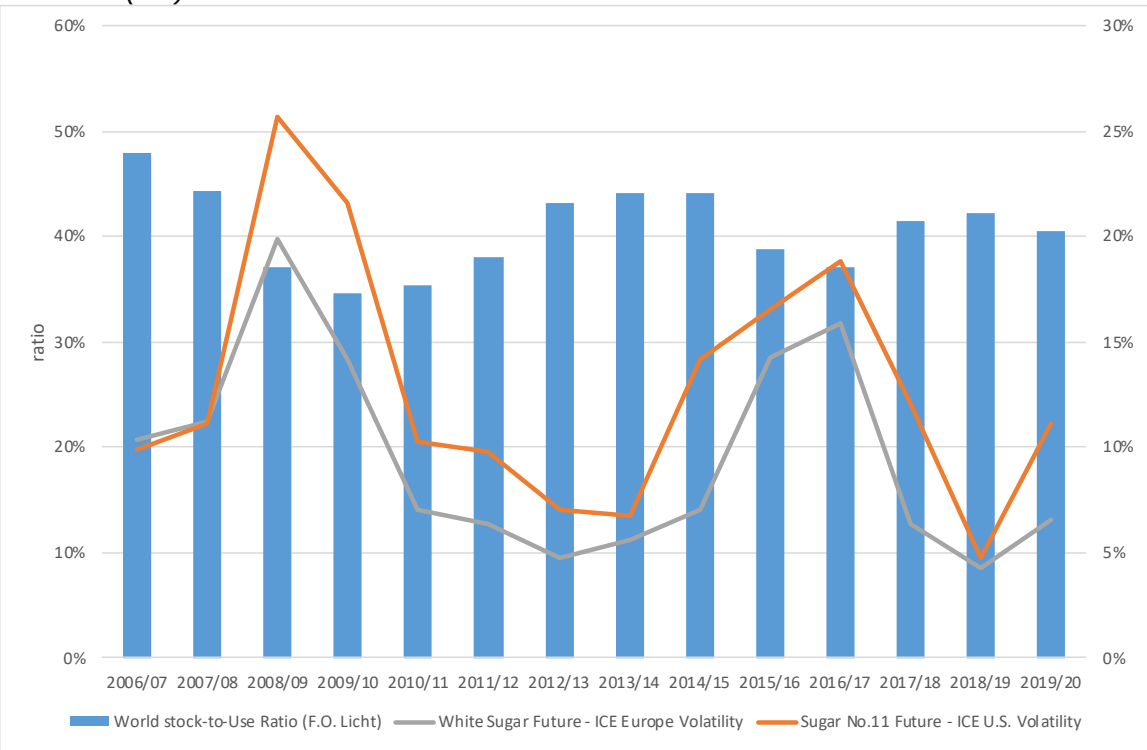
Sugar market fundamentals play a key role in the behaviour of international and European sugar prices. As the global **stock-to-use ratio** (i.e., the level of sugar stocks as a share of total sugar use) increases, the international sugar price decreases, and vice versa. As a matter of fact, international sugar prices always achieved their highest average levels after a period in which the stock-to-use ratio had decreased. Therefore, the variability of the stock-to-use ratio is one of the determinants of international prices volatility. Figure 7.4 shows indeed how the highest levels of international prices volatility have been reached in marketing years that have been affected by a severe change in the world stock-to-use ratio.

Moreover, the international prices volatility is transmitted to European sugar prices with a magnitude that depends on the EU import dependency level. As a matter of fact, the EU sugar regime, and in particular its import regulation component, is the main determinant of the existing spread between the international sugar prices and the EU sugar prices, i.e., the so-called "basis". In general terms, the higher is the EU sugar import dependency, the higher is the basis between international and EU sugar prices. As a matter of fact, when the EU is not self-sufficient for sugar, domestic prices tend towards the so-called "import parity" (international sugar price + logistics + market disturbances, mainly import duties), and the gap versus the so-called "export parity" (international sugar price + logistics) increases. This implies that as the EU import dependency decreases, the EU price premium vs. international price decreases, albeit with a certain lag[77]. Therefore, the higher is the EU import dependency, the less EU prices are affected by international prices volatility. By contrast, when the EU import dependency decreases, EU prices tend towards international prices, thus reaching a much higher level of volatility (see Figure 7.5). The aforementioned relation between international and European prices volatility explains, for instance, why in the marketing

[77] See § 4 for a more detailed analysis.

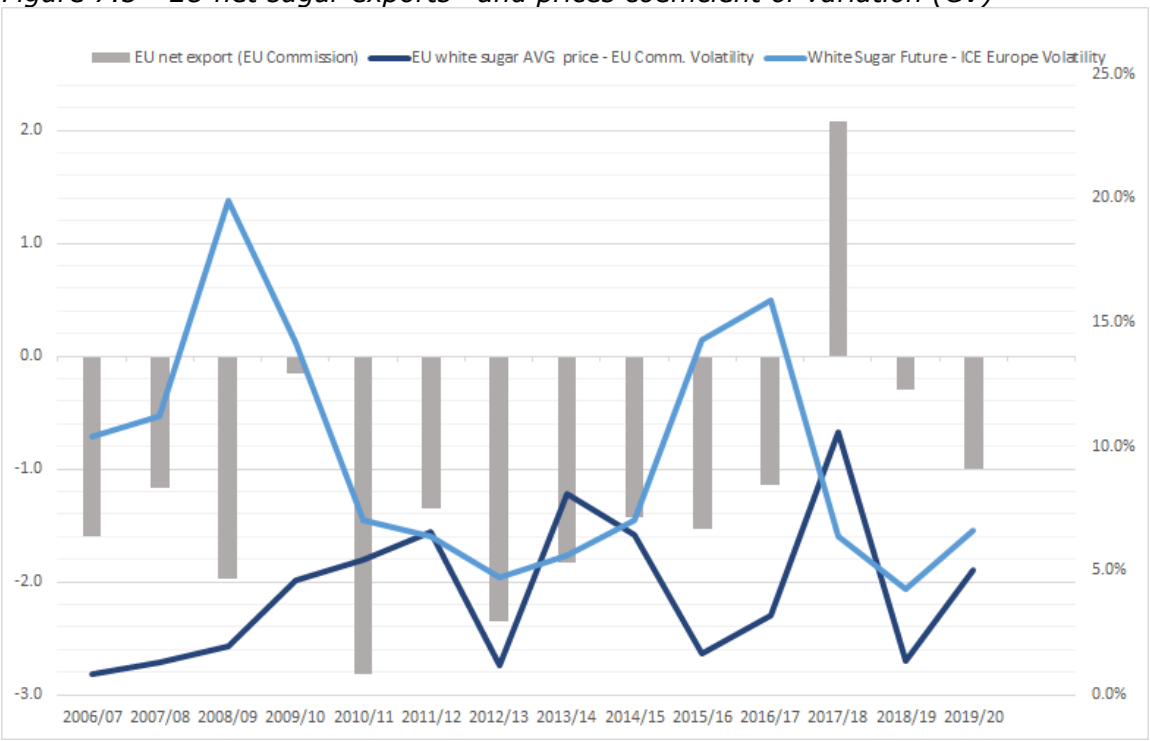
year following the termination of the EU sugar quota system (2017/18), the European prices had a higher volatility than international prices.

Figure 7.4 – Global sugar stock-to-use ratio and international sugar prices coefficient of variation (CV)



Source: elaboration of IHS Markit (F.O. Licht) and ICE data

Figure 7.5 - EU net sugar exports and prices coefficient of variation (CV)*



* in million tonnes, left axis

Source: elaboration of EU Commission and ICE data

The following sections briefly discuss the factors that can impact on sugar supply (production, stocks and exports) and sugar demand (consumption and imports) and that can lead to a certain level of price volatility, thus resulting in market risks for the sugar sector[78].

Supply side factors

Unpredictable weather conditions, extreme climatic events, pest outbreaks etc., can determine significant variability of sugar beet and sugar cane areas and yields. For instance, the 2019/20 marketing year global production has been heavily affected by a severe dry weather in major growing areas in India and Thailand. India reached the lowest sugar output in three years, while Thailand produced almost 40% less than in the previous marketing year. Global sugar production decreased by approximately 4 million tonnes, with a decreasing stock-to-use ratio. The negative effect on the world stock-to-use ratio was partially offset by good production in Brazil and by a decreasing consumption due to the COVID-19 pandemic; however, international and European average sugar prices increased respectively by almost 9% and 15%, respectively.

As already discussed, unpredictable weather conditions, extreme climatic events, and pest outbreaks are relevant risk also in the EU. For instance, the 2020/21 EU production reached a five-year low mainly due to the decreasing production in France (-32%). The ban on the use of neonicotinoids since 2018 has indeed resulted in crop losses because of widespread viral yellowing. Moreover, the main sugar beet farming areas in the country were affected by an extraordinary drought.

Policy-related factors, mainly in terms of support measures promoting the expansion/contraction of sugar production or export, are another important root cause of sugar price volatility. As previously discussed, the end of the quota regime in the EU promoted an expansion of the area under sugar beets that – combined with higher-than-average yields – resulted in an exceptional beet sugar production and in a situation of oversupply of the EU sugar market. Policy developments in the other sugar producing and exporting countries can also play an important role. For instance, starting from the 2018/19 marketing year the Indian government introduced an export subsidy as part of efforts to cut surplus stocks and prop up local prices. India reached a record high export of around 7 million tonnes of sugar in the 2019/20 marketing year. This positive shock on world supply has partially offset the bullish effect on prices of a less abundant world sugar market. Other countries set up trade policy instruments to protect their domestic markets, which can have an impact on price volatility (e.g., the import tariffs in the EU, the out of quota tariffs in China, and the export limitations for Mexico).

Interdependence relations between the sugar market and other markets are another root cause of sugar price volatility. For instance, the sharp 2019/20 sugar production decline in Thailand has been amplified by rising prices for cassava, a key competitor for sugar cane cultivation: those rising prices drove farmers to switch from sugar cane to cassava. The variability of the world sugar production also depends on the ethanol market. In particular, Brazilian mills can choose what portion of sugarcane goes to ethanol production or to sugar production. Therefore, low oil prices (through their depressive effect on ethanol prices) represent an incentive to Brazilian sugar production (Figure 7.6). The relationship between crude oil futures prices (North Sea BRENT in this case) and ethanol futures prices (CBOT fuel ethanol future) appears clearly from Figure 7.7, and has become tighter from 2014 onwards.

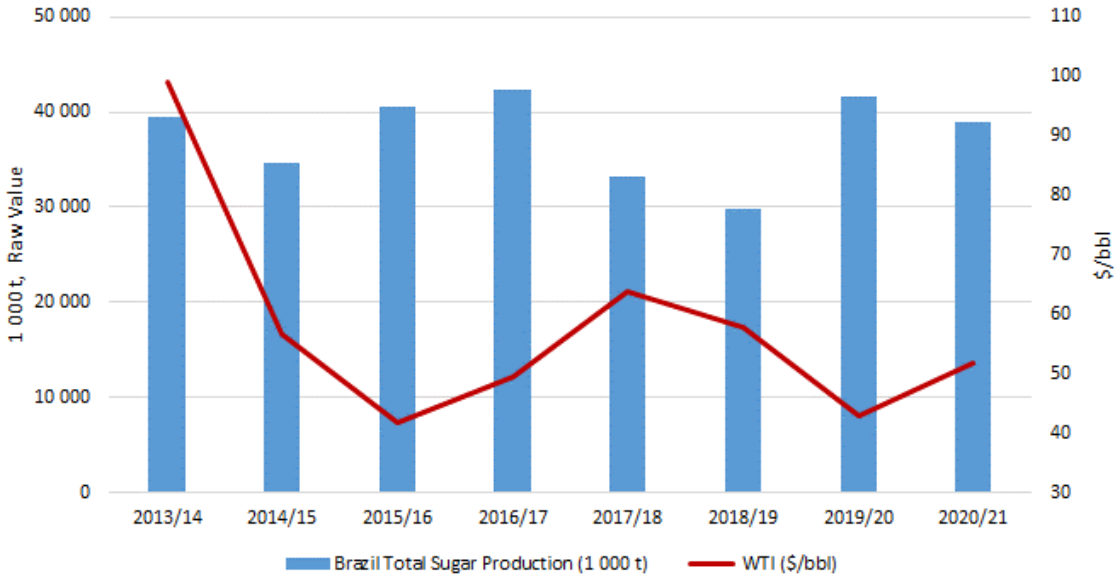
Macroeconomic conditions and exogenous factors are also among the root causes of sugar price volatility. For what concerns the role of **exchange rates**, it should be noted that a weaker Brazilian real encourages export selling from Brazil's sugar producers, and it is therefore bearish for sugar prices (Figure 7.8).

[78] The following sections provide examples and clarifications. For an overview of the underlying supply and demand data, see § 4.

Higher freight rates, ports logistic issues, and shortage of manpower connected with the COVID-19 pandemic, represent one of the main concerns over world commodity trade during the 2020/21 marketing year, including international sugar trade.

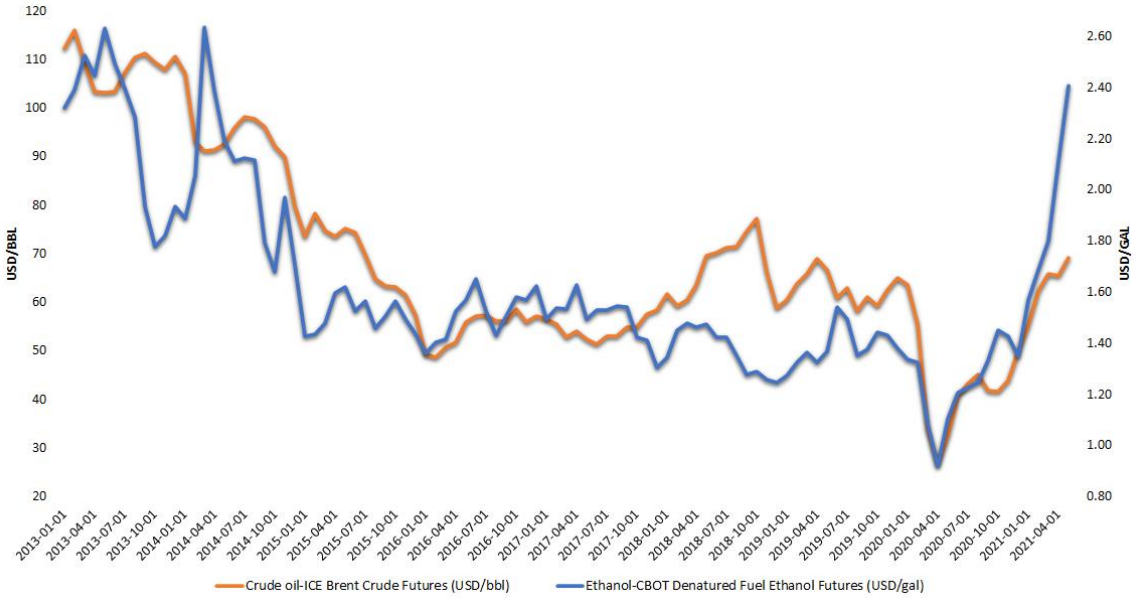
Non-coordinated behaviour of sugar producers in terms of production decisions, especially in terms of extent of sugar beet / sugar cane areas under contract in each processing campaign, is another root cause of price volatility, inasmuch it contributes to determine situations of over- or undersupply of sugar in the concerned geographical areas.

Figure 7.6 – Interdependence relations between the sugar market and other markets: oil prices and sugar production in Brazil



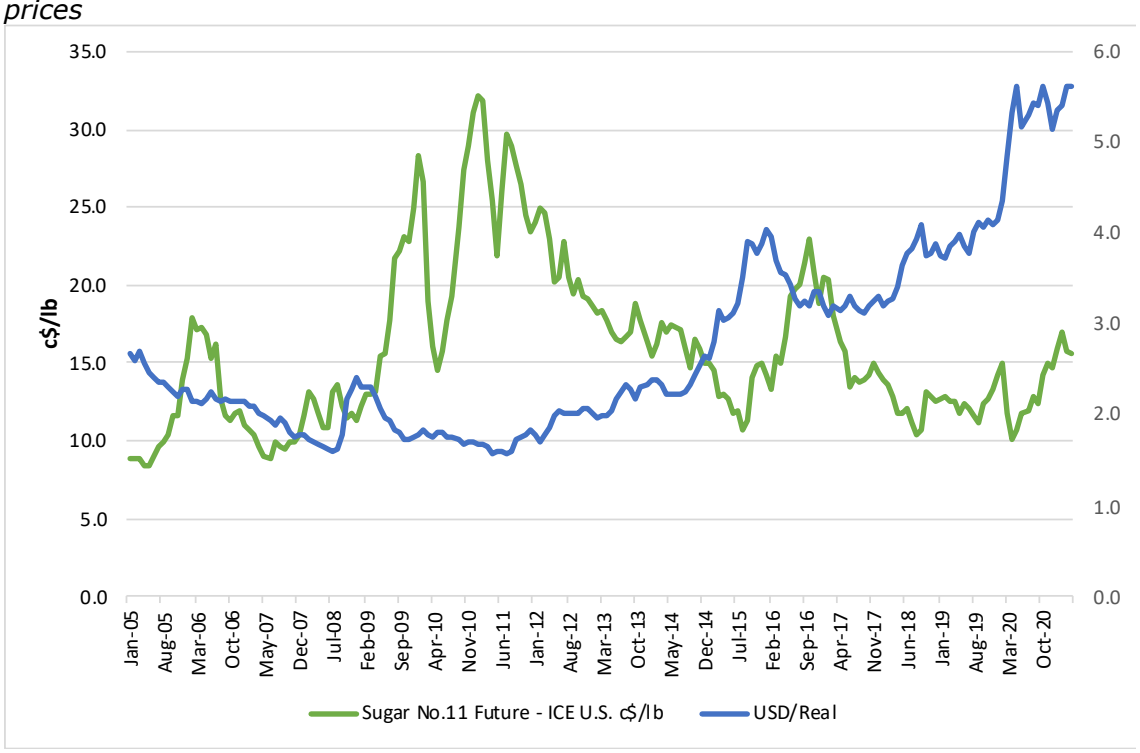
Source: CME Group, IHS Markit

Figure 7.7 - Interdependence relations between the oil market and the fuel ethanol market (2013-2021)



Source: ICE and CBOT

Figure 7.8 – Brazilian real to US dollar exchange rate: effect on international sugar prices



Source: elaboration of ICE and XE data

Demand side factors

The dynamics of a number of **macro-economic factors** can have an influence on the demand for sugar (for both direct consumption and industrial use): exchange rates, interest rates, household income, exogenous shocks. In particular, the global consumption growth is driven by developing countries with increasing population and GDP. Sugar demand in industrialised countries is indeed decreasing, mainly due to the introduction of sugar taxes as well as general health concerns related to sugar.

The **COVID-19 pandemic related restrictions** led, in the 2019/20 marketing year, to the first global sugar consumption decrease since the 1980/81 marketing year, thus representing a huge exogenous shock.

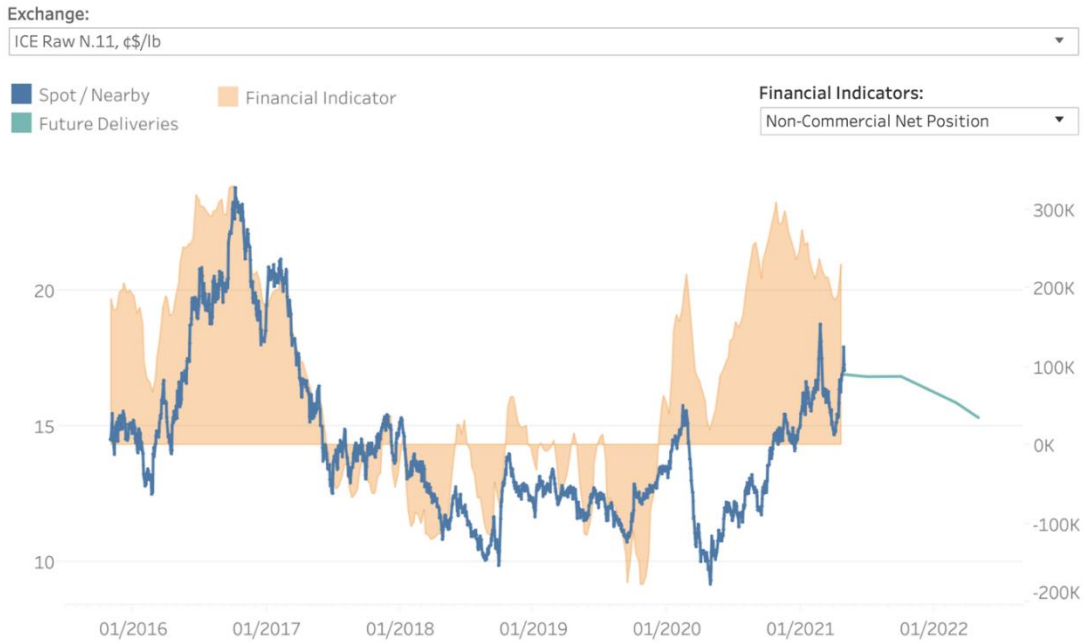
Substitution of sugar by alternative sweeteners (HFS/isoglucose, inuline, low-calorie sweeteners, etc.) in both direct consumption and industrial use is another demand side factor that can contribute to the volatility of sugar prices.

Last but not least, **policy-related factors** are another significant root cause, mainly with regard to measures (e.g., the so-called "sugar taxes") promoting the expansion/contraction of direct sugar consumption or imports, and of industrial use of sugar beets (e.g., for bio-ethanol production) and/or sugar.

Speculative conduct by non-commercial operators on the sugar market

Another important root cause of volatility of sugar prices is the speculative conduct by non-commercial operators on the sugar market. The Commodity Future Trading Commission (CFCT) define a non-commercial operator as a subject who has no business activities related to a particular commodity in which he/she has a position in the futures or options markets. Therefore, non-commercial operators take positions in the market purely to seek profits: this is why they are also referred to as speculators. Sugar futures prices are correlated with the positions of non-commercial traders (see Figure 7.9).

Figure 7.9 - Non-commercial net position and raw sugar futures price



Source: Areté elaboration on ICE data

In particular, when non-commercial net positions increase, most non-commercial traders are betting on a price rise, and this is usually a strong bullish signal. Speculators can therefore increase international price volatility, and amplify or dampen the effect on prices of supply and demand factors.

Importance of price risks for the different actors of the EU sugar supply chain

Price risks related to volatility of sugar prices or to prolonged periods of depressed sugar prices do not have the same importance for the different actors of the EU sugar supply chain. The importance of those risks varies according to the exposure of each typology of operator to them, and on the potential adverse effects on its business activities. The following sections are based on the analysis of evidence sourced from the available literature and – especially – the consultation of sectoral stakeholders and independent experts.

Sugar beet growers are directly exposed to, and affected by sugar price volatility only in case the sugar beet supply contracts that they sign with sugar producers / the pricing formulas of sugar producing cooperatives have a component that is somehow linked with the dynamics of sugar prices (variable pricing formulas and value-sharing clauses). These typologies of contracts have seen an increasing diffusion in the post-quota period (see the reply to question 2 at § 6.2). Growers that are rewarded through fixed price formulas are only indirectly exposed to, and affected by sugar price volatility across different marketing years, since the dynamics of sugar prices affect the ability of sugar producers to offer attractive enough price levels to growers. As for prolonged periods of depressed sugar prices, they affect growers via sugar beet price levels, irrespective of the type of pricing formulas: long periods of depressed sugar prices clearly have a negative impact on the ability of sugar producers to offer attractive enough sugar beet prices.

Beet sugar producers are directly exposed to, and affected by sugar price volatility both within each marketing year, and from one marketing year to another. Where sugar supply contracts with customers are agreed at a fixed price, the adverse effects on sugar producers stemming from sugar price volatility are felt when sugar prices rise above the levels set in contracts; where pricing formulas in sugar supply contracts are totally or partially linked with the dynamics of sugar prices, the positive and negative effects deriving from price variations are clearly straightforward. The different duration of sugar

supply contracts (see the reply to question 2 at § 6.2) also has implications in terms of exposure to, and potential adverse effects from sugar price volatility. The pricing of **spot sales** and **short duration contracts** (weekly/monthly) is affected by **sugar price volatility** in a straightforward way. Price volatility also has implications for contracts of longer duration (annual or multi-annual). In case the related pricing formulas are totally or partially linked with the dynamics of sugar prices, the effects of volatility on producers are direct and straightforward. In case **longer-term contracts** are concluded at a fixed price, the adverse effects for producers in terms of foregone revenue and lost business opportunities clearly arise when price levels rise above the fixed price set in the contract, unless contractual conditions include specific clauses for price revision in case of substantial variations of market conditions. Publicly available information from the annual reports issued by sugar producers reveals that some of them concluded longer term "loss-making sales contracts" (also known as "onerous sales contracts") in the post-quota period, i.e., contracts where the cost of sales is higher than the selling price, and fulfilment of the contract cannot be avoided (in other terms, contracts concluded at prices that do not cover sugar production and marketing costs: the expected economic benefit from these contracts is hence lower than the unavoidable cost of fulfilling the contracts themselves). These contracts were concluded in the period characterised by depressed sugar prices on the EU market, i.e., especially over the 2018/19 and 2019/20 marketing years. Loss-making contracts clearly affect negatively the profitability of the concerned producers. There is no publicly available information on the underlying volumes and on the duration of such loss-making contracts. In case a significant volume of sugar has been sold at loss-making price conditions, and in the framework of annual or multi-annual supply contracts, this should affect the dynamics of sugar prices monitored by the European Commission's Sugar Market Observatory. As anticipated in the reply to question 1 (see § 6.1), the negative implications for EU sugar producers of prolonged periods of depressed sugar prices on the EU market are direct and straightforward: besides the impacts on profitability, such conditions affect adversely the capacity of sugar producers to offer attractive enough beet prices to growers. As discussed under question 1, such a condition can start a vicious cycle that can have very serious consequences for the economic sustainability of beet sugar producers.

Differently from beet sugar producers, **EU raw cane sugar refiners** are exposed to, and affected by the volatility of sugar prices in both raw cane sugar procurement and refined sugar marketing. Coping with price volatility in both markets is part of the daily business of sugar refiners. As previously seen, the international raw cane sugar market is generally characterised by much higher price volatility than the EU refined sugar market; however, the latter got rather close to the degree of volatility of international raw cane sugar prices (New York No. 11 raw cane sugar futures) in the 2017/18 marketing year. The interplay between the intra-annual and inter-annual volatility of raw and refined sugar prices determines the extent of the "sugar refining premium" (also known as "white sugar premium"), that is the key determinant of the economic sustainability of raw cane sugar refining. In the case of sugar refiners, the implications of prolonged periods of depressed refined sugar prices on the EU market can be particularly negative whenever the prices for raw cane sugar get closer to the price of refined sugar, thus squeezing the "sugar refining premium". The considerations on the duration of refined sugar supply contracts and on "loss-making contracts" developed above for beet sugar producers naturally apply also for refiners.

Similar to refiners, **independent sugar traders** (i.e., sugar traders that are not controlled by EU sugar producers) are also exposed to, and affected by the volatility of sugar prices both on the procurement side and on the sales side. The additional complication for these operators is that their daily business is about purchasing and selling shipments of the same type of sugar (raw or refined). Independent sugar traders have to turn the daily and even intra-daily volatility of raw cane sugar and white sugar prices on the international markets into business opportunities: since they act as intermediaries between suppliers and buyers of the same type of sugar (raw or refined), usually located in different geographical markets, international sugar traders are heavily exposed to, and affected by the volatility of prices in both the origin and destination

markets. Even limited variations in sugar prices can provide business opportunities to independent sugar traders (or can make them disappear): traders operate on an extremely tactical market, where business opportunities may arise or vanish over a very short time span, and usually on very tight margins. An additional complication for independent sugar traders is related to the interplay between the volatility of sugar prices and the volatility of international freight rates (dry bulk freight rates or container freight rates for raw cane sugar; usually the latter only for refined sugar).

Policy risks and threats

The conceptual framework for the analysis of policy risks and threats is outlined in Box 7.4. The following sections provide a characterisation of the main policy risks identified as relevant for the EU sugar sector. Stakeholder consultation revealed that the majority of business stakeholders operating along the EU sugar supply chain perceive policy risks and threats as particularly serious in the post-quota period. These risks and threats were found to derive from both EU level and national policies. Besides the risks and threats deriving from policies already in force, a number of business stakeholders were found to perceive as relevant for the EU sugar sector also risks and threats from EU and national policies that will enter into force only in the future, and even from policies that are currently in their elaboration stage, or are just being discussed. The assessment of the implications of some of these policies for the resilience of the EU sugar sector is carried out under questions 11 and 13 (see § 8.2 and 8.4, respectively).

Box 7.4 -Conceptual framework for the analysis of policy risks and threats

Risks related to changes in EU and/or national policies concerning the sugar sector, with particular attention to policies affecting sugar beet and sugar production, sugar trade, and sugar consumption. The implications of these risks in terms of increased/decreased resilience of the EU sugar sector are assessed under questions 10, 11 and 13 at § 8.1, 8.2, and 8.4, respectively.

The analysis under question 3 focuses on:

- risks related to **heterogeneous levels of public support** – across the EU, or in the EU vis-à-vis third countries - to sugar beet / sugar cane farming, sugar production (including raw cane sugar refining), production of technically related products (e.g., beet or cane ethanol);
- risks related to **differences** - across the EU, or in the EU vis-à-vis third countries - **in environmental, food safety, sanitary legislation** that affect sugar beet sugar beet / sugar cane farming, sugar production (including raw cane sugar refining), production of technically related products (e.g., beet or cane ethanol).

The main **unfavourable implications** of the above policy risks for the actors in the EU sugar supply chain are linked to the **market distortions / non-level playing field conditions** deriving from them.

According to both sugar beet growers and sugar producers, the **major risks that operators in the EU sugar sector face in the post-quota period** are **policy risks**. The intensity of policy risks is generally considered higher in the post-quota period because the EU sugar sector now operates in the absence of a legislation-based supply management system (and hence with higher uncertainty and unpredictability), with tight margins due to depressed sugar prices, and it is hence in a more difficult position to address the negative effects of any risks.

The main risks and threats of the post-quota period stemming from policy-related factors were found to derive from:

- National decisions concerning **voluntary coupled support (VCS) to sugar beet farming** in some Member States (risk that support becomes unavailable; intensity of support).
- EU level implementing legislation (e.g., the already mentioned ban on neonicotinoids) that **limits the adoption of certain agricultural practices** that used to act as effective risk-preventing and/or mitigating measures.

- **Subsidised sugar production** and **use of plant protection products and reproduction materials** (GM sugar beet or cane) **not allowed in the EU** in key exporting third countries operating on the international market, which can result in unfair competition vis-à-vis EU sugar producers.
- The ongoing negotiations for **new free trade agreements (FTAs)** between the EU and sugar producing third countries / trade blocs, as well as some **provisions included in the FTAs currently in force**, which are perceived by several sectoral stakeholders as critical policy-related factors that increase risks for, or pose additional threats to, the EU sugar sector.
- The inclusion in the **reformed CAP and in other relevant EC initiatives (e.g., Farm to Fork strategy; EU Green Deal)** of provisions that can negatively affect the productivity and/or the costs of sugar beet farming in the EU, or which require significant adaptation efforts from the EU sugar sector (e.g., provisions regarding the reduction of CO2 emissions; provisions aimed at expanding the area under organic farming across the EU). The description of the relevant provisions is provided in the descriptive chapter (see § 3.2), whereas the effects of these provisions on the resilience of the EU sugar sector are assessed under question 11 (see § 8.2).
- **Other pieces of EU or national legislation** (currently in force or under elaboration/discussion) that can pose threats to the EU sugar sector. The potential effects of these policy-related factors on the resilience of the EU sugar sector are investigated under question 13 (see § 8.4). More specifically, question 13 investigates on potential challenges stemming from policy measures promoting the reduction of direct sugar consumption and of industrial use of sugar (e.g., the so-called "sugar taxes"), and from policy measures related to recent events, including Brexit and the outbreak of the COVID-19 pandemics.

It should be noted that the above-mentioned policies are risks and threats as such, but risks also derive from the **non-homogeneous implementation of some of those policies at national level across the EU.** Member States are given the possibility to apply certain elements of these policies on a voluntary/discretionary basis: this may eventually result in a non-level playing field for operators.

In addition to EU policies, a number of **external policy-related factors** also represent a threat for the EU sugar sector in the post-quota environment. The most serious threats come from a number of heavily subsidised sugar producers and exporters operating on the world market, that further aggravates the pressure of strong competition from highly cost-efficient sugar producers (Brazil in particular).

A description of the main internal and external policy-related risks and threats for the sugar sector is presented in the following sections.

Policy risks and threats related to voluntary coupled support

From a risk management perspective, voluntary coupled support (VCS) provides clear advantages (possibility to support sectors in difficulty in view of socioeconomic benefits) but also entails certain risks (potential for market distortion; it may also discourage market orientation). In addition, a potential future abolishment of coupled support (see also the reply to question 11 at § 8.2) is seen as a future threat by a group of actors, as it may result in shifts to other crops, or even abandonment of production by farmers, which in turn may seriously decrease sugar beet supply in certain regions, potentially resulting in more or less serious negative implications for local processors (with potentially worsened economic viability).

Policy risks and threats related to non-homogeneous implementation of the ban on neonicotinoids

As explained at § 3.3.3.3, Article 53 of Regulation (EC) No 1107/2009 allows Member States to authorise the placing on the market of plant protection products, in special circumstances and derogating from the regular authorisation process, for a period not exceeding 120 days and for limited and controlled use, where such a measure is necessary because of a danger which cannot be contained by any other reasonable

means. Member States are fully responsible for granting such emergency authorisations. With specific regard to the ban of neonicotinoids, 10 Member States have granted emergency authorisations for their use in sugar beets. As previously discussed, the impossibility to use neonicotinoids for beet seed treatment can translate into (and has actually caused) serious reductions in sugar beet yields and additional costs for crop protection, and, through these, serious deterioration in the economic sustainability of sugar beet farming. The considerations that can be made on non-homogeneous implementation of the ban on neonicotinoids across the EU are analogous to the ones presented above for VCS. Besides the temporary, *ad hoc* nature of derogations from the general rule, which creates additional uncertainty for growers and sugar producers (the adoption of a derogation cannot be taken for granted in each campaign), there is the issue of the introduction of distortions in the level playing field and fair competition among operators based in different Member States that grant (or not) emergency authorisations for neonicotinoids.

Policy risks and threats related to Free Trade Agreements with sugar-producing third countries/trade blocs

Several consulted sectoral stakeholders highlighted the negative impacts for the economic viability of the EU sugar industry stemming from some provisions included in the FTAs currently in force, or by the way in which some EU commercial partners manage their trade relationships with the EU in practice. Stakeholders representing the interests of EU sugar refiners (see also ESRA, 2019) highlighted the adverse effect on their activities of the imposition of duties (albeit reduced ones) on imported raw sugar for refining in the framework of the so-called CXL quota (98 Euros/tonne duty), or following the revision of the EU-Mexico Global Agreement (49 Euros/tonne duty within a 30 000 tonnes TRQ).

An ample majority of the consulted stakeholders in the EU beet sugar sector sees the potential implications of the negotiations for a FTA with the Mercosur trading bloc as a major threat to the economic viability of beet sugar production in the EU. This kind of policy-related threats creates serious uncertainty, since the potential adverse impacts for the EU sugar industry cannot be assessed with sufficient precision until the detailed conditions governing sugar trade between the EU and the concerned partner(s) have been defined, and the threats become concrete only in case the agreements are ratified. Further uncertainty derives from the fact that the actual impacts of a FTA on sugar trade depend on a complex combination of factors, including the attractiveness of the EU sugar market vis-à-vis the traditional export outlets for the third countries involved, the conditions in the global sugar market, etc. Practical experience has showed that once a TRQ for preferential imports is in place, its systematic filling cannot be taken for granted (some of the TRQs for raw or refined sugar granted in the framework of the FTAs described at § 3.3.4 have seen limited use, or their filling rate has varied significantly over the years; see also the reply to question 10 at § 8.1.2).

The above elements would lead to conclude that even though the ongoing negotiations for FTAs are widely perceived as a major policy-related threat by many sectoral stakeholders, their potential severity remains absolutely uncertain.

Risks and threats from climate change

Agricultural production largely depends on climate conditions. In the last decades changes in temperature and extreme weather conditions linked to climate change raised concerns over the effects of these events on crop yields. Climate change exposed EU sugar producers and sugar beet growers to serious production risks because the effects of changes in temperature, and the climate-change related weather conditions influence crop productivity. Climate change also has a direct impact on the variability of yields, which the assessment found to be significant in several EU sugar beet producing Member States (especially "minor" ones where the beet sugar sector may suffer from structural weaknesses and/or operational challenges). In addition, it also impacts on the seasonality of sugar beet processing, on the timing of irrigation, on the severity of soil erosion, on the types and seriousness of sugar beet pests and diseases and on the

presence of invasive weeds or animal species, the latter leading to increasing risks associated with these effects and additional need of plant protection treatments. Ultimately these events also have cascading socio-economic impacts on farmers' livelihoods. Changes in climate also have an impact on the growing importance of risk management tools that aim at reducing the vulnerability and exposure of the agricultural system to risks and threats.

Climate change and the related concerns about its effects on agricultural production systems dominate the global and EU agenda on environmental policies, as well as discussions at academic and industry level, and several analyses have been carried out over the last decades on the issue, including a number of reports published by international and EU level organisations. An in-depth analysis of the effects of climate change on agricultural systems and sugar beet cultivation is out of the scope of this study. However, for the purposes of this study, it is worth to recall here the main risks linked to climate change which can affect the cultivation of sugar beets and, through the tight linkage between sugar production and sugar beet farming, the entire EU beet sugar industry.

According to the European Environment Agency (EEA), climate change has substantially increased the occurrence of climate and weather extremes in many regions of Europe. The following drivers of climate change influence the agricultural production system, including crop productivity[79]:

- **Warmer temperature**: despite significant regional and seasonal differences, global average annual near-surface (land and ocean) temperature in the last decade (2009-2018) was about 0.910.96 °C warmer than the pre-industrial average (1850-1899). The main effect of warmer temperature is the earlier start, and a potential extension, of the crop-growing season.
- **Heat extremes:** heat extremes and heat waves have increased considerably in last fifty years. Heat excess causes stress to plants, thus reducing crop yields. Heat waves are projected to become even more frequent and longer lasting in Europe, in particular in the southernmost Member States.
- **Precipitations and hailstorms*:*** precipitation patterns are changing. As a general rule, annual precipitation has increased in most parts of northern Europe and decreased in parts of southern Europe. As regards hailstorms, the projections of the effects of hail events leave space to uncertainties; generally, hail causes damage to agricultural crops in most of Europe, but there are regions that are most vulnerable to this event, mainly in the Mediterranean area and in the Alpine region.
- **Heavy precipitations and inland floods**: the intensity of heavy precipitation events, which can cause floods, has increased in both summer and winter in most parts of Europe. Excess precipitation and floods can lead to crop damage and to soil erosion in agricultural fields. In addition, excessively wet soils can directly damage crops, increasing the risk of plant disease and insect infestation. Finally, wet soils can cause delays in planting or harvesting activities because it is not possible to operate machinery.
- **Droughts**: frequency and severity of insufficient water availability is generally increased in southern Europe and decreased in northern Europe. Drought negatively affects crop yields and causes increased demand for water for irrigation, reducing suitability for rainfed crop production and increasing production costs.

[79] This section is based on results of the following reports of the European Environment Agency: "Climate change adaptation in the agriculture sector in Europe", 2019; "Climate change, impacts and vulnerability in Europe", 2016.

Most of the above **climate-related phenomena and trends** were actually found to be among the **main root causes of variability of yields and sucrose content in sugar beet farming**.

The effects of climate change are not evenly distributed across the EU. In addition, the actual impact of climate change is still being debated and its specific effects on agricultural yields are not straightforward, given than several other productivity factors exist. In some areas, climate change may even produce positive effects on agriculture; however, the unpredictability of the effects is a factor of uncertainty that most EU farmers are currently facing and that requires the implementation of appropriate risk management tools.

Climate change can be considered as a **systemic production risk** (it affects the EU agribusiness system as a whole, even though it can have some specific impacts on sugar beet farming) that is **clearly not linked to the end of sugar quotas**, and that **cannot be influenced by it**. Nevertheless, climate change can have some implications in terms of market risks and policy risks of relevance for the EU sugar sector. More specifically:

- In the post-quota environment, the EU sugar system is more vulnerable and exposed to the implications of climate change that affect the global agricultural system. Climate change is affecting the variability of agricultural production at global level, and this has an impact on the EU agricultural markets and agricultural and food prices, including sugar prices. According to a briefing paper[80] of EEA, among the commodities imported in the EU, raw and refined cane sugar is one of the most affected by climate change, because the non-EU countries of origin are highly vulnerable to climate change.
- Adaptation to and mitigation of climate change are among the key topics of the current EU policy agenda, including in policy areas that directly or indirectly have an impact on sugar beet farming and beet sugar production. For instance, policy related to water management, biodiversity protection, reduction of carbon emissions and, above all, the Common Agricultural Policy (CAP) encourage actions within the agribusiness system aimed at changing agricultural practices, and this can have a medium-term impact on the whole EU sugar supply chain. The risks for the EU sugar sector linked to policy factors have been previously illustrated; the implications of current and prospective EU policies for the resilience of the EU sugar sector are assessed under question 10 (see § 8.1) and question 11 (see § 8.2).

Other systemic risks

A number of **systemic risks other than climate change** were also considered in the assessment. These risks affect the EU agribusiness system as a whole (or even the entire EU economic system): this implies that they can also affect the EU sugar sector, but are by no means specific to it. The assessment focused on three main systemic risks:

1. variations in the price of the main energy sources used in sugar beet growing and in sugar production (coal, natural gas, oil);
2. variations in exchange rates, with particular attention to those concerning the main non-EU exporters of raw and refined sugar on the international market;
3. variations in interest rates.

The following sections provide a synthetic analysis:

- of the evolution of the aspects considered (energy prices, relevant exchange rates) over time, with specific respect to their volatility;
- of the perceptions of the consulted stakeholders about the relevance of these systemic risks in the post-quota period.

[80] The briefing paper is available at: https://www.eea.europa.eu/publications/global-climate-change-impacts-and/global-climate-change-impacts-and

Variations in the price of the main energy sources

The most important energy sources used in EU sugar factories are natural gas and coal (lignite), the latter mainly in the sugar producing Member States that still have a significant domestic production of soft coal (i.e., mainly in Germany, Poland, and Czechia).

According to a recent report of the European Commission[81], the wholesale prices of **natural gas** of relevance for the EU market have shown a remarkable volatility only at the beginning of the post-quota period (initial part of the 2017/18 marketing year); volatility decreased significantly afterwards, and has remained relatively limited till the beginning of 2020. In general, natural gas prices in the post-quota period have been lower than in the 2011-2013 period[82]. Whereas the overall variability of gas prices trends responds to oil price dynamics, price spikes are seasonal and usually appear in winter (e.g., like in March in 2013 and 2018), when demand grows for heating and the power sector (owing to low nuclear and/or renewable generation), or when supply is constrained by infrastructure unavailability and/or low storage levels. Extremely low wholesale prices for natural gas tend to be rare, but can occur (e.g., as in 2009 and 2020, when demand plummeted due to a severe global economic slowdown).

As for **soft coal**, an analysis performed on an indicative time series reconstructed by the study team for the wholesale price of lignite and lignite products (briquettes) in Germany revealed limited variability over the period considered, and only a slight increase in the post-quota period compared to the quota period.

Stakeholder consultation revealed that the vast majority of both sugar producers and sugar beet growers perceives the risks related to variations of energy prices as still very relevant in the post-quota period, and deems very likely, or at least fairly likely, that these risks will affect operators in the EU sugar sector also in the future. Some sectoral stakeholders also observed that they consider changes in the EU energy and environmental policies as a significant threat, mainly if they should require the conversion of the existing coal-fired heat and power plants in sugar factories to "greener" but costlier natural gas. By contrast, other industrial stakeholders highlighted the opportunities offered by an EU policy aimed at further promoting the use of "green energy", which they mainly identify in strengthened support to energy generation (biogas production or direct biomass combustion) using the residues of sugar beet farming and processing as feedstock.

Variations in exchange rates

As already explained in the section about the volatility of sugar prices, the variations of the Brazilian Real to US dollar exchange rate play a critical role in terms of both influencing sugar price volatility, and in determining the international competitiveness of Brazilian sugar exports. Another exchange rate of interest for the international sugar market is the one between Indian Rupee and the US dollar. Variations in the exchange rates of the currencies of the main sugar exporting countries against the US dollar are transmitted to EU sugar producers via the Euro to US dollar exchange rate (transactions for purchasing raw cane sugar for refining are made either in dollars or directly in Euros, mainly depending on the origin of the product). There have been rather important variations of the Euro to US dollar exchange rate between 2013 and 2021.

The Brazilian Real to US Dollar exchange rate is an intrinsic key driver of variability in the global sugar market: it is therefore not surprising that nearly all the consulted EU sugar producers perceive the risks related to variations of exchange rates (especially

[81] European Commission (2020), *Energy prices and costs in Europe*, COM(2020) 951 final.

[82] The cited report observes that in 2014 crude oil prices started to fall, and dragged down natural gas prices to very low levels in 2016. The decline was followed by a recovery until late 2018, when liquefied natural gas (LNG) imports started to increase, resulting in a significant price fall in 2019. In 2020, wholesale gas prices fell further, reaching historical lows in May 2020 (for instance, the Dutch TTF gas hub price dropped to 3.5 €/MWh). This was the result of falling gas demand due to the abrupt halt in economic activity induced by the COVID-19 pandemic.

the Brazilian Real to US dollar and the US dollar to Euro ones) as still very relevant in the post-quota period, and deem very likely, or at least fairly likely, that these risks will affect their business also in the future.

7.1.2 Classification of risks/threats

The synoptic tables that follow (Tables 7.2 and 7.3) provide an "at a glance" classification of:

- The risks affecting the EU sugar sector in the quota period that are still relevant in the post-quota period (the assessment did not identify any risks that have become relevant for the EU sugar sector in the post-quota period only). Risks are classified according to their probability and importance.
- The prospective threats to the EU sugar sector, classified according to their importance and relevant time horizon (short vs. medium-long term).

7.1.3 Key findings

Most of the risks identified as relevant for the EU sugar sector (e.g., risks related to planning of sugar production, to sugar beet cultivation, to sugar price volatility) combine **high probability of occurring in the post-quota period** with **high importance**, based on the severity of the related impacts and/or on the perceptions of the affected supply chain actors.

Only two of the identified risks (i.e., those related to: decreasing sugar consumption due to changes in consumer preferences; voluntary coupled support to sugar beet farming becoming unavailable, or contributing to market distortions) combine high probability of occurring in the post-quota period with just moderate importance.

Finally, risks that are characterised by a **moderate or low probability of occurring in the post-quota** period were found to be **fewer**; these risks tend to have **just moderate** (like in the cases of the risks related to the extent of the sugar refining premium, or to variations in exchange rates) or **low importance** (like in the cases of the risks related to sugar production and to diversion of sugar consumption due to alternative sweeteners) for the affected supply chain actors.

Policy-related threats - in particular those related to voluntary coupled support to sugar beet becoming unavailable or contributing to market distortions, to non-homogeneous implementation of the ban on neonicotinoids, and to Free Trade Agreements with sugar-producing third countries/trade blocs - are **perceived as serious** by an ample majority of the consulted actors in the EU sugar supply chain. However, it should be noted that the potential impacts stemming from those threats were often found to be **variable** – due to the influence of several external factors – or **unclear** (due to the still undetermined details concerning the implementation of prospective policy changes).

Table 7.2 – Risks affecting the EU sugar sector in the post-quota period

PRO = production risks; MAR = market risks; POL = policy risks; SYS = systemic risks

Probability of risks	**Importance of risks**		
	High	***Moderate***	***Low***
High	***Risks related to planning of sugar production*** (PRO): extent of deviation from normal conditions has been significant for yields (unintentional; no linkage with end of quotas) and areas under sugar beets (intentional; linkage with end of quotas)	***Risks from decreasing sugar consumption due to changes in consumer preferences*** (MAR) (no linkage with end of quotas): stagnating sugar consumption in industrialised countries since 2014	
High	***Risks related to sugar beet cultivation*** (PRO) (unintentional; no linkage with end of quotas): climatic conditions and pests (e.g., viral yellowing) have caused substantial drops in yields	***Risks related to voluntary coupled support*** (POL) (partially linked with end of quotas): uncertainty of support; possible market distortions; limited to some Member States	
High	***Risks related to sugar price volatility*** (MAR) (partially linked with end of quotas): substantial deviations from normal conditions; affect all the actors in the supply chain		
High	***Risks from non-homogeneous implementation of the ban on neonicotinoids*** (POL) (no linkage with end of quotas): uncertainty of derogations; possible distortions in the level playing field (derogations avoid sharp decreases in yields); limited to some Member States		
High	***Risks from variations in the price of the main energy sources*** (SYS): deviations from normal conditions can be significant (more for natural gas than for lignite); affect all sugar producers; energy is an important cost component in sugar production		
High	***Risks from variations in exchange rates*** (SYS): deviations from normal conditions can be significant (Brazilian real to US dollar in particular); strong influence on international sugar market dynamics; affect all sugar producers		

Probability of risks	Importance of risks		
	High	***Moderate***	***Low***
Moderate	***Risks related to prolonged periods of depressed sugar prices*** (MAR) (partially linked with end of quotas): substantial deviations from normal conditions; affect all the actors in the supply chain	***Risks related to the extent of the sugar refining premium*** (MAR): substantial deviations from normal conditions; affect the raw cane sugar refining business only (impacts for EU refiners are partially linked with end of quotas → depressed prices on EU refined sugar market)	
Moderate		***Risks from variations in interest rates*** (SYS): perceived as neither very likely nor very important by the majority of sectoral stakeholders	
Low			***Risks related to sugar production*** (PRO) (no linkage with end of quotas): significant decreases in polarisation are rather unlikely
Low			***Risks related to diversion of sugar consumption due to alternative sweeteners*** (MAR) (linkage with end of quotas): foreseen post-quota increase in isoglucose production in the EU has failed to materialise so far

Table 7.3 – Prospective threats to the EU sugar sector

Threats from developments that have already took place / are certain, but whose concrete effects on the EU sugar sector to date are absent or difficult to assess			
Relevant time horizon	**Importance of threats**		
	High	***Moderate***	***Variable/unclear***
From the short term to the long term			***Brexit (see the reply to question 13 at § 8.4 for a detailed discussion)****:* too recent; some key implementing conditions regulating sugar trade between the EU and the United Kingdom not yet defined
From the short term to the long term			***COVID-19 (see the reply to question 13 at § 8.4 for a detailed discussion)****:* some effects have been/are already being experienced, some positive, other negative for the EU sugar sector

From the short term to the long term			***Climate change***: some effects have been/are already being experienced in terms of more frequent and/or severe climate-related production risks; not necessarily negative for sugar beet and sugar cane farming, at least in the short term; medium-long term effects still unclear/uncertain
Threats from future developments of ongoing processes that have not determined significant effects on the EU sugar sector to date			
Relevant time horizon	**Importance of threats**		
	High	***Moderate***	***Variable/unclear***
Medium-long term			***Ongoing negotiations for Free Trade Agreements with sugar-producing third countries/trade blocs***: perceived as a serious threat by the majority of sectoral stakeholders, but uncertainty reigns about: • Timing for completion of the FTAs • Specific conditions affecting the EU sugar sector • Potential impacts for the EU sugar sector
Medium-long term			***CAP reform; Green Deal and related strategies: F2F, biodiversity etc. (see the reply to question 11 at § 8.2 for a detailed discussion)***: perceived as a significant or serious threat by several sectoral stakeholders, but uncertainty reigns about: • Timing for the completion of the policymaking process • Specific conditions affecting the EU sugar sector • Potential impacts for the EU sugar sector
Medium-long term			***Nutrition policies and environmental policies (see the reply to question 13 at § 8.4 for a detailed discussion)***: perceived as a significant or serious threat by several sectoral stakeholders, but also as an opportunity by others (with regard to bioenergy policies in particular); however, uncertainty reigns about: • Actual finalisation of the policymaking process and, in case, timing for its completion • Specific conditions affecting the EU sugar sector • Potential impacts for the EU sugar sector

Source of Tables 7.2 and 7.3: assessment made at § 7.1.1

7.2 Q4: What are the existing private and publicly funded tools used, as well as strategies/approaches to reduce/mitigate the impact of the identified risks for the EU sugar sector?

Definition of key terms

The following key terms are defined:

"**Existing risk management tools**". In this case, a "tool" is an instrument that can be used to manipulate an economic variable to achieve an economic objective. In this context, existing tools refer to the instruments currently implemented in the sugar sector in the EU (and to a larger extent in the EU agribusiness sector as a whole) to prevent the occurrence of risks or reduce their impact. The following tools can be distinguished:

- Private tools: For instance, private insurance contracts, forward contracts and futures contracts are relevant private tools.
- Public tools: these tools are implemented by the public authorities, at both national and EU level. For instance, direct subsidies and CAP instruments can limit risks in the sugar sector. Other examples of public support include tax rebates destined to encourage farmers (including sugar beet growers) to save money in case of disasters. Public subsidies granted to farmers who subscribe a yield insurance, as well as public reinsurance funds, combine public support and private tools. Public authorities also impact risk, and contribute to risk management in agriculture, through their regulatory power in most areas of the farm and food economy: use of inputs (e.g., authorisation of genetically-modified seed varieties and crop protection products, monitoring of water quantities that can be used for irrigation, etc.), market management, trade policy, etc.

"Strategies/approaches". A strategy is a plan implemented through the mobilisation of various tools, in order to achieve a set of objectives. A strategy can be short to long-term and involve a wide range of objectives and rely on both public and private tools. In the context of the study, strategies are implemented by private operators (sugar beet or cane growers, sugar producers). They can be individual or collective. These strategies aim at avoiding or limiting the occurrence and the impacts of identified risks. Strategies are combinations of tools that are specific to each operator. Strategies may combine several existing private or public risk management tools together with other kinds of action (for instance: cost reduction, productivity efforts, geographical diversification, sectorial diversification, product differentiation, technical, product and financial innovation, etc.).

Understanding of the question

Tools and strategies implemented to address risks vary from an operator to another, and from a Member State to another. Besides the distinction between private and publicly funded tools, it is possible to distinguish instruments concerning the upstream stages of the sugar supply chain (sugar beet producers) from those concerning the downstream stages (sugar producers).

Risk management tools can be preventive (i.e., applied *ex-ante*, to reduce the probability of risks) or compensatory (i.e., applicable *ex-post*, when the risks occurred). The distinction between preventive and compensatory tools is not always straightforward. For instance, crop insurance indemnities and crop disaster payments are both compensatory measures; but from a policy standpoint, a difference is to be made between crop insurance, whereby farmers actively manage their production risks (and bear at least part of the cost through insurance premia) before damage occurs, and a State fund against natural disasters, that generally indemnifies farmers who have not managed their production risks, either by choice or because no insurance is available for their production.

7.2.1 Inventory of existing risk management tools

This section describes the risk management tools available to operators in the sugar sector. It does not include (decoupled) direct payments to farmers, which are first and foremost income support measures, although they contribute to stabilise sugar beet growers' income, especially when sugar beet prices are low or very volatile, all the more since they represent a large share of farmers' (and sugar beet growers') income. The contribution of decoupled direct payments to improved resilience of the EU sugar sector

is assessed under question 10 (see § 8.1.4). Also, it does not discuss the role of cooperatives/producer groups and inter-branch agreements, which are not conceived as risk management tools but pursue much broader objectives, although their actions definitively impact the intensity of risks borne by each operator and the sharing of risks between the different operators. The instruments specifically devised for risk management, presented below, are classified as private and public tools.

Private tools

Sugar beet farming practices and use of specific agricultural inputs/equipment

Cultivation practices and the use of specific agricultural inputs/equipment in sugar beet farming are mainly aimed at preventing crop failures and at achieving satisfactory yields (EU BSSP, 2019). They hence exert a preventive or mitigating action towards the most significant risks related to sugar beet cultivation that may result in crop failures or in decreased yields, and do that by acting on the main root causes of yield variability, i.e., climatic conditions and pests. Farming practices with significant risk management implications include seedbed preparation, fertilisation, irrigation and crop protection. The agricultural inputs and equipment that are relevant for risk management in sugar beet farming are therefore those used in the aforementioned practices (fertilisers, water, plant protection products; ploughs, harrows, cultivators, spreaders and sprayers, and irrigation equipment). Mainly according to their timing, some farming practices reduce the likeliness of pest attacks or water deficits before they occur (preventive action), whereas other practices limit the negative effects in terms of yield reduction and/or decreased sucrose content of beets stemming from risks that have already occurred (mitigating action). The extent of the costs related to the application of these practices can greatly vary according to a high number of factors (geography, farm management and organisation, recourse to contract machinery services, etc.). These costs are usually borne by sugar beet growers in their entirety, but in some cases sugar producers cover them at least in part, or supply farmers with the needed inputs, or provide technical advice for the application of optimal sugar beet farming techniques.

Insurance

Insurance is a mechanism used to transfer a specified risk by the insured subject to a third party, normally an insurer. The insured subject pays a premium to the insurer and in exchange the insurer agrees to pay an indemnity (compensation for suffered, assessed losses) that occurs during and in accordance to the period as well as the terms and conditions of the insurance policy (PARM, 2016). Insurance is a typically compensatory risk management measure.

Insurance tools are aimed at covering an array of risks that may affect sugar beet farming. Insurable risks for sugar beet farming generally include climate-related adversities (hailstorms, frosting, drought and flooding in particular) and pest-related adversities. As for sugar beet processing and raw cane sugar refining, the investigations made identified no insurance tools covering specifically the risks related to the production process (e.g., from poor technological quality of agricultural raw materials and/or insufficient supply of the same). Sugar producers are generally insured against general risks that are not specific to their production process, such as fire, theft etc. (the related typologies of insurance tools are not considered in the assessment).

The working mechanism of insurance against the main risks affecting sugar beet farming is generally the following: growers secure the right to receive a compensation for damages suffered because of the insured risks through the payment of an insurance premium. The extent and frequency of insurance premia are related to several factors, with particular regard to the likeliness of the insured risks. The extent of the compensation is clearly related to the extent of the damage incurred. The costs related to payment of insurance premia may be:

- borne by growers in their entirety;
- borne totally or partially by sugar beet processors;

- fully or partially compensated by public support (see the following section dealing with publicly funded risk management tools).

Insurance indemnities generally do not fully cover the cost of damage, as growers absorb part of the risk through a deductible, the level of which is specified in the insurance contract.

Mutual funds aimed at addressing income loss or damage from pests

Mutual funds are based on the establishment of financial reserves, built up through contributions by participants in the fund, which can be withdrawn by participants in the event of severe losses, according to predefined rules. The rationale behind mutual funds is to spread the risk within a pool of members with limited risk transfer (contrary to insurances). By establishing long-term commitments mutual funds may also provide effective risk pooling over time (Ecorys and Wageningen Economic Research, 2017). Mutual funds in agriculture are generally aimed at addressing income loss or damage from pests, including in sugar beet farming. Mutual funds are a typically compensatory risk management measure. The costs related to the establishment and operation of mutual funds may be:

- borne by sugar beet growers participating in the mutual fund in their entirety;
- borne totally or partially by sugar beet processors;
- fully or partially compensated by public support (see the following section dealing with publicly funded risk management tools).

Indemnities paid by the mutual fund generally do not fully cover the cost of damage, as farmers absorb part of the risk through a deductible, the level of which is specified in the mutual fund regulations.

Saving accounts / reserve funds

Precautionary savings are a basic risk management tool aimed at providing on-farm protection against normal risks / shallow losses (Ecorys and Wageningen Economic Research, 2017). They are based on the gradual accumulation of financial resources by farmers (including sugar beet growers, of course) in a saving account. These resources can be used to address risks, either by funding the establishment of ordinary or exceptional preventive risk-management measures, or by ensuring that the economic impact of damages incurred because of risks does not endanger the overall financial equilibrium of the affected holdings. The costs for establishing a saving account are usually borne by the concerned farmers; however, public intervention may provide incentives to farmers for establishing saving accounts, mainly in the form of favourable fiscal treatment for the concerned funds.

Reserve funds established by sugar producers follow exactly the same rationale of saving accounts by farmers, and are used for the same purposes. In some Member States, national legislation may make the establishment of reserve funds mandatory for companies; reserve funds may also enjoy favourable fiscal treatment. The constitution of mandatory reserve funds may be established in the charter/management procedures of certain companies; agribusiness cooperatives, including those engaged in beet sugar production, often include in their statutes/management procedures provisions on mandatory establishment of reserve funds, which often must be replenished whenever they decrease beyond a safety threshold.

Arrangements and contracts between operators in the sugar supply chain

Even though the arrangements and contracts between operators in the sugar supply chain discussed under question 2 (see § 6.2) pursue multiple objectives, they do perform also some risk management functions, or may have some implications in terms of risk management/exposure to risks.

Sugar beet supply contracts between farmers and processors – which in some Member States are set in the framework of general conditions established by inter-branch agreements - serve the purpose of ensuring adequate supply of sugar beets to processing plants and certainty of an outlet for sugar beets: through that, they

contribute to prevent production risks, and are the key tool for production planning by both farmers and processors.

Inter-branch agreements and/or sugar beet supply contracts may also include specific provisions aimed at ensuring an orderly management of the sugar beet processing campaign through a steady flow of sugar beet deliveries to processing plants over the entire duration of the campaign. In certain conditions[83], sugar producers may offer incentives (e.g., higher beet prices for late deliveries) aimed at persuading growers to assume some production and price risks, in order to ensure that beet deliveries to processing plants are evenly distributed over the entire length of the beet processing campaign, rather than concentrated in the initial part, for a more efficient exploitation of processing capacity.

As for management of price risks, sugar beet supply contracts may be based on predetermined fixed prices, or on the combination of fixed and variable price components: the latter are usually linked to the evolution of sugar prices (Masson, 2015). These two approaches to pricing clearly have different implications for growers in terms of price risk assumption. It is important to note that sugar beet pricing formulas integrating variable components linked to sugar prices expose growers to additional market and price risks: the value-sharing component of these formulas is tightly linked with a risk-sharing component, which is not necessarily addressed through opportune risk management solutions.

The duration of sugar beet supply contracts also has risk management implications: multi-annual contracts (in alternative to the traditional annual ones) ensure stability and predictability to growers, greatly reducing their exposure to market and price risks, but this is achieved at the expense of seriously limited flexibility to adapt to changed agronomic and/or market conditions that can reduce the attractiveness of sugar beet farming.

Analogous considerations apply to *sugar supply contracts* between producers and their customers (and also to raw cane sugar supply contracts between producers and refiners). These contracts ensure adequate supply of (raw) sugar to refiners, industrial users, independent traders and retailers, and the certainty of a market outlet for (cane and) beet sugar producers: through that, they contribute to prevent production and market risks, and are an important tool for business planning by the involved parties.

Similar to beet supply contracts, sugar supply contracts may be based on predetermined fixed prices, or on the combination of fixed and variable elements (the latter are usually linked to the dynamics of a reference price). These two approaches clearly have different implications for the involved parties in terms of price risk assumption.

Finally, the duration of sugar supply contracts also has risk management implications: annual and multi-annual contracts (in alternative to spot sales or supply contracts of shorter duration) ensure stability and predictability to the involved parties, reducing their exposure to market and price risks, but also reduce flexibility to adapt to changed market conditions and price dynamics; in other words, they reduce the scope for reacting to their adverse evolution, or for profiting from their favourable evolution.

[83] Especially where sugar beets are cultivated in clay soils in regions affected by heavy autumn rainfalls, growers tend to prefer to harvest and deliver their beets to factories in the initial weeks of the campaign, i.e., when harvesting conditions are optimal given the general absence of heavy rains. Harvesting sugar beets in wet clay soils may result in deliveries affected by high soil tare, which are undesirable for both farmers and processors. The use of cleaner-loader machines can address this issue, but clearly entails additional costs. Especially in the southernmost Member States, early harvest and delivery of sugar beets also reduce the risk of sharp decreases in polarisation due to extreme temperature variations (see § 7.1.1), and leave more time to farmers to carry out seedbed preparation activities for winter crops following sugar beet in the rotation (e.g., wheat), reducing the risk of sub-optimal seedbed preparation due to heavy rainfall (which is more severe if sugar beets are harvested towards the end of the processing campaign).

Tools and techniques aimed at addressing price risks (pooling of price risks; hedging of price risks through market derivatives; storage)

Meuwissen at al. (2001) provide the conceptual framework behind the principle of **risk pooling**. *Risk sharing* involves a contract in which risk is shared. This risk-sharing characteristic distinguishes this type of contract from other forms of contract. In a lease contract, the farmer pays a rent to the lessor to use a certain resource, but has to bear all the risks related to its use. In a *risk-shifting* contract (e.g., a fixed-forward-price contract) the risk-shifter pays a kind of premium to the risk-taker and receives a guaranteed price in return. The sharing of risks is based on the concept of *pooling*. The principle of pooling is that by combining independent losses in a pool, the expected total amount of losses remains the same, but the variance of individual losses decreases. Furthermore, if the pool consists of large numbers of independent risks, the relative variation in actual loss compared with the average loss further decreases (due to the so-called "law of large numbers"), and the party that pools the risk is able to predict average losses more accurately. Price risks can also be pooled: however, the more price risks are correlated, the smaller the decrease in the variance of losses. When completely systemic (i.e., positively correlated) risks are pooled, variance does not decrease at all. Risks that are completely systemic, like prices and interest rates, can be efficiently dealt with on exchange markets.

Hedging of price risks, through the use of the so-called **market derivatives**, i.e., futures and options, is aimed at limiting or offsetting the probability of losses from fluctuations in agricultural commodity prices and, therefore, provides a theoretically sound risk management method for farmers, processors, traders/wholesalers and their customers (Ecorys and Wageningen Economic Research, 2017; NYBOT, 2004). Futures are standardised exchange-traded contracts in which the contract buyer agrees to take delivery, from the seller, of a specific quantity of a certain product at a predetermined price on a future delivery date. Futures exchanges are organised marketplaces that provide and operate facilities for trading; establish, monitor and enforce rules for trading; and keep and disseminate trading data. All the functions performed by a futures exchange revolve around price, which is however set by the marketplace, not by the exchange. The exchange provides a visible, free market setting for the trading of futures and options, which helps operators to find a market price (price discovery function) for the traded product, and allows the transfer of risk associated with the volatility of cash (spot) prices for that product. As price discovery takes place, futures exchanges provide price dissemination worldwide. Continuous availability of pricing information contributes to wider market participation, which improves the quality of pricing (interaction between large numbers of buyers and sellers in a certain market leads to better pricing opportunities). To ensure the accuracy and efficiency of the trading process, futures exchanges also resolve trading disputes through arbitration. The main futures exchanges dealing with sugar are:

- New York Intercontinental Exchange (ICE): its futures contract No. 11 constitutes the world benchmark contract for raw sugar trading[84].
- London International Financial Futures Exchange (LIFFE): its futures contract No. 5 provides the reference price for white sugar trading[85].

International sugar prices contain two elements: the price of the related futures contracts and the premium or discount (also called differential or basis) between the cash (spot) price for physical delivery of sugar and the futures price. The basis and the futures tend to move in opposite directions: when futures are high, the basis tends to be low, and vice versa. For international sugar traders importing and exporting sugar, freight costs constitute an additional price element. Whereas a high number of non-commercial operators are active on sugar futures markets for speculative purposes

[84] Detailed information available at: https://www.theice.com/products/23/Sugar-No-11-Futures

[85] Detailed information available at: https://www.theice.com/products/37089080/White-Sugar-Futures

(thus contributing to improve the efficiency of price discovery mechanisms and the quality of pricing), sugar futures also provide a price hedging tool for sugar producers (including refiners), international sugar traders, and industrial sugar users. Hedging through sugar futures and options allows operators to lock in a specific price or establish minimum/maximum prices for upcoming purchases or sales of sugar or sugar-containing products.

A **futures hedge** allows to lock in a specific sugar price. By opening a futures position, the hedger will establish a purchase or selling price that will offset potential losses on the cash transaction covered by the future hedge. As long as the position is open, the hedger's price will be secure. The hedger must maintain a margin account for as long as the position remains open. During adverse market movements, the hedger may have to make payments into the margin account to maintain the required margin level. This also implies that the hedger will have access to gains in the margin account during periods of favourable market dynamics. Margin accounts are marked to market on a daily basis. The practical example of a refiner using futures to lock in the price of a future purchase of raw cane sugar illustrates a typical case of futures hedging (the rationale would be the same for a trader purchasing raw or white sugar, or an industrial user purchasing white sugar). In the case of a rising market, the hedger (the refiner) uses the gains over the purchase price of the future for the foreseen delivery period to offset losses from higher cash prices for raw cane sugar in that period. In the case of a falling market, the losses over the purchase price of the same future are offset by the lower cash price for raw cane sugar in the delivery period. A straight futures hedge hence offers the certainty of a price, which can be useful in managing price risks and in business planning.

Differently from hedging through futures, hedging through options offers more flexibility to hedgers. An **options hedge** will not lock in a specific sugar price, but will establish a price floor or ceiling to limit the losses in case of adverse evolution of the cash (spot) market. It can offer greater flexibility in an uncertain market and allows to limit losses to the size of the premium paid for the option. The option buyer does not have to maintain a margin account: the premium must be paid in full when the option is purchased. Cash flow and availability of financial resources are important components of a hedging strategy through options, which provides the hedger with a pre-determined level of price insurance without the capital commitment required by the opening of a futures position.

Hedging techniques based on market derivatives can be used also to manage other price risks affecting the EU sugar sector (mainly the prices for energy sources).

In any case, disbursements, costs and revenue losses deriving from the (possibly inaccurate) application of hedging are entirely borne by the hedger.

Storage of sugar is a measure that can support the implementation of other risk management tools/strategies aimed at addressing market and price risks, and has price risk management implications in itself. Storage of sugar is especially used by producers and traders in case of depressed sugar prices on the market, with the aim of selling the product when prices are at least equal to the production costs. It is worth observing that the relevance of sugar storage as a price risk management tool is questionable: storage just delays the effects of oversupply on sugar prices, and stored sugar volumes weigh in any case on the supply/demand balance, with a potentially depressive effect on sugar prices. Where no public market intervention system (market withdrawals) is in place, storage costs for sugar are entirely borne by the concerned operators; however, recourse to private storage can be incentivised through public support (see "public tools", aid for private storage).

Measures aimed at addressing policy risks

Policy risks can be addressed through two different approaches. Exchanges with / provision of information to / sensitisation activities targeted at policymakers - often collectively referred to as "**lobbying**" - are generally used by operators to influence the policymaking process in a way to prevent unfavourable developments / promote

favourable developments. Lobbying activities can be undertaken individually or collectively by operators at national or EU level, in the latter case usually through their reference EU level sectoral associations:

- International Confederation of European Beet Growers (CIBE) for sugar beet growers;
- European Association of Sugar Manufacturers (CEFS) for beet sugar producers;
- European Sugar Refineries Association (ESRA) for full-time refiners;
- European Association of Sugar Traders (ASSUC) for sugar traders and wholesalers;
- Committee of European Sugar Users (CIUS) for industrial users of sugar.

Furthermore, unavoidable policy risks whose effects can be defined with sufficient precision can be prevented, or at least mitigated, through **business strategies** (which are analysed in a following section) aimed at **anticipating the adaptations needed**, or at least at **strengthening the resilience and the overall financial robustness of the affected operators**, to improve their capacity to bear the expected adverse impacts stemming from policy changes.

In both cases, the costs for implementing the approaches described above are entirely borne by operators.

Public tools

Public tools of risk management can be financial or regulatory. Both the EU and, in well-defined circumstances, Member States can financially support measures destined to help sugar operators cope with risks affecting production, prices and markets. Regulatory measures touch on most aspects of the farm and food economy, starting with the authorisation or the ban on the use of certain inputs (e.g., genetically-modified seeds, plant protection products, etc.) that directly impact sugar beet growers' ability to limit yield fluctuations.

The main financial tools available in the CAP to stabilise farmers income are **direct payments**. Direct payments are granted to farmers in the form of a basic income support based on the number of hectares farmed on the condition that they respect certain rules (e.g., environmental conditions, the use of certain farming practices, animal welfare, etc.). As already underlined, direct payments play an important role in stabilising sugar beet growers' income, especially when sugar beet prices are low or volatile, since they usually account for a large share of total farm income: their contribution to improved resilience of the EU sugar sector is assessed under question 10 (§ 8.1.4). Besides basic payments decoupled from production, Member States can use a certain amount of direct payment budget for voluntary coupled support in certain sectors, including sugar beet. As illustrated at § 3.1, eleven Members States decided to grant VCS to sugar beet, with a various degree of support. The support received with these tools, not linked to the quantities produced or to any specific market situations (e.g., sugar beet or sugar prices) is designed to provide a safety net for EU farmers.

Basic payments and coupled payments are not conceived as a risk management tool; however, they can be seen as instruments limiting negative effects of low yields and market price and have a key role in supporting farmers' income and reducing income variability. In addition, a portion of direct payments funds an EU-wide crisis reserve that can be used by the European Commission to finance emergency measures in circumstances that go beyond normal market developments (article 226 of Regulation (EU) No 1308/2013). If this reserve is not used, which has been the case since its first implementation in 2014, the portion of direct payments that finances the crisis reserve is reimbursed to farmers the following year. As for VCS, the related direct payments cannot be considered as a tool intended to manage risks for sugar beet growers and sugar producers, but they can contribute to limit the decrease in production of sugar beets that may otherwise occur, especially in periods of low sugar and sugar beet prices; they may also indirectly contribute to mitigate the negative implications for processors that can derive from reduced area under sugar beets. It should be noted that granting

of VCS in itself does not ensure that farmers will opt for growing sugar beets rather than alternative crops.

A number of specific **risk management instruments** (albeit not specific to the sugar sector) are available in the framework of the CAP to support the EU farmers in case of production/income losses. Such instruments are financed through the Rural Development Programmes (RDP) within the so-called "Second Pillar" of the CAP (Regulation (EU) No 1305/2013). The following risk management instruments are available for the 2014–2020 programming period:

1. **Subsidised insurance contracts against yield losses.** According to article 37, Member States can provide financial contributions to support farmers that want to stipulate insurances against production losses. The support takes the form of national or CAP subsidies to render insurance premiums affordable to farmers. The financial contributions are available to premiums for crop, animal, and plant insurance against economic losses to farmers caused by adverse climatic events, animal or plant diseases, pest infestation. Under the 2014- 2020 Financial Framework, the programmed total public expenditure for insurance premiums represents almost EUR 2.2 billion[86]. Subsidised insurance contracts under CAP are currently implemented in Croatia, Estonia, France, Italy, Latvia, Lithuania, Hungary, the Netherlands, Portugal, Romania and Flanders (Belgium). Depending on the Member State, the public sector provides support to premiums of insurances against crop losses to cover the different risks (e.g., adverse weather, including extreme weather conditions; pests and plant diseases; etc.). The contribution covers only part of the total insurance premiums: up to 70%, raised from 65% after the amendment introduced by the Omnibus regulation. The minimum production losses to be covered with insurances to have access to the contribution should represent more than 20% of the average annual production of the farmer based on a three years average or an "Olympic" average (initially was 30% reduced to 20% with the Omnibus regulation).
2. Financial contributions **to mutual funds** can be co-financed under Article 38 of the Regulation (EU) No 1305/2013 for production losses due to adverse climatic events, animal or plant diseases, pest infestations. After the amendments introduced by the Omnibus regulation, the financial contribution can supplement the annual payments into the fund as well as the initial capital stock, with a maximum support rate of 70% of the eligible costs. Support to mutual funds has been implemented in few Member States: only three Member States have opted for financial support for mutual funds to compensate production losses due to climatic, sanitary and environmental events (France, Italy and Portugal). France has programmed EUR 24 million of expenditure, Italy EUR 97 million and Portugal EUR 4 million for the period 2014-2020. Hungary has implemented a financial support scheme of mutual funds to compensate for production losses caused by adverse climatic events.
3. The **income stabilisation tool (IST)**, which is part of the broader category of mutual funds, is an option provided under the CAP (Art. 39 of Regulation (EU) No 1305/2013) to manage severe drops in farmers' income. Under the 2014-2020 Financial Framework of the Rural Development Program, only two countries (Italy and Hungary) and one region (Castilla y Leon in Spain) planned expenditure for the IST. Through the fund, a financial reserve is established, and it can be used to compensate farmers for income losses caused by adverse market conditions and productivity drop. A "trigger event" activates the uses of the funds. A number of changes to the IST has been introduced with the Omnibus regulation. The main changes are the following: introduction of a sector-specific IST; decreasing of the threshold level to active the funds from 30% to 20%; increase of maximum support from 65% to 70%; implementation of method based on index to calculate income losses. For the period 2014-2020, only two

[86] EU Agricultural Markets Briefs, Risk management schemes in EU agriculture. Dealing with risk and volatility, N°12, September 2017.

Member States programmed to include IST in their Rural Development Programmes: Italy and Hungary planned respectively EUR 97 million and EUR 19 million. In France, a first experimental IST will be tested in 2022.

In terms of budget, for the 2014-2020 almost EUR 2.6 billion have been allocated on the above-mentioned risk management tools: insurance premiums on production risks are projected to receive EUR 2.3 billion, while this amount corresponds to EUR 125 million for mutual funds on production risks and EUR 116 million for the Income Stabilisation Tool. In relative term, the share of CAP budget spent on risk management is very limited, representing 2% of the Pillar II budget and 0.4% of the total CAP budget for the 2014–2020 period.

Aside of the specific risk management tools discussed above, there are other instruments available under **the second Pillar of the CAP** (Regulation (EU) No 1305/2013), as well as under State Aid schemes, to allow farmers, including sugar beet growers, to deal with price and production risks. According to a study made for the European Commission (Ecorys and Wageningen Economic Research, 2017), the following measures funded by EAFRD are also relevant for dealing with agricultural risks:

- Measure 5 "Restoring agricultural production potential damaged by natural disasters and catastrophic events and introduction of appropriate preventive actions" which gives the possibility to support farmers: i) to undertake preventive actions and; ii) to compensate for the destruction of the agricultural production potential where at least 30% of the relevant agricultural potential has been affected. Preventive actions have an EU support rate varying from 80-100% while compensative actions have an EU support rate which might reach 100%. This measure has been programmed in 46 out of 118 Rural Development Programmes.
- Measure 4, "Investment in physical assets" which allows for supporting investments to improve the overall performance and sustainability of the holdings and reducing risks. The EU support rate for this measure varies from 40% to 75%.
- Measure 9 for "Setting up of producer groups and organisations" promotes collective action that contributes to strengthening the bargaining power of farmers and therefore reduces the market risk, while supporting knowledge transfer and advice.

A number of **market management instruments** are also available in the Common Organisation of the Markets Regulation (i.e., Regulation (EU) No 1308/2013; "CMO Regulation" henceforth), aimed at tackling difficult market situations, thus reducing different types of risks. One of such instruments, namely aid for private storage, is specifically available for white sugar and other identified sectors, while the others are general measures available for all sectors, including sugar. A brief description of these measures is provided below.

- **Aid for private storage (art. 17)**. European Commission may finance the storage of sugar in the case of a particularly difficult market situation or economic development having a significant negative impact on the margins of the sector with the aim of reducing the available quantity of sugar on the market during a certain period to support sugar prices. The quantities taken out from the market and stored would become available again as from the beginning of the following marketing year.
- **Measures against market disturbance (art. 219)**. Article 219 of the CMO Regulation establishes that measures to address such situations may be adopted in case of market disturbance or a threat thereof (in particular, but not exclusively, due to price dynamics) that are likely to continue or deteriorate. The measures in question may extend or modify the scope, duration or other aspects of other measures provided for under the CMO Regulation, and may also provide for entirely new measures.

- **Measures to resolve specific problems (art. 221).** Article 221 of the CMO Regulation allows the European Commission to adopt implementing acts taking necessary and justifiable emergency measures to resolve specific problems. Those measures may derogate from the provisions of the CMO Regulation only to an extent and for a period that are strictly necessary, in any case for a period not exceeding twelve months. Article 221 may be used if it is not possible to adopt the required emergency measures in accordance with Article 219; application of Article 221 does not require market disturbance or a threat thereof, i.e., the "specific problem" to be addressed may derive from another reason preventing the objectives of the CAP from being attained.
- **Derogation from Article 101(1) TFEU (art. 222).** Article 222 of the CMO Regulation authorises the European Commission to exempt, via implementing acts, recognised producer organisations (POs) supply management agreements from the application of competition law in case of a severe imbalance in a market (such agreements are normally not allowed by Competition law as they are liable to reduce competition). The derogation at Article 222 also covers agreements made by recognised associations of producer organisations, recognised inter-branch organisations (IBOs) and also farmers' associations. The types of supply management agreements covered under Article 222 include production planning, market withdrawal, private storage or orientation of production towards a specific outlet, while collective bargaining or price-fixing activities would not be allowed.
- **Safeguard and inward processing measures (art. 194 and art. 195).** Article 194 authorises the European Commission to take safeguard measures against imports of agricultural products (including sugar) into the European Union, if these measures are provided for in trade agreements concluded by the EU, when the level of imports is deemed to be excessive or in case of unfair trading practices. Safeguard measures are temporary; they can take the form of import duties or suspension of tariff quotas. Article 195 allows for the suspension of processing and inward processing arrangements (concerning for instance import of sugar aimed at incorporation into food products destined for export) when the EU market is disturbed or is liable to be disturbed by these arrangements.

Finally, certain types of **State aids** can also be broadly considered as risk management tools. As stated in Article 107(1) of TFEU, State aid is not permitted in the EU as it is considered incompatible with fair competition and the internal market. However, the Treaty leaves room for granting State aid to achieve several policy objectives. For instance, according to Article 107(2) of TFEU, certain types of State aid are considered to be compatible with the internal market and have to be authorised by the Commission. This is notably the case with regard to State aid granted by a Member State in order to **compensate damages caused by a natural disaster or an exceptional occurrence**. Moreover, small amounts of aid, called "*de minimis*" (Regulation (EU) No 1408/2013) do not count as State aid, and can be granted without prior notification and even without any information to the European Commission. In addition, the Temporary Framework for State Aid Measures introduced by the European Commission in response to the COVID-19 outbreak in March 2020 allows Member States to provide up to 100,000 Euros per farm, following rapid approval by the Commission, provided the aid is not fixed on the basis of the price or quantity of products put on the market. This amount can be combined with the *de minimis* aid.

7.2.2 Classification of risk management tools

The **matrix presented below classifies** the risk management tools falling under the scope of the assessment at question 4 (Table 7.4). It summarises the information included in § 7.2.1.

Table 7.4 – Matrix of risk management tools available in the sugar sector*

Tool	Operators implementing the tool	Preventive or compensatory (1)	Aim of the tool (2)	Aim of the tool (3)	Private or public tool (4)
Use of specific inputs *(e.g., genetically-modified seed varieties, plant protection products, water for irrigation, etc.)*	Sugar beet growers	Preventive	Both sector and non-sector specific depending on the input	Production risks	Public regulation
Crop insurance	Sugar beet growers	Compensatory	Non-sector specific	Production risks	Private or public, depending on the insurance
Mutual funds against pest and disease	Sugar beet growers	Compensatory	Both sector and non-sector specific depending on the pest/disease	Production risks	Public
Income stabilisation tool	Sugar beet growers	Compensatory	Sector on non-sector specific	Market risks	Public
Saving accounts/reserve funds	All operators	Preventive	Non-sector specific	Market risks	Public
Supply contracts	All operators	Preventive	Sector-specific	Market risk	Private
Futures and options	Mostly sugar producers and users	Compensatory	Sector-specific	Market risks	Private
Storage Aid for private storage	Sugar producers and users	Preventive and compensatory (**)	Sector specific	Market risks	Private or public
State aids	Implemented by Member States, mostly in favour of growers	Compensatory	Non-sector specific	Production and market risks	Public
CMO emergency measures (articles 194, 195, 219, 221, 222)	Authorised by European Commission, targeted both at growers and processors	Preventive and compensatory (**)	Authorisation by sector	Market risks	Public

Tool	Operators implementing the tool	Preventive or compensatory (1)	Aim of the tool (2)	Aim of the tool (3)	Private or public tool (4)
Lobbying	All operators	Preventive and compensatory	Sector-specific	All risks, including policy risks	Private

1) Risk management tools are considered preventive if they are applied ex-ante, to reduce the probability of risks. They are classified as compensatory if they are applicable ex-post, after the risk occurred. From a policy standpoint, the distinction between ex-ante and ex-post risk management tools is not straightforward (see box "Definition of key terms").

2) Tool targeted at addressing sector or non-sector specific risks, systemic risks, or a combination of these risks

3) Tool targeted at addressing production risks, market risks, policy risks, or other risks and threats

4) Private: with no public support; public: partially or fully implemented, regulated or supported by public authorities

* Decoupled direct payments, voluntary coupled support (VCS) to sugar beets, and Measures 4, 5 and 9 under Pillar II of the CAP are not covered in the table because they were not conceived as risk management tools (even though they have some implications for risk management)

(**) Aid to storage and other CMO emergency measures are compensatory in the sense they are triggered after the risk has occurred, but preventive in the sense that they aim at limiting a further decline in sugar prices

Source: analysis made at § 7.2.1.

7.2.3 Overview of risk management strategies and of general business strategies with risk management implications

Strategies aimed at limiting sector-specific and systemic risks.

Operators at the different stages of the sugar supply chain apply, to a varying extent, risk management strategies based on combinations of the previously described risk management tools. Operators in the downstream stages of the chain (sugar producers and traders in particular) devise and implement more or less formally codified **risk management approaches** based on: i) the identification of the relevant risks; ii) the assessment of their likeliness and severity; iii) the elaboration and implementation of opportune measures aimed at preventing or mitigating the relevant risks. No detailed information was available on whether and to which extent sugar beet growers and processors participate in EAFRD-funded schemes aimed at strengthening competitiveness, innovation, diversification of income, etc. that have an indirect impact on their ability to mitigate and manage risks. These schemes include in particular Measure 3 - "Quality schemes for agricultural products and foodstuffs", Measure 4 - "Investments in physical assets", Measure 6 – "Farm and business development", and Measure 16 – "Cooperation" for the establishment of European Innovation Partnerships (EIP).

Strategies aimed at strengthening competitiveness.

Sugar producers – and especially beet sugar producers – have traditionally pursued scale economies and a high utilisation rate of the installed processing capacity (both at individual plant level and at company level) in order to improve their margins through cost reduction, with a view to strengthening their competitiveness. For companies that operate multiple sugar beet processing plants, rationalising the geographical distribution of processing capacity vis-à-vis the changing geography of beet procurement areas has

remarkable importance from a techno-economic standpoint[87]. On the revenue side, sugar producers strive for improving the quality of the products and services offered to customers. Innovation and research and development activities often play a critical role in terms of both cost reduction and quality improvement. Vertical integration between sugar beet farming and processing can be a way to pursue cost competitiveness through rationalisation and elimination of transaction costs. In the EU, vertical integration in the beet sugar sector has traditionally taken the form of control by sugar beet growers on the processing stage of the chain, rather than vice versa. In the specific case of raw cane sugar refining, strategies aimed at strengthening competitiveness can be based on upstream vertical integration with raw cane sugar production, or in the control of sugar traders dealing with raw cane sugar. In the EU case, this strategy would include geographical diversification, since refining capacity is located in Member States that are generally not suitable for cane sugar production (with the limited exception of the French Overseas Territories[88]).

Strategies aimed at diversification towards higher value-added sugar products

The diversification strategies that are more closely linked to the traditional core business of sugar producers are focused on product differentiation and on producing higher value-added products, such as specialty sugars (liquid sugars, icing sugar, caramel, etc.) and organic sugar. These strategies aim at increasing revenues with relatively limited investments and acquisition of specific know-how (due to the similarities between the production and marketing practices for these products and those for traditional sugar production). Whereas diversification of production always entails diversification of risks, with potentially positive implications for risk management, it may also entail exposure to "new" risks, or increased exposure to traditional risks. For instance, wherever the size of the market for these higher value-added sugar products is limited, the entry of multiple producers in the related "niche" markets can rapidly result in oversupply and shrinking of price premium over standard sugars.

Strategies aimed at geographical diversification

Strategies aimed at geographical diversification pursue lower production costs and/or diversification of production, market and policy risks. Geographical diversification *strictu sensu* is pursued by operators that produce the same typologies of sugar from the same raw material (sugar beet) in different geographical areas (within a certain Member State, in different Member States, or even outside the EU). Like any other diversification strategy, geographical diversification always entails diversification of risks, with potentially positive implications for risk management, but may also imply potential exposure to "new" risks, or increased exposure to traditional risks. Geographical diversification may be combined with diversification towards other crops than sugar beet (see the next section) wherever it involves cane sugar production (generally outside the EU, given that very limited portions of the EU territory are suitable to sugar cane farming). Even though the need to acquire additional know-how tends be limited, these strategies may require more substantial investments than those required for focusing on specialty sugars or organic sugars.

Strategies aimed at diversification towards other crops than sugar beet

Besides the above discussed case of diversification towards cane sugar production, EU beet sugar producers pursuing diversification of risks and wishing to cease being single-commodity processors can start processing other agricultural raw materials in their

[87] A balance needs to be struck between the total beet volume processed by a sugar factory during the campaign, and the extent of its beet procurement area (which determines the maximum distance over which beets have to be transported to the factory for processing), to keep the overall transportation costs within an economically sustainable limit.

[88] The southernmost regions of Spain and Italy would also theoretically be suited to cane sugar production; however, commercial cane sugar production in continental Europe has traditionally been very limited, and completely disappeared several years ago, when the only Spanish sugarcane mill ceased sugar production (continuing to produce cane ethanol only).

sugar factories (often through adaptations) or in dedicated plants. This approach to diversification often entails a combination with diversification towards other types of sweeteners than sugar (such as inuline, produced from chicory roots), which will be discussed in the next section. Processing multiple agricultural raw materials allows diversification of risks, with potentially positive implications in terms of risk management, but is also likely to expose the concerned operators to "new" risks (production risks in particular) that affect the additional crops processed. The implementation of these strategies may require significant acquisition of additional know-how, and more substantial investments than those required for focusing on specialty sugars or organic sugars.

Strategies aimed at diversification towards other types of sweeteners

Similar to the previous case, these strategies pursue the diversification of risks through the production of sweeteners other than sugar: starch-based sweeteners such as HFS/isoglucose, inuline from chicory roots, low-calorie sweeteners, etc. It is often combined with the diversification towards other crops than sugar beet discussed above. Similar to other product diversification strategies, it combines potential benefits in terms of risk management with potential exposure to "new" production and/or market risks that affect the additional crops/agricultural raw materials processed (cereals, potatoes, chicory roots, native starch, etc.) and/or the additional products marketed (sweeteners other than sugar). Again, these strategies may require significant acquisition of additional know-how, and more substantial investments than those required for focusing on specialty sugars or organic sugars.

Strategies aimed at diversification towards beet-based ethanol production

These strategies pursuing diversification of risks are technically related to sugar beet processing because of the direct use of sugar beet juice, other intermediate products of the sugar extraction process, and/or molasses as feedstock for ethanol production. Beet ethanol distilleries can be annexed to beet sugar factories, or can be stand-alone operations (in the EU these are often converted beet sugar factories). Since beet ethanol production is a capital-intensive process benefitting from scale economies and requiring a different technology than sugar production, pursuing this type of diversification strategies tends to require substantial investments in fixed capital and the acquisition of specific know-how; exposure to "new" or increased production and (especially) market risks may be significant.

Strategies aimed at diversification towards sugar-containing products

These product diversification strategies pursue the diversification of risks through downstream vertical integration towards a wide range of sugar-containing food and beverage products. Thanks to the techno-economic linkages with sugar production, these strategies may combine cost reductions, a stable and profitable alternative outlet for sugar production, and additional revenues for the concerned operators. The investments and know-how needed vary remarkably according to the type of sugar-containing products: some products are obtained through rather simple processes that do not allow significant scale economies; for other products, scale economies may be important and the processes technologically sophisticated, thus requiring substantial investments and acquisition of specific know-how. Also in this case, exposure to "new" or increased production and (especially) market risks may be significant.

Strategies aimed at diversification of the business portfolio towards activities that are technically and economically not linked with sugar production.

These are the most radical product diversification strategies, which can focus on a wide range of food and non-food products. They allow an important diversification of risks, but the exposure to "new" or increased production and market risks may be equally important. The investments and know-how needed vary remarkably according to the type of products concerned.

Strategies aimed at technical innovation (through the use of innovative inputs, equipment, technology, etc.)

These strategies are pursued to a varying extent by operators at all the stages of the sugar supply chain, from sugar beet growers to sugar producers and traders/wholesalers. The focus of these strategies may be on innovation in production, marketing or logistics, mainly to pursue cost reductions through higher efficiency and/or gains in productivity. The needs in terms of investments and acquisition of know-how can vary remarkably according to the characteristics of the innovation to be implemented. Even though the needed innovative inputs, equipment, technology can be purchased from external suppliers, the implementation of these strategies may also profit from the carrying out of in-house research and development activities by the concerned operators. The investigations made revealed that **innovation and research and development (R&D) activities** have significant importance in the EU beet sugar sector; some among the leading EU sugar producers allocate a non-negligible share of their operational expenses to research and development. An analysis based on information retrieved in the annual reports and company websites of a number of leading EU sugar producers revealed that **R&D expenses** in the post-quota period ranged from 0.1 to 3.5% of total operating expenses; it should be considered that the higher shares concern highly diversified sugar producers, where R&D expenses are also allocated to sectors other than sugar. R&D activities by the analysed EU sugar producers were found to cover a wide range of innovation areas, and are aimed at addressing different major risks, threats and operational issues facing the sector. Among the R&D activities targeted at **sugar beet farming**, the most noteworthy are those aimed at finding alternatives to neonicotinoids, at addressing major pests and climatic risks, and at promoting environmentally sustainable agronomic practices. As for R&D activities targeting the **processing stage**, the most noteworthy ones are aimed at improving the efficiency of the sugar extraction process and at minimising its environmental impacts. R&D activities aimed at developing new value-adding processes using sugar beets, sugar and its co-products (molasses, beet pulps) and residues (e.g., sugar beet leaves) as feedstock are illustrated in the following section, dealing with product innovation. It is also worth underlining that R&D activities by some EU sugar producers are aimed at pursuing a **fully circular business model**, where all the products, co-products and residues of sugar beet cultivation and processing find a sustainable use within the supply chain.

A number of actors in the EU sugar supply chain (sugar producers and sugar beet growers) is, or has been, involved in **EU-funded innovation-oriented research projects** (mostly in the framework of the Horizon 2020/Europe and EIP-AGRI[89] programmes). Box 7.5 reports additional information on EU-funded research projects of relevance for sugar beet farming.

Strategies aimed at product innovation

These strategies pursue risk diversification through the implementation of value adding processes using sugar beets, sugar or the related by-products to obtain innovative products, such as biochemicals, biopolymers etc. The implementation of these strategies is based on a combination of innovation and tight techno-economic linkages with sugar production. The needs in terms of investments and acquisition of specific know-how can vary according to the characteristics of the innovation to be implemented, but tend to be substantial because of the technologically advanced nature of the related processes. Similar to the previous case, innovative product ideas and the needed inputs, equipment and technology can be purchased from external suppliers; however, in-house research and development activities by the concerned operators may effectively promote the implementation of this kind of strategies.

[89] Agricultural European Innovation Partnership. EIP-AGRI Operational Groups are project-based and tackle a certain (practical) problem or opportunity which may lead to an innovation. They can be funded under the Rural Development Programmes and are intended to bring together multiple actors such as farmers, researchers, advisers, businesses, environmental groups, consumer interest groups or other NGOs to advance innovation in agriculture (https://ec.europa.eu/eip/agriculture/en).

The Horizon 2020/Europe programmes have provided and provide significant funding opportunities for the sugar supply chain actors that intend to explore the possibilities offered by innovation-oriented research projects in terms of new value adding processes. Table 7.5 provides a synthetic overview of some noteworthy product innovation-oriented research projects that see the involvement of EU sugar producers.

Strategies aimed at financial innovation.

These strategies are pursued to a varying extent by operators at all the stages of the sugar supply chain, from sugar beet growers to sugar producers and traders/wholesalers. The focus of these strategies, implemented through the use of innovative financial instruments, is usually on preventing or mitigating financial risks or price risks. These financial instruments include for instance over-the-counter contracts between sugar producers and sugar users, price swaps, margin swaps, etc. Although they are more and more utilised in the food industry, the extent of their use in the sugar sector is not known precisely.

Box 7.5 – Overview of EU-funded research projects of relevance for sugar beet farming

Research projects can be of paramount importance to find a solution to reduced use of pesticides, including the possibility to implement mechanical control of weeds, or biological control of pests and diseases. Currently there are no **Horizon-funded projects** exclusively investigating sugar beet pest management strategies. However, there are projects in place that investigate the implementation of Integrated Pest Management (IPM) strategies in other sectors with heavy pesticide use, and the results of those projects can be relevant for sugar beet farming (e.g., *OPTIMA*, *IPM Decisions*, *SmartProtect*[90]). Additionally, innovations from Horizon 2020 projects like *ASTERIX* or *WeLASER*[91] could be extended to weed management in beets. Regarding pest control, the project *nEUROSTRESSPEP*[92] has developed new classes of environmentally friendly insect control agents targeted at specific groups of insects that can damage several crops, including sugar beets. A recently started project, *ultraRNAs*[93] (Horizon 2020, European Research Council) will test a proof of concept on novel antiviral siRNAs to tackle the Beet Yellows Virus (BYV), and hence help sugar beet farming. In line with the Farm To Fork strategy, Horizon Europe will continue funding research and innovation activities to help the agriculture sector to remain productive and contribute to sustainable agriculture[94] Some examples of **EIP-AGRI Operational Groups** related to sugar beet farming and the sugar sector include the following: *BetterBio*: support locally the technical development of sugar beet from organic farming[95]; test and validation of innovative tools at low input for the protection of sugar beet grown under organic and integrated farming protocol[96]; development and improvement of the production system for organic sugar beet[97]; development of plant strengthening substance from sugar beet plant extracts (SBE)[98]; development of surveying and regulating measures on selected animal pests in sugar beet growing[99]; crop succession: Durum

[90] https://cordis.europa.eu/project/id/773718 ; https://cordis.europa.eu/project/id/817617 ; https://cordis.europa.eu/project/id/862563

[91] https://cordis.europa.eu/project/id/829983 ; https://cordis.europa.eu/project/id/101000256

[92] https://cordis.europa.eu/project/id/634361

[93] https://cordis.europa.eu/project/id/966855

[94] Horizon Europe Strategic Plan 2021-2024: https://op.europa.eu/s/pdvw

[95] https://ec.europa.eu/eip/agriculture/en/find-connect/projects/betterbio-accompagner-localement-le-d%C3%A9veloppement

[96] https://ec.europa.eu/eip/agriculture/en/find-connect/projects/messa-punto-di-strumenti-innovativi-di-difesa

[97] https://ec.europa.eu/eip/agriculture/en/find-connect/projects/entwicklung-und-verbesserung-des

[98] https://ec.europa.eu/eip/agriculture/en/find-connect/projects/utveckling-av-v%C3%A4xtst%C3%A4rkande-medel-fr%C3%A5n-restprodukt

[99] https://ec.europa.eu/eip/agriculture/en/find-connect/projects/aufbau-von-erhebungs-und-regulierungsma%C3%9Fnahmen-zu

wheat – Sugar beet for the development of the territory and of regional productions[100]; a sustainable process chain for sugar beets as an energy or raw materials supplier[101].

Table 7.5 - Noteworthy EU sugar producers' innovation-oriented research projects

Initiative *Budget*	**Brief description**	**Partners in the sugar sector**
AFTER-BIOCHEM *Overall: € 33 081 489.09 EU contribution: € 19 959 552.01*	Objective: creating multiple new value chains, from non-food biomass feedstock (including co-products and residues of sugar beet processing) to multiple end-products, by combining anaerobic batch fermentation and esterification Started in May 2020; biorefinery in France to be commissioned by 2022 and to run at full capacity and integrate esterification by 2024 *Sources:* https://cordis.europa.eu/project/id/887432 https://www.bbi-europe.eu/projects/afterbiochem	Südzucker
CARBAFIN *Overall: € 6 128 058.75 EU contribution: € 5 362 908.75*	Objective: creating a new value chain for utilisation of surplus sugar beet biomass in the EU by converting glucose and fructose separately into value-added products (functional glucosides for use in food and feed-, cosmetics-, detergents- and polymer sectors) at demonstration and then industrial scale Started in January 2018; expected completion December 2021 *Sources:* https://www.carbafin.eu/ https://www.carbafin.eu/workpackages/ https://www.carbafin.eu/partners/	Pfeifer & Langen
Green Protein *Overall: € 5 572 234.38 EU contribution: € 4 227 361.37*	Objective: producing high-added value, food-grade and fully functional proteins and other ingredients, out of vegetal residues mainly from sugar beets Started in September 2016 - end May 2021; demonstration plant at COSUN's Dinteloord sugar factory (The Netherlands) opened in October 2019 *Sources:* http://greenproteinproject.eu/ https://www.cosunbeetcompany.com/products/food/protein	COSUN Beet Company
PULP2VALUE *Overall: € 11 428 347.50 EU contribution: € 6 589 180*	Objective: obtaining high-value products for a wide range of applications (detergents, personal care, oil and gas, paints and coatings and composites) from sugar beet pulps. Start July 2015 / end June 2019; pilot plant operated by COSUN Beet Company *Sources:* http://pulp2value.eu/ https://cordis.europa.eu/project/id/669105	COSUN Beet Company

100 https://ec.europa.eu/eip/agriculture/en/find-connect/projects/la-successione-grano-duro-barbabietola-da-zucchero

101 https://ec.europa.eu/eip/agriculture/en/find-connect/projects/nachhaltige-prozesskette-f%C3%BCr-zuckerr%C3%BCben-als

7.2.4 Key findings

The analysis allowed to identify the main private and publicly funded risk management tools that are relevant for addressing the main risks and threats affecting the actors in the EU sugar supply chain in the post-quota period.

The main **private tools** were identified in:

- sugar beet farming practices and the use of specific agricultural inputs/equipment;
- insurance schemes (the related costs may be fully or partially compensated by public support);
- mutual funds aimed at addressing income loss or damage from pests;
- saving accounts and reserve funds;
- arrangements and contracts between operators in the sugar supply chain (even though these pursue multiple objectives, they do perform also some risk management functions, or may have some implications in terms of risk management / exposure to risks);
- tools and techniques aimed at addressing price risks, i.e.: pooling of price risks; hedging of price risks through market derivatives; storage;
- measures aimed at addressing policy risks.

As for the main **public tools**, they were identified in:

- A number of specific risk management instruments (albeit not specific to the sugar sector) aimed at supporting EU farmers in case of production/income losses; these include: subsidised insurance contracts against yield losses; co-financing of contributions to mutual funds; the income stabilisation tool (IST).
- Other instruments funded by EAFRD available under the second Pillar of the CAP (Regulation (EU) No 1305/2013) that allow farmers to deal with risks, and which can be relevant also to sugar beet growers: measure 5 "Restoring agricultural production potential damaged by natural disasters and catastrophic events and introduction of appropriate preventive actions"; measure 4 "Investment in physical assets"; measure 9 for "Setting up of producer groups and organisations".
- A number of market management instruments available in the CMO Regulation: aid for private storage (art. 17); measures against market disturbance (art. 219); measures to resolve specific problems (art. 221); derogation from Article 101(1) TFEU (art. 222); safeguard and inward processing measures (articles 194 and 195).

It is worth reminding that a "risk management toolkit" was introduced under the second Pillar of the CAP in the 2014-2020 programming period. However, such "toolkit" builds upon and takes forward the possibilities that existed under Article 68 of Council Regulation (EC) No 73/2009, thus providing a wider range of risk management solutions under various programming options and with different support intensity.

The analysis also found that:

- **Basic payments and coupled payments** (in particular voluntary coupled support to sugar beet - VCS), albeit not conceived as risk management tools, can be seen as instruments limiting the negative effects of low yields and market prices; they also have a key role in supporting farmers' income and in reducing farm income variability. By addressing structural problems in sugar beet farming (e.g., low yields), VCS may also indirectly contribute to mitigate their potentially negative implications for processing plants (mainly in terms of reduced area under sugar beets) in the 11 Member States where the aid is granted. However, it should be noted that granting of VCS in itself does not ensure that farmers will opt for growing sugar beets rather than alternative crops.
- Certain types of **State aids** can also be broadly considered as risk management tools.

Finally, the analysis identified a number of **risk management strategies** and of **general business strategies with risk management implications**, aimed at: i) limiting sector-specific and systemic risks, based on combinations of the previously described risk management tools; ii) strengthening competitiveness; iii) diversification towards higher value-added sugar products; iv) geographical diversification; v) diversification towards other crops than sugar beet; vi) diversification towards other types of sweeteners than sugar; vii) diversification towards beet-based ethanol production; viii) diversification towards sugar-containing products; ix) diversification of the business portfolio towards activities that are technically and economically not linked with sugar production; x) technical innovation (through the use of innovative inputs, equipment, technology, etc.); xi) product innovation; xii) financial innovation.

7.3 Q5: To what extent the identified risk management tools address effectively the main identified risks? What are their strengths and weaknesses?

The reply to this question provides an overview of the main findings of the study on the **coverage** of risk management tools used in the EU sugar sector, their **adequacy** vis-à-vis the main risks faced by sugar operators, the **main gaps** identified by sectoral stakeholders in the EU risk management system, and the **protection** offered by risk management instruments. It ends with an overall assessment of the **strengths and weaknesses** of current risk management tools.

Definition of key terms

"Risk management tools": see the definition provided at question 4 (§ 7.2).

"Address effectively the main risks". Capacity of the risk management tool to limit both the probability of occurrence of the risk and the effects of anticipated risks when they occur. The main risks affecting the sugar supply chain are the ones identified in question 3 (§ 7.1): they can be either systemic to the agricultural/agri-food sector or specific to the sugar supply chain.

"Strengths and weaknesses": the strengths and weaknesses of each risk management instrument can be assessed through a diagnosis of their ability to achieve the objectives they pursue

Understanding of the question

The approach to assessing whether the main risks, as identified under question 3, are covered by the risk management tools/strategies identified under question 4 consists in the following methodological steps:

1. Analysis of the **coverage** of the main sugar supply chain risks with appropriate risk management tools.
2. Analysis of the **adequacy** of risk management tools vis-à-vis the main risks faced by the EU sugar sector (assessing whether each tool matches stakeholders' expectations and needs; identifying the strengths and weaknesses of each tool).
3. Analysis of the **protection provided** by risk management tools (in terms of: depth of protection; net cost of protection to the user; total net cost of protection; efficiency of public support, where relevant).

7.3.1 Coverage of the main sugar supply chain risks with appropriate risk management tools

Concerning the coverage of risk management tools, the investigation shows a very diverse situation by instrument, by stakeholder and by Member State.

Coverage by instrument

Certain tools are very present in the risk management tool box of sectoral operators (e.g., crop insurance, futures hedging by sugar producers, inter-branch agreements

between sugar beet growers' organisations and sugar producers), while some others are very scarce (e.g., mutual funds against pest and disease, IST). Even for the most utilised instruments, coverage can be relatively low for some tools (e.g., multi-peril crop insurance), while others are universally adopted (e.g., pre-sowing delivery contracts between sugar beet growers and sugar producers) because they are compulsory as per the CMO Regulation (No 1308/2013).

The uptake of certain tools depends on their authorisation by the EU Commission: such is the case for market support measures that can be triggered in case of strong market perturbation (articles 17, 194, 195, 219, 221 and 222 of the CMO Regulation). So far, these tools have never been implemented in the sugar sector. The use of state aids is restricted by EU regulations, but Member States have a substantial flexibility, which they generally use, concerning in particular disaster payments and *de minimis* aid to farmers.

Coverage by stakeholder profile

The coverage of risk management instruments is more heterogeneous for sugar beet growers than for sugar producers (including cane refiners). The former have a relatively large array of tools at their disposal, but the actual use of these tools shows great variations among Member States. By contrast, a relatively large share of sugar producers across the EU hedge their price risks on futures markets, although the share of sugar production for which price is hedged is far from being homogeneous among operators.

Coverage by Member State

No Member State makes full use of the various risk management instruments available to the sugar sector. There are significant differences in coverage by country, due in particular to the differences in climatic/natural conditions that determine the intensity and frequency of production risks, and the diversity of governments' approaches to farm policy. For instance, some Member States have a long experience in public support to crop insurance, while others believe it is inefficient and prefer subsidising other tools.

There has been a limited increase in the uptake of risk management tools since the end of the EU sugar quota regime. For example, 47% of sugar beet growers' associations surveyed for the study, compared to around 40% in the quota period, indicated that multi-peril insurance covers more than 25% of their members' sugar beet area. The share of surveyed sugar producers declaring that they do not hedge price risks on the futures markets fell from 33% in the quota period to 19% in the post-quota period.

7.3.2 Adequacy of risk management tools vis-à-vis the main risks faced by the EU sugar sector

Overall, almost 60% of sugar beet growers' associations and 50% of sugar producers surveyed for this study consider that the types of implemented/used risk management tools, including market management instruments available in the CMO Regulation, are not adequate to mitigate the main risks affecting the EU sugar sector in the post-quota period.

The extent to which the risk management tools match the needs of each category of stakeholders along the sugar supply chain varies strongly by instrument. While sugar producers generally find hedging on futures markets appropriate for managing price risks, other instruments are the subject of criticism. The main concerns of the consulted sectoral stakeholders pertain to:

- the existence of substantial gaps in the protection offered by risk management tools, with the consequence that some expectations regarding risk management are not covered by the existing instruments (see § 7.3.3 below);
- the insufficient protection provided by the existing risk management tools, because of the very design of the tools or due to the low uptake / lack of

application of the instruments resulting from high adoption cost or other obstacles and reasons (see § 7.3.4 below).

It should be noted that the above identification of drawbacks mostly reflects the views of sectoral stakeholders, and may not be shared by other concerned parties, including the European Commission, especially on the role and effectiveness of market measures in the CMO Regulation. The debate on this subject remains open, as confirmed also by the nuanced analysis of these measures carried out by the High Level Group on sugar (HLG, 2019) in the first half of 2019, when sugar prices reached their lowest level. In addition, one should stress that the opinions expressed by the consulted sectoral stakeholders often go beyond the adequacy of risk management tools as such. A large part of them tends to emphasise the risks linked to the structural weaknesses of the EU sugar sector, such as its lack of competitiveness relative to its main non-EU competitors, and the growing market imbalance in favour of large-scale retailers in the EU food chain. These topics are beyond the scope of this study, but it is clear that structural weaknesses in the EU sugar sector reduce the capacity of the operators to bear and manage their risks, as discussed in-depth in the reply to Question 1 (see § 6.1).

7.3.3 Main gaps

The main gaps identified by sectoral stakeholders in the current EU risk management system (given by the combination of private and publicly funded tools analysed under Question 4; see § 7.2) include the following.

- *Risk management tools do not address the potential distortions resulting in particular from differences in the way Member States regulate the use of inputs (especially neonicotinoids) for sugar beet cultivation*. In particular, stakeholders who do not benefit from emergency authorisations for neonicotinoids feel that these distortions are inequitable, as sectoral operators in the different Member States do not bear the same amount of risk.
- *Member States have generally not implemented the improvements in risk management tools authorised by the 2018 EU Omnibus regulation*. Sugar beet growers feel this is regrettable, since these improvements could increase the uptake of multi-peril crop insurance and the Income Stabilisation Tool.
- *Sugar beet growers' associations in some Member States deplore the lack of innovation in contracts with sugar producers*. Even though beet supply contracts are not – strictly speaking – risk management tools, they do perform some functions / have significant implications in terms of management of production and market risks (see Question 2, § 6.2.7). According to those growers' associations, more flexibility in sugar beet supply contracts would be needed, in particular to allow growers to hedge their price risk on sugar futures markets, as is being done in the United Kingdom (albeit still on a rather limited scale). Contractual innovation is all the more important in the more market-oriented, post-quota sugar regime. It could be facilitated by a deepening and a larger use of inter-branch agreements. According to most sugar beet growers' associations, the development of these agreements could also help in finding common solutions to increase the competitiveness of the EU sugar industry and ensure a more equitable sharing of risks and value added among its stakeholders, but this opinion is not necessarily shared by sugar producers, which by contrast emphasise the usefulness of more flexible sugar beet supply contracts to cope with increased yield volatility, and its implications in terms of production planning and supply management.

7.3.4 Analysis of the protection provided by risk management tools

The protection provided by risk management tools has been assessed – within the limits allowed by the collected evidence[102] – through the following criteria:

1. depth of protection (share of the loss covered by the risk management tool);
2. net cost of protection to the user (difference between the payment received and the cost incurred by the user of the risk management tool);
3. total net cost of protection (sum of net costs incurred by all the stakeholders that finance risk management tools: the user, other actors of the sugar value chain, the entity to which the risk has been transferred, and the public sector);
4. efficiency of public support (ratio of the payment received by the user to the public support provided to the tool);
5. qualitative aspects, including in particular the complexity of the tool.

The evidence collected from interviews with sectoral stakeholders has been complemented with a review of a selected literature on risk management instruments.

The major result of the analysis is that there is an insufficient protection provided by the EU risk management tools available in the sugar sector, due to (i) the very **design** of the tools, which steer doubts on their efficacy to reduce risks borne by sectoral operators, and/or (ii) the **low uptake or lack of application** of the tools, imputable to high adoption costs or other obstacles/reasons. From a public policy point of view, this lack of protection is regrettable because some instruments make, or could make an efficient use of public support if they were more widely adopted.

Examples of ***risk management tools improperly designed*** *– at least in the views of several sectoral stakeholders - include aid for private storage and derogation to competition law, which are subject to the EU Commission's authorisation.* According to some consulted sectoral stakeholders, *aid for private storage* is of limited interest in case of a strong and prolonged market crisis. It hinges on the expectation of a pick-up of sugar prices that may not occur, and should thus be complemented with provisions for a reduction in sugar supply in the following campaign. The stored sugar volumes weigh in any case on the sugar market fundamentals (thus depressing sugar prices): this basically shifts the adverse effects of oversupply on prices from one marketing year to the following (i.e., the release of stored sugar volumes in an already depressed market would only continue to deteriorate the situation), so that storage would become financially unsustainable if sugar prices remain depressed for consecutive years. According to the High Level Group on Sugar (HLG, 2019), to have an effect on the market private storage should be granted for a substantial quantity (more than 1 million tonnes to be stored under the regime) and for a sufficiently long period (until the end of a given marketing year). In fact, the production cycle of sugar is annual and operational sugar stocks are quite large during most of the time. On average, EU stocks in the hands of producers are above 6 million tonnes during two thirds of the marketing year, and ending stocks do not go below one million tonnes. Storing a limited quantity of sugar would merely subsidise sugar producers' regular storage costs. In addition, the timing of aid to storage is crucial: without appropriate timing, this measure would mainly move sugar surplus from one marketing year to another, and with it most likely put pressure on market balance and prices. The High Level Group suggests that the launch of the measure should coincide with or precede the period of signing new sowing contracts, i.e. in autumn. As for the *derogation to EU competition law*, in order to put sectoral operators in the position to implement actions aiming at supply management of the EU sugar market, in the views of several consulted stakeholders its efficiency is jeopardised by: i) the voluntary nature of these actions (i.e., the impossibility of making supply management agreements applicable *erga omnes*), which opens room to free

[102] This section only covers the tools for which there was sufficient evidence to feed the assessment criteria 1 to 5. Such evidence happened to be available mostly for public tools, with the notable exception of multi-peril crop insurance (private tool). Furthermore, this section focuses on the main problems emerged from the assessment.

riders; ii) the exclusion of collective bargaining or price-fixing activities from the scope of the agreements; and, iii) the fact that they may not be supported financially by Member States' governments. Several sectoral stakeholders identified in those alleged weaknesses in the design and implementation mechanisms of these tools the main reasons behind their lack of application in the sugar sector in the post-quota period; by contrast, the Commission did not identify any significant inherent weaknesses in the same tools, and offered different arguments for the lack of application[103]. It should be noted that market measures under the CMO Regulation are of a horizontal nature, i.e., applicable to all agricultural sectors; they were used to address serious crisis situations faced by other agri-food sectors (fruit and vegetables, milk, olive oil, etc.), when the conditions for their implementation were met. Furthermore, the High Level Group on sugar (HLG, 2019) concluded, after a careful and detailed analysis, that the available regular market instruments were "mismatched to deal with the specific market situation experienced during the post-quota period". The lack of application of market measures under the CMO Regulation in the EU sugar sector in the post quota period is discussed in detail under Question 6 at § 7.4.4.

Examples of ***weak protection resulting from low uptake of the tool*** *include in particular multi-peril crop insurance and the Income Stabilisation Tool*. Although there are signs that sugar beet growers have more subscribed to crop insurance since the end of the sugar quotas, its coverage remains limited, due to the growers' perception of excessive cost linked to the 30% loss threshold imposed by WTO regulations and to the non-adoption in most Member States of the EU Omnibus regulation that could reduce insurance premia paid by the grower (for a given level of protection)[104]. The fact that multi-peril crop insurance does not cover damage due to pest and disease of sugar beets also hampers its adoption. The situation is much worse for the IST, that has been so far non-implemented in the EU, neither in the sugar nor in other production sectors. This failure is imputable to the cumulation of the factors explaining the low uptake of crop insurance, on the one hand, and of obstacles specific to mutual funds, including their administrative costs and the amount of financial contributions required to make them viable, with the potential need for reinsurance, on the other hand. Overcoming these obstacles implies support not only from a large number of sugar beet growers, but also from Member States and from sugar producers, whose contributions are difficult to garner.

The non-adoption of IST is at odds with the results from research showing its efficiency in terms of public support. A study suggests that for a given euro of subsidy, the IST brings about a significantly greater reduction in the variability of farm income than either direct payments or crop insurance alone[105]. However, these results refer to a single farm type in a single Member State (Spain), and have been obtained for a specific pattern of price and production variability; they should thus be confirmed for other farms in other Member States and economic contexts. Another study[106], focusing on another Member

[103] The study team deems that those diverging views are likely to derive from different mindsets. Whereas the Commission attaches great importance to the consistency of risk management measures in the CMO Regulation with the market orientation of the CAP, sectoral stakeholders have stability and predictability as their key priorities, mainly due to the peculiarity of the business model of the sugar industry (see § 5.1).

[104] However, in at least one Member State, the possibility given by the Omnibus regulation to subsidise index-based insurance may have contributed to the launching of this type of insurance, targeted against drought.

[105] Alba Castaneda-Vera and Alberto Garrido Colmenero, 2017. "Evaluation of risk management tools for stabilising farm income under CAP 2014-2020". *Economia Agraria y Recursos Naturales – Agricultural and Resource Economics*. For a discussion of this study and other research on EU risk management tools, see Alan Matthews, "Which is the best risk management tool?", *CAP Reform*, August 22, 2017.

[106] Luigi Biagini, *The role of Common Agricultural Policy (CAP) in enhancing and stabilising farm income: an analysis of income transfer efficiency and the Income Stabilisation Tool*, Università degli Studi della Tuscia, A.A. 2019/2020.

State (Italy), also shows that the introduction of IST would significantly reduce farm income variability. According to the author, reluctance to implement IST could be partly explained by the difficulty in defining the structure of the premiums paid by farmers, as in the case of all new insurance schemes. The same study stresses that a sectoral IST would strongly increase the variability of indemnities paid to farmers, compared to an all-sector IST, which may be another obstacle to its adoption and financial viability. Finally, it is not clear whether the available studies take into account the fact that the protection provided by IST tends to decrease in periods of prolonged market crisis, as the reference margin that triggers indemnities diminishes when the farms' gross margins are low. In other words, the IST is not, by design, an appropriate instrument for managing risks linked to prolonged periods of low farm prices (which is the situation experienced by many EU sugar beet growers in the post-quota period) and/or high production costs (which characterise sugar beet farming in certain Member States). However, it can be debated if tackling long periods of low market prices should be addressed by risk management measures or by structural measures aimed at improving the competitiveness of the sugar sector, a remark that also applies to aid for private storage that can be granted under the CMO Regulation.

7.3.5 Strengths and weaknesses of risk management tools

The strengths and weaknesses of the main risk management tools available to the EU sugar sector are outlined in the matrix below (Table 7.6). The criteria used for the assessment are those described in the previous sections, i.e., the level of coverage of the tools, their adequacy vis-à-vis stakeholders' expectations, and the protection that they provide. For the sake of simplification, each criterion is scored (+) (bold characters, light green background) if it is deemed globally satisfactory, and (-) (light red background) if it is not.

Table 7.6 – Overall assessment of strengths and weaknesses of major risk management tools

Risk management tools		**Main risk covered**	**Criteria**		
			Coverage	***Adequacy***	***Level of protection***
Crop insurance	***Hail (private)***	***Hail***	**+**	**+**	**+**
	Index-based (subsidised)	Drought	-	-	-
	Multi-peril (subsidised)	Defined set of climatic hazards	-	-	-
Mutual funds		Pest and disease	-	-	-
Income Stabilisation Tool		Decrease in farm's gross margin	-	-	-
Farm savings account (subsidised)		Decrease in farm's revenue	(*)	(*)	(*)
Sugar beet supply contracts***		Production and price risks	+	-	-
Futures and options	For sugar beet growers	Price	-	-	-
	For sugar producers, refiners, traders	***Price***	**+**	**+**	**+**
Aid for private storage		Price	-(**)	-(**)	-(**)

Risk management tools	Main risk covered	Criteria		
		Coverage	***Adequacy***	***Level of protection***
Other CMO emergency measures (articles 194, 195, 219, 221, 222)	Price	-(**)	-(**)	-(**)
State aids	***Production and price risks***	**+**	**+**	**+**

(*): overall assessment difficult as results pertain to a limited number of Member States
(**): according to the consulted sectoral stakeholders; the Commission did not identify any significant inherent weaknesses
***: albeit not a risk management tool *strictu sensu*, they do have significant risk management implications
Source: assessment by the study team

To complement the analysis, the strengths and weaknesses of each risk management tool in the previous matrix are summarised in qualitative terms in the matrix below (Table 7.7), taking into account both the theoretical advantages and limitations of the tools, and their actual implementation in the EU sugar sector. Risk management tools that received a favourable overall assessment in the previous matrix are highlighted in bold italics in the matrix below.

Table 7.7 – Qualitative assessment of strengths and weaknesses of major risk management tools

Risk management tools		Main risk covered	Strengths	Weaknesses
Crop insurance	***Hail (private)***	***Hail***	***Smaller premium cost***	***Protection limited to hail***
	Index-based (subsidised)	Drought	Smaller premium cost due to index-based indemnification	Protection limited to drought 30% loss threshold without Omnibus regulation Risk basis
	Multi-peril (subsidised)	Defined set of climatic hazards	Higher premium cost	All productions are not insurable 30% loss threshold without Omnibus regulation No protection against pest and disease
Mutual funds		Pest and disease	Reduction in premium cost due to pooling of risk	Protection limited to certain pests and diseases

Risk management tools		Main risk covered	Strengths	Weaknesses
Income Stabilisation Tool		Decrease in farm's gross margin	Reduction in premium cost due to pooling of risk Covers both against a decline in sugar beet prices and/or an increase in input prices Possibility of an index-based sectoral IST with a reduced threshold loss under Omnibus regulation Efficiency of public support for the stabilisation of farm income	Potentially high administrative and reinsurance costs Reluctance of sugar producers to contribute to the fund High (30%) loss threshold if no sectoral IST Protection declines in case of consecutive years of low farm's gross margins
Farm savings account (subsidised)		Decrease in farm's revenue	Smoothing out of income variations	Not all farms have the capacity to save Ceiling on the tax-deductible amount
Sugar beet supply contracts*		Production and price risks	Effective in ensuring certainty of an outlet for sugar beet output Effective in ensuring planning of sugar beet supply Effective in addressing price risks in ordinary conditions (via pre-set sugar beet pricing arrangements)	Ineffective in coping with high yield and price volatility Not conceived to address prolonged periods of low sugar → sugar beet prices
Futures and options	For sugar beet growers	Price	Taking advantage of sugar price increases during the marketing year	Generally not available to sugar beet growers in the EU
	For sugar producers, refiners, traders	***Price***	***Taking advantage of sugar price increases and protecting against sugar price decreases in the marketing year***	***Risk basis on London and New York futures sugar markets compared to the EU situation***
Aid for private storage		Price	Prevents further decline in sugar prices	Inefficient and counter-productive if sugar prices do not pick up (**)
Other CMO emergency measures (articles 194, 195, 219, 221, 222)		Price	Prevent further decline in sugar prices	May be inefficient because of the voluntary nature of actions that can be taken by sugar producers (**)
State aids		***Production and price risks***	***Free for the farmer***	***Ceiling of de minimis aid per farm*** ***With disaster payments, uncertainty and lower indemnification of damage compared to insurance***

*: albeit not a risk management tool *strictu sensu*, they do have significant risk management implications
(**): according to the consulted sectoral stakeholders; the Commission did not identify any significant inherent weaknesses
Source: assessment by the study team

Attention is drawn to the fact that the analysis by each risk management tool gives only a partial assessment of the strengths and weaknesses of the overall tool box available to sugar stakeholders. An important consideration is how each operator combines different instruments to address the array of production and price risks that it faces. For instance, sugar beet growers in a given Member State using both multi-peril crop insurance and a farm savings account may get an appropriate coverage for risk management, even if the subscription to crop insurance, on the one hand, and the uptake of savings accounts, on the other hand, remain limited overall in this Member State.

7.3.6 Key findings

Concerning the **coverage** of risk management tools, the investigations made revealed a very diverse situation by instrument, by stakeholder and by Member State. Certain tools are found frequently in the operators' risk management tool box (e.g., crop insurance for sugar beet growers, hedging techniques based on sugar futures for sugar producers), while some others are absent or very scarce (e.g., mutual funds against pest and disease, Income Stabilisation Tool). The coverage of risk management instruments is more heterogeneous for sugar beet growers than for sugar producers (including cane refiners). No Member State, among the ones analysed for the study, was found to make full use of the various instruments available. Since the end of the sugar quotas, there has been a certain increase in the uptake of some risk management tools, such as multi-peril crop insurance for sugar beet growers and the hedging of price risk by sugar producers on futures markets.

Half or more of sugar beet growers' associations and sugar producers surveyed for this study consider that the implemented/used risk management tools are **not adequate** to mitigate the main risks affecting the EU sugar sector in the post-quota period. Their concerns mainly pertain to: (i) the existence of **substantial gaps in the protection** offered by risk management tools, with the consequence that some expectations regarding risk management are not covered by the existing instruments (e.g., distortions in the EU sugar market resulting in particular from differences in the way Member States implement the CAP, leading to coupled or decoupled payments to sugar beet growers, and regulate the use of inputs, especially neonicotinoids, for sugar beet cultivation); and, (ii) the **insufficient protection** provided by the existing risk management tools, because of weaknesses in the design of the tools (e.g., aid for private storage and derogation to competition law,) or their low uptake resulting from high adoption costs or other obstacles (e.g., multi-peril crop insurance, IST), in spite of the high intensity of support authorised by EU legislation (up to 70% for crop insurance premiums and eligible costs of IST and other mutual funds).

The assessment also covered **sugar beet supply contracts** that, albeit not conceived as a risk management tool, do **perform some functions / have significant implications in terms of risk management**, and are widely used in the sector. These contracts can be deemed effective in ensuring planning of sugar beet supply (thus preventing the related production risks), in providing certainty of an outlet for sugar beet production (prevention of market risks), and in addressing price risks in ordinary conditions (thanks to pre-set sugar beet pricing arrangements). By contrast, they show weaknesses in coping with high yield and price volatility, and were clearly not conceived to address prolonged periods of low sugar beet prices as a result of depressed sugar prices. In that regard, sugar beet growers' associations in some Member States deplored the lack of innovation in sugar beet supply contracts with sugar producers (for example to allow growers to hedge their price risk on sugar futures markets), but this opinion

was often not shared by the consulted sugar producers. Nevertheless, the **potential for innovation in contractual relationships along the sugar supply chain** – in particular for what concerns sugar beet supply contracts - **could be explored further**, due to the important role that they play in the more market-oriented post-quota sugar regime.

The opinions expressed by the consulted sectoral stakeholders need to be put into perspective. In particular, market measures under the CMO Regulation are of a horizontal nature, i.e., applicable to all agricultural sectors; they were used to address serious crisis situations faced by other agri-food sectors (fruit and vegetables, milk, olive oil, etc.), when the conditions for their implementation were met. Also, it should be considered that the High Level Group on sugar (HLG, 2019) concluded, after a careful and detailed analysis, that the available regular market instruments were "mismatched to deal with the specific market situation experienced during the post-quota period". Sectoral stakeholders and the Commission were found to have diverging views on the presence/absence of inherent weaknesses in the design and implementation mechanisms of risk management tools under the CMO Regulation[107].

Finally, it should be noted that Member States have generally **not implemented** the improvements in risk management tools authorised by the 2018 Omnibus regulation, with the result that sugar beet growers do not have access to the protection against low sugar beet prices that could be provided by an Income Stabilisation Tool in the sugar sector.

[107] The study team deems that those diverging views are likely to derive from different mindsets. Whereas the Commission attaches great importance to the consistency of risk management measures in the CMO Regulation with the market orientation of the CAP, sectoral stakeholders have stability and predictability as their key priorities, mainly due to the peculiarity of the business model of the sugar industry (see § 5.1).

7.4 Q6: What is the level of uptake of the identified risk management tools and to what extent is this level sufficient to manage the main identified risks effectively?

Definition of key terms

"Level of uptake": a measure of the diffusion of risk management tools among the operators in the sugar sector. It can be expressed, e.g., in terms of tonnes of sugar or sugar beet covered, % share of the total number of stakeholders covered, or value of the production covered.

"Level sufficient to manage the main identified risks": the efficacy of risk management tools can be linked to the actual coverage of the sugar supply chain that has implemented such tools. This "sufficient" level can vary according to: i) the scope of the relevant risk management tools; ii) the level of protection provided; iii) the type of risk(s) covered (systemic/specific; punctual/recurrent; etc.).

Understanding of the question

The starting point for answering question 6 are the findings from question 5 (see § 7.3), which: i) assessed the effectiveness of risk management tools in addressing the main risks (as identified under question 3 at § 7.1); and, ii) classified the available risk management tools available to each type of operator in the sugar supply chain.

The approach to assessing to what extent the current level of uptake of individual risk management tools is sufficient to manage the main identified risks effectively consists in the following methodological steps:

1. Assessment of the extent to which the identified risk management tools have actually been used by operators (i.e., what has been the actual level of uptake of the risk management tools), and of their actual effectiveness with that level of uptake.
2. Assessment of the extent to which a wider use of the identified risk management tools would have contributed to a more effective risk management.

7.4.1 Level of uptake of the risk management tools

The aim of this section is to illustrate the level of uptake of each relevant risk management tool, as identified under question 4 (§ 7.2). This section is mainly based on the results of the two surveys carried out in the framework of the study, namely the survey targeting beet growers' associations and sugar producers. Information collected through the surveys is also complemented with findings from in-depth analyses carried out in 10 Member States, and with the results of literature review. It should be noted that no complete database exists on the specific level of uptake of individual relevant risk management tools in the sugar sector, either at EU level or at Member State level. The results of the report of the High Level Group on Sugar[108], as well as the impact assessment carried out in the framework of the proposal for the new CAP[109] do not provide quantitative elements in this respect; however, they both provide insights into the limited use of certain risk management tools at EU level, for the agricultural sector in general and for the sugar sector in particular. Evidence from in-depth analysis in selected Member States and from surveys also indicates that the level of uptake of risk management tools among sugar beet growers and sugar producers is quite limited, with some notable exceptions (e.g., the use of futures - mainly in the application of hedging techniques - among sugar producers, in particular raw cane sugar refiners and sugar producers also operating on the international export market).

Besides the general low level of uptake of the main risks management tools among sugar beet growers and sugar producers, the results of the **surveys targeting EU**

[108] Report of the High-Level Group on Sugar, 2019.

[109] European Commission Staff Working Document SWD(2018) 301 final - *Impact Assessment accompanying the Proposal for a Regulation of the European Parliament and of the Council establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic Plans)*.

sugar producers and sugar beet growers' associations also show that the level of implementation of most risk management tools remained basically similar between the quota and the post-quota periods, with some noteworthy exceptions. Table 7.8 below shows the share of respondents of the two surveys that implemented the main risk management tools in the quota and post-quota periods.

Table 7.8 - Which are the risk management tools implemented in the quota period and in the post-quota period?

Prevalence among survey respondents as % of total replies

Risk management tools	Beet growers' associations		Sugar producers	
	Quota period	***Post-quota period***	***Quota period***	***Post-quota period***
Market tools (e.g., futures)	18%	18%	52%	86%
Cooperatives	29%	29%	14%	19%
Insurance tools	88%	94%	52%	52%
Mutual funds	12%	12%	14%	19%
Saving accounts	24%	24%	19%	38%
Aid for private storage (CAP)	24%	0%	14%	0%
Subsidies for multi-risk yield insurance (CAP)	41%	41%	0%	5%
Support to mutual funds and IST(CAP)	6%	0%	0%	0%
Crisis measures (CAP)	6%	6%	14%	0%
Inter-branch agreements (CAP)	100%	65%	67%	67%
EC Sugar market observatory (CAP)	71%	71%	62%	86%
State aids (*e.g., disaster payments; other direct payments -including "de minimis")*; fiscal/tax measures	41%	53%	19%	33%
Temporary derogations for the use of certain production inputs (e.g., pesticides) banned at the EU level	41%	71%	24%	71%

Significant increase in the prevalence Significant decrease in the prevalence

Source: Areté: survey of beet growers' associations and sugar producers, 2021.

The implementation of tools for managing market risks, like **futures**, is far more common among sugar producers than among farmers: in the post-quota period, only 18% of the surveyed sugar beet growers' associations had members implementing this tool, against 86% of the surveyed sugar producers. In addition, the use of this tool among sugar producers increased in the post-quota period from 52% to 86% of respondents.

Insurances are of widespread use among sugar beet growers, in both the quota and post-quota periods (respectively used by 88% and 94% of respondents). In addition, in both the quota and post-quota periods, 41% of this respondent group received **support from the public sector for insurance premiums.** By contrast, only 52% of surveyed sugar producers stipulated insurances in both the quota and post-quota periods.

The use of inter-branch agreements was found to be common among both sugar beet growers and sugar producers. In the post-quota period, respectively 65% and 67% of respondents in the two groups used this instrument. 29% of the surveyed beet growers' associations are member of **cooperatives** (a share which remained unchanged in the transition from the quota to the post-quota period).

The number of respondents who implemented certain publicly funded tools (e.g., **aid for private storage; support to mutual funds and to the income stabilisation tool; other crisis prevention instruments foreseen in the CAP**) is very limited. On the contrary, about half of the surveyed sugar beet growers' associations replied that

their members make use of **other forms of state aids** in the post-quota period, while only a third of respondents to the survey of sugar producers stated to make use of this tool. **Aid for private storage** has never been used in the post-quota period.

Finally, the **use of saving accounts** has remained stable among the surveyed sugar beet growers from the quota to the post-quota period (24%), while it strongly increased for the surveyed sugar producers: in the quota period, 18% of the sugar producers implemented this tool, while in the post-quota period the share increased to 38%.

The survey targeting sugar beet growers' associations also provides insights on the **share of sugar beet area or sugar beet production covered by specific risk management tools**.

Consistently with the reply to the previous question on the implementation of risk management tools, the sugar beet area covered by the **income stabilisation tool** is very limited both in the quota and in the post-quota period. Respectively 88% and 94% of respondents indicated that, among the members of their associations, no sugar beet production is covered by this tool. Similarly, the volume of sugar beet production covered by a **mutual fund against pests and diseases** is very limited: 88% of beet production is not covered, a share that remained unchanged in the transition from the quota to the post-quota period. On the contrary, **insurance** covers a significant share of the sugar beet area. In addition, it should be noted that the use of insurance tools (both multi-perils and against hail), remained basically unchanged in the quota and post quota periods. Half of respondents indicated that among their members **multi-peril insurance** covers more than 25% of the sugar beet area (specifically, 29% indicated that this tool covers from 25% to 50% of the sugar beet area, while 18% indicated that it covers more than 50% of sugar beet area). Finally, among the analysed tools, the use of **crop insurance against hail** is quite common: 35% of respondents indicated that more than half of the sugar beet area of their members is covered by this tool, and 29% indicated that an area between 25% and 50% of the total beet area is covered by this tool.

The survey targeting sugar producers provided information on the share of sugar production covered through **hedging instruments**, which has significantly increased with the transition from the quota period to the post-quota one. In the quota period, 33% of respondents indicated that no portion of their sugar production was covered by this risk management tool. In addition, around half of the respondents indicated that less than 10% of their production was covered by this tool. In the post-quota period, these shares decreased respectively to 19% and 10%. By contrast, the share of respondents indicating that between 10% and 25% of their sugar production is covered by hedging instruments increased from 10% in the quota period to 62% in the post-quota period.

Survey results show that the **uptake of most risk management instruments by farmers and by sugar producers** is **limited to date**: this is especially evident among EU sugar beet growers.

Regarding the **risk management schemes provided by the CAP** (i.e. **support to insurance premium; support to mutual funds; income stabilisation tool)**, the impact assessment carried out by the European Commission for the new CAP proposal[110] identifies the following underlying causes to the low level of uptake: too stringent WTO Green-Box requirements (e.g., too high loss thresholds to receive compensation), budget unpredictability, lack of farm-level data, unfamiliarity of stakeholders with novel tools, and the likelihood of ex post public support reducing incentives for an ex-ante risk management approach at farm level. According to this document, amendments introduced in the Omnibus regulation have addressed some of these issues, notably by

[110] European Commission Staff Working Document SWD(2018) 301 final - *Impact Assessment accompanying the Proposal for a Regulation of the European Parliament and of the Council establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic Plans)*.

lowering loss thresholds for certain instruments and introducing a new sector-specific tool for income losses, but the level of uptake remains low. One can argue that the lack of tradition in farm risk management in certain Member States, combined with the large share of direct payments in farm revenue, contributing to stabilise farmers' income, probably have acted, and to some extent still act, as a deterrent to a wider adoption of risk management tools.

As for the recourse to **other tools foreseen in the CMO Regulation to tackle difficult market situations** (i.e., aid for private storage; measures against market disturbance; measures to resolve specific problems; derogation from Article 101(1) TFEU under art. 222, the safeguard measures under art. 194 and 195), in the post-quota period these tools have never been activated for the sugar sector.

As illustrated under question 4 (§ 7.2), **sugar beet growers** have also access to support from other publicly funded tools that are not specifically intended to manage risks, but which aim at stabilising incomes and reducing uncertainty and income variability. These tools are mainly **direct payments and voluntary coupled support (VCS)**; in certain Member States, also other forms of support are granted, e.g., in the form of *de minimis aid*. Direct payments are widely granted to farmers in all EU Member States, under certain conditions, while VCS is granted only in the 11 Member States that allowed the use of this support measure for sugar beet. The intensity of support granted to sugar beet growers through VCS varies among Member States; however, all active sugar beet growers in the Member States that granted VCS to sugar beet can have access to this support measure. In other words, Member States that grant VCS to sugar beet do not differentiate among sugar beet growers located in different territories and regions of the country.

Regarding the **level of uptake of insurances**, it should be stressed that it is quite difficult to separate the level of uptake for purely-private insurances and for private insurances for which farmers have access to publicly-funded support. In any case, at least among sugar beet growers these risk management tools seem to be the most widespread, with significant differences across the EU. For instance, in **Austria**, in total, around 97% of the sugar beet area was insured in 2020. In this Member State, most of the sugar beet area (89%) is insured under the "Sugar Beet Universal" scheme, an insurance scheme specifically designed for this crop, while the remaining area is insured under the "Agrar Universal" scheme, a general insurance scheme (6 % of the area under sugar beets in the country) or under the "Pure Hail Insurance", covering damages from hail events (2 % of the national sugar beet area). In **Belgium**, the only scheme that has been used by the sugar beet sector is the Broad Weather Insurance (*Brede weersverzekering*). This recent comprehensive weather insurance is private, but recognised by the Flemish government and subsidised by public funding. Nonetheless, uptake has been relatively limited when compared to other sectors: in 2020, approximately 250 farmers participated in this scheme in the Flanders region, to cover approximately 2 000 hectares of sugar beet. In **Croatia**, sugar beet is considered a valuable crop: therefore, although it is difficult to assess the exact uptake of multi-risk insurance in sugar beet production, a considerable proportion of the production is insured. Furthermore, sugar producers are encouraging farmers to acquire multi-risk insurance. **In France,** the number of sugar beet growers insured, and the area covered by insurance, both increased greatly since 2015. Currently 33% of sugar beet growers are covered by a climatic insurance, covering 37% of the national sugar beet area. The increase of the level of uptake of insurances is mainly driven by the risk of variability of yields caused by recent climatic events (e.g., droughts in 2018, 2019 and 2020). However, compared to other crops, the level of uptake is low. In **Germany**, growers do use hail insurance on all major crops. About 80% of German beet producers are using this kind of risk insurance. On the other hand, the multi-risk insurance basically does not exist in practical broad-acre crop production (including sugar beet farming), although it does play a significant role in high-value crops such as vineyards. In **Italy, Netherlands** and **Poland** the level of uptake of supported specific risk management tools among sugar beet growers is very low. For instance, in Italy, despite a steady increase since 2015 (+12% from 2015 to 2019, 479 insured farms), the number of

subsidised insurance contracts covering sugar beet farming is still very limited. In **Spain** the level of uptake of insurance among sugar beet growers is also very low. No official data exist on the level of uptake of insurances among Spanish sugar beet growers; expert estimates deem that approximately 18-20% of sugar beet producers are covered by insurance.

The survey targeting sugar producers also provides useful information about **the diffusion of strategies implemented** by the EU sugar industry to tackle different types of risks. A significant group of respondents (38%) indicated that they implemented geographical diversification strategies in both the quota and post-quota period. In addition, a significant share of respondents (29%) indicated that they implemented these strategies only in the quota period. By contrast, there are no respondents that implemented geographical diversification strategies in the post-quota period only. In other words, the level of uptake of geographical diversification strategies decreased with the transition from the quota to the post-quota period. Finally, about one third of respondents (33%) have implemented diversification strategies neither in the quota period nor in the post-quota period.

As for the **implementation of product/sector diversification strategies** among sugar producers, most respondents (57%) indicated that they implemented product/sector diversification strategies in both the quota and post-quota periods. 24% of respondents implemented these strategies only in the quota period, while 5% implemented them only in the post-quota period, meaning that, despite a high level of uptake of these strategies among EU sugar producers, the pace of the implementation of product/sector diversification strategies decreased in the transition from the quota to the post-quota period. Finally, a relatively small group of respondents (14%) indicated that they have implemented diversification strategies neither in the quota nor in the post-quota period.

As for the implementation of **process or product innovation strategies** (not covered in the survey, but described in detail at § 7.2.3), it emerged that most of the leading EU sugar producers, and diversified ones in particular, have significant R&D expenditure (albeit not necessarily concerning the sugar business unit only, in diversified groups). There is much scarcer information on the implementation of innovations strategies by (non-diversified) medium- and small-sized sugar producers. A few leading sugar producers are/have been also involved in **EU-funded innovation-oriented research projects**, mostly in the framework of the Horizon 2020/Europe programme.

7.4.2 Effectiveness of existing risk management tools

This section discusses the actual effectiveness of the relevant tools considering their current level of uptake in the EU sugar sector. The analysis of the effectiveness of risk management tools from a theoretical standpoint has been made under question 5 (see § 7.3).

Overall, based on the results of the surveys carried out for this study, sectoral stakeholders do not have a favourable opinion on the effectiveness of the existing risk management tools in the sugar sector:

- 59% of the surveyed sugar beet growers' associations and 48% of the surveyed sugar producers consider that the types of implemented/used risk management tools are not adequate to mitigate the main risks affecting the EU sugar sector in the post-quota period;
- 35% of the sugar beet growers' associations and 52% of sugar producers believe that these tools are only partially adequate;
- only 6% of sugar beet growers' associations and none of sugar producers think that they are completely adequate.

This low level of satisfaction can be partly explained by the perception of a relative inadequacy of existing risk management instruments for mitigating yield and price risks:

- a large majority of respondents in the surveys (71% of sugar beet growers' associations as well as sugar producers) consider that the implemented risk management strategies have been only partially successful in preventing/eliminating/limiting the negative variations of sugar beet yields;
- a large majority of growers' associations (65%) believe that these strategies were not successful in preventing/eliminating/limiting the negative variations of sugar beet prices, while slightly more than half of producers (52%) think they were only partially successful in this respect;
- a large majority of sugar producers (62%) estimate that these strategies were only partially successful in preventing/eliminating/limiting the negative variations of sugar prices.

The consulted organisations of sugar beet growers and individual sugar producers shared additional concerns, related to:

- Potential distortions in the EU sugar market due to the availability of voluntary coupled support (VCS) to sugar beet in certain Member States, and to differences among Member States in the authorisation of certain plant protection products. Not surprisingly, sugar beet growers and sugar producers in Member States that grant VCS to sugar beet and that grant emergency authorisations to certain pesticides used in sugar beet cultivation whose use would be banned in the EU are satisfied with these measures, while growers and producers in the other Member States are not.
- The fact that some risks are not at all, or not well covered by the existing risk management tools. These include for instance: increased sugar beet production risks – mainly in terms of increased yield volatility - due to climate change and ban on certain plant protection products; negative consumer perception of new gene editing tools, preventing or slowing down the design and availability of improved sugar beet varieties; long periods of low world sugar prices, falling below the costs of production and forcing growers to shift to other crops and sugar producers to close some processing plants; policy changes at Member State level potentially affecting the return on investments made by sugar beet growers and sugar producers; unfair competition from third countries aggressively subsidising their sugar production and/or exports, against which the EU is believed not to act firmly enough; currency devaluation in competing countries (Brazil in particular) that hampers the competitiveness of EU sugar exports.

It is worth noticing that within the sugar sector there is a strongly different appreciation among sugar beet growers and sugar producers about who bears the major part of the price risks:

- Sugar beets growers' associations generally consider that their negotiating position was significantly weakened in the new EU sugar regime, due in particular to the elimination of the minimum sugar beet price, and think that this has resulted in a more dominant position of sugar producers. The latter emphasise that through their cooperatives, growers have steadily increased their share in sugar beet processing, and now control a substantial part of the EU sugar production capacity (see § 5.2.2).
- Some sugar producers would like to implement more flexible contracts with sugar beet growers, in order to have them bear more of the downward sugar price risks. Growers do not agree, but are favourable to instilling more flexibility in the contracts to give sugar beet producers the possibility to hedge prices for a part of their crop on futures markets, a possibility that is offered to sugar beet growers in the United Kingdom since the 2021/22 campaign.
- Sugar beet growers and sugar producers both agree that they bear the consequences of the increasing market imbalance in the food value chain in favour of ever-bigger and concentrated food retailers and industrial users of sugar. This imbalance results in weak price transmission in the food value chain and rising risks of contract breeching by large sugar buyers.

7.4.3 Effectiveness of risk management with wider use of the risk management tools

The surveys carried out for this study show that a large majority of sugar beet growers' associations (82%) and slightly more than half of sugar producers reckon that an increased level of uptake of risk management tools in the sugar sector would increase the overall effectiveness of risk management. However, opinions on this issue vary depending on the tool.

When asked which specific tools would be more effective if they had a larger uptake, sugar beet growers' associations and sugar producers share the same opinion for some instruments. They agree that risk mitigation would be improved by a wider adoption of crop insurance and increased subsidies for multi-peril insurance, as well as by more state aids (e.g., disaster payments, tax measures, etc.) and temporary derogations for the use of certain production inputs (pesticides in particular) banned at the EU level. They also express the same judgement (although much more strongly among sugar beet producers) on the fact that larger use of inter-branch agreements (i.e., the possibility to collectively negotiate the distribution of added value in the contracts between growers and producers), and an increased level of uptake of the European Commission sugar market observatory (aiming at providing all stakeholders with better market transparency), would not improve the effectiveness of these tools.

Although these results show that improving the uptake of risk management tools would strengthen their effectiveness, they do not imply that stakeholders in the sugar sector would consider that it would be sufficient to mitigate adequately the risks that they face.

Firstly, as previously discussed under question 3 (§ 7.1.1), sugar beet growers and sugar producers emphasise that differences in the way the CAP is implemented and pesticide use is regulated among Member States entail significant distortions in the EU sugar market, and that numerous other risks are not covered by the existing tools.

Secondly, and even more importantly, it should be considered that **there is a thin line, but a real difference, between managing risks and addressing structural weaknesses**. While risk management aims at making economic agents able to absorb temporary shocks through appropriate tools and strategies, including with public support, it cannot remedy a lack of competitiveness due to excessive production costs, a declining market power in the food value chain or other systemic problems. The prolonged crisis that the EU sugar sector has experienced as a result of a long period of low world sugar prices, started right after the transition to the post-quota environment, and coinciding with a bumper sugar beet crop in the first marketing year without quotas, may induce some beet growers and sugar producers to ask for far-reaching policy measures that would go beyond risk management *per se*, and provide them with effective means to maintain their financial viability until the crisis ends or recedes. In this regard, it is worth emphasising the positive contribution of direct payments, including voluntary coupled support, to addressing structural difficulties faced by the sugar beet farming sector in certain Member States, thus increasing the overall resilience of sugar beet growers in those countries.

7.4.4 Incentives/disincentives to a higher level of uptake of risk management tools

There are several reasons why EU sugar beet growers and/or EU sugar producers generally make scarce use of the available risk management tools.

Regarding private instruments, the uptake **of hail insurance** by sugar beet growers is generally considered appropriate and is not cited as a problem by the survey' respondents.

Few growers use **futures contracts and options** because sugar beet supply contracts with sugar producers usually do not allow them to hedge part of their crop in order to take advantage of the volatility of world sugar prices, although some sugar companies

have recently started, or are considering offering this possibility. As demanded by an increasing number or large sugar users, i.e., leading food manufacturers, sugar producers have indexed more of their contracts to sugar futures markets since the end of the sugar quotas, but a significant share of small sugar producers still do not hedge their price risk on these markets, for different reasons (lack of know-how, contractual arrangements with sugar users, perception that the dynamics in futures markets do not reflect correctly those in their local market, etc.).

Farm-level **tax deduction for precautionary savings**, when they exist, are limited in scope and can be useful only if sugar beet growers had the capacity to save money in previous years.

Concerning the EU risk management schemes supported by the CAP, the main obstacles to larger uptake of **multi-peril yield insurance** are the perception of high premium prices and the fact that insurance does not cover pest damage. Premium prices often appear too high, in spite of subsidies, due to the high loss threshold (30%) triggering the payment of insurance indemnities, imposed by EU regulations, and the deductible borne by farmers. The Omnibus regulation in 2018 allowed Member States to lower the loss threshold and increase subsidies to crop insurance, but few of them, if any, have implemented these measures. In fact, their effectiveness remains to be seen, because lowering the loss threshold would lead to an increase in the risk borne by insurers, and a subsequent rise in insurance premiums that might not be fully offset by larger subsidies. Other impediments to increased adoption of multi-peril yield insurance in some Member States are the preference for financing direct payments rather than subsidising crop insurance, the ceiling that may be put by the government on the amount of insurance subsidies per farm (which penalises large sugar beet growers), and the granting of direct compensations in case of natural disasters (which disincentives the uptake of insurance). Finally, in the Member States where it has been implemented, index-based insurance has garnered growers' attention, due to its lower premium price compared to indemnity-based multi-peril yield insurance, but it has also shown its limitations due to the basis risk it entails for farmers whose beet yield falls beyond the reference area yield used for triggering the indemnities.

Sugar beet growers' interest in the **Income Stabilisation Tool** has been delayed by the fact that no dedicated (i.e., no sectoral) IST was allowed before the Omnibus regulation. The main obstacles to the development of the IST are to have all stakeholders (sugar beet growers and sugar producers) and the government agree on the levels of their financial contribution, and the doubts expressed by some operators that this instrument will be cost effective.

As for the recourse to other **tools foreseen in the CMO Regulation to tackle difficult market situations** (i.e.: aid for private storage; measures against market disturbance; measures to resolve specific problems; derogation from Article 101(1) TFEU under art. 222; the safeguard measures under art. 194 and 195), they arouse little (if any) interest, in practical terms, from stakeholders in the sugar sector. Sugar producers generally consider that publicly funded **private storage** is bound to be ineffective in prolonged periods of low sugar prices and difficult to use in the absence of a clearly defined and predictable triggering mechanism. Both sugar producers and sugar beet growers stress that private storage only shifts excess production to the following campaign, if sugar prices do not pick up, and that stored sugar volumes weigh in any case on market fundamentals, thus depressing sugar prices.

Sugar beet growers and sugar producers' opinions vary on the activation of Article 222 of the CMO Regulation, granting a **derogation to EU competition law**. Some consider it could be interesting in principle, while others reckon it is unfeasible because it is too complex. The efficiency of this tool is questioned as all sugar producers would not be obliged to reduce sugar production in case of oversupply, which would open the way to free riders. At the least, according to sectoral stakeholders, it would be necessary to clarify the mechanisms that would trigger the derogation to competition law in order to address market crises, the actions that sugar operators could undertake if this

derogation is granted, and the public support they could receive to implement these actions.

With regard to the lack of application of the set of market management instruments offered by the CMO Regulation in the sugar sector in the post-quota period, there are also other key elements that should be considered:

- After a careful and detailed analysis, the High Level Group on sugar (HLG, 2019) considered those measures "mismatched to deal with the specific market situation experienced during the post-quota period"; nevertheless, it did not exclude that those market measures could be used in the future[111].More precisely, an important number of Group's members agreed that to intervene during the transition period, when market fundamentals are changing, risks interfering with the adaptation process in an undesirable way.
- **Aid for private storage** is used to reduce temporarily the impact of short-term oversupply during a difficult market situation. However, apart from the first marketing year without quotas (2017/18), the EU sugar production continued to decline, leading to tighter stock levels. Under these circumstances, the activation of this measure would have either not been picked up by operators, or could compromise sugar supply.
- The organisational structure for an effective implementation of **Article 222** is currently not in place in the sugar sector, as it would require the participation of the large majority of both beet growers and sugar producers; however, the current number of recognised Producer Organisations (POs) or Inter-branch Organisations (IBOs) is limited in most sugar producing Member States.
- The exclusion of collective bargaining or price-fixing activities in the context of the supply management measure under **Article 222** is needed to ensure the respect of the competition rules in force.
- Despite criticism from sectoral stakeholders on the lack of triggering mechanisms, **aid for private storage and other market measures** were implemented for other agricultural sectors (i.e., milk, livestock and olive oil[112]) over the years, thus demonstrating – whenever the conditions for their use are met - their effectiveness in addressing crisis situations faced by EU agri-food sectors.
- Different amendments proposed in the context of the recently finalised CAP negotiations, for example on more clear triggering mechanisms (i.e., early warning systems based on thresholds) and the introduction of a mandatory production reduction scheme in case of oversupply situations (to address the risk of "free riding") were not retained in the final text of the new CMO Regulation, because they are considered not appropriate to reveal the existence of a crisis. Furthermore, such mechanisms may raise expectations in business operators, and thus influence the behaviour of market actors. This would not be in line with the market orientation of the CAP. It is also worth mentioning in this context the recommendations made by the European Court of Auditors (ECA) about introducing such triggering mechanisms for the activation of exceptional

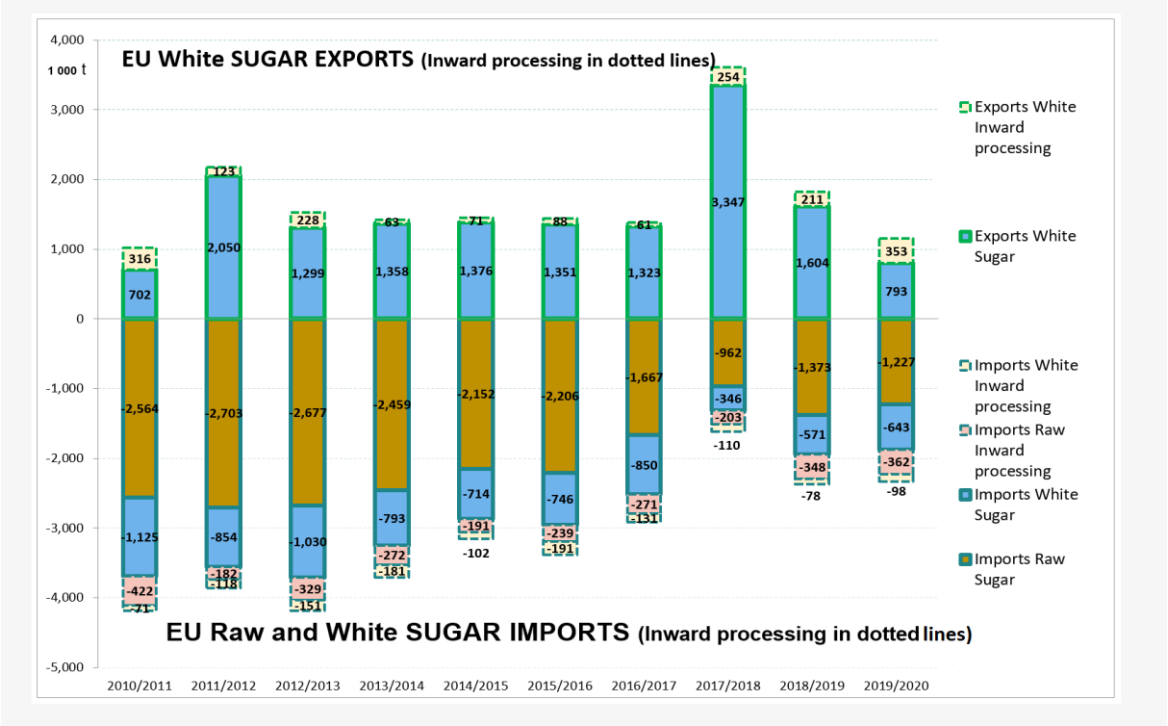
[111] In this context, the Group requested the European Commission to further examine the possibilities for other market measures, in particular those offered by Article 222 of the CMO Regulation.

[112] Milk sector/livestock sector: Commission Implementing Regulations (EU) No 947/2014 and (EU) No 948/2014; Commission Implementing Regulations (EU) 2020/597 and (EU) 2020/598; Commission Implementing Regulations (EU) 2016/559 and 2020/599; Commission Implementing Regulations (EU) 2016/1612 and 2016/1613. Olive oil sector: Commission Implementing Regulations (EU) 2019/1984 and (EU) 2019/2187; Commission Implementing Regulations (EU) 2020/126 and (EU) 2020/278.

measures in other sectors (ECA, 2019 and 2021), and the European Commission replies[113].

With regard to the lack of application of the **safeguard measures** under Article 194 of the CMO Regulation, it should be considered that, except for the first marketing year without quotas (2017/18), the sum of EU sugar consumption and exports was above the domestic production: therefore, the difference had to be covered by imports. Also, in the last three marketing years EU sugar imports have been declining. As for the lack of application of the **suspension of processing and inward processing arrangements** under Article 195 of the CMO Regulation, the analysis of the evolution of sugar imports/exports under these arrangements shown in Figure 7.10 shows that in the first three years after the end of quotas, sugar imports under inward processing have remained at fairly similar levels compared to the last two years of the quota period, while the exports have increased quite significantly over the same period.

Figure 7.10 – Evolution of EU sugar exports and imports, including inward processing (2010/11 to 2019/20)



Source: European Commission, DG Agriculture (elaboration on Eurostat data)

[113] In ECA Special Report No 23/2019 *Farmers' income stabilisation: comprehensive set of tools, but low uptake of instruments and overcompensation need to be tackled*, recommendation 3 "Clarify the criteria for triggering and ending exceptional measures and their combination with other instruments" required the Commission to define "objective market and economic parameters and criteria for deciding when a sufficient basis exists for considering the use of exceptional measures. In its reply, the Commission stated that "setting objective market parameters and criteria ex ante would contradict the essence of the measure by impairing its aim: addressing catastrophic risks, usually sudden and unforeseeable, that cannot be addressed by farmers and public authorities in the scope of risk management strategies". In ECA Special Report No 11/2021 *Exceptional support for EU milk producers in 2014–2016 - Potential to improve future efficiency*, recommendation 2 "Improving budgeting and targeting" required the Commission to "establish thresholds for analysing potentially significant market disturbances". In its reply, the Commission stated that "market disturbances are of a multidimensional and unforeseen nature, making it impossible and undesirable to predefine operational thresholds that would confine any eventual course of action within a predetermined framework. Market disturbances have to be addressed on an ad-hoc basis and with a holistic approach".

Finally, two points need to be mentioned concerning the limited use of risk management tools in the EU sugar sector**. The sector has operated for a long time under the strong protection of the former sugar regime**, which did not encourage stakeholders to look for solutions to tackle price volatility. It obviously takes a certain amount of time and a "cultural change" to adapt to the new policy environment. In addition, the risk of cultivating sugar beets was limited, until recently, in most of the traditional sugar beet farming regions in the EU. Climate change, leading to larger yield variations, coupled with declining EU direct payments, are expected to increase sugar beet growers' interest for yield insurance and other risk management tools in future years.

7.4.5 Key findings

The analysis (mostly based on the results of surveys targeted at sugar beet growers' associations and sugar producers) found that the **uptake of certain risk management tools significantly increased with the transition to the post-quota period**. Tools with a wider uptake among EU sugar producers after the end of quotas include sugar futures (mainly used for the application of hedging techniques), saving accounts and the use of the European Commission Sugar Market Observatory. The post-quota period saw an expanded use of insurance tools among sugar beet growers. Both sugar beet growers and sugar producers made wider recourse to state aids and benefitted from more extensive temporary derogations for the use of certain production inputs (pesticides in particular) banned at EU level. By contrast, aid for private storage was not activated in the sugar sector in the post-quota period. In this regard, it should be considered that the final report of the High Level Group on sugar (HLG, 2019) concluded that the available regular market instruments (such as the aid for private storage) were mismatched to deal with the specific market situation experienced during the transition period, when fundamentals are changing, as they would risk interfering with the adaptation process in an undesirable way, but it did not exclude that those measures could be used in the future[114].The analysis also revealed a **preference of sugar producers** for the implementation of **product/sector diversification** in the post-quota period (compared to geographical diversification strategies).

The assessment revealed diverging views between sugar beet growers and sugar producers about the introduction of **increased flexibility in sugar beet supply contracts**[115], with particular regard to the related pricing arrangements, with a view to coping with more volatile sugar price dynamics.

Stakeholder consultation revealed rather **negative perceptions of beet growers and sugar producers** about the **adequacy of risk management tools** to mitigate the main risks affecting the sugar sector in the post-quota period. A much **more positive perception by beet growers** (compared to sugar producers) about the **overall effectiveness of a larger uptake of risk management tools in the future** also emerged.

The uptake of certain tools (especially multi-peril yield insurance and the income stabilisation tool – IST) was found to be **limited by specific disincentives/barriers**: some of these are related to specific context factors or to features of potential users, other to drawbacks in the implementation mechanisms of the tools themselves.

The **market managements tools in the CMO Regulation** (aid to for private storage; measures against market disturbance; measures to resolve specific problems;

[114] In this context, the Group requested the European Commission to further examine the possibilities for other market measures, in particular those offered by Article 222 of the CMO Regulation.

[115] Even though beet supply contracts are not – strictly speaking – risk management tools, they do perform some functions / have significant implications in terms of management of production and market risks (see Question 2, § 6.2.7).

derogation from Article 101(1) TFEU under art. 222; the safeguard measures under art. 194 and 195) saw **no application in the sugar sector in the post quota period**. Several sectoral stakeholders showed little interest for those measures, at least in their current form, mainly due to what they identified as inherent weaknesses in their design and implementation mechanisms. However, the following elements should also be considered in that regard.

After a careful and detailed analysis, the High Level Group on sugar (HLG, 2019) considered those measures "mismatched to deal with the specific market situation experienced during the post-quota period"; an important number of Group's members agreed that to intervene during the transition period, when market fundamentals are changing, risks interfering with the adaptation process in an undesirable way.

Aid for private storage is used to reduce temporarily the impact of short-term oversupply during a difficult market situation. However, excluding the first marketing year without quotas (2017/18), the EU sugar production continued to decline, leading to tighter stock levels. Under these circumstances, the activation of this measure would have either not been picked up by operators, or could compromise sugar supply.

The organisational structure for an effective implementation of **Article 222** is currently not in place in the sugar sector: the current number of recognised Producer Organisations (POs) or Inter-branch Organisations (IBOs) is limited in most sugar producing Member States. Besides that, the exclusion of collective bargaining or price-fixing activities in the context of the supply management measure under Article 222 is needed to ensure the respect of the competition rules in force.

Despite criticism from sectoral stakeholders on the lack of triggering mechanisms, **aid for private storage and other market measures** were implemented for other agricultural sectors (i.e., milk, livestock and olive oil[116]) over the years, thus demonstrating –whenever the conditions for their use are met - their effectiveness in addressing crisis situations faced by EU agri-food sectors.

Different amendments proposed in the context of the recently finalised CAP negotiations, for example on more clear triggering mechanisms[117] and the introduction of a mandatory production reduction scheme in case of oversupply situations, were not retained in the final text of the new CMO Regulation, because they are considered not appropriate to reveal the existence of a crisis. Such mechanisms may also raise expectations in business operators, and thus influence the behaviour of market actors: this would not be in line with the market orientation of the CAP.

Safeguard measures under Article 194 of the CMO Regulation were not applied because - except for the first marketing year without quotas (2017/18) - the sum of EU sugar consumption and exports was above the domestic production, with the difference to be covered by imports (which have been declining over the last three marketing years). There was no **suspension of processing and inward processing arrangements** under Article 195 of the CMO Regulation because in the first three years after the end of quotas sugar imports under inward processing have remained at fairly similar levels compared to the last two years of the quota period, while the exports have increased quite significantly over the same period.

[116] Milk sector/livestock sector: Commission Implementing Regulations (EU) No 947/2014 and (EU) No 948/2014; Commission Implementing Regulations (EU) 2020/597 and (EU) 2020/598; Commission Implementing Regulations (EU) 2016/559 and 2020/599; Commission Implementing Regulations (EU) 2016/1612 and 2016/1613. Olive oil sector: Commission Implementing Regulations (EU) 2019/1984 and (EU) 2019/2187; Commission Implementing Regulations (EU) 2020/126 and (EU) 2020/278.

[117] It is also worth noticing that the European Commission did not accept recommendations by the European Court of Auditors (ECA) about introducing triggering mechanisms for the activation of exceptional measures in other sectors (see § 7.4.4).

7.5 Q7: To what extent the overall risk management strategies/approaches of the sector's main actors address effectively the existing and anticipated risks?

Definition of key terms

"Overall risk management": combination of actions implemented by a private or public body, aimed at preventing, eliminating or limiting the effects of all kinds of risks, after they have been identified and rationally analysed.

"Strategies/ approaches": plans to achieve one or more goals. The risk management strategies are, most of the times, composed by combinations of several risk management tools.

"Address effectively the risks": capacity of the risk management strategies to limit the effects of anticipated risks when they actually occur.

"Existing risks": risks that have already occurred.

"Anticipated risks": risks that may occur in the future.

Understanding of the question

The analysis of the effectiveness of the overall risk management strategies/approaches in addressing effectively the existing and anticipated risks for the EU sugar sector is performed for two separate groups of **main actors**:

- Leading sugar producers – including full-time refiners – operating in the EU.
- Sugar beet producers - organised in associations at national and/or regional/local level – currently implementing (or willing to implement) collective actions aimed at defending farm income.

The analysis of effectiveness covers: i) practical experience of implementing strategies against the existing risks (*historical perspective* → *ex-post assessment*); and, ii) the hypothetical effects of the implementation of strategies aimed at eliminating or mitigating anticipated risks, i.e., risks that have not yet occurred in the past, but which may occur in the future (*theoretical perspective* → *ex-ante assessment*). The ex-post assessment is mainly based on the quantitative and qualitative evidence emerged from the analysis made under questions 5 and 6 (§ 7.3 and 7.4, respectively), whereas the ex-ante assessment is mainly based on the perceptions of stakeholders and, where possible, the simulation of the effects of planned actions in case of difficult situations. For these reasons, stakeholders' consultation plays an important role in collecting evidence and insights for answering question 7, mainly focusing on: risk management strategies; expected effects of those strategies; evidence on the actual effects of those strategies.

7.5.1 Effectiveness of risk management strategies/approaches in the EU sugar sector

7.5.1.1 Historical perspective (ex-post assessment)

Overall, the effectiveness of risk management strategies applied in the EU sugar sector to mitigate the risks, or the impacts of the risks, faced by operators in the post-quota environment has not been satisfactory.

Sugar beet growers have generally not implemented a global strategy targeted both at production and price risks, which has left them exposed to vagaries of the climate and volatility of the market. Use has remained low, on average, for each existing risk management tool and for combinations of tools. On the production side, the uptake of multi-peril crop insurance has increased little, and few mutual funds against pest and disease have been set up, whereas regulations on the utilisation of certain plant protection products, in particular neonicotinoids, have become stricter. Concerning price and market risks, sugar beet supply contracts with sugar producers have not allowed growers to hedge on futures markets, and no sectoral Income Stabilisation Tool has been implemented. Some Member States have granted tax incentives to encourage

farmers to build up precautionary savings, but it is hard to assess the impact of this measure for sugar beet growers.

Overall, the unfavourable dynamics of sugar beet prices and sugar beet farming profitability in the post-quota period, even in the most cost-efficient Member States (see § 5.5.1; the issue of cuts in beet prices is discussed further under question 10, § 8.1.1), suggest that the effects of the prolonged depression of EU sugar prices have been too severe a test for the effectiveness of the collective actions aimed at defending farm income implemented by the organisations of sugar beet growers. Inter-branch agreements and sugar beet supply contracts, which are generally effective in addressing price risks for growers in ordinary conditions, were of limited help in addressing the remarkable decline in sugar beet prices experienced during the crisis, simply because they are not designed for such purpose. The assessment also revealed diverging views between sugar beet growers and sugar producers on the implications of introducing increasing flexibility in sugar beet supply contracts to cope with more volatile sugar beet yields and sugar prices.

Sugar producers have somewhat increased the use of futures markets, partly in response to the needs of their customers. They have invested, sometimes heavily, to improve efficiency at the different stages of the supply chain; they also further rationalised their production capacity, pursuing scale economies at plant level and closing the less cost-efficient processing plants. The last wave of restructuring of the EU sugar sector, which started several years before the end of quotas, with the 2006 reform of the EU sugar regime, saw several EU sugar producers investing to improve their capacity to cope with the increased competitive pressure from the transition to the post-quota environment, which was originally foreseen for 2015. All these efforts have significantly increased the debt load for some sugar companies.

The analysis of the profitability of sugar production (see § 5.5) revealed that the operators that diversified into other products and sectors have been better positioned to stand the sugar crisis, and have fared better through the prolonged depression of EU sugar prices than the producers that were heavily focused on the core business of sugar production, with limited or no diversification (except for a limited geographical diversification into cane or beet sugar production in third countries, which could provide little help, since also the international sugar prices were depressed).

As for the contribution of process and product innovation strategies implemented in the sector to addressing effectively the existing and anticipated risks, the available evidence suggests that innovative sugar beet farming and processing techniques have helped significantly in addressing production risks; innovative value-adding processes using sugar beets, sugar, the related co-products and residues as feedstock have provided sources of additional revenue streams to cope with a more volatile sugar market. Some of the most recent innovations (especially those concerning the so-called "biobased value-adding processes") also appear to be promising; however, they have not yet completely proved their effectiveness in practice, and several sectoral stakeholders identified some constraints to their wide implementation, the most serious one being the need of substantial investments (especially for the transition from pilot plant scale to commercial production) against rather uncertain returns. In particular, price premia for innovative "niche" products can shrink if several producers enter the related markets. In general, the main downside of process and product innovations is that they can expose producers to risks that they were previously not facing.

7.5.1.2 Theoretical perspective (ex-ante assessment)

The foreseen simulation of the hypothetical effects of the implementation of strategies aimed at eliminating or mitigating anticipated risks for the EU sugar sector, i.e., risks that have not yet occurred in the past, but which may occur in the future, could not be performed according to the intended methodology because the consulted sugar producers were unwilling to disclose any kind of insight into their future strategies, which they (understandably) deemed an extremely sensitive topic. Nevertheless, some

theoretical, forward-looking considerations on the future implementation of the strategies that have so far emerged as the most relevant ones for the EU sugar sector will be developed in the next section.

7.5.2 Replicability of risk management strategies under different conditions

Generally speaking, the probability and severity of a number of highly relevant risks faced by stakeholders in the EU sugar sector have strongly increased since the end of the quota regime, and will continue to increase in future years. This will pose new challenges to operators to adapt their risk management strategies.

The elimination of EU minimum prices for sugar beets (and, several years ago, for sugar), coupled with the removal of sugar export subsidies, has exposed the operators to the volatility of the world market, and reinforced their needs to improve competitiveness and enhance resilience. In the near/middle term, sugar beet growers and sugar producers will have to cope with additional constraints due to:

- the impacts of climate change, leading to more frequent, high-intensity drought and precipitation, and rising crop vulnerability to pest and disease;
- policy changes linked to the implementation of the new European Green Deal, aiming at carbon neutrality by 2050 and better protection of biodiversity;
- stronger consumer dietary concerns about excessive sugar intake, possibly exacerbated by Government taxes on sodas and other sugar-containing products;
- limited potential increase in the use of ethanol derived from sugar beets, because of a likely reduction in fuel use (due to a shift to electric cars) and an EU ceiling on the utilisation of first-generation biofuels (to avoid feed-food competition);
- new bilateral trade agreements expected with third countries, such as the one pending with Mercosur, potentially resulting in larger imports of sugar, sugar-containing products and ethanol.

The implications of this new context for sugar stakeholders are multi-fold, and will have a strong influence on their capacity to replicate the risk management strategies on which they have relied so far also in the future.

Sugar beet growers will need wider and better risk management strategies, while the cost of implementing these strategies will rise due to the amplification of yield and price risks. Premiums paid for crop insurance and participation in mutual funds, including IST, are likely to go up. In addition, farmers may have to change their production systems to cope with stronger regulations on the use of fertilisers and pesticides, and diversify their crop rotations to reduce production and market risks, with potential decrease in sugar beet cultivation.

Sugar producers will have less leeway in improving their competitiveness through restructuring, as the technical concentration of the sector is already high. With the exception of few Member States (France, Germany and Poland) where the still significant number of processing plants, and their geographical distribution, may still allow some rationalisation without a significant reduction of production capacity, the very limited number of plants in operation in most of the remaining sugar producing Member States, together with the distance between those factories, will not allow to pursue further scale economies at plant level without some downsizing of the sector. Sugar beets in the procurement areas of the closed plants would have to be transported for too long distances to the remaining operational plants, and this is likely to translate into a reduction of domestic sugar production in those Member States. In some Member States (Finland, Greece, Hungary, Lithuania, Sweden, and recently also Croatia) there is just one beet sugar factory still in operation: should the conditions for its operation cease, raw cane sugar refining or reliance on white sugar imports would be the only available options.

As for further concentration in the EU sugar sector in terms of mergers and acquisitions, the size and the very limited number of sugar producers in activity in each Member State would surely raise serious anti-trust concerns in the involved national competition authorities in case of further domestic consolidation. Since the leading beet sugar producers operate in multiple Member States, also the room for trans-national mergers and acquisitions appears to be decreasing (it should be noted that the last significant M&A activity in the EU sugar sector dates back to 2013).

As for further geographical and/or product/sector diversification by EU sugar producers, this will probably be constrained – in the short-to-medium term at least – by the limited financial resources available to EU sugar producers after the last, extremely difficult years. An option that might be explored to circumvent the issue are partnerships, alliances and joint-ventures, which may allow EU sugar producers to take advantage of rising opportunities in emerging sugar economies and/or in growing market segments and sectors, related or not to sugar production.

The direction set by the new European Green Deal indicates that investments in technology to reduce fossil energy use will be of key importance for the sector, together with the diversification into higher value products obtained from innovative biobased processes using the co-products and residues of sugar production as feedstock.

Last but not least, the implementation of new financial tools to better manage sugar price and market risks may provide a competitive advantage.

7.5.3 Key findings

Overall, the effectiveness of risk management strategies applied in the EU sugar sector to mitigate the risks, or the impacts of the risks, faced by operators in the post-quota environment has not been satisfactory.

Sugar beet growers have generally not implemented a comprehensive strategy targeted both at production and price risks, which has left them exposed to vagaries of the climate and volatility of the market. The unfavourable dynamics of sugar beet farming profitability after the end of the former EU sugar regime suggest that the effects of the prolonged depression of EU sugar prices - which occurred in the context of low sugar prices also at world level - have been too severe a test for the effectiveness of the collective actions aimed at defending farm income promoted by sugar beet growers' organisations. Inter-branch agreements and sugar beet supply contracts were of limited help in addressing the remarkable decline in sugar beet prices experienced during the crisis, simply because they are not designed for such purpose. Furthermore, sugar beet growers and sugar producers were found to have diverging views on the implications of introducing increasing flexibility in sugar beet supply contracts to cope with more volatile sugar beet yields and sugar prices.

Sugar producers have somewhat increased the use of futures markets, partly in response to the needs of their customers. They have invested to improve efficiency at the different stages of the supply chain, and have further rationalised their production capacity, pursuing scale economies at plant level and closing the higher-cost plants. Operators that diversified into other products and sectors have fared better than those who remained heavily focused on the core business of sugar production. However, these strategies have their own limitations, as their implementation increases the debt load of sugar companies, and may have unfavourable implications for sugar beet growers.

The contribution of process and product innovation strategies implemented in the sector to addressing effectively the existing and anticipated risks was found to be significant, with regard to both production and market risks. However, some of the most recent innovations (especially the so-called "biobased value-adding processes"), albeit showing a significant potential, have not yet completely proved their effectiveness in practice,

and the need of substantial investments against rather uncertain returns[118] may prevent their wide implementation in the sector. In general, the main downside of innovation strategies is that they can expose producers to risks that they were previously not facing.

The shortcomings of risk management strategies implemented in the sugar sector are all the more problematic as sugar beet growers and sugar producers will face **new challenges** in the near and middle terms. These relate in particular to the impact of climate change on sugar beet cultivation, new constraints on farming and industry imposed by the EU Green Deal, stronger consumer dietary concerns about excessive sugar intake, potential decrease in ethanol use as fuel due to a shift to electric cars, and new bilateral trade agreements potentially leading to larger imports of sugar, sugar-containing products and ethanol. The amplification of yield and price risks resulting from climate change and stricter farm input regulation will increase the cost of sugar beet growers' participation in crop insurance and mutual funds. As for sugar producers, they may have less leeway in improving their competitiveness through restructuring and pursuit of further economies of scale, since technical concentration in the sector is already high. Investments in technology to reduce fossil energy use will be of key importance, together with the diversification into higher value products obtained from innovative bio-based processes using the co-products and residues of sugar production as feedstock.

The end of the EU quota regime has led to diverging interests between sugar beet growers and sugar producers. Finding common ground through new contractual arrangements between all stakeholders, as well as making risk management a top priority, will be increasingly needed for the EU sugar production and marketing system to survive. The challenge is also for providers of risk management tools and solutions, to find new instruments and strategies appropriate to the changing business environment, and for the EU and Member States, to encourage the use of well-designed risk management tools.

Finally, improving the ability of sugar beet growers and sugar producers to cope with existing and future risks cannot be addressed without taking into account the market power of the sugar sector relative to other sectors in the food value chain. In most Member States, the high concentration of the distribution sector, in particular, considerably limits the bargaining power of food processors and, in turn, sugar producers and sugar beet growers. In this respect, the effectiveness of EU and Member States regulations aiming at improving risk management strategies in the sugar sector partly depends on the effectiveness of EU and Member States regulations aiming at balancing power across the food value chains.

[118] In particular, price premia for innovative "niche" products can shrink if several producers enter the related markets.

7.6 Q8: To what extent the risk management strategies and specific tools implemented by beet growers and sugar producers increase the resilience of the EU sugar sector, and notably the capacity of beet growers to withstand substantial income reduction (or turnover reduction, in case of sugar producers) in the event of cumulative external shocks and adverse market evolutions?

Definition of key terms

"Resilience of the EU sugar sector": see the definition provided at § 6.1.

"Substantial income/turnover reduction in the event of cumulative external shocks and adverse market evolutions": For the purposes of the fact-based assessment (as described in the following section), the conditions defining such a situation in the post-quota period are those experienced in the months when domestic sugar prices in the EU reached their lowest levels due to a combination of oversupply on the EU sugar market and prolonged depression of world sugar prices, i.e. basically over the 2017/18 and 2018/19 marketing years[119].

Understanding of the question

The overall approach to answering question 8 is based on two interlinked assessments.

The **theoretical assessment** aims at evaluating: i) whether the **intended objectives** of the risk management strategies/tools explicitly pursue, or can anyway contribute to, increased resilience to cumulative external shocks and adverse market evolutions, especially in terms of addressing substantial income/turnover reduction; ii) whether the **functioning mechanisms** of those strategies/tools are designed in such a way to ensure – at least from a theoretical standpoint – effectiveness in terms of increased resilience to cumulative external shocks and adverse market evolutions, especially in terms of addressing substantial income/turnover reduction. The theoretical assessment is mostly based on a critical review of the findings of question 2 (§ 6.2), focusing on organisational arrangements and contractual relations between the main actors in the sugar supply chain, and of question 4 (§ 7.2), focusing on the risk management strategies and tools available to the EU sugar sector.

The **fact-based assessment** focuses on the concrete results achieved by the risk management strategies and tools actually implemented by EU sugar beet growers and sugar producers after the end of quotas, in particular in the period when prices on the EU sugar market were at their lowest levels, i.e., over the 2017/18 and 2018/19 marketing years. Practical effectiveness is assessed mainly in terms of capacity of offsetting (wholly or in part) the adverse effects of depressed sugar prices on sugar beet growers' income and/or on the turnover of sugar producers. The fact-based assessment consists in a critical review of the findings from: question 5 (§ 7.3), for what concerns the strengths and weaknesses of each relevant risk management strategy/tool; question 6 (§ 7.4), for what concerns the actual level of uptake of each relevant risk management strategy/tool, and whether that level is sufficient to effectively address the relevant risks; and, question 7 (§ 7.5), providing an overall assessment of the actual effectiveness of each relevant risk management strategy/tool, or of the most widespread combinations of those strategies/tools.

The results of the theoretical and fact-based assessments explained above are critically reviewed in order to draw a **synthetic judgment on the overall effectiveness** of the relevant risk management strategies and tools in increasing the resilience of the EU sugar sector in terms of increased capacity of beet growers or sugar producers to withstand substantial income or turnover reductions in the event of cumulative external shocks and adverse market evolutions.

[119] In the 2017/18 marketing year, EU sugar production reached its peak since the 2006 reform of the sugar regime, surpassing the 21 million tonnes mark, and the EU recorded an unprecedented net sugar export of over 2 million tonnes; world white sugar price (ICE) was on average lower than 320 Euros/tonne in the 2017/18 and 2018/19 marketing years, down from nearly 430 Euros/tonne in the 2016/17 marketing year.

7.6.1 Theoretical assessment

Relevant risk management strategies/tools for sugar beet growers

As a starting point, it is essential to consider that the last reform of the EU sugar regime took away what had been, for decades, an essential pillar in the safeguard of the beet growers' income: the minimum price of sugar beets. This implies that there is **no floor anymore in the bargaining/definition of sugar beet prices**: the only limit to beet price reductions in case of adverse market evolutions is the need to grant attractive enough prices to farmers, to prevent their shift to alternative crops and, therefore, potential difficulties in securing an adequate supply of beets to processing plants.

The critical review of the **findings of question 2** (see § 6.2) allowed to identify two strategies/tools that may – in theory at least – prevent the adverse effects on sugar beet growers' income of adverse market evolutions, or at least mitigate those effects:

1. **Multi-annual** inter-branch agreements, sugar beet supply contracts or arrangements within sugar companies controlled by growers (see § 6.2.1), upon the condition that they grant a **fixed price covering beet farming costs and ensuring a sufficient margin to growers for the entire duration** of the agreement/contract/arrangement, **without the possibility of price reductions**. Sugar beet pricing formulas allowing some form of hedging based on sugar futures may also be of some interest, but their actual effectiveness in prolonged periods of depressed sugar prices is questionable, since hedging techniques are designed to address price volatility, not price depression.
2. **Control of the processing stage by sugar beet growers** (downstream vertical integration), through membership in cooperative sugar companies or other forms of control on sugar companies (see § 6.2.2), with a view to **benefitting from any effective strategies** that the companies may implement to withstand substantial turnover reductions in case of adverse market evolutions (see below), in the form of **satisfactory prices for sugar beets** and/or of **additional revenues** deriving from the diversified business activities of those companies. In this regard, it is important to consider that in the case of **multinational groups controlled by growers**, a number of subsidiaries operating in Member States other than the one where the parent company is based may have no participation whatsoever of the local sugar beet growers. The aforementioned benefits would hence be **directly reaped exclusively by the growers that control the parent company**; growers in other Member States could only hope in indirect benefits, mainly in the form of satisfactory sugar beet prices thanks to the stronger resilience of the multinational group as a whole.

The critical review of the **findings of question 4** (see § 7.2) allowed to identify a number of additional strategies/tools that explicitly pursue by design, or can anyway contribute to, address the adverse effects on growers' income of adverse market evolutions:

3. The **income stabilisation tool (IST)**, as provided under Article 39 of Regulation (EU) No. 1305/2013. This tool is specifically designed to manage severe drops in farmers' income.
4. **Saving accounts**: it should be noted that these basic risk management tools are generally aimed at providing on-farm protection against normal risks / shallow losses; in order to help sugar beet growers to withstand severe income losses, the extent of such accounts/funds would have to be substantial.
5. **State aids**, upon the condition that the intensity of whichever support granted to sugar beet growers is adequate to compensate, at least for a significant part, the reduction in income caused by the adverse market evolutions.
6. CMO emergency measures, and in particular the **derogation from Article 101(1) TFEU provided for under Article 222 of the CMO Regulation**.

Relevant risk management strategies/tools for sugar producers

In order to prevent the adverse effects on the turnover of sugar producers from adverse market evolutions, or at least to mitigate those effects, the relevant strategies/tools should to contribute to:

1. **Keeping production costs**, and in particular raw material procurement costs (for sugar beets or raw cane sugar), **under control** over the period of depressed sugar prices.
2. **Maintaining sugar prices close to pre-crisis levels**, or at least above the levels that would be reached during the crisis period in case of no action.
3. **Improving the overall economic sustainability** of the affected producers by providing **additional revenue streams** that cannot be affected (or at least that are less affected) by a prolonged depression of sugar prices.

The critical review of the **findings of question 2** (see § 6.2) allowed to identify some strategies/tools that may – in theory at least – contribute to achieving the above objectives.

The previously discussed **multi-annual** inter-branch agreements, sugar beet supply contracts or arrangements within sugar companies controlled by the growers (see § 6.2.1), as well as the **control of the processing stage by sugar beet growers** (downstream vertical integration; see § 6.2.2) should be mainly considered here for their **potential benefits in terms of more certain, stable and cost-effective raw material procurement** (also thanks to the reduction of transaction costs). However, it should be considered that in all the cases where sugar beet growers exert no control on the processing stage, the interests of growers and beet sugar producers in terms of setting sugar beet prices over a prolonged period of depressed sugar prices would clearly be **conflicting**. That said, sugar producers are clearly aware that any reduction in sugar beet prices cannot be pushed beyond a limit that would trigger massive switching to other crops by farmers, and hence difficulties in supplying adequate volumes of beets to processing plants, since this would have serious negative implications: sub-optimal utilisation of processing capacity, higher processing costs, potential inactivity of plants that lack a sufficient sugar beet supply, and potential reduction in sugar output that, in combination with depressed sugar prices, would finally result in further deterioration of the overall economic sustainability of the companies.

In the specific case of **raw cane sugar refiners**, **long-term arrangements for the supply of raw cane sugar** (see § 6.2.3) at a price that allows a satisfactory refining margin also when refined sugar prices are depressed, and/or **vertical upstream integration towards raw cane sugar production** (also thanks to the reduction of transaction costs), can theoretically contribute to keeping production costs, and in particular raw material procurement costs, under control over the price crisis period.

On the product marketing side, **multi-annual sugar supply contracts with customers** (see § 6.2.6) may provide some support (as well as welcome stability), but only upon the condition that they grant a **fixed price covering production costs and ensuring a sufficient margin to producers for the entire duration** of the contract, **without the possibility of price reductions**. Similar to what already noted for sugar beet growers, sugar pricing formulas allowing some form of hedging based on sugar futures may also be of some interest, but their actual effectiveness in prolonged periods of depressed sugar prices is questionable, since hedging techniques are designed to address price volatility, not price depression.

The critical review of the **findings of question 4** (see § 7.2) allowed to identify a number of additional strategies/tools that explicitly pursue by design, or can anyway contribute to, address the adverse effects on the turnover and the overall economic sustainability of sugar producers of adverse market evolutions, through the three mechanisms defined above (cost reduction, support to sugar prices, additional revenue streams):

1. **Reserve funds**, always upon the condition that their extent is proportionate to the severity of the price crisis.
2. **Storage of sugar by producers**, also including publicly supported storage via the aid for private storage (Article 17 of the CMO Regulation). However, in the views of several sectoral stakeholders, this instrument would present significant weaknesses already from a theoretical standpoint (see Question 5 at § 7.3.4).
3. **Measures against market disturbance**. Article 219 of the CMO Regulation establishes that measures can be adopted in case of market disturbance or a threat thereof (in particular, but not exclusively, due to price dynamics) that are likely to continue or deteriorate.
4. The **derogation from Article 101(1) TFEU provided for under Article 222 of the CMO Regulation**; however, in the views of several sectoral stakeholders, the very design and implementation mechanism of the tool would have a number of significant weaknesses, at least for the specific purpose of supporting sugar beet growers' income during market crises (see Question 5 at § 7.3.4).
5. **Safeguard and inward processing measures** (Articles 194 and 195 of the CMO Regulation).

Last but not least, some **overall business strategies** – albeit not specifically designed to address prolonged market crises - may contribute to address the adverse effects on the turnover and the overall economic sustainability of sugar producers of adverse market evolutions, mainly through cost reduction and/or provision of additional revenue streams for producers:

6. Besides the already discussed vertical integration between sugar beet farming and processing (or between raw cane sugar milling and refining), sugar producers implement **business strategies aimed at strengthening competitiveness**, and cost competitiveness in particular. Sugar producers – and especially beet sugar producers – have traditionally pursued scale economies and a high utilisation rate of the installed processing capacity (both at individual plant level and at company level) in order to improve their margins through cost reduction, with a view to strengthening their competitiveness.
7. **Strategies aimed at geographical diversification** pursue lower production costs and/or diversification of production, market and policy risks. On the sales side, these strategies may help in a prolonged sugar price crisis only if they entail sugar production in geographical areas that are not affected by the crisis itself. If the price depression has a global reach, only geographical diversification involving the (relatively few) sugar producing countries that are basically isolated from the international sugar market could provide some relief.
8. **Strategies aimed at product or sector diversification**. By definition, these strategies are aimed at providing additional revenue streams. In principle, the more detached the price dynamics of the products/sectors concerned from the sugar price dynamics, the lower the risk that they may be negatively affected by the prolonged depression of sugar prices. In concrete, and by way of example, diversification into ready-to-eat meals should be less affected by such problem than diversification into isoglucose production, since isoglucose is a sugar substitute whose price dynamics are clearly influenced by sugar price dynamics.
9. **Innovation strategies**. *Process innovation* can contribute to reduce production costs and/or to improve the quality of final products (the latter outcome can translate into increased revenues via higher prices and/or increased demand for improved products). Both effects can translate into strengthened economic viability for operators (via improved margins). *Product innovation* allows the implementation of diversification strategies (see point 8); the sale of innovative products can generate additional revenue streams, thus contributing to strengthen the economic viability of operators.

There are several EAFRD-funded measures that can support sugar beet growers' and sugar producers' business strategies, such as (among others) Measure 3 – "Quality schemes for agricultural products and foodstuffs", Measure 4 – "Investments in physical assets", and Measure 6 – "Farm and Business Development". However, no detailed

information was available on the extent to which EU sugar beet growers and sugar producers participate in these schemes.

7.6.2 Fact-based assessment

Relevant risk management strategies/tools for sugar beet growers

Multi-annual inter-branch agreements, sugar beet supply contracts or arrangements within sugar companies controlled by growers have reached a certain diffusion in the EU beet sugar sector in the post-quota period (see § 6.2.1). However, the available data on the evolution of sugar beet prices in the post-quota period clearly show a **substantial decline in price levels during the crisis**, compared to price levels in the quota period. This suggests that the beet pricing conditions in the arrangements between growers and sugar producers (or in the internal arrangements of cooperative sugar companies) had to be adapted to the situation in the sugar market, and c**ould not provide support to the income of sugar beet growers during the crisis**. It should however be underlined that there are diverging views between sugar beet growers and sugar producers with regard to the contribution of those arrangements in terms of managing price risks. Based on the results of the assessment made under questions 5, 6 and 7 (see § 7.3.3, 7.3.5, 7.4.4 and 7.5.1, respectively), it can be concluded that these arrangements contribute significantly to safeguard the economic viability of sugar beet growers in ordinary conditions, but can provide little (if any) help when sugar beet prices are depressed by prolonged periods of low sugar prices (as it happened in the post-quota period).

As for the effectiveness of the **control of the processing stage by sugar beet growers** (downstream vertical integration) in supporting the income of sugar beet growers, even in the few cases where publicly available data allow to compare sugar beet price levels among companies (like in France), it is impossible to determine the extent to which possibly higher prices for the members of cooperative / grower-controlled sugar companies, vis-à-vis those paid by companies on which growers exert no control, are related to the cooperative nature of the company, rather than to other factors[120].

In spite of being designed purposedly to address variations in farmers' income, and of its significant strengths from a theoretical standpoint (see § 7.3), the **income stabilisation tool (IST)** basically saw no practical implementation and no significant uptake in the EU sugar beet farming sector in the post-quota period (see § 7.4.1).

As for **saving accounts**, the limited evidence available does not allow to assess their actual contribution to addressing income reductions suffered by sugar beet growers during the market crisis.

Recourse to **state aids** was found to be more widespread in the sugar beet farming stage in the post-quota period (see § 7.4.1); however, support from state aids to the beet growers' income was found to be mainly limited by the ceiling of "de minimis" aid per farm (see § 7.3.5).

As for the **derogation from Article 101(1) TFEU** provided for under **Article 222** of the CMO Regulation, it was not applied in the sugar sector in the post-quota period for the reasons discussed at § 7.4.4. Nevertheless, the High Level Group on sugar (HLG, 2019) requested the European Commission to further examine the possibilities for the application in the sector of other market measures under the CMO Regulation, in particular those offered by Article 222.

Within this rather disappointing overall picture, it should be underlined that the only measure that proved to be effective in supporting the incomes of sugar beet growers

[120] Only a comparison between two or more perfectly identical companies operating in the same sugar beet growing areas, with at least one of them controlled by growers, would allow to determine that: such a situation does not exist in practice.

undergoing difficulties, albeit only in the 11 sugar beet producing Member States where it was granted, was **voluntary coupled support to sugar beets** (VCS). Even though VCS was not conceived as a risk management tool, it has significant implications in terms of risk management, and can contribute to improve the resilience of sugar beet growers. Leaving aside the debate on the acceptability of VCS in light of the general aim to decouple direct payments (which are actually 90% decoupled today, with coupled payments only representing some 10%, with strict budgetary limits also in place), and the issue of possible side effects in terms of potential market distortions, it is hardly questionable that the granting of a payment per hectare of sugar beet, whose amount is not depending on yields and sugar price dynamics, provides an effective support to the growers' incomes. As for the implications of the granting of VCS on sugar beet price levels, an analysis carried out by the Commission services reveals that sugar beet prices in VCS Member States in the 2017/18 and 2018/19 marketing years were, on average, higher than in non-VCS Member States.

Finally, it is worth reminding here the important role played by **decoupled direct payments.** This income support is broadly available to EU farmers (86% of the EU utilised agricultural area received basic payments in 2019), irrespective of the agricultural sector (i.e., potentially available to sugar beet growers, too), or, in fact, production. Therefore, these aids effectively limit the negative effects of low or volatile yields and/or prices through the stabilisation of farm income, and, by providing a predictable income, can improve the farmers' access to bridging loans to survive tighter years (the contribution of decoupled direct payments to improved resilience of the EU sugar sector is assessed under question 10 at § 8.1.4).

Relevant risk management strategies/tools for sugar producers

A fact-based assessment of the contribution "in isolation" of each strategy/tool that may contribute to address the adverse effects on the turnover and the overall economic sustainability of sugar producers of adverse market evolutions mainly through **cost reduction** is not possible: combinations of these strategies/tools (e.g., multi-annual beet supply contracts + strategies aimed at pursuing scale economies at plant and company level) are always used in practice, and it is impossible to distinguish their individual contribution. Overall, it can anyway be concluded that these **cost-oriented approaches contributed significantly to keep EU sugar producers in operation even when sugar prices on the EU market were at their lowest**: only very few independent sugar producers, all of them of very limited size, were forced to quit operating during the crisis period. Analogous considerations can be made for **reserve funds**, which are extensively used by EU sugar producers to cope with particularly difficult situations. In the specific case of EU-based **raw cane sugar refiners**, none of them was found to rely on upstream vertical integration (control of raw cane sugar producers); the use of multi-annual raw sugar supply agreements was found to be limited (see § 6.2.3).

As for the **aid for private storage** (Article 17 of the CMO Regulation) and the other **emergency measures foreseen by the CMO Regulation** (measures against market disturbance ex Article 219; derogation from Article 101(1) TFEU ex Article 222; safeguard and inward processing measures ex Articles 194 and 195), they found **no practical application in the sugar sector during the market crisis**: according to several sectoral stakeholders, this was probably also due to what they saw as inherent weaknesses in the design and implementation mechanisms of the measures (see § 7.3.4 and 7.3.5). However, to explain the lack of practical application of those measures, it should also be considered that, after a careful and detailed analysis, the High Level Group on sugar (HLG, 2019) deemed them to be mismatched to deal with the specific market situation experienced during the post-quota period. It should also be underlined that the aid for private storage proved to be an effective measure to address market crises in other sectors than the sugar one (e.g., milk, oil, etc.), when certain conditions were met. The reasons behind non-application of the aid for private storage and the other emergency measures under the CMO Regulation in the sugar sector in the post-quota period are discussed in detail at § 7.4.4.

On the product marketing side, it is impossible to assess the role played by **multi-annual sugar supply contracts with customers** (see § 6.2.6), signed before the decline in sugar prices, in providing some support to price levels on the EU market during the crisis: there is no publicly available information on the related prices, the underlying volumes and the timing for contract enforcement (from the settlement date to the expiration of the related contractual obligations). The only publicly available information on sugar supply contracts in the crisis period concerns the signing of "loss-making sale contracts" (also known as "onerous sale contracts") by some sugar producers, even though no further details are available also for those contracts. Nevertheless, the very fact that such contracts were signed implies clearly adverse effects in terms of turnover reduction for sugar producers, and reveals that they were not in the position to maintain selling prices close to the pre-crisis levels when bargaining with their customers.

The most robust fact-based assessment of the effectiveness in addressing the adverse effects on the turnover and the overall economic sustainability of sugar producers of the adverse market evolutions of the post-quota period concerns the role played by **geographical and/or product/sector diversification strategies**. The analysis developed at § 5.3 revealed that the implementation of these strategies, often in combination, is widespread among EU sugar producers, and in particular the leading multinational groups. It is also important to underline that whereas further product/sector diversification was pursued by several of the surveyed EU sugar producers also in the post-quota period (see § 7.4.1), with a view to finding new revenue streams that could partially compensate the more or less substantial decline in turnover from sugar production (mainly due to depressed sugar prices), no surveyed sugar producer indicated to have pursued further geographical diversification in the post-quota period.

A possible explanation behind this trend, as also confirmed by the interviews with some sectoral stakeholders and independent experts, is the fact that **geographical diversification** provides little, if any, relief in a global sugar price depression. In such conditions, even the revenues and profitability of the most cost-effective non-EU producers would in any case be adversely affected. It is also worth noticing that no EU sugar producer operates in beet or cane sugar production in third countries (e.g., Japan, or the USA) that are somewhat more "sheltered" from the international sugar market dynamics due to strong sugar import regulation.

By contrast, **product/sector diversification**, in particular where it is targeted at products/sectors that are not influenced by sugar price dynamics, can be more effective in providing additional revenue streams when the sugar business units of diversified companies struggle in the midst of a prolonged global sugar price depression. The results of the analysis of the profitability of selected EU sugar producers (see § 5.5.2 and 5.5.3), based on indicators that combine profitability data with turnover data, clearly show that diversified sugar producers fared much better also in the 2018/19 and 2019/20 marketing years, even though they also experienced a deterioration of the overall economic sustainability of their operations in the post-quota period. By contrast, the aforementioned analysis revealed a serious deterioration of the overall economic sustainability of sugar producers that were heavily focused on the core business of beet sugar production (mostly in the EU), with just some geographical diversification and limited product/sector diversification (often in activities that are tightly related with sugar production and the related price dynamics, such as alternative sweeteners). It should be noted that the results of the sugar business units of diversified producers were negatively affected by the global depression in sugar prices as badly as non-diversified sugar producers. However, the former could count on the support of positive performances in at least some of the other business units, which helped the diversified companies as a whole to weather the worst phase of the crisis.

It is finally worth noticing that the contribution of product/sector diversification in maintaining the overall economic sustainability of the companies can also have **helped to prevent a further decline of sugar beet prices**. Last but not least, in the case of

diversified sugar producers controlled by growers (i.e., all the leading ones in the EU), the positive results of the diversified activities surely contributed to provide welcome revenues for the growers themselves (in the form of dividends or ex-post additional payments for the delivered sugar beets), which mitigated the adverse effects on their incomes from declining sugar beet prices.

It can hence be concluded that **product/sector diversification** (preferably towards activities whose profitability is not influenced by sugar price dynamics) proved to be an **effective strategy to address the adverse effects on the turnover of sugar producers** (and, more generally, on the overall economic sustainability of their activities) **from adverse market evolutions**; it also contributed, albeit indirectly, to prevent sugar beet prices from falling further in the worst phase of the crisis, and provided welcome revenues to the growers exerting a control over the diversified sugar producers.

As for the actual contribution of **innovation strategies** to addressing the adverse effects on the economic viability of sugar producers deriving from extremely unfavourable sugar price dynamics, it was found to be significant for several of the process and product innovations reviewed under question 4 (see § 7.2.3). The most recent innovations, in particular those concerning the development of the so-called "biobased value adding processes", appear to have significant potential in terms of strengthening the economic viability of sugar producers; however, their implementation on a commercial scale is limited to very few examples, and is still too recent to draw a conclusive judgment on the actual importance of their contribution to strengthened economic viability for the concerned sugar producers. Furthermore, the transition from pilot plant scale to commercial production for those processes often requires substantial investments, and the potential returns are often rather uncertain (in particular, price premia for innovative "niche" products can shrink if several producers enter the related markets).

7.6.3 Overview of the results of the assessment

This section provides a **synthetic judgment on the overall effectiveness** of the relevant risk management strategies/tools in increasing the resilience of the EU sugar sector in terms of **increased capacity of beet growers or sugar producers to withstand substantial income or turnover reductions** in the event of cumulative external shocks and adverse market evolutions. The synthetic judgment is based on the results of the theoretical assessment (§ 7.6.1) and of the fact-based assessment (§ 7.6.2) previously carried out.

Sugar beet growers

In spite of the availability of a number of theoretically suitable strategies/tools, no particular strategy or tool emerged for its capacity to address (through prevention or mitigation) substantial income reductions of sugar beet growers in practice. In the views of several sectoral stakeholders, derogation from Article 101(1) TFEU provided for under Article 222[121] would suffer from some inherent weaknesses; for other tools (multi-annual inter-branch agreements, sugar beet supply contracts or arrangements within sugar companies controlled by growers), which had generally been effective in ordinary conditions, the severity of the crisis proved to be too hard a test. The conceptually most promising instrument, i.e., the Income Stabilisation Tool (IST) (Article 39 of Regulation (EU) No 1305/2013), regrettably saw no practical application in the sector during the crisis.

In the end, besides non-sector-specific income support provided via **decoupled direct payments**, the only significant income support to sugar beet growers (some of them, at least) was provided by the **positive results of diversified activities implemented**

by the sugar companies that they controlled (see below) and, in the 11 Member States that implemented this support measure, from the direct payments per hectare granted via **voluntary coupled support to sugar beets** (VCS).

Sugar producers

From a theoretical standpoint, the selection of suitable strategies/tools available to sugar producers was wider than for sugar beet growers. However, similar to what observed for growers, some tools would suffer from inherent weaknesses (in particular the aid for private storage and the other emergency measures foreseen by the CMO Regulation), at least in the views of several sectoral stakeholders, and in any case they saw no practical application in the sugar sector during the crisis. In this regard, it should anyway be considered that, after a careful and detailed analysis, the High Level Group on sugar (HLG, 2019) deemed that the available regular market instruments (such as the aid for private storage) were mismatched to deal with the specific market situation experienced during the post-quota period, and did not exclude that those measures could be used in the future. The actual effectiveness of the multi-annual sugar supply contracts with customers could not be assessed for lack of concrete evidence, even though some developments during the crisis period (signing of loss-making sales contracts by some sugar companies) suggest that EU sugar producers were not in the position to maintain selling prices close to the pre-crisis levels when bargaining with their customers.

Besides the positive overall contribution from combinations of strategies/tools aimed at keeping production costs under control, the fact-based assessment demonstrated the clear effectiveness of **product/sector diversification** (preferably towards activities whose profitability is not influenced by sugar price dynamics) in **addressing the adverse effects on the turnover of sugar producers** (and, more generally, on the overall economic sustainability of their activities) **from adverse market evolutions**. It also contributed, albeit indirectly, to prevent sugar beet prices from falling further in the worst phase of the crisis, and provided welcome revenues to the growers exerting a control over the diversified sugar producers. Process and/or product innovations also have significantly contributed to strengthen the economic viability of sugar producers. The most recent ones (especially the so-called "biobased value-adding processes") also seem to have significant potential in that regard: however, practical examples of their implementation on a commercial scale in the sugar sector are too few, and too recent, to draw a conclusive judgment on the actual importance of their contribution, and there are significant constraints to their wide implementation in the sector due to the substantial investments needed to switch to commercial production, also considering that the potential returns are often rather uncertain[122].

General considerations

It is essential to underline that **there is a thin line, but a real difference, between managing risks and addressing structural weaknesses**. While risk management aims at making economic agents able to absorb temporary shocks through appropriate tools and strategies, including with public support, it cannot remedy a lack of competitiveness due to systemic problems[123]. The prolonged crisis that the EU sugar sector has experienced may induce some beet growers and sugar producers to ask for far-reaching policy measures that would go beyond risk management *per se*, and provide them with effective means to maintain their financial viability until the crisis ends or recedes.

[122] In particular, price premia for innovative "niche" products can shrink if several producers enter the related markets.

[123] In this regard, it should be underlined that voluntary coupled support positively contributed to addressing structural difficulties faced by the sugar beet farming sector in certain Member States, thus increasing the overall resilience of sugar beet growers in those countries.

7.6.4 Key findings

Synoptic table 7.9 provides a synthetic overview of the key findings of the theoretical assessment (see § 7.6.1) and of the fact-based assessment (see § 7.6.2) of the **overall effectiveness** of the relevant **risk management strategies and tools** in increasing the **resilience of the EU sugar sector** in terms of **increased capacity of beet growers and sugar producers** to **withstand substantial income or turnover reductions** in the event of **cumulative external shocks and adverse market evolutions**[124].

An essential caveat to consider is that **there is a thin line, but a real difference, between managing risks and addressing structural weaknesses[125]**. The prolonged market crisis of the post-quota period may induce sectoral stakeholders to ask for far-reaching policy measures that would go beyond risk management *per se*, and provide them with effective means to maintain their financial viability until the crisis ends or recedes.

Table 7.9 – Question 8: synthetic overview of the key findings

Concerned actors	**Key findings**	
	Theoretical assessment	*Fact-based assessment*
Sugar beet growers	*No minimum price for sugar beets in the post-quota period → no floor for bargaining anymore* *Available tools*: multi-annual inter-branch agreements, sugar beet supply contracts or arrangements (fixed price); control of the processing stage by growers; income stabilisation tool (IST); saving accounts; state aids; CMO emergency measures	Several tools proved to be *ineffective* due to: • the severity of the crisis (e.g., multi-annual arrangements) • limited/no uptake (e.g., IST) Some tools *could not be assessed due to limited evidence* (control of processing stage; saving accounts) Measures under the CMO Regulation saw no application in the sugar sector in the post-quota period → no concrete evidence for a fact-based assessment[126] ***Most effective*** tools/strategies: • ***diversified activities*** of sugar companies controlled by growers (additional revenues); • payments from ***voluntary coupled support***[127] (in 11 Member States only) • ***decoupled direct payments*** (broadly available to EU farmers; non-sector-specific tool that effectively stabilises the farmers' income)

[124] It should be noted that there are several EAFRD-funded measures that can support sugar beet growers' and sugar producers' business strategies, such as (among others) Measure 3 – "Quality schemes for agricultural products and foodstuffs", Measure 4 – "Investments in physical assets", and Measure 6 – "Farm and Business Development". However, no assessment of their contribution to improved resilience in the sugar sector could be made, due to the lack of detailed information on the extent to which EU sugar beet growers and sugar producers participate in these schemes.

[125] While risk management aims at making economic agents able to absorb temporary shocks through appropriate tools and strategies, including with public support, it cannot remedy a lack of competitiveness due to systemic problems.

[126] It should be noted that the High Level Group on sugar (HLG, 2019) did not exclude that those measures could be used in the future.

[127] Even though VCS was not conceived as a risk management tool, it has significant implications in terms of risk management, and can contribute to improve the resilience of sugar beet growers by contributing to address structural difficulties faced by them in certain Member States.

Concerned actors	Key findings	
	Theoretical assessment	*Fact-based assessment*
Sugar producers	*Relevant action mechanisms*: 1. Keeping raw material procurement and production costs under control 2. Maintaining sugar prices close to pre-crisis levels 3. Providing additional revenues streams (preferably not related to sugar price dynamics) *Available tools*: multi-annual sugar supply contracts with customers; reserve funds; storage of sugar (including aid for private storage); measures against market disturbance (CMO Regulation); safeguard and inward processing measures. *Relevant overall business strategies*: pursuing cost competitiveness; geographical diversification; product/sector diversification	Some tools proved to be *ineffective* due to: • linkage with sugar price dynamics (geographical diversification; diversification towards sugar substitutes) Some tools *could not be assessed due to limited evidence* (multi-annual sugar supply contracts with customers) or *too limited and recent implementation in the sector* (development of innovative "biobased value-adding processes") Measures under the CMO Regulation saw no application in the sugar sector in the post-quota period → no concrete evidence for a fact-based assessment[128] ***Most effective*** tools/strategies: • strategies pursuing ***cost competitiveness***; • ***reserve funds***; • ***diversification strategies*** targeted at ***products/sectors*** that are ***not influenced by sugar price dynamics***

Source: assessment made at § 7.6.1 and 7.6.2

[128] It should be noted that the High Level Group on sugar (HLG, 2019) did not exclude that those measures could be used in the future.

7.7 Q9: Are there any successful tools/approaches/strategies implemented by other major players at world level to address the identified risks that would be relevant for the EU sugar sector?

Definition of key terms

"Successful (risk management) tools/approaches/strategies": all the ones that meet the *identification criteria* outlined below.

"Other major players at world level": the investigation under question 9 focuses on successful risk management tools/approaches/strategies implemented by beet or cane growers, and by beet or cane sugar producers (including full-time refiners), operating in the following third countries: Australia; Brazil; India; Thailand; United States of America.

"Identified risks": all the risks identified as relevant through the investigation made under question 3 (see § 7.1), with particular attention to sector-specific risks.

"Relevant for the EU sugar sector": all the successful risk management tools/approaches/strategies implemented by other major players at world level (see the definition provided above) that meet the *relevance criteria* outlined below.

Understanding of the question

The assessment is based on two sets of criteria ("identification criteria" and "relevance criteria"), and takes into account the findings of questions from 2 to 8.

The *identification criteria* are used to identify the successful risk management tools/approaches/strategies implemented in the third countries considered; both the following criteria have to be met:

1. proven practical effectiveness of the tools/approaches/strategies in addressing the typologies of risks that they are designed to cover;
2. significant level of uptake.

The *relevance criteria* are used to identify which successful risk management tools/approaches/strategies implemented in third countries are relevant for the EU sugar sector. These criteria are defined as follows:

1. Proven capacity to address effectively one or more typologies of risk identified as relevant for the EU sugar sector under question 3 (see § 7.1), with particular attention to sector-specific ones.
2. Compatibility with the regulatory framework applying in the EU.
3. Acceptability by stakeholders in the EU sugar sector, with special respect to established relationships between sugar beet growers and sugar producers, between sugar producers and their customers, and between sugar producers and trade unions.
4. Practical feasibility in the techno-economic and organisational conditions applying in the EU sugar sector.

The relevant risk management tools/approaches/strategies are finally classified according to:

- the expected timing for the adoption of the tools/approaches/strategies in the EU;
- the nature and extent of the adaptations - in the risk management tools/approaches/strategies themselves, and/or in the EU context - needed to allow their adoption in the EU.

The available literature and insights from the consulted sectoral stakeholders and independent experts in the third countries of interest allowed to identify a number of similarities and differences between the sugar sectors of the third countries of interest (Australia, Brazil, India, Thailand, United States of America), and the EU sugar sector.

These similarities and differences were taken into account to better target the identification of the successful risk management tools/approaches/strategies implemented in the third countries, in the light of their likely relevance for the EU sector. It seemed sensible to exclude from further investigations all the tools/approaches/strategies that are clearly designed to address risks that are not relevant for the EU sugar sector, and/or that can be successfully implemented in practice only in the specific context of the concerned third countries. Similarities and differences

were also considered in determining the replicability in/transferability to the EU context of the most promising tools/approaches/strategies implemented in third countries.

7.7.1 Classification of the risk management tools/approaches/strategies in terms of replicability in/transferability to the EU context

The successful risk management tools/approaches/strategies implemented by other major players at world level, which were identified as relevant for the EU, were then classified in terms of replicability in/transferability to the EU context. Table 7.10 provides a synoptic overview of the replicability in/transferability to the EU context of each relevant risk management tool/approach/strategy.

Table 7.10 – Classification of the risk management tools/approaches/strategies implemented in relevant third countries

Name of the tool/approach/strategy *(grounds for selection)*	**Expected timing for the adoption**	**Nature and extent of the adaptations needed**	**Key obstacles to the implementation**
Use of GM beet seeds *(based on proven effectiveness in the USA[129])*	Not rapidly implemented	No significant adaptations needed from an operational standpoint Change of attitude towards the use of GM seeds in the EU by policymakers, the general public and a part of the EU farmers	Unfavourable attitude by policymakers, the general public and a part of the EU farmers
Use of railroads for long-distance beet transportation *(based on proven effectiveness in sugarcane transportation in Australia)*	Variable depending on territorial specificities; not rapidly implemented in areas that lack the needed infrastructure	Variable according to the implementation model (transhipment vs. intermodal[130]) and territorial specificities (available rail infrastructure)	Lack of adequate rail infrastructure Need of costly specialised equipment to implement the most efficient model (intermodal) Important coordination effort over the beet processing campaign

[129] The use of genetically modified (GM) sugar beet seeds has become the norm in the US: close to 99% of sugar beet currently cultivated in the country comes from GM seeds. Consulted sectoral stakeholders in the US beet sugar sector explained that GM sugar beets are easier to cultivate and more cost-effective for farmers. Always according to the consulted sectoral stakeholders, the development of GM beet seeds was a huge advance in reducing production risks in sugar beet farming.

[130] The first model is based on the transhipment of sugar beets coming from the fields in trucks or farm trailers to conventional, open-top "gondola" railcars, with the use of a high-capacity mechanised shovel. Once arrived at the factory railyard, sugar beets have to be unloaded from railcars, and further mechanised shovel work may be required to finally discharge them into the conveyor belts that feed the sugar factory. In the second model, beets are transported in special containers carried by trucks from the fields (where they are loaded directly from the harvesting machines). Loaded containers are directly transferred on special flat railcars for the rail trip to the factory, with no need to unload and reload the beets (and hence no damage to them): however, a heavy-duty forklift is needed for transferring the containers at both the origin station and the railyard of the sugar factory.

Name of the tool/approach/strategy *(grounds for selection)*	Expected timing for the adoption	Nature and extent of the adaptations needed	Key obstacles to the implementation
Involvement of growers in price risk management (based on forward pricing) for sugar beets *(based on proven effectiveness in the sugarcane farming sector in Australia[131])*	Not rapidly implemented	Tailoring to the organisational and contractual arrangements along the EU sugar supply chain Cultural change among sugar company management and beet growers	Complex compared to fixed price formulas and also variable/mixed, index-linked price formulas Exposes growers to risks that they were previously not bearing
Switch between beet sugar and beet ethanol production as a supply management solution and a diversification strategy *(based on proven effectiveness in the Brazilian cane sugar sector[132])*	Variable depending on territorial specificities; not rapidly implemented in areas that lack the needed industrial infrastructure (distilleries)	Design and implementation of policy measures providing support to domestic ethanol production Substantial investments into processing facilities (distilleries)	Lack of clear, targeted policy support to promote beet ethanol production Substantial investments into processing facilities (distilleries)

Source: assessment by the study team

7.7.1 Key findings

A preliminary analysis identified a number of significant differences between the sugar sectors of the third countries of interest (Australia, Brazil, India, Thailand, United States

[131] The approach was developed by a consulted Australian sugar miller. The Australian sugar industry is completely exposed to the ICE No. 11 raw sugar futures price. The so-called "Cane Payment Formula" determines a price for cane that is predominantly a function of both sugar price and sugar content in cane. The average No. 11 sugar price achieved by a grower via "forward pricing" (i.e., pricing achieved via "orders" made through the concerned miller's web-based system) and/or the average sugar price achieved via a price risk pool managed by the miller, is an input into the "Cane Payment Formula". Growers can either take on the price risk themselves, or they can pool it: in the latter case, the miller makes sugar pricing decisions on behalf of the growers. In case growers want to manage the price risk themselves, they receive a daily email and text communicating the daily indicative price based on the ICE No. 11 contract and currency markets. Growers can then use the web-based system and set a target price for specific proportions of the sugar tonnage obtained from the cane they delivered to the mill. If the target price set by the grower is achieved, the order is 'filled' or executed by the miller, but growers can change the target price as long as the order has not been filled.

[132] Only the switch between sugar production and direct ethanol production from cane or beet performs supply management functions: juice or other intermediate products of the sugar extraction process used to produce ethanol are not converted into sugar, and the switch can hence prevent situations of oversupply in the sugar market (the switch is reversed when the relative market conditions become more favourable to sugar production than to ethanol production). Besides cost competitiveness in ethanol production from cane or beet (or, in its absence, policy support aimed at addressing any cost disadvantages), an essential condition to implement this supply management tool is clearly a significant presence of sugar factories with an annexed ethanol distillery. As for ethanol production from cane or beet molasses, it must be considered as a diversification strategy and a way to create additional revenue streams, but it does not perform supply management functions: sugar production from cane or beet is maintained, since ethanol is produced by using a co-product of the sugar production process (molasses) as feedstock. Ethanol production from cane or beet molasses is hence of no use to address situations of oversupply on the sugar market.

of America) and the EU sugar sector. Since those **differences** were often found to **limit the transferability/replicability to the EU case** of successful risk management tools/approaches/strategies implemented by other major players at world level, the assessment focused on a number of specific tools/approaches/strategies that:

1. emerged as having proven effectiveness in addressing risks and threats that are relevant also for the EU sugar sector;
2. showed some potential for application in the EU context, with more or less significant adaptations.

The assessment identified:

- one solution aimed at addressing production risks, i.e., the **use of GM beet seeds**;
- one solution – **rail transportation of sugar beets** - aimed at addressing the potential need for cost-efficient long-distance shipment of beets, due to further industrial restructuring (fewer processing plants with wider and more geographically dispersed sugar beet procurement areas);
- an innovative approach for **involving growers in price risk management,** based on **forward pricing**;
- the **switch between beet sugar and beet ethanol production** as a supply management solution and a diversification strategy.

In general, all the aforementioned solutions:

- were found to require **some time** for potential adoption in the EU;
- were found to require **more or less substantial adaptations** for their practical implementation in the EU sugar sector, including a number of changes in the operational environment (e.g., in the relevant policy framework, in the attitude of policymakers or specific stakeholders, etc.);
- would entail **overcoming significant obstacles** to their practical implementation in the EU sugar sector.

In conclusion, the experience of other major players in the global sugar market **does not seem to offer ready-to-use, effective risk management solutions** that would be rapidly applicable in the EU sugar sector.

8 THEME 3: THE INSTITUTIONAL SETTING OF THE MARKET AND EU POLICY INSTRUMENTS AVAILABLE FOR THE SUGAR SECTOR

8.1 Q10: What is the effect on the EU sugar sector's resilience of the current regulatory framework at EU and national levels?

Definition of key terms

"**Resilience of the EU sugar sector**": see the definition provided at § 6.1.

Understanding of the question

Under question 10, a number of provisions that can have an influence on the EU sugar sector's resilience is identified, and their actual effects on the two dimensions of resilience (i.e., economic viability of the main actors in the sugar supply chain and adequate supply of sugar in the EU) are assessed.

The regulatory framework of the EU sugar sector is composed by a complex system of provisions that can either explicitly target the sugar supply chain or the whole food supply chain, including the sugar sector. The **preliminary step in the assessment** consisted in the **identification of the main provisions at EU and national level** that:

- explicitly pursue objectives that are directly related to improving the EU sugar sector's resilience, as defined under question 1 (see § 6.1);
- pursue objectives that can indirectly affect - positively or negatively - the EU sugar sector's resilience, insofar they are linked to one or both components of such resilience.

The identification of the main provisions is mainly based on the descriptive section (§ 3), under which a detailed description of the current EU and national regulatory framework is provided.

It is important to note that:

- the **implications of future developments in EU legislation for the EU sugar sector's resilience** are **investigated in the framework of question 11** (see § 8.2);
- the **effects on the resilience of the EU sugar sector** of certain **other pieces of legislation** (at EU or national level) that can influence the current institutional setting of the EU sugar market are **investigated under question 13** (see § 8.4); more specifically, question 13 focuses on nutrition policies (including the related policy tools, such as "sugar taxes") and on environmental sustainability policies;
- the analysis of **risk management tools** available in the framework of the CAP is performed under **question 4** (see § 7.2), while **their effects on the resilience** of the EU sugar sector are assessed under **question 8** (see § 7.6).

The following provisions have been identified as relevant for the assessment under question 10:

- the end of the quota system (and the end of mandatory sugar beet minimum price);
- the EU trade policy;
- the voluntary coupled support and decoupled direct payments.

For each relevant provision, the assessment includes a preliminary analysis of: i) the working mechanism of the provision; and, ii) the intended effects of the provision, in particular on the EU sugar sector's resilience. Where a description of the provision has already been given in the descriptive part of the report, a synthetic overview is provided here, together with a reference to the relevant section of the descriptive part, to avoid repetitions. In conclusion, for each relevant provision, an assessment of the actual effects on the two dimensions of the EU sugar sector's resilience is performed. Given the overlapping between the analyses made in other parts of the report, and the analysis to be made under question 10, a reference to the relevant sections of the descriptive part or to other study questions is provided wherever needed, always to avoid repetitions.

8.1.1 End of the sugar quota system; end of sugar beet minimum price

Description

The end of the sugar quota system was anticipated by the 2006 sugar reform, which led to substantial restructuring of the EU sugar sector. The end of the quota system was initially agreed for 2015 in the 2013 CAP reform, but was then postponed by two years to the end of the 2016/17 sugar marketing year, i.e., from 30 September 2017. Since this date, the EU has no longer in place a legislation-based supply management system for its domestic beet sugar production. A detailed description of the EU sugar policy framework that led to the termination of the quota system is provided at § 3.1.

Another significant change in the EU sugar policy from the quota period to the post-quota one is the elimination of the mandatory minimum purchase price of in-quota sugar beets, applying to sugar beets processed into quota sugar. The minimum sugar beet price was progressively reduced and, from the 2017/2018 marketing year, was finally eliminated. Specifically, before the 2006 reform, the minimum price for sugar beet was 46.72 Euros/tonne. After 2006, the minimum price for sugar beet was set at 32.86 Euros/tonne (2006/07 to 2008/09) and at 26.29 Euros/tonne (2009/10 to 2016/17).

Intended effects

The main reasons leading to the termination of the sugar quota system have been illustrated at § 3.1; however, it is worth reminding here that the main underlying causes that led to the abolition of the quota system and to the end of the minimum price for sugar beet were: i) the EU's international commitments (compliance with WTO in particular); ii) the need to remove market distortions, opening the EU sugar market to competition; and, iii) the objective of increasing the competitiveness of the EU sugar sector. In practice, with the end of the quota system, there are no limitations to domestic sugar production or exports, allowing for a better adjustment of domestic sugar production to market signals, and of the overall sugar supply to market demand, both within and outside the EU. In addition, without limitations to sugar production, EU sugar producers should be able to optimise the use of their production capacity, thus reducing the unit cost of producing sugar. Finally, the increased competitiveness of EU sugar producers should allow them to increase their exports on the world market.

As regards the end of the minimum price for sugar beet, it complements the EU policies that led to the end of the quota system, and it is consistent with the objective of a more market-oriented domestic sugar production system in the EU. The elimination of the minimum sugar beet price means that:

- farmers can connect with, and adjust their production to market demand, also taking into account the profitability of sugar beet compared to alternative crops;
- sugar producers are provided with more flexibility in their negotiations with sugar beet growers.

Actual effects

*Effects on the key determinants of the **economic viability of the main actors** in the EU sugar supply chain*

The termination of the quota system had both direct and indirect effects on the **economic viability of the involved actors** (i.e., sugar beet growers and beet sugar producers).

The main direct effect (i.e., an effect linked to the end of the EU legislation-based sugar supply management system as such) is the possibility for EU sugar producers to produce and export sugar without quantitative limitations.

The analysis made at § 4 and 5 illustrates in detail the main developments that followed the end of the quota system. It is important to underline that the most evident effect, i.e., the **situation of oversupply that depressed sugar prices in the EU** after the exceptional sugar production of the 2017/18 marketing year, is the result of a

combination of factors that are only in part related to the end of the quota system. If it is fair to say that the removal of sugar quotas induced some EU sugar producers to pursue an expansion of their production in the 2017/18 and 2018/19 marketing years, it should also be observed that several factors that are not related to the end of the quota system concurred to determine the aforementioned situation of oversupply. The main external factors that played a role in this regard were above average sugar beet yields in the 2017/18 campaign, and a situation of oversupply at global level. The prolonged depression of the EU white sugar price in the 2018/19 and 2019/20 marketing years can hence be related only in part to the end of the sugar quotas: in any case, **the depression definitely worsened the economic viability of the core actors in the EU sugar supply chain** (sugar beet growers and beet sugar producers), whose profitability decreased significantly (see § 5.5 for a detailed analysis of the evolution of the key metrics, i.e., industrial margins from beet sugar production, and overall profitability of EU sugar producers). Some consulted sectoral stakeholders observed that the EU is the only significant beet sugar producer to have completely phased out any legislation-based supply management mechanisms, and that other leading beet sugar producers (e.g., the USA) have made completely different decisions in terms of policy for the sugar sector (maintaining supply management mechanisms, providing strong tariff protection and enforcing strict import regulation policies, etc.).

As for the tighter linkage between the dynamics of the international sugar price and those of the EU domestic price (improved horizontal price transmission: see Areté, 2012), it should be noted that the related alignment process had already started way before the end of sugar quotas, as an aftermath of the 2006 sugar reform and, above all, of expanded access granted to the EU market for preferential sugar imports (in particular from the former ACP countries in the framework of the EBA initiative and of EPAs).

By contributing to the aforementioned situation of oversupply, the end of the quota system indirectly contributed to further interconnection between the EU price dynamics and the (depressed) world sugar price dynamics. As explained at § 4.3, when the EU becomes a net exporter of sugar (this typically happens in a situation of oversupply), the so-called "export parity" (international sugar price + logistics) determines the price of sugar on the EU market, whose dynamics follow more closely those of the international sugar price.

As for the analysis of the **effects of the end of minimum price for sugar beets** on the economic viability of the involved actors, these are direct and straightforward. As already explained in the reply to question 2 (see § 6.2.1), the end of the minimum price removed a floor in the bargaining process between sugar beet growers and beet sugar producers for the definition of basic beet prices in sugar beet supply contracts. This translated into a clear decline in sugar beet prices in the post-quota period (Table 8.1), mainly due to the adverse conditions in the EU sugar market discussed above. From the dynamics of sugar beet prices in selected Member States presented in Table 8.1, it can be noted that the intensity of sugar beet price reduction has not been even, since it is also influenced by country-specific (and company-specific) variables. The granting of Voluntary Coupled Support (VCS) to sugar beet in some Member States is an important variable to consider in this regard: it will be discussed in more detail at § 8.1.3.

Table 8.1 - Sugar beet prices in a selection of Member States (€/tonne)

Member States	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	Average quota period (2014/15 - 2016/17)	Average post-quota period (2017/18 - 2019/20)	Var. %
Austria		39.90	40.10	31.90	28.10	30.70	40.00	30.23	-24%
Belgium	25.41	25.41	26.42	19.73	20.11	21.83	25.75	20.56	-20%
Czechia	29.61	31.93	31.48	32.25	31.38	25.83	31.01	29.82	-4%
France	26.00	26.80	29.09	25.60	23.00	21.90	27.30	23.50	-14%
Italy*		27.10	27.54	28.96	21.37	19.60	27.32	23.31	-15%
Netherlands	50.18	43.01	44.15	45.65	35.59	36.05	45.78	39.10	-15%

Note: the reported price data should generally exclude any public support-related component; they refer to the actual sucrose content recorded in each processing campaign (i.e., they are not the basic prices offered to growers for beets with standard sucrose content)
* Italy: price includes: pulp allowance + three-year contract premium + other non-public revenue elements
Source: Areté's elaboration on information collected in selected Member States; base data sources: Austria: Federal Institute of Agricultural Economics, Rural and Mountain Research (BAB); Belgium: Confédération des Betteraviers Belges (CBB); Czechia: National Statistical Office (CZSO); France: Confédération Générale des Planteurs de Betteraves (CGB); Italy: COPROB, "Prezzi Bietole"; Netherlands: COSUN Annual Report.

The analysis of the effects on the **economic viability of sugar beet growers** (in terms of margins from sugar beet cultivation) stemming from the decline in sugar beet prices that followed the end of the minimum sugar beet price has been presented at § 5.5.1. It is worth recalling here that the analysis revealed a significant decline of the profitability of sugar beet farming in the post-quota period, mainly due to falling beet prices (production costs at farm level did not vary remarkably during the transition from the quota period to the post-quota one).

As for the implications of the decline in sugar beet prices in terms of economic viability of beet sugar producers, the analysis of their profitability (see § 5.5.2) suggests that cuts in beet prices could not offset, by themselves, the adverse effects of depressed sugar prices, which caused a serious deterioration of the economic performance of sugar producers especially in the 2018/19 and 2019/20 marketing years. In this regard, it is worth reminding that beet sugar producers must offer to growers attractive enough sugar beet prices also when sugar prices are depressed, to prevent a massive switch by farmers to alternative crops, which would translate into serious difficulties for the operation of processing plants (lack of an adequate supply of sugar beets).

It is anyway important to underline that the positive developments occurred since the 2020/21 marketing year in terms of rising sugar prices on the world and EU markets have translated into an improvement of the profitability of EU sugar producers, which has been highlighted in the annual reports of a number of operators.

*Effects on the **availability of an adequate sugar supply in the EU***

At EU aggregated level, **the end of quotas had no significant effects in terms of ensuring an adequate supply of sugar in the EU**. As illustrated at § 4.1.2.1, after the end of quota the total area under sugar beet remained basically stable, experiencing only a modest increase from 2007 to 2018 (+3%) while the increase in total sugar beet production over the same period has been just slightly higher (+8%). This also reveals that the end of the minimum sugar beet price, and the following decline in sugar beet prices (compared to the quota period), did not translate into a significant reduction of sugar beet area (and volume) at EU level. As extensively discussed above, the first marketing year without quotas (2017/18) saw a record production of sugar in the EU (over 20 million tonnes), determining so serious a situation of oversupply that reduced sugar outputs in the three following marketing years (2018/19 to 2020/21) were unable to address (see § 4).

However, **remarkable changes in sugar beet and sugar output at Member State level** were experienced in the post-quota period, also due to differences in production costs (at both farming and processing stage: see § 5.4). The inherent cost competitiveness of certain areas contributed to keep beet sugar factories in operation; by contrast, there was a reduction in sugar beet production in certain areas, and some beet sugar factories ceased operations. In conclusion, the overall structure of the EU beet sugar sector, as well as its geographical structure, changed due to the adjustments to the new post-quota environment. It should however be noted (as reported at § 4.1.2.1) that the redistribution of sugar beet areas and production within the current EU-27, and extensive industrial restructuring in the beet sugar sector, have mainly been an effect of the 2006 reform of the sugar regime (see § 5.2.1.1).

As previously explained, **the end of quotas contributed to create the conditions that resulted in the oversupply of sugar on the EU market** that characterised most of the post-quota period, but the expansion in sugar beet areas in some Member States in the 2017/18 marketing year clearly derives from the business strategies of some producers**.** The most plausible explanation, also confirmed by some consulted sectoral stakeholders, is that the most competitive beet sugar producers tried to gain market shares at the expenses of weaker competitors by increasing their sugar production in the 2017/18 marketing year, taking advantage of the elimination of quotas. It is worth reminding that price levels on both the world and EU markets were not yet depressed in the 2016/17 marketing year (see § 4.2), i.e., when decisions on business strategies and production plans for the 2017/18 marketing year were mostly taken. However, the increased production in cost-competitive Member States in 2017/18 was not sufficiently offset by a reduction in sugar production in the less competitive Member States. The final result of this process, through the interplay between business strategies and external and unpredictable factors, was the situation of oversupply discussed above.

It is finally important to note that the termination of quotas should also have promoted more intense competition among beet sugar producers of different Member States, the creation of wider (trans-national) geographical markets, and more substantial intra-EU sugar trade. In fact, intra-EU exports of white sugar actually increased from around 5.2 million tonnes in 2016 to 6.3 million tonnes in 2018, but decreased again to 5.6 million tonnes in 2019[133]. Such an evolution of intra-EU sugar trade would lead to conclude that the extent to which a transition towards wider, more competitive trans-national markets in the EU has occurred in practice, and the related implications in terms of ensuring adequate sugar supply at individual Member State level, still remain unclear.

8.1.2 EU trade policy

Description

The architecture of the EU sugar import regime is composed by a complex system of bilateral agreements, tariff rate quotas (TRQs) under WTO rules, European Partnership Agreements with ACP Countries (EPAs) as well as the "Everything but Arms" (EBA) regime for Least Developed Countries (LDCs). Therefore, imported sugar is composed by a mix of sugar supplied by EPA/EBA countries and sugar supplied by other third countries under bilateral and multilateral trade agreements. The only sugar that can enter the EU duty-free and quota-free is sugar under the Everything But Arms (EBA) regime or from countries covered by Economic Partnership Agreements (EPAs) with the EU. Outside these agreements/regimes, volume limitations and in-quota duties apply for countries covered by TRQs under WTO rules (the so-called CXL quota: reduced duty of 98 Euros/tonne), tariff rate quotas for certain Balkan countries (zero duty) or for countries covered by Free Trade Agreements (FTAs). Finally, it should be noted that the "most favoured nation" (MFN) full tariffs on sugar imports are prohibitive

[133] Based on Eurostat data, EU trade since 1988 by HS2,4,6 and CN8 dataset (DS-645593): https://ec.europa.eu/eurostat/web/main/data/database)

(339 Euros/tonne for raw cane sugar for refining; 419 Euros/tonne for white sugar); this implies that imports available to the EU are restricted, in practice, to sugar that can be supplied at zero or reduced duty[134]. Therefore, imported sugar marketed in the EU is only supplied through limited quotas or by countries that enjoy some kind of preferential arrangement with the EU. According to European Commission Agri-food data portal[135], most of the EU sugar imports are composed by raw cane sugar for refining. A small volume of imported sugar, mainly originating from Balkan countries, is white sugar.

Intended effects

A key goal of the EU sugar trade policy is **to allow access to the raw materials for EU operators**, both sugar users and cane sugar refiners. However, a complex interplay among the domestic (EU) price for white sugar, international prices for raw and white sugar, and other factors, exerts an influence on the achievement of this goal, as well as on the EU sugar supply chain operators. The following sections present a conceptual analysis of the intended effects of the EU sugar trade regime, mainly derived from the theoretical background provided by the 2014 JRC study[136] *EU sugar policy: A sweet transition after 2015?*.

From a theoretical standpoint, the volume of EU sugar imports largely depends on the difference between the EU white sugar price and the world market prices for raw or white sugar, which can also be called "***preference margin***" (or, in the operators' jargon, "basis"). For EU refiners, **importing raw cane sugar** is profitable when the EU white sugar price covers the purchasing price of raw sugar (which includes the price of raw sugar plus import duties, if applicable), plus the production costs borne by refiners (which include all the cost items within their supply chain, from transport costs to distribution costs). **Third country sugar producers that export white sugar** choose to export to the EU when the EU white sugar domestic price is higher than, or at least equal to, their production cost plus any other costs (e.g., transport costs, insurance costs) that they incur to supply the final customer in the EU, plus import duties if applicable. Either for raw cane sugar or for white sugar, the condition determining the volume of sugar imports is the difference between the EU price and the world price, plus the in-quota tariff where it applies.

It should be noted that the difference between the EU white sugar price and world sugar price is a central element for any third country operator willing to export sugar to the EU, irrespective of its cost competitiveness. However, different production cost levels lead to different conclusions about the profitability of exporting white or raw sugar towards the EU. In particular:

- High-cost producers that are generally not competitive at world market prices (i.e., mainly the countries currently covered by EPAs and the EBA regime) can supply their sugar to the EU only when the EU white sugar price is sufficiently high, and in any case higher than the world price. When the EU white sugar price is lower than the world market price for white sugar, exporters have no incentive to supply the EU market rather than the world market, also when their access to the EU sugar market is free of duties (analogous considerations apply for raw sugar exports to the EU, of course considering also the costs borne by refiners[137]).

[134] It is generally assumed that the interplay between EU and world sugar prices would not allow any sugar imports at full duty towards the EU.

[135] https://agridata.ec.europa.eu/extensions/DataPortal/trade.html

[136] The JRC study was carried out before the end of quotas; however, the underlying theoretical assumptions, as well as the key elements of the EU sugar trade policy, have remained unchanged in the transition from the quota to the post-quota period.

[137] In this case, the EU white sugar price must be high enough to cover the sum of higher raw sugar production costs in third countries, logistic costs, import duties (if applicable; EPA/EBA high-cost raw cane sugar suppliers generally benefit from zero duty access to the EU market), and

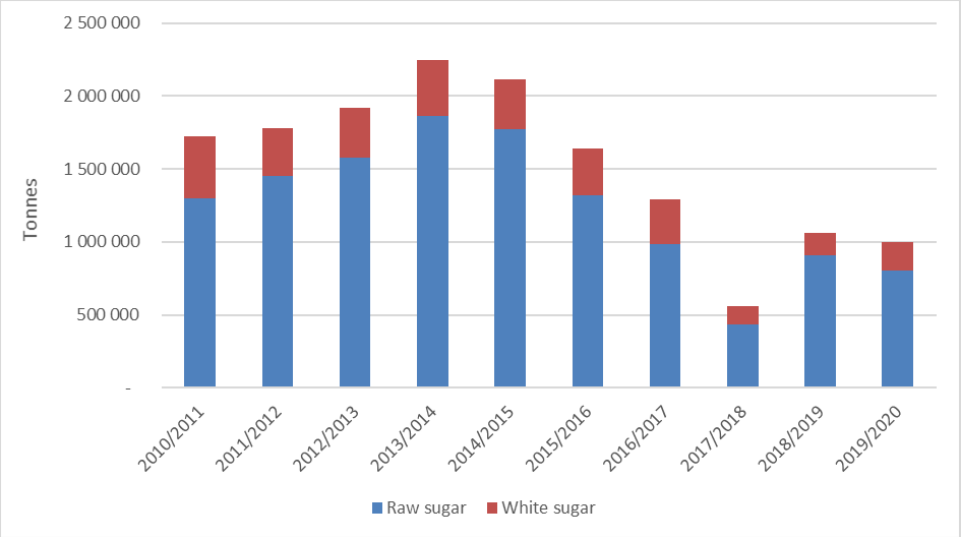
- As for low-cost producers (mainly countries whose exports to the EU are covered by both bilateral and multilateral TRQs, including the so-called CXL quota for raw cane sugar), when the EU white sugar price was high, the EU was an important destination market because of the high preference margin, which also made exports of raw cane sugar for refining through the CXL quota competitive. For raw cane sugar exporters within this group of operators, when the price gap between the EU white sugar price and the world market price for white sugar is smaller than the in-quota tariff (98 Euros/tonne in most cases), selling sugar on the world market is more attractive than supplying EU refiners. Raw cane sugar exports to the EU by low-cost producers are unfeasible when the preference margin is lower than the sum of the import tariff (98 Euros/tonne in most cases) and the costs borne by refiners.

Actual effects

*Effects on key determinants of the **economic viability of the main actors** in the EU sugar supply chain*

The effects of the EU trade policy on the economic viability of the main actors in the EU sugar sector (i.e., beet sugar producers and raw sugar cane refiners) changed significantly in the transition from the quota to the post-quota environment. **During the quota period**, when the world price for raw sugar was much lower than the EU price for white sugar (also taking into account the in-quota tariff, where applicable, and the costs borne by refiners), the EU was the preferred destination for raw cane sugar exports from several third countries, due to the high preference margin. **After the end of quotas**, EU white sugar prices sharply decreased (see § 4.2), leading to a situation where the imports of raw cane sugar for refining drastically decreased. The combination of depressed white sugar prices on the EU market and decreasing raw cane sugar imports had a negative impact on the profitability of refining raw cane sugar, which decreased due to the narrow "***refining margins***" (i.e., the differential between the cost of imported raw cane sugar and the EU white sugar price). A study carried out by the EU association representing the interests of EU sugar refiners (ESRA, 2019), based on data from the European Commission services, indicated that **both the volume and the origin of EU raw cane sugar imports changed in the transition from the quota to the post quota period**. This is confirmed by elaborations made for the present study on publicly available data from the European Commission (Figures 8.1 and 8.2).

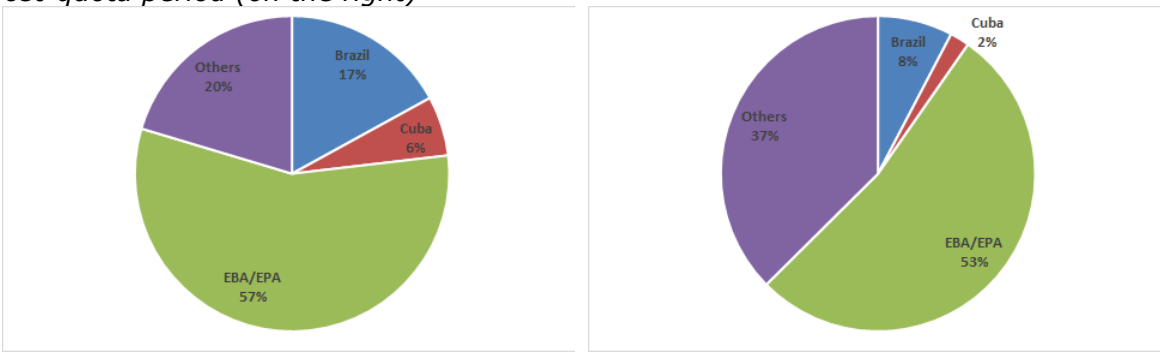
Figure 8.1 – Sugar imports from EBA/EPA countries, 2010/11 to 2019/2020



Source: European Commission Agri-food data portal
(https://agridata.ec.europa.eu/extensions/DataPortal/trade.html)

refining costs, and ensure some margin for both overseas raw cane sugar suppliers and EU refiners.

*Figure 8.2 – Total EU sugar imports, by origin (% share), quota period (on the left) vs. post-quota period (on the right)**



* Quota period: average % share 2010/11 - 2016/17; post-quota period: average % share 2017/18 - 2019/20
Source: elaboration of European Commission data

In the quota period, EU refiners had access to raw cane sugar through a number of different sources, among which the following were the most relevant:

- The bulk of raw cane sugar imports for refining (67% on average in the period 2012- 2016) came from the ACP countries and LDC countries which are covered by the EBA regime and EPA agreements. Purchasing prices of raw sugar from these countries were high, compared to other sources, but the high white sugar prices in the EU as well as the fact that this raw sugar was imported at zero duty and without quantitative restrictions made refining of imported raw sugar from these sources more profitable than that from other sources.
- In the same period, on average 14% of raw cane sugar imports for refining came from Brazil, and 9% from Cuba, two countries which were (and still are) covered by the CXL quota. The low purchasing prices, which were an effect of the low production costs of these countries, in combination with high white sugar prices on the EU market, made refining of raw cane sugar from these countries still profitable also at the in-quota reduced duty.
- The remaining imports of raw sugar for refining came from other countries covered by the CXL quota or by FTAs negotiated by the EU, the latter mainly being Central American and Andean countries following the 2012 free trade agreements with these blocs.

According to the cited ESRA study (2019), **after the end of quotas,** the combination of EU surplus production of sugar and depressed prices for white sugar on the EU market (two interlinked elements), led to the following key changes:

- Imports of raw sugar for refining from countries covered by EPAs or under the EBA regime drastically declined, since the high production costs of these countries, combined with low EU white sugar prices, reduced the refining margin. It is no longer competitive for EU refiners to import raw cane sugar from these countries, even with a zero duty, because the purchasing price of raw cane sugar plus the refining costs are higher than the selling price of white sugar in the EU.
- Similarly, also importing raw cane sugar from countries with low production costs is no longer competitive when the in-quota duty of 98 Euros/tonne is imposed. In fact, the TRQs allocated to these countries remained unfilled (see Table 8.2). Even the temporary lower-duty (11 Euros/tonne) imposed to a limited volume of sugar imports from Brazil, following the accession of Croatia to the Union, remained partially unfilled.
- In the current situation, according to ESRA, the only profitable sources of raw cane sugar are Central American and Andean countries with relatively low

production costs, since they are covered by FTAs that foresee duty-free access to the EU market for a limited quota of raw cane sugar for refining.

Table 8.2 – Filling rate of tariff rate quotas for sugar imports, 2015/16 – 2019/20 (volumes in tonnes)

Origin (duty)	2015/2016		2016/2017		2017/2018		2018/2019		2019/2020	
	TRQ	% use	TRQ	% use	TRQ	% use	TRQ	% use	TRQ	% use
Australia (98 €/t)	9 925	100%	9 925	0%	9 925	0%	9 926	0%	9 925	0%
Brazil (98 €/t)	334 054	96%	353 554	24%	353 554	0%	334 054	0%	334 054	0%
Cuba (98 €/t)	68 969	99%	68 969	100%	68 969	0%	68 969	0%	68 969	12%
Erga Omnes (98 €/t)	253 977	100%	253 977	100%	289 977	11%	289 977	12%	289 977	30%
India (zero-duty)	10 000	100%	10 000	99%	10 000	100%	10 000	100%	10 000	99%
Albania (zero-duty)	1 000	0%	1 000	0%	1 000	0%	1 000	0%	1 000	0%
Bosnia Herzegovina (zero-duty)	12 000	100%	12 000	95%	12 000	89%	13 210	60%	13 210	0%
Serbia (zero-duty)	181 000	98%	181 000	93%	181 000	17%	181 000	52%	181 000	35%
North Macedonia (zero-duty)	7 000	0%	7 000	0%	7 000	0%	7 000	0%	7 000	0%

Sources: from 2016/2017, *DG AGRI TRQs - Allocation Coefficients and Decisions*, available at https://agridata.ec.europa.eu/reports/Allocation%20Coefficients%20TRQs-Import.pdf ; 2015/2016: *Report of the High-Level Group on Sugar* (2019)

As for the **impacts on the economic viability of EU sugar beet processors and sugar beet growers**, in the current situation of limited imports and low EU and world sugar prices, no direct impacts caused by the EU trade policy for this group of stakeholders can be identified. However, the following factors can generate positive – albeit indirect - impacts for sugar producers:

- The effects of the current low level of imports seem to be more favourable to the competitiveness of sugar beet processors than to the competitiveness of raw cane sugar refiners. However, it should be noted that an assessment based exclusively on the relative competitiveness of raw cane sugar refining vs. beet sugar production would oversimplify the current operational structure of the EU sugar sector, in which several sugar beet processing plants also have off-crop refining capacity for raw cane sugar.
- In a situation of oversupply and depressed white sugar prices, the goals of the beet sugar producers and of the refiners are basically the same (i.e., achieving EU white sugar price levels that ensure profitability), and the achievement of profitability for one group can come without prejudice to the achievement of profitability for the other group[138].

Most of the consulted sectoral stakeholders underlined that the import regulation mechanisms provided by EU legislation play a critical role in addressing external shocks caused by the dynamics of the international sugar market.

Several consulted sectoral stakeholders also observed that taking the international sugar market as a sort of "reference" for the EU sugar sector poses problems, since its price dynamics are heavily influenced by competitiveness drivers (less stringent legislation on environmental and social sustainability than in the EU, subsidisation of sugar exports, etc.) that provide an advantage to sugar suppliers operating in developing countries.

[138] According to some consulted independent experts, the leading EU beet sugar producers tried to win market shares not only at the expense of less-competitive beet sugar producers, but also at the expense of EU full-time refiners, and aimed at pushing both groups out of the market by increasing their beet sugar production.

The main concerns of beet sugar producers[139] in relation to EU trade policies are linked with the negotiations of new FTAs, which in the future might grant preferential access to additional volumes of sugar from the following clusters of exporting countries:

- highly competitive countries (e.g., Australia) that should be able to profit from sugar exports to the EU even when its domestic white sugar price is low, provided that they are granted zero-duty access or access at a relatively low duty;
- countries that implement practices that distort the dynamics of the international sugar market. For instance, in the case of Brazil, the main identified practices are: the use of agronomic practices not allowed in the EU (e.g., the use of certain plant protection products that are not authorised for use anymore in the EU); ii) the implementation of cross-subsidisation through support to the cane ethanol industry; and, iii) the devaluation of the national currency (Brazilian real) against the US dollar to support the competitiveness of Brazil's exports.

In this regard, it should however be considered that:

- The Commission has committed to promote its policy priorities concerning a more sustainable food system, set in its Farm to Fork Strategy, through international cooperation.
- Many bilateral trade agreements already include chapters on "Trade and Sustainable Development".
- The Mercosur FTA includes a bilateral safeguard mechanism that allows the EU to adopt temporary measures to regulate imports in the event of an unexpected and significant increase in imports, which causes, or threatens to cause, serious injury to its domestic markets. For the first time, these safeguards also apply to agricultural goods covered by tariff quotas, like sugar.
- The entry into force of the Mercosur FTA remains subject to the presentation of a Commission proposal to the Council and the European Parliament for signature and conclusion.
- In the framework of the ongoing FTA negotiations with Australia, sugar will be treated as a sensitive product, as it was the case for previous FTAs and as recommended to the Commission by the High Level Group on sugar (HLG, 2019).

*Effects on the **availability of an adequate sugar supply in the EU***

In terms of ensuring an adequate supply of sugar to the EU market, the current EU trade policy seems to have a rather limited impact. After the well-known situation of oversupply after the 2017/18 marketing year (with the EU switching to net exporter status; see § 4.3), the EU reverted to its usual condition of net importer, but the deficit was significantly more limited than in the pre-quota period, which suggests that the surplus production of 2017/18 had a prolonged effect on the supply balance, and excludes a situation of shortage in the post-quota period[140]. Therefore, despite a drop in the overall imports of sugar in the EU and the different composition of raw cane sugar imports in terms of origins, an adequate supply of sugar in the EU does not seem under discussion in the medium term. However, it should also be noted that the production risks of the beet sugar supply chain (for instance the possibility that unfavourable weather conditions may negatively affect sugar beet yields) do exist, and can be unpredictable. However, like other agricultural sectors, the sugar sector is also covered

[139] This section mainly reports the perceptions of key stakeholders on the matter, and contains a summary of the main elements featured in position papers publicly available on the CEFS website (https://cefs.org/resources/position-papers/), and evidence collected from interviews with stakeholders carried out in the framework of the study.

[140] The analysis of the effects on the availability of an adequate sugar supply in the EU is performed at aggregate level, i.e., by considering the overall volume of sugar available on the EU market. However, if the availability of an adequate supply of raw cane sugar for the EU refining sector is considered, the current situation leads to a reduced possibility for EU refiners to have access to an adequate supply of raw cane sugar. This is the main reason behind the call by EU sugar refiners for the inclusion of duty-free access to raw sugar through EU free trade agreements with raw sugar exporting countries.

by the **disturbance clauses** ex Article 129 of the CMO Regulation, which would allow the Commission to temporarily activate the opening of "emergency" TRQs for raw sugar and white sugar, in order to improve the availability of sugar on the EU market should the domestic beet sugar production be jeopardised by adverse events.

On the other side, raw cane sugar or white sugar imports at zero or reduced duty from third countries covered by certain trade arrangements with the EU do not seem to be the cause of the **current oversupply of sugar on the EU market**. According to some consulted European Commission officers, the oversupply in the first post-quota marketing year (2017/18) was mainly caused by a combination of factors related to EU domestic production of beet sugar (exceptionally high yields, several EU beet sugar producers expanding their output, etc.). In the views of those officers, the oversupply of the EU market cannot be linked to sugar imports via TRQs, which in fact sharply decreased in the post-quota period because of low EU white sugar prices. Indeed, EU sugar imports (and even more so zero-duty ones)[141] have accounted for a rather limited share (3-6%) of total EU sugar consumption (18-19 million tonnes; see § 4.3) in the post-quota period: this implies a rather strong degree of protection of the EU domestic market ensured through TRQs and import duties. A recent study by the Joint Research Centre of the European Commission (Ferrari et al., 2021) comes to similar conclusions.

8.1.3 Voluntary coupled support

Description

A detailed description of the functioning mechanism of voluntary coupled support (VCS) to sugar beet is provided at § 3.1.2. It is sufficient to remind here that within certain limits, the unit amount (Euros/ha) of coupled support to sugar beet cultivation varies according to decisions of individual Member States, with annual variations mostly caused by variations in the annual sugar beet area eligible for support.

Intended effects

According to art. 52 of Regulation (EU) No 1307/2013, VCS is a production limiting support scheme (falling into WTO blue box subsidies) based on (historical) fixed number of hectares/heads. It can only be granted to a selected list of sectors that are particularly important for economic, social or environmental reasons, and which undergo certain difficulties. Therefore, VCS is not a measure intended to increase the production of the supported sectors. As explained at § 3.1.2, the historical reference area for VCS for sugar beet is underutilised in most Member States, which suggests that the difficulties in the concerned Member States, due to which the aid is granted, apparently persist. In addition, to mitigate the risk of market distortion, the granting of VCS is also subject to a strict budgetary limit at Member State level, i.e., maximum 8/13% (+2% for protein crops) of their national envelope. Furthermore, within this budgetary limit, the measure is also subject to a binding financial ceiling linked with the production limiting character of the support.

Actual effects

The analysis of the effects of VCS on the two dimensions of the resilience of the EU sugar sector is carried out in combination. In fact, the support granted through this tool ensures an income for sugar beet growers which is independent from other factors influencing their profitability (e.g., sugar beet price and sugar prices, sugar beet yields, polarisation, etc.). Such a non-variable basic income contributes to the stabilisation of sugar beet area, even though the granting of VCS in itself does not ensure that farmers will opt for growing sugar beets rather than alternative crops. By addressing structural problems in sugar beet farming, VCS may also indirectly contribute to mitigate their

[141] Imports from EBA/EPA countries have fallen in the 0,5-1 million tonnes range (raw and white sugar combined) in the post-quota period.

potentially negative implications for processing plants (mainly in terms of reduced area under sugar beets).

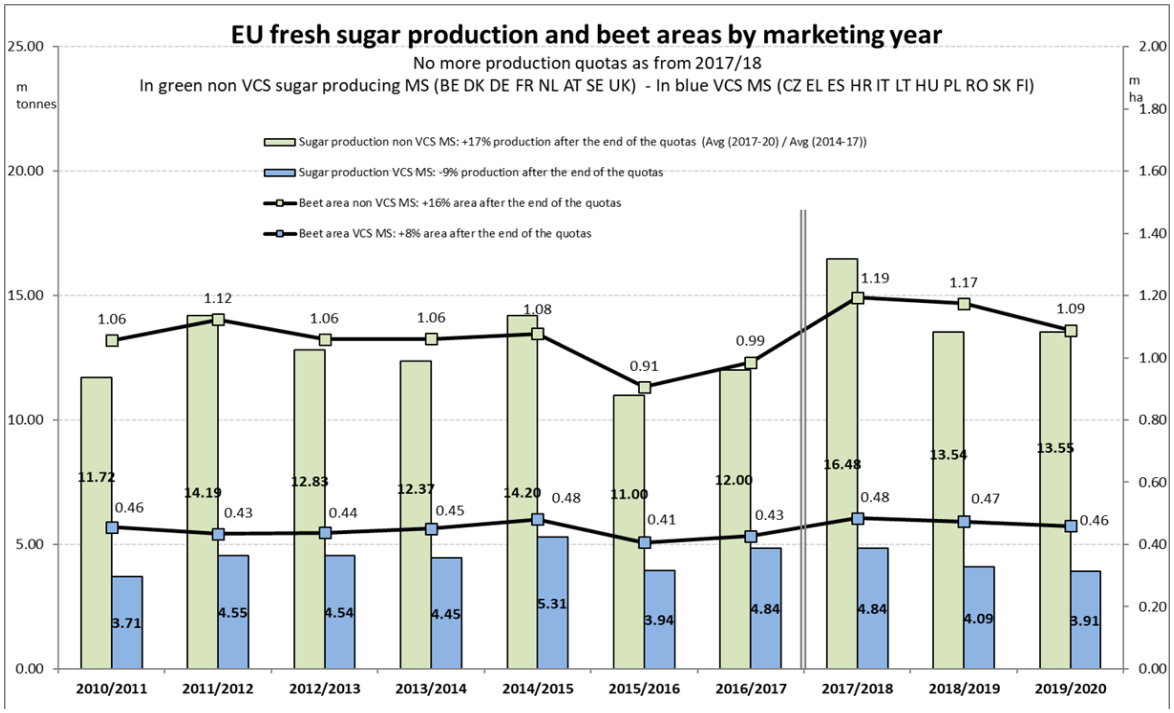
The effects of VCS on both dimensions of resilience are not straightforward, and are mainly influenced by two factors:

- national decisions about whether to grant VCS to sugar beet farming or not;
- the intensity of support granted in each Member State.

As a general rule, the higher the level of support, the more significant the positive effects on the resilience of the national sugar supply chain. However, according to some consulted stakeholders, the positive effects for the group of beneficiaries (i.e., sugar beet growers of Member States where VCS is granted) come at the expense of the group of non-beneficiaries (i.e., sugar beet growers of Member States where VCS is not granted). In the light of the polarised views of stakeholders on the effects of VCS on the resilience of the EU sugar sector, the following section provides a description of the diverging perceptions of advocates or critics of VCS.

Member States granting coupled support consider it as a key contribution to sustaining sugar beet production in regions where it is declining or facing difficulties; by contrast, most Member States not granting VCS claim that the measure may hamper the very concept of the single market. Evidence collected in a selection of Member States where in-depth investigations were made is also backed up by the 2019 Report of the High Level Group on Sugar, in which the polarisation of positions on VCS is clearly presented. All the Member States granting VCS for sugar beet (PL, RO, IT, EL, ES, CZ, FI, HU, LT, SK, HR) consider it an important tool for stabilising farmers' income in a sector facing difficulties, in view of avoiding a significant decrease/complete stop of their domestic sugar production in areas sensitive for socio-economic and environmental reasons. By contrast, six Member States not granting VCS for sugar beet (DE, AT, SE, NL, DK and UK, which was then still part of the EU), underlined that the measure distorts competition by artificially maintaining sugar beet cultivation in less efficient and competitive areas. In their views, VCS hence hampers the creation of a level playing field in the EU and negatively affects those Member States with a competitive sugar sector that are not granting VCS to sugar beet farming. Consequently, these Member States called for eliminating VCS for the sugar beet sector after 2020 or, at least, for imposing more restrictive conditions. However, an updated analysis carried out by the European Commission services (Figure 8.3) has revealed that the aggregated area under sugar beet, and even more so the aggregated sugar production in the Member States granting VCS to sugar beet, have declined in the post-quota period. The expansion feared by non-VCS Member States has hence failed to materialise.

Figure 8.3 – EU sugar production and area under sugar beets: comparison between VCS and non-VCS Member States



Source: European Commission, DG Agriculture

While **VCS has no direct links with the end of quotas**, its elimination would represent a serious risk for sugar beet growers (and processors, albeit indirectly) in situations of depressed sugar prices, considering the lack of legislation-based supply management at Member State level. Without VCS, the economic viability of the whole beet sugar supply chain in certain Member States would be further threatened, and the very existence of that supply chain in those States would be challenged, because farmers currently cultivating sugar beets would be more and more attracted by alternative crops, thus putting sugar beet supply at risk of disruption[142]. It is important to underline that yields (in terms of both sugar beet and sugar production per hectare) in Member States granting VCS to sugar beets are significantly lower than in non-VCS Member States (see § 4.1.2.1). VCS may also indirectly contribute to limit the risk that domestic beet sugar production ceases in certain Member States where there is only one beet sugar producer, or even only one beet sugar factory left: a decline in sugar beet areas (which the granting of VCS tries to prevent) can actually put at serious risk the operation of processing plants. In other words, without the possibility for national governments to grant support via VCS to sugar beet farming in those Member States, their domestic beet sugar production may risk to cease altogether. Therefore, VCS is considered necessary for some Member States to avoid that domestic beet sugar production will disappear, resulting in serious economic/social consequences (i.e., domino effect in the downstream market in rural areas often already marked by high structural unemployment).

On the other hand, **critics of VCS to sugar beet** deem that this non-EU wide support jeopardises the level playing field for beet sugar producers across the EU, thus leading to distortion of competition. According to some stakeholders, the achievement of the aims of the restructuring process of the EU sugar sector promoted by the 2006 reform of the sugar regime, which theoretically should have resulted in a level playing field for

[142] The intensity of this potential risk also depends on the geography of sugar beet processing: in some regions of a certain Member State sugar beet could remain a profitable crop also in the absence of VCS, whereas in other regions farmers could switch to other, more profitable crops.

all EU operators, has been undermined by the implementation of VCS. In their views, less efficient sugar producers in Member States like Italy and Spain indirectly benefit from unintended effects of the granting of VCS to sugar beet farming: VCS would contribute to artificially make them cost-competitive also against more cost-efficient producers, mainly by helping to limit a decline in the supply of sugar beets to processing plants that would be costlier to prevent via sugar beet prices only. According to those stakeholders, VCS would have the unintended negative effect of keeping on the market operators that are less cost-efficient in Member States where production costs are too high. In their views, the granting of VCS hampered the finalisation of the reform of the EU sugar regime, which is hence deemed to be still ongoing and not fully completed, and limited the possibility for the least cost-efficient operators located in some Member States to face the consequences of the end of quotas. In this regard, it is however important to underline that some forms of coupled support to sugar beet farming were in place also before the introduction of VCS in 2015 (in particular, support pursuant to Article 68 of Regulation (EC) No 73/2009).

However, also among Member States that granted VCS for sugar beets, the effect of this support on the competitiveness of the sugar industry appears to be uneven: for instance, in Croatia an increased level of VCS for sugar beet, in combination with "de minimis" national support introduced since 2019, was not attractive enough to stop a declining trend in sugar beet farming. However, it is reasonable to assume that VCS was important for those sugar beet growers who continued to grow sugar beets. In Poland, according to some consulted stakeholders, the abolishment of this form of support would result in the withdrawal of a considerable share of sugar beet growers from business.

According to some consulted experts and stakeholders, VCS would have a negative effect on cane sugar refiners located in Member States (e.g., Italy, Romania) that grant this support to sugar beet farming. In their views, supporting sugar beet farming through VCS would indirectly help beet sugar producers in those Member States to remain cost-efficient (through the mechanism explained above), hence distorting the relative competitiveness of raw cane sugar refining vis-à-vis the competitiveness of beet sugar production in those countries.

The impact assessment carried out by the European Commission[143] in the context of its CAP post-2020 reform legislative proposals concluded that VCS could help addressing specific issues that the decoupled payment would otherwise leave unresolved. The impact assessment however identified also certain shortcomings, in particular for the sugar beet sector, including:

- **The lack of targeting**, since in Member States granting a coupled payment to sugar beet, generally all the area is eligible, and not only areas located in specific territories. In this regard, it could however be argued that the difficulties affecting sugar beet farming in the Member States granting VCS (and low yields in particular) are not specific to certain regions.
- A **contradiction with a market-oriented policy**. The use of coupled support can be questioned when it is used, like in the sugar sector, to compensate for the lack of competitiveness of a whole country (and not of a specific territory). Clearly, in such cases Member States have put forward the social dimension of support via VCS, which helps keeping employment in the related processing industry.
- **Competition issues**. Coupled support introduces elements of unfair competition between Member States. For instance, VCS granted in 2015 ranged from

[143] European Commission Staff Working Document SWD(2018) 301 final - *Impact Assessment accompanying the Proposal for a Regulation of the European Parliament and of the Council establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic Plans)*.

80 Euros/ha in Finland to 780 Euros/ha in Romania. In other words, in Romania sugar beet growers received a coupled support that, due to the low sugar beet yields in the country, translated into an amount of around 20 Euros per tonne of sugar beet. However, it should be considered that disadvantages in terms of productivity of sugar beet farming (i.e., yields per hectare) in the Member States granting VCS vis-à-vis non-VCS Member States are often substantial[144].

- **Disproportionate unit amounts** may be paid: this happens, in the absence of any "safeguard", when to prevent unspent funds Member States increase the unit level of VCS whenever there is a substantially smaller number of applicants than planned. However, it should be considered that this happens when the eligible area decreases substantially: the overall impact in terms of sugar beet supply is hence limited. Higher VCS payments per hectare when cultivated areas are in strong decline are actually the incentive through which VCS tries to encourage production in difficult conditions. Should production start to recover (i.e., the number of eligible hectares start to grow), it would result in a proportional decrease of the unit rate.

8.1.4 Decoupled direct payments

Description

Income support granted to EU farmers pursuant to Regulation (EU) No 1307/2013 is also available to sugar beet growers. In EU Member States, support to farm income is mainly provided via decoupled direct payments, mostly in the form of a basic payment (around 55% of the total budget for direct payments) and a payment for sustainable farming methods ("greening"; 30% of the total budget for direct payments).

Intended effects

As explained under question 4 (see § 7.2.1), decoupled direct payments are not conceived as a risk management tool (i.e., they are not intended to address conjunctural crisis situations by offering *ad hoc* solutions). Nevertheless, they do have implications in terms of risk management and, above all, can contribute to improved resilience of farmers, including sugar beet growers. Direct payments have been conceived as instruments aimed at supporting farmers' income and reducing income variability, and can also limit the negative effects of low or volatile yields and/or prices. In addition, a portion of direct payments funds an EU-wide crisis reserve that can be used by the European Commission to finance emergency measures in circumstances that go beyond normal market developments (article 226 of CMO Regulation).

Actual effects

The assessment made under questions 4 (§ 7.2) and 6 (§ 7.4) concluded that direct payments play an important role in stabilising sugar beet growers' income, especially when sugar beet prices are low or volatile, since they usually account for a large share of total farm income (this is confirmed by a recent study by the Commission[145]) The fact that income support from decoupled direct payments is broadly available to EU farmers – including those growing sugar beets – subject to certain conditions, translates into an extremely wide uptake of this policy instrument, which further reinforces the importance

[144] By way of example, sugar beet yields in Romania (VCS-granting Member State) in the post-quota period were in the 38-42 tonnes/ha range, whereas in Belgium (non-VCS Member State) they were in the 83-95 tonnes/ha range.

[145] European Commission (2021b), Commission Staff Working Document *Evaluation of the impact of the CAP measures on the general objective 'viable food production'*, SWD(2021) 105 and 106 final, Brussels, 11.5.2021. The Staff Working Document is based on the findings of an evaluation support study financed by the European Commission and carried out by EEIG Agrosynergie (https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/products-and-markets/impact-cap-measures-towards-general-objective-viable-food-production_en).

of its contribution to an improved resilience of the EU sugar beet farming sector. Being decoupled from production, direct payments have no effect on sugar beet and sugar supply in the EU.

8.1.5 Key findings

Table 8.3 provides an overview of the key findings of the assessment.

Table 8.3 - Effects of the current regulatory framework at EU and national level on the resilience of the EU sugar sector

Elements of the policy framework	Effects on the economic viability of the main actors in the EU sugar supply chain	Effects on the availability of an adequate sugar supply in the EU
End of the sugar quota system + end of sugar beet minimum price	**Indirect effects, in combination with other factors;** contribution to reduced margins and profitability for sugar beet growers and sugar producers	**At EU level**: **no remarkable effects** (stable sugar beet area and increased sugar production) **At Member State level**: **variable** effects depending on the specific situation of the national sugar sector → redistribution of sugar beet area and sugar production across the EU
EU trade policy	**No effects** on the economic viability of **EU beet sugar producers and sugar beet growers** *(but future FTAs are perceived as a threat to economic viability)* *Negative effects on the profitability of EU sugar refiners (reduction of imports of raw cane sugar and reduction of refining margins) appear to be related to the evolution of international raw sugar prices vis-à-vis EU white sugar prices, rather than to EU trade policy, which remained basically unchanged after the end of quotas*	**No significant effect** on the **availability of sugar** (white sugar and raw sugar for refining) on the EU market *(reduced availability of raw cane sugar for refining in the post-quota period appears to be related to the evolution of international raw sugar prices vis-à-vis EU white sugar prices, rather than to EU trade policy, which remained basically unchanged after the end of quotas)*
Voluntary coupled support to sugar beet	**Positive effect** on the **margins and income of sugar beet growers** in the **MS granting VCS** **Positive effect** on the **profitability of sugar beet growers** in the **MS granting VCS** *May indirectly contribute to mitigate potentially negative implications for the economic viability of sugar beet processors deriving from structural weaknesses in sugar beet farming (e.g., reduced area under sugar beets)*	May contribute to prevent a reduction in the extent of areas under sugar beets in the **MS granting VCS**, thus indirectly helping to mitigate potentially negative implications in terms of reduced domestic sugar supply **Neutral effect** on sugar supply in the **EU as a whole**
Decoupled direct payments	**Positive direct effect** on the **stability of the income of sugar beet growers** **No effects** on the economic viability of **EU beet sugar producers**	**Neutral effect** on sugar supply in the **EU**

Source: assessment made at § 8.1.1 to 8.1.4

8.2 Q11: How the proposed CAP and other relevant EC initiatives (e.g., Farm to Fork strategy) may affect the current regulatory framework and sector's resilience?

Definition of key terms

"Resilience of the EU sugar sector" (as defined in question 1 – summarised here for the purposes of question 11). The general definition of the concept of "resilience" as followed in this study is the ability of a **system** to absorb the impact of a significant **disturbance in its environment**, and to still continue to provide an **acceptable level of** service/**performance**. In the specific context of the study, the key elements of this general definition are defined as follows:

- The "***system***" is identified as the **EU sugar sector** encompassing the entire supply chain: sugar beet growers, sugar producers, sugar users, sugar traders and distributors, etc. This includes the **institutional framework** in which the system operates (as defined by relevant legislation at EU, national, regional level).
- The "***disturbance in the environment***" is identified as any perturbation caused by external factors affecting the EU sugar sector, including climate, pest outbreaks, **policy changes**, etc.
- The "***acceptable level of performance***" of the EU sugar sector, which should be ensured by its resilience, is identified in the combination of: i) the economic viability of its actors (in terms of adequate income levels for sugar beet growers and satisfactory profitability levels for sugar producers, including full-time refiners), and; ii) the availability of an adequate sugar supply in the EU (intended as the combination of domestic sugar production and sugar imports from third countries, where relevant) in terms of sufficient volumes and satisfactory quality.

Understanding of the question

The conceptual framework used to address question 11 includes the analysis of: the relevant initiatives affecting the current regulatory framework; and, the way these may exert positive/negative impacts on the sector's resilience.

The description of the **key initiatives considered in the assessment** comprises several packages of relevance to this study. These include:

- The **reform of Common Agricultural Policy (CAP)**, as well as national action plans / strategies targeted at the sugar sector; and,
- EU strategies that interact with the CAP and directly or indirectly affect the sector, most notably the **European Green Deal**. In particular, the two major components of the Green Deal of relevance to this study are: the **Farm to Fork (F2F) Strategy**; and, the **Biodiversity Strategy**.

The definition of the future regulatory framework as set out above only provides an outline of what is currently known about the **potential changes to be introduced** by the proposed 2021-2027 CAP and the Farm to Fork and Biodiversity strategy.

Given that the policy scenarios and their impacts will materialise beyond the time frame of this study, the methodological framework has been adapted towards performing a **forward-looking assessment**. This means that the focus is on highlighting ***a priori* expected potential, rather than actual, impacts**, as it is still too early to understand the implications of the global quantitative goals set out in this prospective policy framework for the sugar sector and their potential impacts on the sector. The judgment criteria and indicators are developed bearing these considerations in mind. In particular, the expected impact of the potential implementation of the new policy measures on the sugar sector and its resilience is carried out based on the latest available Commission proposals at this phase of the study. As proposals are currently not sufficiently developed to make a more quantitative analysis meaningful, reasonable assumptions/ hypotheses on the likely regulatory framework have to be developed.

Given the uncertainty about policy implementation at this stage of the study, the indicators available for the assessment are mainly qualitative; some quantitative indicators have been included where possible. In particular, the analysis of the possible impacts of the reformed CAP and other relevant EC initiatives is performed against the *current status quo* of the EU sugar sector as reported in the descriptive chapter of the study. Thus, the final output to answer question 11 is a synoptic table providing a synthetic judgment on the potential impact of each policy area in increasing (positive impact), or decreasing (negative impact), the resilience of the EU sugar sector.

8.2.1 Description of the potential changes to the current regulatory framework

The changes to the current regulatory framework on which the analysis in Question 11 is focused are those outlined in § 3: notably, the post-2020 CAP (§ 3.2), and changes in environmental policies (§ 3.3.3). *(Note: changes in nutrition policies foreseen under the Farm to Fork Strategy are examined in Question 13, see § 8.4).*

In particular, the following key changes are identified for the analysis of Question 11:

1. **CAP**: proposed changes of relevance to the sugar sector – comparison to *status quo*. Relevant indicators are:
    a. Direct payments: per ha aid
    b. Rural Development measures
    c. Greening measures and voluntary eco-schemes
    d. Newly introduced sectoral interventions
2. **F2F Strategy:** foreseen actions of relevance to the sugar sector – comparison to *status quo*. Relevant indicators are:
    a. Pesticide use:
        i. reduce the use and risk of chemical pesticides by 50% by 2030
        ii. reduce the use of more hazardous pesticides by 50% by 2030
    b. Fertiliser use:
        i. reduce nutrient losses by at least 50% while ensuring no deterioration on soil fertility
        ii. as a consequence, reduce fertiliser use by at least 20% by 2030
    c. Land under organic management:
        i. increase the proportion of EU farmland under organic management to 25% by 2030
3. **Biodiversity Strategy**: foreseen actions of relevance to the sugar sector – comparison to *status quo*. Relevant indicators are:
    a. **Productive land**: cut in area currently in production

It is noted that the Green Deal, the Farm to Fork Strategy and the Biodiversity Strategy are Commission Communications, and, in this sense, they contain **the Commission's aspirations and initiatives**. The European Council has adopted conclusions on the farm to Fork Strategy and the European Parliament is preparing a resolution to be voted on in the coming months. The initiatives and targets in the Farm to Fork Strategy will then find its way into other legislation.

The Organic Action Plan is a specific outcome foreseen in the Farm to Fork Strategy. This was published on 25 March 2021 and sets out mechanisms to achieve the target of 25% of EU farmland under organic management by 2030 under three axes:

- Axis 1: stimulate demand and ensure consumer trust
- Axis 2: stimulate conversion and reinforce the entire value chain
- Axis 3: organics leading by example: improve the contribution of organic farming to environmental sustainability

The three axes will be supported by 23 actions, some of which were already employed in the 2014-2020 programming period, as well new actions and different sources of funding.

Other initiatives are in the pipeline, including a review of the EU pesticides legislation, and legislation on food labelling.

The post-2020 CAP will be one of the main mechanisms through which Member States will achieve the targets set out in the Farm to Fork Strategy and the Biodiversity Strategy.

Under the post-2020 CAP, Member States will produce National Strategic Plans (NSPs), based on the Commission's recommendations. These are expected by the end of 2021 and will put into place the mechanisms to deliver on the targets set out in the Farm to Fork Strategy and the Biodiversity Strategy at the Member State level; the NSPs will have to be approved by the Commission (expected by autumn 2022) on the basis of legislative criteria. ***Together, the NSPs will be expected to deliver the quantified targets which are set at the EU level.***

At the time of writing, i.e., before the agreement of the post-2020 CAP and before the drafting and approval of Member State NSPs, there is no basis for making assumptions in terms of what targets individual Member States will set out, how they will achieve these or to which sectors measures will apply. In particular, the following crucial elements are not known at the time of writing:

1. How the overall quantitative targets (as set out in the reformed CAP; Farm to Fork Strategy; Biodiversity Strategy) will apply to the sugar sector in each Member State;
2. The baseline for the percentage reduction targets is not defined.

However, clues as to the likely areas in which action will be required can be taken from the Commission's recommendations to the Member States. Hence, for the purposes of this analysis, a broader conceptual analysis is followed on *a priori* expected impacts, based on the elements that are defined at present.

8.2.2 Intended/expected effects on the EU sugar sector's resilience

The theoretical assessment of the intended/expected effects of the policy changes on the EU sugar sector's resilience are described per policy area below. The assessment focuses on the extent to which the identified impacts are expected to improve or worsen the sector's resilience in terms of:

- economic viability of the main actors in the EU sugar supply chain;
- availability of an adequate sugar beet supply in the EU.

1. CAP

a. Direct payments:

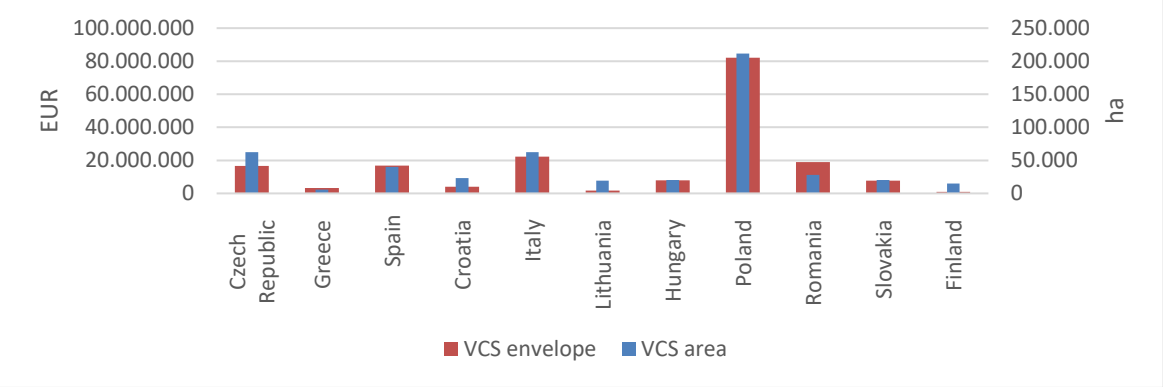
It is not possible to foresee potential changes to direct payments applying in the sugar beet sector and to estimate their impact. *A priori*, a general recommendation by the Commission for most Member States is to improve the viability of farms through a fairer targeting of income support that reduces income gaps between different farm sizes (in particular in favour of smaller-sized farms), by applying, for example, the complementary redistributive income support for sustainability and the reduction of payments. On this basis, given that farms producing sugar beet tend to be larger scale, they may potentially be affected by reduced payments.

On the other hand, the first specific objective with regard to viability of farms also aims to aid those sectors that encounter difficulties; this concerns a closed list of potentially eligible sectors, which also includes sugar beet. The re-designed coupled support (coupled income support, which shows many similarities with its predecessor, i.e., voluntary coupled support) aims to address difficulties by improving competitiveness, quality, and/or sustainability in such sectors. Nonetheless, the Member State support decisions from claim year 2023 onward are not yet known and, as already indicated in Question 3 (§ 7.1), a potential future abolition or reduction of coupled support is seen as a future risk by those actors in the sugar beet supply chain who currently benefit from it.

Originally, ten Member States decided to grant voluntary coupled support (VCS) in the sugar beet sector from claim year 2015. This increased to 11 Member States from claim year 2017. The sugar beet sector accounts for 4.28% of all financial allocations (claim year 2020) under VCS. In total, EUR 182.2 million were earmarked in VCS for this sector

in claim year 2020, making it the sixth largest VCS beneficiary and the third most important area-based beneficiary (507 669 ha). The average claim is 359 EUR/hectare (EU27 average for claim year 2020). The Member States providing such support include four of the producers analysed in the case studies[146]: **Croatia, Italy, Poland and Spain**. These four Member States account for 66% of all EU sugar beet area under VCS and 69% of VCS funding (two other Member States with significant participation in VCS in the sugar beet sector are Romania and the Czech Republic). It is noted, however, that the 11 Member States applying VCS only account for a relatively small share (i.e., 30%) of the total EU-27 sugar beet area.

Figure 8.4: *Voluntary coupled support (VCS) in the sugar beet sector by Member State, 2020*



Source: European Commission, Informative Note on Voluntary coupled support, July 2020[147]

b. Rural Development measures / c. Greening measures and voluntary eco-schemes / d. Newly introduced sectoral measures

It is not possible to foresee potential changes to rural development measures, greening measures, voluntary eco-schemes[148] or newly introduced sectoral measures applying in the sugar beet sector and to estimate their impact, as many aspects related to their implementation will be established by the Member States in their CAP Strategic Plans. *A priori*, these measures should have a positive (indirect) impact on improving growers' viability by mitigating to some extent other negative impacts, although in the case of b. and c. this is not the main focus/objective of the measures. The Commission has recommended to all countries to foresee the uptake of greening and eco-schemes in their National Strategic Plans. It is noted that the share of agricultural area under high diversity landscape features remains relatively low in all Member States (well below the Commission's Green Deal target of 10% by 2030) with the exception of Spain. In the case of d., voluntary measures specifically targeting the sugar sector can be expected to have a positive impact on the sector where these are selected by Member States.

2. F2F Strategy

The Commission has presented the reference values by Member State for the quantified Green Deal targets [149]. Case study Member States with a significant way to go to meet

[146] Other Member States (not covered by the case studies) are: Czech Republic, Finland, Greece, Hungary, Lithuania, Romania, and Slovakia.

[147] https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/voluntary-coupled-support-note-revised-july2020_en.pdf

[148] A list of potential agricultural practices that eco-schemes could support can be found here: https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/factsheet-agri-practices-under-ecoscheme_en.pdf

[149] Annex 1 of the Commission's Recommendations to the Member States as regards their CAP strategic plans (COM(2020) 846 final, 18/12/2020).

the Commission's overall targets include Austria (pesticide reduction); Netherlands, Poland, Bulgaria, Ireland, Malta and Romania (organic area); and, Austria, Belgium, Croatia, France, Germany, Czech Republic, Luxembourg, Slovakia and Poland (share of agricultural area under high diversity landscape features). On the other hand, Croatia and Portugal in particular have made good progress with respect to pesticide reduction, while Austria has almost reached the target for organic area and Italy has made considerable progress in this area.

The Commission has also provided Member States with recommendations to help in the drafting of their National Strategic Plans[150]. These highlight the situation in specific areas and the actions that are needed to move towards the Farm to Fork objectives. Analysis for each of the foreseen actions is presented in the sub-sections below.

a. Pesticide use:

The foreseen reduction in the use and risk of chemical pesticides by 50% by 2030, and of more hazardous pesticides by 50% by 2030, cannot be translated at present to exact targets for the sugar beet sector in any Member State given that the national CAP National Strategic Plans are not yet ready. As explained at § 3.3.3.2, the sugar sector believes it will be affected by the reduction, along with the other arable sectors, and the impact will be negative at least in the short term – until viable solutions offering alternatives to the chemical pesticides (e.g., Integrated Pest Management, as recommended by the Commission) can be put into use[151]. The availability at EU level of significant funds for R&D under Horizon Europe dedicated to finding alternatives to plant protection products is a risk mitigating factor, but the sector has an important role to play in accessing these funds. Overall, in the Commission's view, the effects are difficult to quantify (particularly longer term ones), therefore great precaution should be used when drawing any conclusion in that regard.

All Member States, including the main sugar producers, have a significant way to go to address the recommended reduction – but the rate of progress varies significantly by country. For example, France (accounting for 29% of the EU-27 sugar beet area) records a more or less stable pesticide use during the period from 2011-13 to 2018,[152] which suggests that significant progress is necessary to meet the Commission's overall target; by contrast, progress in pesticide reduction over the same period in Germany and Poland (respectively, accounting for 27% and 16% of the EU-27 sugar beet area) suggests that they are closer to the Commission's overall target.

Amongst the more hazardous pesticides, neonicotinoids are particularly relevant for sugar production. Their potential elimination (end to derogations granted under Article 53 of Regulation (EC) No 1107/2009 for the use of banned neonicotinoids in special circumstances and for limited and controlled use) is likely to negatively affect the sugar sector in the ten Member States that apply derogations (amongst them, some major EU sugar producers such as France, Poland, Belgium). EFSA found that alternatives were only available for around one third of the products for which emergency authorisations were granted[153]. However, efforts are under way in some countries to improve the situation and there is some evidence to suggest that effective methods are in fact available (Jactel, *et al.*, 2019).

[150] Commission's Recommendations to the Member States as regards their CAP strategic plans (Commission Staff Working Documents, 18/12/2020).

[151] See also the joint open letter from agri-food chain organisations on this issue: https://www.cibe-europe.eu/Data/Files/132b-21_JOLfromAFCRTorgs.pdf

[152] It is noted that for the purposes of the Green Deal target, the indicator will be re-indexed to set 2015-2017 as the reference period.

[153] https://ec.europa.eu/food/plants/pesticides/approval-active-substances/renewal-approval/neonicotinoids_en

b. Nutrient losses/fertiliser use:

The foreseen reduction in nutrient losses by at least 50% cannot be translated at present to exact targets for the sugar beet sector in any Member State given that the CAP National Strategic Plans are not yet ready. Furthermore, as noted in the Eurostat methodological note regarding the data available, the current balances are not comparable between countries due to differences in definitions, methodologies and data sources used by countries.

The available data nonetheless indicate that all countries, including the main sugar producers, have a significant way to go to address the recommended reduction, although the rate of progress and the issues that countries face to achieve an improvement in nutrient balance vary significantly by country.

However, in all countries the biggest contributor to nutrient losses tends to be the livestock sector, while the sugar sector is generally not considered to be a significant contributor to this problem. Therefore, *a priori*, the sugar sector will not be as affected by the measures aiming to limit nutrient losses, although some effects should occur as with the other arable sectors. The impact could be negative at least in the short term – until viable solutions contributing to improve fertiliser management and application can be put into use. Once such solutions are adopted, to the extent these result in improved input management and yield improvements, the longer-term impact could well be positive.

c. Organic farming:

The total organic farming area is relatively low in all major sugar producing countries, including France, Germany, Poland, the Netherlands and Belgium; while a very minor share of sugar beet area is currently registered as organic. However, a major factor to stimulate growth in organic production is demand for organic products; this factor, *a priori*, can act as an impediment in the sugar sector, as hardly any demand for organic sugar (except for cane sugar) as such has been identified in the Member States covered by case studies. However, if demand for organic sugar developed longer term, a shift to organic production would present opportunities for the development of premium products at premium prices, thus potentially exerting a positive impact on viability.

3. Biodiversity Strategy

a. Productive land

The foreseen cut in area currently in production cannot be translated at present to exact targets for the sugar beet sector in any Member State given that the national CAP National Strategic Plans are not yet ready. *A priori*, the sugar sector will be affected by the cut, along with the other arable sectors. The impact could be negative, unless two mitigating factors are in place: a) there are considerable yield improvements in the remaining land in production; and b) some compensation is foreseen under, e.g., the greening measures and eco-schemes. If these mitigating factors apply, the impact could be positive in the longer term.

It is noted that there are ongoing private sector initiatives on this: e.g., the LIFE Food and Biodiversity project which aims (*inter alia*) to improve the environmental sustainability of sugar beet production by highlighting best practices along the whole production cycle from soil preparation and seeding to harvest[154]. The recommended practices include that a minimum of 10 % of the utilised agricultural area (UAA) is used to provide semi-natural habitats. The project also highlights the importance of appropriately designed greening measures under the CAP for ensuring this goal, noting that the *"first assessments after two years indicate the necessity to adjust the current set of greening measures, as the effect on biodiversity is not apparent".*

[154] Biodiversity Fact Sheet: Arable Cropping - Arable Cropping, Cultivation of Sugar Beet. Available at: https://www.business-biodiversity.eu/en/food-standards.

The **overall results of the assessment**, summarising the potential direction of impact for each of these key potential policy changes examined under question 11, are presented in a synoptic form in Table 8.4.

Table 8.4 – Intended/expected effects of relevant provisions on the EU sugar sector's resilience (question 11)

Provisions	Effects on sugar beet cultivation		Effects on sugar production	
	Economic viability of sugar beet growers (1)	**Availability of an adequate sugar beet supply (2)**	**Economic viability of sugar producers (3)**	**Availability of an adequate sugar supply (4)**
1. CAP changes				
a. Direct payments: per ha aid	Not possible to foresee potential changes to direct payments applying in sugar beet sector and to estimate their impact – except for potential changes in **voluntary coupled support (VCS)**, depending on the final decisions taken by Member States on coupled income support in their CAP Strategic Plans.			
	A **reduction/abolition** of coupled support decisions by Member States could have a **negative impact** on growers' economic viability in the 11 Member States that apply VCS on sugar beet. Amongst them, Poland could be particularly affected, as it accounts for 42% of the total EU sugar beet area under VCS and 45% of all VCS payments. At EU level, the impact could be significant, given that the 11 Member States account for 30% of the EU-27 sugar beet area.	A reduction/abolition of coupled support decisions by Member States could, due to impact on (1), have a **negative impact** on ensuring adequate sugar beet supply in the 11 Member States that currently apply VCS on sugar beet.	A reduction/abolition of coupled support decisions by Member States could, due to impact on (2), have a **negative impact** on producers' economic viability in the 11 Member States that currently apply VCS on sugar beet.	A reduction/abolition of coupled support decisions by Member States could, due to impact on (3), have a **negative impact** on ensuring adequate sugar supply in the 11 Member States that currently apply VCS on sugar beet.
b. Rural development measures / c. Greening measures, voluntary eco-schemes / d. sectoral measures	Not possible to foresee potential changes to rural development measures, greening measures and voluntary eco-schemes applying in the sugar beet sector and to estimate their impact. *A priori*, measures b. and c. should have a **positive (indirect) impact** on improving growers' viability (hence on (2), (3), (4), thus compensating partly for any potential negative impacts from potential reduction in coupled support, although this is not the main focus/objective of the measures. Measure d. should have a direct positive impact since these measures would specifically aim to address issues in the sugar sector; again, the measures, if any, to be selected in the sugar sector by Member States are not foreseeable at the time of writing.			

Provisions	Effects on sugar beet cultivation		Effects on sugar production	
	Economic viability of sugar beet growers (1)	**Availability of an adequate sugar beet supply (2)**	**Economic viability of sugar producers (3)**	**Availability of an adequate sugar supply (4)**
2. Farm to Fork Strategy				
a. Reduce pesticide use	**Negative impact**, particularly from potential end of derogation for use of banned neonicotinoids in the 10 Member States that apply derogations: increase in costs of treatment and/or crop losses, at least in the short term. The availability at EU level of significant funds for R&D under Horizon Europe dedicated to finding alternatives to plant protection products is a risk mitigating factor, but the sector has an important role to play in accessing these funds. Overall, in the Commission's view, the effects are difficult to quantify (particularly longer term ones), therefore great precaution should be used when drawing any conclusion in that regard.		End of derogation in use of neonicotinoids (and reduction in use of pesticides more generally) could, due to impact on (2), have a negative impact on producers' economic viability in the 10 Member States that apply derogations. Use of R&D funds to find alternatives should act as a mitigating factor.	End of derogation in use of neonicotinoids (and reduction in use of pesticides more generally) could, due to impact on (3), have a negative impact on ensuring adequate sugar supply in the 10 Member States that apply derogations. Use of R&D funds to find alternatives should act as a mitigating factor.
b. Reduce nutrient losses	**Negative impact:** increase in costs for fertiliser management and application, at least in the **short term**; although in medium to longer term, it could improve yields and/or reduce costs (i.e., could have an overall positive impact). Nonetheless, the short-term impact is not expected as strong in the sugar beet sector as in other arable sectors, and is expected to be less significant than in the case of pesticide reduction impacts.		Relatively minor negative short-term impact expected (through impact on (1) and (2)), compared to other factors examined here – unless if combined with their impacts, the cumulative effect is particularly strong.	
c. Organic farming	Expected to have a **minor positive impact**, if any, in the sugar sector: positive, due to the generally higher premium prices for organic products; albeit, minor, due to insufficient demand for organic beet sugar (compared to demand for other organic products).		Minor positive, if any, impact expected (through impact on (1) and (2)).	
3. Biodiversity Strategy				
a. Cut in productive land area	Not possible to foresee the potential impact of this provision (10% overall cut in productive land area) on sugar beet. To the extent that this cut may be compensated by yield improvements in the rest of the land remaining into production, and/or payments under greening measures and voluntary eco-schemes, there may be a **positive (indirect) impact** on improving growers' viability (hence on (2), (3), (4)). However, it is not possible to foresee at present what type of measures may apply in the sugar beet sector and to estimate their impact. *A priori*, these measures should have a potentially positive impact, although indirectly, as improving farmer viability is not the main focus/objective of the measures.			

Source: assessment by the study team

8.2.3 Key findings

The synoptic table at § 8.2.2 (Table 8.4) presents the key final output and the core of the answer to question 11. It is noted that the analysis of the potential impacts of the policy changes examined under this question is restricted by the fact that these are still at proposal stage and set overall, aspirational targets for all sectors and all Member States. It is therefore not possible at present to define how these will translate to specific targets for the sugar sector, even in the key Member States accounting for the bulk of sugar production. Within this context, the analysis has followed a conceptual forward-looking framework to assess the **broader *a priori* anticipated direction of potential, positive and/or negative, impacts**.

Bearing this methodological caveat in mind, on the basis of the information available to date, the key findings of question 11 can be summarised as follows:

- The most important **negative** impacts on the economic viability of sugar beet growers and sugar producers are expected from:
    - The **reduction in pesticide use**, as well as the end of derogations currently provided in ten Member States for the use of banned neonicotinoids (including some major sugar producing Member States). The availability at EU level of significant funds for R&D under Horizon Europe dedicated to finding alternatives to plant protection products is a risk mitigating factor, but the sector has an important role to play in accessing these funds. Overall, in the Commission's view, the effects are difficult to quantity (particularly longer term ones), therefore great precaution should be used when drawing any conclusion in that regard.
    - The **reduction/abolition of coupled support decisions** by the 11 Member States that currently apply VCS on sugar beet (these currently account for 30% of the EU-27 sugar beet area and production, including, e.g., Poland, which accounts for 16% of the sugar beet area and 12% of production).
- All of the other provisions examined are expected to have **limited, minor impacts**, as follows:
    - On the **positive** side, i.e., playing a role in mitigating negative impacts: the application of greening measures/eco-schemes (e.g., to promote the biodiversity target cut in productive land area), the availability of voluntary sectoral measures; and, the expansion of organic area under sugar beet production.
    - On the **negative** side: the application of measures to reduce nutrient losses (at least in the short-term); the biodiversity target cut in productive land area (unless, compensated by productivity gains and/or support under greening measures/eco-schemes).
- On balance, it is not possible to determine whether the overall direction of impacts on the sector's viability will be positive or negative.
- The first-order impacts of the above policy changes are expected on grower's economic viability (parameter 1, Table 8.4). These first-order impacts are then expected to trickle down to the availability of sugar beet supply (parameter 2), thus also impacting the economic viability of sugar producers (parameter 3) and the availability of sugar supply (parameter 4).

8.3 Q12: What are the main elements underlying the price transparency and price discovery possibilities (including futures markets) specific to the sugar sector, and how does it affect the sector's resilience?

Definition of key terms

"Price transparency": the definitions found in literature greatly vary according to the different context in which they are used. More general definitions of price transparency relate to the extent to which information about the bid prices, the ask prices and trading quantities for a specific stock is available[155]. In the actual context of the study, the more suitable definition relates to a process that assures that all market participants are afforded equal access to prices quoted for the respective security, commodity or currency. Such process may mean that the buyer and the seller know the price and no intermediary is involved in the transaction. The term can also relate to the availability of pricing information to the public. High price transparency would allow the public to see the broad range of bid and ask prices for each commodity, security or financial instrument. Low price transparency would limit public access to some or all of these details[156].

"Price discovery": it can be defined as the overall process, whether explicit or inferred, of setting the spot price or the proper price of an asset, security, commodity, or currency. The process of price discovery looks at a number of tangible and intangible factors, including supply and demand, investor risk attitudes, and the overall economic and geopolitical environment. Simply put, it is the situation where a buyer and a seller agree on a price, and a transaction occurs[157].

"Resilience of the EU sugar sector": see the definition provided at § 6.1.

Understanding of the question:

The concepts of price transparency and price discovery, as defined above, are strictly connected to the availability of complete, accurate and updated information on prices, as well as to the possibility to have access to reliable market forecasts. Since the possibility to base business decisions on such accurate and complete information directly impacts the capability of each business to take informed choices, the level of access and the overall quality of price information available to EU operators may have a more or less direct impact on the EU sugar sector's resilience.

8.3.1 Influence exerted by price transparency and price discovery possibilities on the EU sugar sector's resilience

This section illustrates the stakeholders' perception about the usefulness of different price information to effectively enhance business strategies and – more generally – to improve the EU sugar sector's resilience. This section is mainly based on the results of the two surveys carried out in the framework of the study, namely the survey of beet growers' associations and the survey of sugar producers. Information collected through the surveys is also supplemented by findings from interviews and case studies.

The results of the **surveys targeting EU sugar producers and sugar beet growers' associations** show that the perceived usefulness of price information to positively impact the capacity of addressing external shocks and adverse market evolutions varies between the two main categories of stakeholders; more specifically, EU beet growers' associations seem more optimistic than sugar producers regarding the overall usefulness of price information.

A possible explanation of these partially different judgements may rely on the actual use and level of knowledge of the different price sources between the two categories: while it is reasonable to assume that sugar producers are extremely familiar with the main data providers and regularly use – or at least consult – such information in their daily business, it is possible that at least some beet growers' associations are less

[155] Adapted from Investopedia: https://www.investopedia.com/terms/p/pricetransparency.asp

[156] Adapted from ForexTrading: https://www.forextraders.com/forex-education/forex-glossary/what-is-price-transparency/

[157] Adapted from Investopedia: https://www.investopedia.com/terms/p/pricediscovery.asp

acquainted with them. It could be hence inferred that those operators with higher knowledge of such price information are also more disenchanted about their real capacity to provide useful insights to adjust strategies and better face market shocks. On the other hand, it should also be noticed that for the same reasons, sugar producers are so used to analyse price information in their daily activities that they may take them for granted, thus unconsciously reducing their perceived usefulness.

Both surveys also drilled into the actual price characteristics that are deemed as more useful to implement management procedures and business strategies aimed at addressing external shocks and adverse market evolutions.

Also in this case, the feedback provided by beet growers' associations is more positive than the one by sugar producers: there is a certain agreement between the two categories regarding which **price characteristics** are **very useful to enhance the sector's resilience**, namely: *access to historical price series*, *reliable and backed-up forecasts on prices*, *reliable and backed-up forecasts on marketed volumes* and *information on futures market*.

A noteworthy group of price characteristics is made up of those **features judged as somehow useful by beet growers' associations but not by sugar producers**, namely: *information on prices formed on the spot market*[158], *information on long-term contracts* and *on forward contracts*, *weekly* and *monthly updates on prices*, *prices set in different typologies of transactions*, *prices set by different categories of actors in the sugar supply chain* and *coverage of multiple geographical markets*.

It should be noted that **the needs of the two categories of stakeholders are basically different in nature**: on the one hand, the main goal of beet growers is to increase market transparency to ensure that fair sugar beet prices are paid to farmers; this explains – for example – the very high degree of usefulness recognised to prices set by different categories of actors in the sugar supply chain. On the other hand, sugar producers are focused on the correct understanding of market fundamentals to better match supply and demand; in this context, the high degree of usefulness of reliable forecasts of market volumes can be explained.

It is worth comparing the full list of the aforementioned price characteristics with the actual availability on the market of relevant data. This allows both to understand whether the information considered as crucial by operators is actually available or not and, in case, the level of its availability (i.e., public vs. proprietary). Table 8.5 below summarises this comparison; it was compiled from publicly available information only. The table shows that some of the information deemed crucial by stakeholders is either not available on the market or at least not for free. In addition, it should be noted that some information may be theoretically available at global level, but not with details concerning the EU (e.g., futures market).

Elements emerged during interviews further stress the different views of sugar beet growers and sugar producers about price transparency and the usefulness of complete price information.

Generally speaking, interviewees agreed on the fact that the Sugar Market Observatory of the European Commission suffers from a rather long list of limitations that would hinder its usefulness. Among the most serious issues highlighted, there is the long timespan between observed prices and their publication (about two months), the fact that reported prices are the results of averages among quite old multi-annual contracts (sometimes years-old) and more recent ones, as well as the fact that the underlying contracts have different expiring dates and thus do not reflect spot prices. On the same aspect, it should also be noted that the aggregation of data in three geographical zones

[158] In this regard, it should be noted that starting from January 1, 2021, also selling prices on invoices corresponding to short-term contracts have to be reported to the European Commission, pursuant to Commission Implementing Regulation (EU) 2017/1185 (Annex II, point 3(a)(ii)).

– performed by the European Commission for confidentiality reasons – further complicates the possible utilisation of prices for business decisions. However, interviewees belonging to different categories, highlighted that with regard to the new provisions of the European Commission ruling the price reporting system, implemented through Regulation (EU) 2019/1746[159] and entered into force on January 1, 2021, it is not possible to already judge whether this new system will fill in some of the information gaps mentioned above[160]. In particular, Regulation (EU) 2017/1185 establishes (Annex II, point 3(a)(ii)) an obligation for Member States to notify selling prices for short-term contracts. An average selling price corresponding to this type of contracts is published by the Commission after all the necessary quality checks have been finalised, also taking into account the specific conditions agreed with the Member States (i.e., representativeness of the quantities sold under this type of contracts).

Table 8.5 – Comparison between degree of usefulness for operators' categories and market availability

Price characteristic	Stakeholders' views on usefulness*	Market availability (general)	Market availability in the EU	EU available sources	
				Public	Proprietary
a) access to historical price series	High for both BGA and SP	✓	✓	✓	✓
b) reliable and backed-up forecasts on prices	High for both BGA and SP	✓	✓	×	✓
c) reliable and backed-up forecasts on marketed volumes	High for both BGA and SP	Low	×	×	×
d) information on prices formed on the spot market	Medium/high for BGA only	✓	✓	✓	✓
e) information on long-term contracts	Medium/high for BGA only	✓	✓	✓	✓
f) information on forward contracts	Medium/high for BGA only	Low	Low	×	Low
g) information on futures market	High for both BGA and SP	✓	×	–	–
h) intra-daily updates on prices	Low for both BGA and SP	✓	×	–	–
i) daily updates on prices	Low for both BGA and SP	✓	✓	×	✓
j) weekly updates on prices	Medium/high for BGA only	✓	✓	×	✓
k) monthly updates on prices	Medium/high for BGA only	✓	✓	✓	✓
l) prices set in different typologies of transactions	Medium/high for BGA only	×	×	×	×
m) prices set by different categories of actors in the sugar supply chain	Medium/high for BGA only	Low	Low	Low	✓
n) coverage of multiple geographical markets	Medium/high for BGA only	✓	✓	✓	✓

* BGA = beet growers' associations; SP = sugar producers
Source: desk research; Areté: survey of sugar beet growers' associations and sugar producers, 2021

Moving to the longer list of aspects where stakeholders' categories have divergent views, the availability of reliable information on sugar prices is crucial. Interviewed **beet growers' associations** indicate that – partially because of the limits of the Sugar

[159] Commission Implementing Regulation (EU) 2019/1746 of 1 October 2019 amending Implementing Regulation (EU) 2017/1185 laying down rules for the application of Regulations (EU) No 1307/2013 and (EU) No 1308/2013 of the European Parliament and of the Council as regards notifications to the Commission of information and documents (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R1746).

[160] For further details, please see also § 3.1.3, Box 3.2.

Market Observatory reported above – the current offer of reliable data is extremely scarce if we limit our judgment to public sources only. The situation improves when the analysis includes availability of proprietary data, but it remains somehow limited for the EU market in particular. In response to the argument that a higher price transparency would weaken the bargaining power of sugar producers towards industrial sugar users, beet growers pointed out that such structured players already have all the available information at their hand to take informed decisions and to negotiate their prices. On the contrary, beet growers cannot neither rely on this proprietary information nor refer to a sugar futures market for the EU. In addition, the EU sugar market results much opaquer when compared with the US, Brazilian and Mexican ones, where official sugar prices and information on sugar uses[161] are published weekly.

On the opposite, most **sugar producers** believe that the current set of public information is already quite extensive and, in some cases, wider than the ones available for other agricultural commodity markets. With few exceptions, this category reports that the obligation to disclose prices has a double negative effect: on the one hand, it implies a weakening of their bargaining power vis-à-vis their customers, thus reducing their margins and possibility to pay higher prices to beet growers; on the other hand, this information is not useful, at the end of the day, for beet growers in their strategies and to support their bargaining processes.

Regular requests by sugar supply chain operators for further improvement of the system of price information were reported by the European Commission, clarifying that these requests are carefully assessed before being satisfied, because too much price transparency could create a vehicle for collusion among operators where very detailed price information (especially in terms of geographical markets) is provided. The European Commission also clarified that, even in the case that a higher price transparency would help beet growers in their negotiations with sugar producers, it is not the role of an institution to provide such information: the current market offer for this data ensures the possibility to implement autonomous investigations on sugar prices. Therefore, it seems that, according to the Commission, the existing EU Sugar Market Observatory already provides sufficient information to ensure price transparency, also considering the new obligations concerning the notification of selling prices in short-term contracts, applying since January 1, 2021.

8.3.2 Key findings

The elements provided in the previous sections allow to make some conclusive remarks on price transparency and price discovery in the EU sugar market, and on their influence on the resilience of the EU sugar sector.

The first aspect to take into account is the rather **polarised opinions** on this topic **by the different categories of stakeholders**. **Sugar beet growers** generally deem the current offer of information as inadequate to ensure price transparency; they ask for more publicly available data on a rather long list of prices and complementary information, and claim that in the current situation the market is too opaque. By contrast, **sugar producers** point out the already stringent disclosure obligations, and believe that provision of additional publicly available information on prices would be ultimately detrimental also for beet growers, since it would weaken sugar producers' bargaining power vis-à-vis sugar users, potentially reducing their margins and their possibility to offer higher sugar beet prices to growers. In addition, since production decisions concerning sugar beet at farm level are taken up to 30 months before the last tonne of sugar obtained from beets is actually sold, it is deemed that more updated and detailed information on sugar prices would have a negligible impact in improving the resilience of sugar beet growers.

[161] I.e., how much sugar is sold in liquid form, how much is sold for non-food applications, etc.

Generally speaking, the EU sugar market seems to be characterised by a **lower availability of sophisticated price information, compared to the global market**, but also to some extra-EU markets (e.g., US, Brazil). A number of information items are considered of critical importance by the vast majority of stakeholders, be they beet growers, sugar producers or users: historical price series, futures prices specific to the EU market, and reliable forecasts on prices and volumes emerge as the most appreciated ones. Some of these information items – like forecasts on prices – are indeed available for the EU market, but only through proprietary data providers. The associated costs may cause information asymmetry between the different stakeholder categories.

Finally, the current **availability of public data on sugar prices** is generally considered as not responding to the market operators' needs, mainly because prices are not representative for the EU spot market, since they are averages that include also long-term contracts. However, these limitations are addressed by the obligation introduced by Regulation (EU) 2017/1185 for Member States to notify (starting from January 1, 2021) selling prices for short-term contracts, which allows the Commission to publish an average selling price corresponding to this type of contracts.

8.4 Q13: Is there any other element, which influence the current institutional setting of the EU sugar market? If so, present main characteristics and influences on sector's resilience.

Definition of key terms

"Resilience of the EU sugar sector" (as defined in question 1 – summary provided for the purposes of question 11 is applicable also for the purposes of question 13).

Understanding of the question

The conceptual framework used to address question 13 includes the analysis of: the identified elements of relevance in affecting the current institutional setting; and, the way these may exert positive/negative impacts on the sector's resilience.

Beyond the policy changes examined under question 11, other broader developments have the potential to influence the current institutional setting, hence the sugar sector's resilience. The analysis under question 13 focuses on **four key areas** identified to be of most relevant potential impact on the EU sugar sector's resilience. These are:

1. **Nutrition policies**: As indicated in § 3.3.3.2, the Farm to Fork Strategy's objectives on nutrition policies merits more specific investigation in terms of potential impacts. In particular, the Farm to Fork strategy envisages front-of-pack nutrition labelling; and, affirms its intention to set up nutrient profiles to restrict the promotion (via nutrition or health claims) of foods high in fat, sugars and salt. It is also noted that, across the EU, Member States are currently taking various diverse approaches (e.g., reformulation agreements, marketing restrictions of foods high in fat, salt and sugar, public procurement of healthy food, taxing sugary drinks) as part of their strategies on health promotion and disease prevention (outlined in § 3.4.1).
2. **Environmental sustainability policies: bio-energy**. As indicated in § 3.4.2, currently Member States apply different approaches with regards to the national targets set on the use of biofuels, depending on how countries choose to meet their targets for renewables under EU policies implemented at national level (Renewable Energy Directive; Fuel Quality Directive).
3. **Brexit:** The regime under which sugar trade between the EU and the United Kingdom (UK) will take place in the future.
4. **COVID-19**: Impacts of the unparalleled disruptions caused by the COVID-19 deserve particular attention, given also that the pandemic has lasted for over a year and is still ongoing.

It is noted that the assessment is forward-looking and therefore highlights ***a priori* expected, rather than actual, impacts** as both the scenarios on the future institutional setting and their impacts will materialise beyond the time frame of this study. The main elements of the future

institutional setting, as set out above, only provide an outline of what is currently known. Therefore, it is still too early to understand the potential impacts on the sector.

The assessment therefore is focused on the main characteristics of the identified four elements and their potential effects in terms of improving, or worsening, the resilience of the EU sugar sector. Given this premise, the assessment of impacts of all four elements is theoretical (i.e., the **intended/expected effects**) and is mainly based on qualitative evidence sourced via desk research and through interviews with stakeholders in the sugar supply chain, as well as on the thematic case study focusing on the UK sugar sector in the post-Brexit scenario.

Given the uncertainty about the above elements of the institutional setting at this phase of the study, indicators are **mainly qualitative**; some quantitative indicators have been included where possible. The analysis is performed against the *current status quo* of the EU sugar sector as reported in the descriptive chapter of the study. Thus, the final output to answer question 13 is a synoptic table providing a synthetic judgment on the potential impact of each element in increasing (positive impact), or decreasing (negative impact), the resilience of the EU sugar sector.

8.4.1 Potential changes of relevance to the sugar sector

Some of the changes to the current institutional setting of the EU sugar market on which the analysis in question 13 is focused are outlined in § 3: notably, nutrition policies (at EU level: § 3.3.2; at national level: § 3.4.1), and, the national instruments implementing EU targets on bio-energy (§ 3.4.2). In particular, the following key changes are examined for the analysis of question 13:

1. **Nutrition policies**: potential policy changes of relevance to the sugar sector – comparison to *status quo*. The most relevant impacts examined in the analysis are:
   a. **Front of Pack (FoP) labelling**: extent to which the potential introduction of harmonised FoP labelling may influence sugar demand
   b. **Nutrient profiles**: extent to which the potential introduction of nutrient profiles, including on sugar content, for food bearing claims may influence sugar demand
2. **Bioenergy policies**: potential policy changes of relevance to the sugar sector – comparison to *status quo*. The most relevant impacts examined in the analysis are:
   a. Feedstock for bioenergy: extent to which the potential changes may affect demand for feedstock
3. **Brexit**: potential changes, post Brexit – comparison to *status quo*. The most relevant impacts examined in the analysis are:
   a. Extent to which Brexit affects the EU sugar sector
4. **COVID-19**: potential measures taken to address specifically COVID-19 disruptions. The most relevant impacts examined in the analysis are:
   a. Expected impact on the EU sugar sector

8.4.2 Intended/expected effects on the EU sugar sector's resilience

The theoretical assessment of the intended/expected effects of the four key elements considered on the EU sugar sector's resilience are described below. The assessment focuses on the extent to which the identified elements are expected to improve/worsen the sector's resilience in terms of:

- economic viability of the main actors in the EU sugar supply chain;
- availability of an adequate sugar supply in the EU.

1. Nutrition policies

It is not possible to foresee potential changes to EU nutrition policies and to estimate their impact on the sugar sector. *A priori*, the intention of the measures foreseen under the Farm to Fork Strategy (FoP labelling; Nutrient Profiles – as described in § 3.3.2) is to improve consumer awareness/understanding on the nutritional composition of foods,

so as to enable consumers to make more informed choices. Sugar is one of three nutrients,[162] the excessive consumption of which is being targeted by these measures. On this basis, it can be expected that the foreseen measures would have a negative impact on sugar consumption, as is their intended impact. However, it is noted that several Member States have taken a range of national measures with the same aim (as described in § 3.4.1). The additional impact from the adoption of EU-level, harmonised measures is therefore not expected to be as strong as if no national measures were in place currently. For example, it is possible that EU level measures may be less demanding than is currently the case in some Member States. Therefore, the impact of harmonised provisions on sugar consumption at EU level can be expected to be moderately negative. According to the Commission, the medium- and long-term effects are for the moment very difficult to quantify: therefore, great precaution should be used when drawing any conclusion.

2. Bioenergy policies

The objective of reducing carbon emissions - ultimately, under the EU Green Deal, reaching a climate neutral Union by 2050 - has underpinned a range of global, EU-wide and national initiatives. These include targets for the production and use of bioenergy. In the new 2030 Biodiversity Strategy, part of the EU Green Deal, the Commission recognised sustainable bioenergy as an important tool to fight climate change. Bioenergy represents more than 60% of the renewable energy consumed in the EU-27; hence, its contribution to the energy mix is considered pivotal to achieving carbon neutrality by 2050. It is noted that in its revised Renewable Energy Directive (RED II), the European Commission has capped first-generation biofuels produced from food and feed crops at 7% of energy use in transport by 2030[163].

According to Bioenergy Europe, with 95% locally produced biomass, the growth potential of bioenergy relies essentially on the potential of sustainable biomass resources available in Europe. The Energy System Integration Strategy includes a specific chapter on unlocking the potential of **renewable fuels produced from sustainable biomass** and acknowledges biomass as an enabler of carbon capture, storage and use that can lead to "deep decarbonisation."

Although the sugar beet sector is a less important provider of biomass than cereals, the income from this activity can be important for beet producers. The sugar sector also has a role to play in renewable energy consumption, including bioenergy. Economic production of biomass from sugar beet - referring to cultivation for biomass production – amounts to 27.4 Mt/year;[164] this represents approximately 5% of the total economic production of biomass per year from agricultural sources in the EU (514 Mt/year, or 54% of total EU biomass production). There is also production of biomass from sugar beet residues, 9.2 Mt/year, representing 2% of the total agricultural residue production of biomass per year in the EU (442 Mt/year, or 46% of total EU biomass production)[165] (Camia et al, 2018). Sugar beet feedstock is estimated to account for 19% of EU bio-ethanol production[166] (European Commission, 2021a).

Against this background, it is not possible to foresee potential changes to EU bio-energy policies and to estimate their impact on the sugar sector and on sugar beet farming. *A priori*, the foreseen measures should improve the economic viability of sugar beet growers and sugar producers as a supplementary source of income. According to interviewees, the diversification into bio-energy (bioethanol and biogas) from the processing of sugar beet is a highly positive prospect. As the Brazilian model shows, it

[162] The other two nutrients being: fats, in particular, transfats, saturated fats; and, salt.

[163] Article 26.1 of Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources.

[164] In dry matter, average values over the period 2006-2015. Source: Camia et al (JRC), 2018.

[165] Production from residues (e.g., dry biomass from leaves, stems) is not the primary aim of the production process and is therefore referred to as 'residue production'.

[166] 2019 data. Molasses/beet; cereals account for 78%, wine for 2% and others for 1%.

introduces flexibility that allows a better resilience vis-à-vis volatile markets. At present, only one major EU sugar producing Member State (France) is dedicating a significant part of its sugar beet output to the production of bioethanol (around 25%). This flexibility should be more used, in particular during periods of crisis, when a sugar to ethanol programme (similar to the one in the US) could be incentivised.

However, the 7% ceiling in place under RED II to 2030 constrains the overall potential at EU level. Furthermore, the use of biofuels in the EU varies by Member State, depending on how countries choose to meet their targets for renewables in transport and for reduction of greenhouse-gas intensity of fuels under the Fuel Quality Directive (as outlined in § 3.4.2). Therefore, at present, the impact of bio-energy policies on the sugar sector's resilience at EU level can be expected to be moderately positive.

3. Brexit

The institutional setting for sugar trade between the EU and the United Kingdom (UK henceforth) in the post-Brexit scenario presents significant uncertainties, and this raises concern among the actors in the EU sugar sector. The main issues noted *ex-ante* by CEFS-CIBE[167] are: (i) that the EU meets around 25% of UK sugar demand and this supply is threatened by the UK's new status as a third country; and, (ii) the UK could reduce tariffs on the import of raw sugar for refining which could then allow UK exports to the EU.

The UK left the EU on 31 December 2019 and entered a transition period which ended on 31 December 2020. The EU and the UK agreed the EU-UK Trade and Cooperation Agreement (EU-UK TCA) to take effect at the end of the transition period, i.e., from 1 January 2021. The Agreement comprises: (i) a Free Trade Agreement; (ii) a close partnership on citizens' security; (iii) an overarching governance framework[168]. Under the Agreement, trade in goods between the UK and the EU will be tariff and quota free. However, trade will not continue on the same basis as when the UK was part of the EU Single Market. As a third country, goods entering the EU from the UK, and *vice versa*, will be subject to border checks. Also, should the UK enact legislation that is considered to provide a competitive advantage, a dispute resolution process under the governance framework could result in the EU imposing tariffs on goods from the UK to the EU to compensate for the competitive advantage.

The last-minute agreement avoided trade between the UK and the EU being undertaken on WTO Most Favoured Nation terms, under which sugar imported to the UK from the EU would have been liable for a tariff of GBP 28/100kg under the UK Global Tariff (UKGT). Commentators agree that while the post-Brexit operating environment is inferior to the UK being part of the EU Single Market, it is considerably less disrupting than the UK leaving without a deal and trading on WTO terms.

Following its departure from the EU, the UK has retained access for LDCs and ACPs, while the market access under trade agreements has, in many cases, been rolled over under the Trade Agreement Continuity (TAC) programme. Under this, market access quotas were replicated rather than split (pending possible agreement in the WTO on splitting access) between the EU and the UK. This means that the UK now has access to around 140 000 tonnes of tariff-free raw sugar from countries within the Central American, Andean Community and SADC (South Africa) agreements.

While there is no tariff on sugar under the EU-UK Trade and Cooperation Agreement, the UK government also introduced an autonomous tariff rate quota (ATQ), additional to the existing tariff-free access. This allows 260 000 tonnes of raw cane sugar to enter the UK at an in-quota rate of 0% for the duration of 2021, after which the volume will be reset annually, i.e., back to 260 000 tonnes, subject to any future review. In this context it should be noted that commentators have referred to the ATQ as a remnant

[167] https://cefs.org/blog/2018/06/27/brexit-the-position-of-the-european-sugar-sector/

[168] https://ec.europa.eu/info/relations-united-kingdom/eu-uk-trade-and-cooperation-agreement_en

of the UK government's tariff schedule issued in case no deal could be reached. One interviewee was not convinced that the ATQ will be retained beyond 2021.

Rules of Origin (RoO) are in place under the EU-UK TCA with respect to raw and refined sugar, as well as products containing sugar such as confectionary, baked goods, etc. Products which are not considered to originate in the UK (EU), cannot be exported tariff-free to the EU (UK). These rules prevent the UK from importing raw sugar under the various tariff-free agreements refining it and then exporting white sugar to the EU.

Had the EU and the UK failed to reach a trade deal, it may have become necessary for the EU to make adjustments to its sugar regime to respond to any difficulties faced. However, as a deal was agreed, and based on the evidence available to date, it is not thought likely that the post-Brexit institutional setting will have any direct influence on the institutional setting of the EU sugar market. That said, developments in the UK sugar sector will no doubt be carefully monitored to ensure that the EU sector is not disadvantaged.

The main impact of the post-Brexit institutional setting will be the increased competitiveness of raw cane sugar refining in the UK, and to a lesser extent, in the EU, which now also has access to a greater volume of tariff-free raw sugar imports due to the replicating of the existing access arrangements. There may also be downward pressure on UK sugar prices resulting from the ATQ and other tariff-free access for raw sugar. This increased competitiveness in the UK is likely to lead to increased competition with white sugar exports to the UK from the EU. To the extent that this takes place, the EU will lose at least some access to a proximate premium market. According to the Commission, the medium- and long-term effects are for the moment very difficult to quantify: therefore, great precaution should be used when drawing any conclusion.

There is thus likely to be some downward pressure on the EU sugar price, unless a comparable alternative market is found to replace lost UK exports and any market lost domestically to EU-refined cane sugar. As always when there is price pressure, this will be felt most keenly by the less efficient, highly geared and indebted producers.

The UK's approach to climate and the environment remains unclear at the time of writing. However, it is considered unlikely that the UK will reduce environmental protection to the point that the UK sugar sector derives any benefit vis-à-vis the EU sugar sector; therefore, no influence on the resilience of the EU sugar sector is anticipated.

However, it is considered likely that the UK will permit gene editing to be used. The express purpose of this is to increase productivity which would confer an advantage on the UK sugar sector which could impact on the EU sugar sector if this allows the UK to reduce its reliance on imported sugar, including from the EU. However, this impact is contingent on the outcome of the consultation, suitable varieties being developed and taken up, and the EU continuing not to allow access to these varieties.

Finally, the risk mitigation and management tools in respect of frost damage, yield loss from Virus Yellows and nascent access to the futures market all provide increased resilience to the UK sugar sector. To the extent that these tools could help influence UK farmers to remain in the sugar beet sector, then they could be said to have an impact on the resilience of the EU sugar sector by virtue of reducing export opportunities. However, this impact is likely to be marginal.

4. COVID-19

COVID-19 has caused an unparalleled shock to the economy, both in the Union and globally. The three waves of responses to COVID-19, and the uncertainty over the duration of the disruptions these have caused, are likely to influence the current institutional setting across all policy areas and spheres of life. Uniquely, they are expected to create both supply and demand shocks; and, the situation is dynamic, in the sense that these effects are still in motion and may be for some time.

Overall, the impact of the market disruptions caused by the first wave of the COVID-19 crisis on the EU sugar and food industry proved to be temporary, with recovery starting as soon as lockdown measures were lifted. However, European Parliament (2021) did note that the sugar sector suffered considerable financial losses.

CIBE reported, on 29 June 2020, that the low point following the first wave of COVID-19 was over, although sugar prices and demand remained lower than prior to the crisis. EU agri-food trade data for the first half of 2020[169] also highlight the resilience of the agri-food sector, while emergency measures specifically to address the impact on the sector were taken by the European Commission[170], in addition to the *NextGenerationEU* recovery plan[171], which will invest €750 billion, mainly in the area of cohesion, resilience and values through the Recovery and Resilience Facility[172]. This suggests that longer term impacts – *a priori* – may be expected to be not as strong, or as lasting, as in other industries. The prolonged lockdowns of the food service/HORECA sector has affected demand for sugar and sugar-containing food and beverages, but this has been compensated by increased consumption at home and in the retail sector. Overall, according to most interviewees the net effect of these disruptions has been a decrease in sugar consumption/use, although the extent of the decrease is considered to be relatively small (-1% to -5%).

Apart from the supply and demand for sugar as such, COVID-19 has caused other impacts on the demand of raw material for other uses, both positive and negative:

- On the negative side, the slowdown in other sectors of economic activity has affected demand for bioenergy and the consequences on the EU bioethanol market have been significant. For instance, in its latest annual Report, the International Energy Agency (IEA) anticipates an 11.6% drop in global transport biofuel production compared to 2019 – the first reduction in annual production in two decades.
- On the positive side, the ability to switch from biofuel-ethanol production to pharma-ethanol production to respond to the demand for hand sanitisers has been a key feature of the industry.

Overall, therefore, the EU sugar sector has proved to be relatively resilient to the specific impacts caused by the COVID-19 pandemic. The net impact of the pandemic, once the negative and positive impacts described above are considered, can be assessed to have been negative but limited. However, it is noted that an interinstitutional agreement between the European Commission, the European Parliament and the Council of the EU has made available recovery funding in the agricultural sector, with a total of €10 billion available for farmers from 2021 up until the end of 2022 in the context of the rural development fund (the second pillar of the Common Agricultural Policy), which is designed to help the sector bounce back from disruptions caused by the COVID-19 pandemic. The potential use of this funding in the sugar sector should *a priori* contribute to further limit any negative impacts the sector has experienced due to the pandemic. Longer term, the repeated disruptions caused by COVID-19 to the EU economy may lead to potential changes to the institutional setting and further measures to address specifically these disruptions. At present, it is not possible to determine what measures may be taken or what their specific effect may be on the EU sugar sector.

The **overall results of the assessment**, summarising the potential direction of impact for each of these key ongoing and potential developments examined under question 13, are presented in a synoptic form in Table 8.6.

169 https://ec.europa.eu/info/news/eu27-agri-food-trade-sustains-growth-spite-covid-19-crisis-and-brexit-2020-oct-16_en

170 https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/factsheet-covid19-agriculture-food-sectors_en.pdf

171 https://ec.europa.eu/info/strategy/recovery-plan-europe_en

172 https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en

Table 8.6 – Intended/expected effects of relevant ongoing and potential developments on the EU sugar sector's resilience (question 13)

Ongoing and potential developments	Effects on sugar beet cultivation		Effects on sugar production	
	Economic viability of sugar beet growers (1)	Availability of an adequate sugar beet supply (2)	Economic viability of sugar producers (3)	Availability of an adequate sugar supply (4)
1. Nutrition policies				
a. FoP labelling b. Nutrient profiles	Not possible to foresee to what extent the examined potential changes to EU nutrition policies may affect the resilience of the sugar sector. *A priori*, these measures should have a negative impact on demand for sugar, although this is expected to be moderate given that in some Member States measures already exist with the same aim. On this basis, the negative impact on demand for sugar at EU level should be moderate; resulting therefore to **moderate negative impacts** on the sector's resilience. According to the Commission, the medium- and long-term effects are for the moment very difficult to quantify: therefore, great precaution should be used when drawing any conclusion.			
2. Bioenergy policies				
a. Feedstock for bioenergy	Not possible to foresee to what extent the examined potential changes to EU bioenergy policies may affect the resilience of the sugar sector. *A priori*, these measures should have a positive impact as a supplementary source of income from increased demand for feedstock. However, this is expected to be moderate given the 7% ceiling to 2030 on the use of first-generation biofuels produced from food and feed crops in energy for transport (under RED II); and the fact that in some Member States measures already exist with the same aim. On this basis, the positive impact on demand for feedstock at EU level should be moderate; resulting therefore to **moderate positive impacts** on the sector's resilience.			
3. Brexit				
a. Impact on EU sector	Overall, the post-Brexit operating environment is inferior to the UK being part of the EU Single Market, it is considerably less disrupting than the UK leaving without a deal and trading on WTO terms. However, the main impact of the post-Brexit institutional setting will be the increased competitiveness of raw cane sugar refining in the UK, which may cause some downward pressure on the EU sugar price, unless a comparable alternative market is found to replace lost UK exports and any market lost domestically to EU-refined case sugar. As always when there is price pressure, this will be felt most keenly by the less efficient, highly geared and indebted producers. According to the Commission, the medium- and long-term effects are for the moment very difficult to quantify: therefore, great precaution should be used when drawing any conclusion.			
4. COVID-19				
a. Impact on EU sector	Overall, the EU sugar sector has proved to be relatively resilient to the specific impacts caused by the COVID-19 pandemic. It is noted that the €10 billion recovery funding made available in the context of the rural development fund (from 2021 up until the end of 2022) is designed to help the agricultural sector bounce back from disruptions caused by the COVID-19 pandemic. The net impact of the pandemic, once the *NextGenerationEU* recovery plan, including the Recovery and Resilience Facility, and the specific emergency measures taken in the sector, as well as the negative and positive impacts are considered, can be assessed to have been **negative** but **limited**. Not possible to foresee to what extent the repeated disruptions caused by COVID-19 to the EU economy in the longer term may lead to potential changes to the institutional setting and further measures to address specifically these disruptions.			

Source: assessment by the study team

8.4.3 Key findings

The synoptic table at § 8.4.2 (Table 8.6) presents the key final output and the core of the answer to question 13. It is noted that the analysis of the potential impacts of the ongoing and potential developments examined under this question is restricted by the fact that the specific relevant policies have yet to be defined and/or more time is needed for the impact of events (Brexit and COVID-19) to become apparent. It is therefore not possible at present to analyse how these will impact on the sugar sector. Within this context, the analysis has followed a conceptual forward-looking framework to assess the **broader *a priori* anticipated direction of potential, positive and/or negative, impacts**.

Bearing this methodological caveat in mind, on the basis of the information available to date, the key findings of question 13 can be summarised as follows:

- Front of Pack labelling and the introduction of nutrient profiles at the EU level is expected to result in a **moderately negative** impact on the resilience of the sugar sector. It is noted that similar measures already exist in some Member States, meaning that the additional impact of EU measures is likely to be modest. According to the Commission, the medium- and long-term effects are for the moment very difficult to quantify: therefore, great precaution should be used when drawing any conclusion on this point.
- The impact of COVID-19 is expected to be **negative, but limited**, partly as a result of the resilience demonstrated by the EU sugar sector so far, and partly as a result of the emergency measures taken at the EU level. It is noted that the €10 billion recovery funding, which was made available in the context of the rural development fund from 2021 up until the end of 2022, is designed to help the agricultural sector bounce back from disruptions caused by the COVID-19 pandemic; as such, it should *a priori* contribute to further limit any negative impacts the sugar sector has experienced due to the pandemic.
- Although the final impact of Brexit on the EU sugar sector cannot yet be determined, there is a risk that increased competitiveness of raw cane sugar refining in the UK and the EU could put moderate downward pressure on price and thus **moderately negative** pressure on resilience.
- On the other hand, measures in the bioenergy sectors should have a **moderately positive** impact on the resilience of the sugar beet farming sector by providing a supplementary income through increased demand for feedstock.
- On balance, the overall direction of impacts on the EU sugar sector's resilience is likely to be moderately negative when viewed in the round.
- The moderate first-order impacts of the above ongoing and potential developments are expected on (beet) sugar producers' economic viability (parameter 3, Table 8.6). These first-order impacts are then expected to trickle down in weakened form to sugar beet growers (parameter 1). No net impact is expected on the availability of sugar beet supply (parameter 2) or on the availability of sugar supply (parameter 4).

SECTION D - CONCLUSIONS

The **conclusions on the overall level of the EU sugar sector's resilience** focus on the **most serious risks for and threats to** short, medium and long-term **economic viability of the EU sugar sector**, and on the possible **adaptation strategies** to address those threats. They are strictly based on the findings of the analyses carried out in the study, and are drafted in such a way that they can be used for future policy developments.

The conclusions on the overall resilience of the EU sugar sector, in the light of the influence of diverse factors (competitiveness drivers; organisational arrangements and contractual relations along the supply chain; current regulatory framework at EU and national levels; prospective policy changes and other external factors influencing the current institutional setting of the EU sugar market) are illustrated at § 9; the conclusions on the main risks and threats to the economic viability of the EU sugar sector, and on the possible risk management tools and adaptation strategies to address those risks and threats, are presented at § 10.

9 CONCLUSIONS ON THE OVERALL RESILIENCE OF THE EU SUGAR SECTOR

9.1 The overall resilience of the EU sugar sector in the post-quota period

In the 2017/18 marketing year (the first without sugar quotas) the implementation of expansive strategies by the most cost-efficient EU sugar producers, combined with higher-than-average yields, resulted in an exceptionally abundant sugar production (see § 4.3). The resulting oversupply on the EU sugar market, in combination with the significant decline of sugar prices on the international market, triggered a four-year period of low sugar prices on the EU market (see § 4.2), which has proved to be a severe "stress test" for the overall resilience of the EU sugar sector[173]. As revealed by the analysis of the evolution of the EU sugar industry in the transition from the quota to the post-quota environment (§ 5), all the key actors in the EU sugar supply chain – sugar beet growers, beet sugar producers, and raw cane sugar refiners - experienced a **serious decline of their profitability** especially in the worst period of the crisis, coinciding with the 2018/19 and 2019/20 marketing years. As a result, the **economic viability of the structurally weaker parts** of the sector (sugar beet growers and processors in Member States affected by low productivity and high production costs; full-time refiners, which were forced to cope with an extremely tight refining margin) was **seriously threatened**. However, also **sugar beet growers and beet sugar producers in the most competitive Member States** experienced **serious difficulties**, which in some cases were further aggravated by additional factors (to mention a particularly serious one, viral yellowing of sugar beets, which caused a remarkable decrease in yields in certain Member States). Nevertheless, in spite of non-satisfactory profitability over most of the post-quota period, beet sugar production has not ceased altogether in any Member State but Portugal (where it was already minimal at the end of the quota period).

Since the 2018/19 marketing year, the yearly downward adjustment of sugar production is an indication that **the EU market is in the process of finding a new balance**. The **average price for white sugar on the EU market has slowly and moderately increased** from the minimum reached in January 2019 (312 Euros/tonne), and is

[173] which can be intended as the sector's capacity to overcome periods characterised by external shocks, and then revert to its usual conditions.

reported at 408 Euros/tonne in September 2021[174]. Further to that, recent forecasts see a **tight sugar supply balance at global level for the 2021/22 marketing year**. Thanks to these positive developments, **several leading EU sugar producers have recently reported about improved profitability of sugar production** (including from refining of raw cane sugar) and more satisfactory financial results for the 2020/21 marketing year.

The "stress test" described above has not caused, to date at least, **massive and widespread casualties in the sector**: no medium- or large-sized EU sugar producers went out of business. However, some small-sized producers were forced to cease their activity, a few mid-sized ones were forced to drastically downsize their operations, and most large-sized multinational groups were forced to close some of their processing plants, including a few relatively high-capacity ones. At farm level, the unattractive sugar beet prices that processors had to offer under the pressure of the prolonged sugar price depression, encouraged more and more farmers to switch to more profitable alternative crops. The fact that **the sector as a whole**, mainly thanks to the **positive contribution or influence of several factors** (competitiveness drivers, arrangements in the supply chain, policy measures) analysed in the following sections, has **somehow "weathered the storm"**, suggests that its **overall level of resilience is satisfactory**, but also **remarkably diversified at national level** and **affected by some non-negligible weaknesses**, which may become serious in certain country- or company-specific situations. In general, the negative effects of the prolonged price depression were felt more intensely in the Member States that are handicapped by low productivity and high production costs, and by non-diversified sugar producers.

The study clearly showed that the **risks and threats to the short, medium and long-term economic viability of the EU sugar sector** are numerous and important. For this reason, it focused on a **comprehensive, in-depth assessment of the adequacy of the risk management tools and adaptation strategies** available to its actors, whose results are presented at § 10.

9.2 The competitiveness drivers of the EU sugar sector and their influence on the sector's resilience

The assessment under question 1 (§ 6.1) did not identify any competitiveness driver with structurally weakening effects on the EU sugar sector's resilience. A **clear prevalence of drivers with strengthening effects** on the two dimensions of resilience considered (economic viability of actors in the EU sugar sector; availability of an adequate sugar supply in the EU) emerged from the assessment.

In most cases, the effects of competitiveness drivers on the **availability of an adequate sugar supply in the EU** were found to be **mostly indirect**, i.e., to occur as a result of improved/worsened economic viability of actors in the EU sugar sector.

Some competitiveness drivers (sugar selling prices, profitability of actors in the sugar sector, logistical aspects) were found to have a **variable effect** (i.e., strengthening in some cases, weakening in other cases) on resilience, according to specific conditions applying at national/local level and/or in a certain period.

Cost competitiveness in the farming and processing stages – which varies remarkably across the EU - has **critical importance in determining the overall resilience of the EU beet sugar sector**.

Vertical and horizontal price transmission was found to have an **undetermined effect** on the availability of an adequate sugar supply in the EU, due to the complex interplay of supply and demand dynamics that are caused by price signals.

[174] Above the reference threshold of EUR 404.4 per tonne, fixed under Article 1a of Regulation (EU) No 1370/2013.

Besides assessing the influence on resilience of each driver "in isolation", the study also assessed the overall effects of two meaningful combinations of drivers: i) effect of technical parameters determining productivity levels in the farming and processing stages on the profitability of beet sugar production in the EU; and, ii) effect of size and diversification on the profitability of EU sugar producers.

The key technical factors determining productivity[175] were found to explain only part of the profitability of beet sugar production in the EU; their combined effect on resilience is therefore variable. This implies that the profitability of beet sugar production in the EU is the result of a complex combination of technical, economic and organisational factors: indeed, the **combined influence of size and diversification of sugar producers** was found to be **effective in smoothening variations in profitability**, thus strengthening their resilience.

In general, the structural features of the EU sugar sector that emerged as having the **most negative influence on resilience** were identified in **extremely heterogeneous productivity levels in sugar beet farming** across Member States (some of them have very low sugar beet yields), combined with some **specific handicaps affecting the processing stage** (e.g., short duration of processing campaigns due to climatic factors, or constraints to pursuing scale economies at plant level).

9.3 Organisational arrangements and contractual relations along the sugar supply chain: influence on the sector's resilience

Under question 2 (§ 6.2), the study assessed a wide array of organisational arrangements and contractual relations in the EU sugar sector in terms of: i) effects on resilience (strengthening / weakening); ii) influence of the relative bargaining power of the different actors along the sugar supply chain on arrangements/contracts. The results of the assessment are presented here following a logical order moving from the upstream part of the sugar supply chain (sugar beet farming/processing) to the downstream one (sugar production/distribution).

Sugar beet supply contracts between growers and processors were found to allow for **effective planning of production**, thus contributing to ensure the stability and predictability needed by the beet sugar business model, and through that, to strengthened economic viability of beet sugar producers. The increasing diffusion of multi-annual inter-branch agreements and contracts in the EU beet sugar sector was found to have both pros and cons; it basically offers improved stability at the cost of reduced flexibility in adapting to changing conditions on the market.

Vertical integration between the sugar beet farming and processing stages (i.e., control of sugar beet processing capacity by growers, in different forms) was found to contribute to more effective planning, smoother operation of processing plants, and reduced transaction costs vis-à-vis non-integrated production. Through that, it contributed to improve the economic viability of the concerned actors. However, the study revealed significant difficulties also for integrated beet sugar producers in offering attractive enough sugar beet prices during the worst phase of the price depression on the EU sugar market in the post-quota period.

Contractual arrangements for raw cane sugar procurement were found to contribute to smooth and profitable operation of EU refineries, and hence to the economic viability of refiners, which was however seriously threatened in the post-quota period due to a very tight white sugar premium (i.e., the economic incentive to refining raw cane sugar into white sugar).

[175] sugar beet yield per hectare; sucrose content of sugar beets; sugar yield per hectare; daily beet slicing capacity per plant; length of the beet processing campaign.

As for **vertical integration between sugar production and sugar-consuming downstream activities**, it was found to contribute to improved economic viability of the concerned sugar producers where it allowed to achieve higher margins from internalised production and marketing of sugar-containing products than from sale to industrial sugar users.

Business alliances among sugar producers were found to be especially focused on white sugar marketing and raw cane sugar refining: their main benefits were identified in lower investment to implement diversification strategies and in improved efficiency and wider geographical reach of marketing activities. In that way, business alliances contributed to improved economic viability of the concerned sugar producers.

Finally, **sugar supply contracts between sugar producers and their customers** (industrial users of sugar, wholesalers/traders of sugar, packers, retailers) were found to contribute to improved stability and predictability, and through that to improved economic viability for the concerned parties. Similar to sugar beet supply contracts, multi-annual sugar supply contracts were found to have both pros and cons (trade-off between improved stability and reduced flexibility).

9.4 Current regulatory framework at EU and national levels: influence on the sector's resilience

The assessment at question 10 (§ 8.1) focused on the key elements characterising the regulatory framework of the post-quota period that can have – in theory at least – an influence on the resilience of the EU sugar sector.

The **end of the EU sugar quota system**, combined with the **removal of a legislation-based sugar beet minimum price**[176], was found to have only indirect effects, in combination with other factors (the oversupply of sugar at global level in particular), on the economic viability of the main actors in the EU sugar supply chain. Albeit **indirectly**, it anyway **contributed to reduced margins and profitability for EU sugar beet growers and sugar producers**. As for their effects on the **availability of an adequate sugar supply in the EU**, the two changes combined were found to have **no remarkable effects at EU level** (stable sugar beet area and increased sugar production), whereas they had **variable effects at Member State level**, depending on the specific situation of the national sugar sector. Overall, they contributed to cause a **redistribution of sugar beet area and sugar production across the EU**.

The elements of **EU trade policy** of relevance for the sugar sector (general import regime, preferential trade regimes) were found to have **no effects** on the economic viability of **EU beet sugar producers and sugar beet growers in the post-quota period**, since no significant changes to them were made after the end of the quota system[177]. However, **prospective free trade agreements with sugar-exporting third countries** are perceived as a **major threat to economic viability** by most sectoral stakeholders, which also underlined that the import regulation mechanisms provided by the EU legislation play a critical role in addressing external shocks caused by the dynamics of the international sugar market. The results of the assessment

[176] Some consulted sectoral stakeholders observed that the EU is the only significant beet sugar producer to have completely phased out any legislation-based supply management mechanisms, and that other leading beet sugar producers (e.g., the USA) have made completely different decisions in terms of policy for the sugar sector (maintaining supply management mechanisms, providing strong tariff protection and enforcing strict import regulation policies, etc.).

[177] Generally speaking, the EU trade regime for sugar, and its import regulation elements in particular, play an important role in contributing to both the economic viability of the actors in the EU sugar sector and the availability of an adequate supply of sugar in the EU. This role has not changed with the switch from the quota period to the post-quota one.

suggest that the decline of the profitability of EU sugar refiners, mainly due to reduced availability of raw cane sugar for refining and to reduced refining margins, is an effect of the increase of international raw sugar prices vis-à-vis the decline of EU white sugar prices, rather than being related to EU trade policy. EU trade policy was found to have no significant effect on the availability of sugar on the EU market, which remained adequate over the post-quota period (the problem was rather the opposite, i.e., oversupply after the first marketing year without quotas).

As for **voluntary coupled support to sugar beet**[178] (VCS for short), it was found to have a **positive effect** on the **margins, income and overall profitability of sugar beet growers** in the eleven Member States that opted for granting it. Furthermore, by addressing structural weaknesses in sugar beet farming, VCS may indirectly contribute to mitigate their potentially negative implications for sugar beet processors (mainly in terms of reduced areas under sugar beets). As for its effects on the availability of an adequate sugar supply in the EU, VCS can contribute to prevent a decline in sugar beet supply in the Member States where it is granted (to the extent that it succeeds in preventing a reduction in the areas under sugar beets), thus indirectly helping to mitigate its potentially negative implications in terms of reduced domestic sugar supply; this notwithstanding, VCS was found to have a **neutral effect on sugar supply in the EU** as a whole[179].

Finally, **decoupled direct payments** were found to play an important role in **stabilising sugar beet growers' income**, especially when sugar beet prices are low or volatile, since they usually account for a large share of total farm income. Their extremely wide uptake (basic payments are broadly available to EU farmers under certain conditions, and cover around 86% of the utilised agricultural area in the EU) further reinforces the importance of their contribution to an **improved resilience of the EU sugar beet farming sector**. Being decoupled from production, direct payments have no effect on sugar beet and sugar supply in the EU.

9.5 Prospective policy changes and other external factors influencing the current institutional setting of the EU sugar market: influence on the sector's resilience

Question 11 (§ 8.2) assessed whether, how and to what extent the recently agreed **CAP reform and other relevant European Commission initiatives** (e.g., the Farm to Fork strategy) may affect the current regulatory framework and the EU sugar sector's resilience. It should be noted that the policy changes concerning the future CAP depend on the decisions to be taken at Member State level with regard to the CAP Strategic Plans to be approved by the Commission, whereas those concerning the Farm to Fork and Biodiversity strategies are still at proposal stage, and set overall, aspirational targets for all sectors and all Member States. It is therefore not possible at present to define how these will translate into specific targets for the sugar sector, even in the key Member States accounting for the bulk of sugar production. With this caveat in mind, the assessment concluded that the **most important negative impacts on the economic viability of sugar beet growers and sugar producers** are expected from: i) the **reduction in pesticide use**, as well as the end of derogations currently provided in ten Member States for the use of banned neonicotinoids (including some major sugar

[178] pursuant to Chapter 1 of Title IV of Regulation (EU) No 1307/2013.

[179] An updated analysis carried out by the European Commission services revealed that the aggregated area under sugar beet, and even more so the aggregated sugar production in the Member States granting VCS to sugar beet, have declined in the post-quota period. This decline was more than offset by an increase in production in the remaining Member States.

producing Member States)[180]; and, ii) the **new decisions regarding coupled income support (CIS)** in the eleven Member States that currently apply voluntary coupled support (VCS) for sugar beet (in case of abolition of the coupled support for sugar beet or reduction of the amount per hectare); these currently account for 30% of the EU-27 sugar beet area and production, including, e.g., Poland, which accounts for 16% of the sugar beet area and 12% of production. At the same time, the future CAP (see § 3.2) will offer new opportunities for the sugar sector, through sectoral interventions, for instance, which should, when implemented, benefit the sector and its resilience.

Question 13 (§ 8.4) assessed whether, how and to what extent other elements (nutrition policies, bioenergy policies, Brexit, COVID-19) influencing the current institutional setting of the EU sugar market will affect the resilience of the EU sugar sector. The assessment was restricted by the fact that the specific relevant policies have yet to be defined, and/or more time is needed for the impact of events (Brexit and COVID-19) to become apparent. Bearing this caveat in mind, the assessment concluded that **moderately negative impacts** on the sector's resilience could derive from **nutrition policies** (Front of Pack labelling and the introduction of nutrient profiles at the EU level), **Brexit** and **COVID-19**[181], although it should be noted that EUR 10 billion has been made available in recovery funds for agriculture. By contrast, **measures in the bioenergy sectors** should have a **moderately positive impact** on the resilience of the **sugar beet farming sector**, mainly by providing a supplementary income through increased demand for feedstock.

10 CONCLUSIONS ON THE MAIN RISKS AND THREATS AND ON THE POSSIBLE RISK MANAGEMENT TOOLS AND ADAPTATION STRATEGIES TO ADDRESS THEM

10.1 Conclusions on the main risks and threats to the economic viability of the EU sugar sector

Most of the risks identified as relevant for the EU sugar sector under question 3 (§ 7.1) - e.g., risks related to planning of sugar production, to sugar beet cultivation, to sugar price volatility - were found to combine **high probability of occurring in the post-quota period** with **high importance**, based on the severity of the related impacts and/or on the perceptions of the affected supply chain actors.

The main **production risks** that affected the EU sugar sector in the post-quota period are related to **planning of sugar production** (due to yield volatility and variations in the extent of areas under sugar beets) and to **sugar beet cultivation** (due to climatic conditions and pests). Risks related to **sugar price volatility** and to the **prolonged period of low sugar prices on the EU market** (albeit over most of the post-quota period the average EU white sugar price remained above the international reference price[182]) emerged as the main **market risks**: partially linked with the end of quotas, they have affected all the actors in the sugar supply chain. Sectoral stakeholders were found to perceive **policy-related risks** from **non-homogeneous implementation of**

[180] The availability at EU level of significant funds for R&D under Horizon Europe dedicated to finding alternatives to plant protection products is a risk mitigating factor, but the sector has an important role to play in accessing these funds. Overall, in the Commission's view, the effects are difficult to quantity (particularly longer term ones), therefore great precaution should be used when drawing any conclusion in that regard.

[181] According to the Commission, the medium- and long-term effects of nutrition policies and Brexit are for the moment very difficult to quantify: therefore, great precaution should be used when drawing any conclusion.

[182] See § 4.2.1, Figure 4.3 for a comparison of the evolution of London white sugar futures price (contract No. 5) vis-à-vis the EU average white sugar price.

the ban on neonicotinoids as particularly important, mainly due to the remarkable negative impacts that viral yellowing can have on sugar beet yields and overall sugar output. As for **systemic** (i.e., non-sector-specific) **risks**, those deriving from **variations in the price of the main energy sources** and from **variations in exchange rates** (Brazilian Real to US dollar in particular) emerged as the most serious ones.

Only two of the identified risks (i.e., those related to: decreasing sugar consumption due to changes in consumer preferences; voluntary coupled support to sugar beet farming becoming unavailable or contributing to market distortions) were found to combine high probability of occurring in the post-quota period with just moderate importance.

Finally, risks that are characterised by a **moderate or low probability of occurring in the post-quota** period were found to be **fewer**; these risks tend to have **just moderate** (like in the cases of the risks related to the extent of the sugar refining premium, or to variations in exchange rates) or **low importance** (like in the cases of the risks related to sugar production and to diversion of sugar consumption due to alternative sweeteners) for the affected supply chain actors.

Policy-related threats - in particular those related to Free Trade Agreements with sugar-producing third countries/trade blocs, and to the challenging goals in terms of sustainable farming in the EU set out in the Farm To Fork strategy - are **perceived as serious** by an ample majority of the consulted actors in the EU sugar supply chain. However, it should be noted that the potential impacts stemming from those threats were often found to be **variable** – due to the influence of several external factors – or **unclear** (due to the still undetermined implementation details).

10.2 Conclusions on the possible risk management tools and adaptation strategies to address the main risks and threats to the EU sugar sector

The conclusions on the possible risk management tools and adaptation strategies to address the main risks for the EU sugar sector in the post-quota period, and prospective threats to its short, medium and long-term economic viability (i.e., those identified at § 10.1), are based on the key findings of the assessment made under questions 4 to 9 (§ 7.2 to 7.7) and question 12 (price reporting and monitoring systems; see § 8.3), and consider also the key findings on the overall resilience of the EU sugar sector presented at § 9. The conclusions also take into account the outcomes of a focus group (FG henceforth) involving experts from all the stages of the sugar supply chain and from research institutions, which are presented at § 10.2.1.

The conclusions at § 10.2.2 present the **key lessons learned from the study**, and include a systematic screening of the evidence, indicating in particular:

- which study findings reveal that the actions undertaken in the framework of adaptation strategies match expectations in terms of addressing the most serious threats to the EU sugar sector in the post-quota environment - "**what works**" (§ 10.2.2.1);
- which study findings are too preliminary to draw a conclusive judgment on the actions undertaken - "**wait and see**" (§ 10.2.2.2);
- which study findings reveal clear shortcomings of the actions undertaken in addressing the most serious threats to the EU sugar sector in the post-quota environment - "**what does not work**" (§ 10.2.2.3).

The conclusions presented in the aforementioned sections are also outlined in a set of **synoptic tables**, which detail the elements considered for the assessment.

It should be noted that the key findings of the study are not always clear-cut, that a number of nuances need to be considered, and that some adaptation strategies may fall somewhere "in between" the categories defined above; for these reasons, some

general considerations on the possible strategies to address the main risks and threats to the sector are elaborated at § 10.2.3.

10.2.1 Outcomes of the expert focus group

FG participants underlined the **need to consider the many specificities of the EU sugar sector** in the assessment, with regard to the situation experienced after the end of quotas, and more generally to the inherent sectoral peculiarities vis-à-vis other players in the global sugar market, and vis-à-vis other sectors.

They stressed the **severity of many risks that the sector is facing in the post-quota environment** (yield and price volatility in particular, which are further aggravated by limitations in the use of certain farm inputs, and by the lack of effective supply management tools), together with a number of **prospective threats that raise serious concern** (policy-related ones in particular, related to how the goals of the European Green Deal and of the related EU strategies will be achieved in practice, to the implications of the CAP reform in terms of risk management tools available to the sector, and to the evolution of EU trade policies).

With specific regard to the solutions to address **production risks**, FG participants highlighted the critical importance of quickly finding effective and cost-efficient alternative solutions to seed treatment with neonicotinoids, due to the severity of the impacts of viral yellowing on sugar beet farming. Applied research surely plays an essential role in this regard, but the time that it needs may be incompatible with the urgency of the problem. The use of innovative gene-editing techniques for the improvement of beet seeds would also be welcome, whereas GM beet seeds are not seen as a solution applicable to the EU context.

As for **market risks**, FG participants stressed the urgency of finding effective supply management solutions for both sugar beet and sugar production. A consensus emerged on the need for EU policymakers to reconsider their attitude towards ethanol production directly from sugar beets in the framework of the revision of the RED II Directive, since it would provide the sector with an extremely effective supply management tool. To this end, it would also be important to switch from Member State level ceilings to an EU level one, since this would provide the flexibility needed to make use of this supply management tool where it is economically viable and most needed. This would also be consistent with the removal of national production ceilings in the sugar sector with the end of quotas. However, some participants noted that direct beet ethanol production may be a concrete option only in a limited number of Member States. The views of FG participants on the effectiveness (or lack thereof) of other solutions – in particular those offered by Articles 219 and 222 of the CMO Regulation, or possible reintroduction of public intervention in the sugar sector - were non-unanimous. The need of making effective solutions to address price volatility available also to sugar beet growers emerged, due to some limitations in this regard showed by inter-branch agreements and sugar beet supply contracts in the post-quota period. As for market risks specific to EU sugar export trading, some limitations in the effectiveness of the currently available solutions to address protectionism (Chief Trade Enforcement Officer, WTO rulings and panels) were highlighted: too long times are often needed to apply those solutions, and when the problem is solved, business may be lost.

The effective **contribution of product/sector diversification to improved resilience of EU sugar producers** was widely recognised, together with the huge potential offered in this regard by the development of innovative value adding processes using sugar beets, sugar, beet pulps, and molasses as feedstock. However, it was also underlined that whereas EU funding (mostly through the Horizon programme) surely helps the research & development phase, substantial investments are needed to switch to commercial production, vis-à-vis uncertain returns due to the innovative nature of the products and/or the limited size of the related markets.

As for **policy-related risks and threats**, FG participants underlined that further improving the environmental sustainability of sugar beet farming and sugar production in the EU, in order to meet the ambitious goals of the European Green Deal and of the related EU strategies, will be an extremely challenging task: the substantial losses incurred by the sector due to the prolonged depression of sugar prices in the post-quota period eroded the available financial resources to achieve this difficult transition. A final element emerged from the FG is that **promoting policy changes that can contribute to improved resilience of the EU sugar sector** is often an **uphill struggle for sectoral stakeholders**, mainly due to an adverse public opinion on sugar, because of health concerns. This happens in spite of the numerous merits of the sector, ranging from the environmental value of sugar beet farming, to job creation in otherwise depressed areas, and to supply security also in the wake of COVID-19 and the related issues with sugar procurement on the global market.

10.2.2 Risk management tools and adaptation strategies: key lessons learned from the study

10.2.2.1 "What works"

The study confirmed that some long-established solutions to address **production risks**, i.e., the use of **specific farming practices and inputs** as well as **crop insurance**, have been effective also in the post-quota period, albeit with some limitations (policy-related constraints like the ban on neonicotinoids; coverage limited to specific risks, like hail, droughts, certain pests). **Temporary derogations for the use of certain production inputs** banned at the EU level (neonicotinoids in particular) partly covered those limitations, even though they were granted in some Member States only, with potential distortions.

Reserve funds and increased recourse to **hedging techniques based on futures and options** helped sugar producers (especially refiners) and international sugar traders in smoothening out **variations in turnover/profitability** and in addressing **price volatility**.

State aids (including those falling under the *de minimis* clause) can be broadly considered as risk management tools: they also contributed to improving the resilience of sugar beet growers against **production and market risks**.

Even though they were **not designed as risk management tools**, some policy instruments and private arrangements were found to have **significant implications in this regard**, and to have **contributed effectively to improved resilience** of the EU sugar sector. **Voluntary coupled support to sugar beet** (pursuant to Chapter 1 of Title IV of Regulation (EU) No 1307/2013) contributed effectively to safeguarding the profitability of sugar beet farming in the 11 Member States where it was granted in the post-quota period. By stabilising the income of EU sugar beet growers, **decoupled direct payments** contributed to an improved economic viability for them. **Sugar beet supply agreements and contracts** ensured effective production planning also in the most difficult phase of the market crisis of the post-quota period, even though they were not always effective in safeguarding the profitability of sugar beet farming (via sugar beet pricing), and were affected by issues concerning specific aspects (e.g., management and pricing of sugar beet pulps). **Price monitoring and reporting systems** (public or proprietary ones) available to the EU sugar sector all provided useful indications on the general trends of relevant sugar prices in the post-quota period; however, the views of sectoral stakeholders on their usefulness for elaborating risk management solutions aimed at addressing **price volatility and market risks** were rather divided, with sugar beet growers expressing a more positive judgment than sugar

producers[183]. One of the main identified shortcomings of price monitoring in the EU Sugar Market Observatory, i.e., the fact that it does not capture the dynamics of the spot market, has been addressed by the obligation introduced by Regulation (EU) 2017/1185 for Member States to notify (starting from January 1, 2021) selling prices for short-term contracts, which allows the Commission to publish an average selling price corresponding to this type of contracts.

As for **overall business strategies with significant risk management implications**, the long-established and widely implemented ones aimed at **strengthening cost competitiveness of sugar production** effectively contributed to safeguarding the economic viability of sugar producers in the EU also during the price depression of the post-quota period. **Geographical diversification** effectively contributed to address production risks in the post-quota period, but was of no use in addressing market and price risks, since the crisis had an EU-wide and global reach. Strategies aimed at **product/sector diversification** confirmed their effectiveness in smoothening the adverse effects on the economic viability of the concerned sugar producers of the prolonged EU sugar price depression of the post-quota period, especially where they concerned activities whose profitability is not influenced by sugar price dynamics. **Technical and product innovation** also contributed to reduce production costs in both the farming and the processing stages, and/or to provide additional revenue streams for sugar producers: in this way, innovation helped to safeguard the economic viability of sugar production, and to address production, market and policy risks. **Direct ethanol production from beets** was found to have a great potential as supply management tool (as the successful Brazilian experience with sugar to ethanol switching clearly shows): however, this solution still sees a rather limited uptake in the EU (mostly in France), mainly due to policy-related constraints to more widespread and flexible recourse, and would not be a concrete option in some sugar-producing Member States.

It should be noted that rather few risk management solutions and adaptation strategies filed under this cluster were found to be "perfect". Some of them suffer from (relatively minor) flaws in their design, several others from drawbacks in the implementation and/or constraints to a wider uptake in the EU, others have proved their effectiveness more in third countries than in the EU. Nevertheless, the **overall judgment** that can be drawn on the contribution of those solutions and strategies to improved resilience of the EU sugar sector is **positive**.

The detailed results of the assessment of the risk management solutions and adaptation strategies filed under the "what works" cluster are outlined in synoptic Table 10.1.

[183] In the case of the Sugar Market Observatory, for instance, the main downsides were identified in the rather long timespan between price observation and publication, in the fact that reported prices are the results of averages among multi-annual contracts (sometimes agreed in previous years) and more recent ones, and in the fact that the underlying contracts have different expiring dates, and hence do not reflect spot prices.

*Table 10.1 – Risk management solutions and adaptation strategies to improve the resilience of the EU sugar sector: "**what works**"*

Solutions / strategies	**Assessment criteria**		
	Design	***Practical implementation and uptake***	***Results***
	Conceptually sound design	*Practical implementation and wide/significant uptake in the EU (preferably) or in sugar producing third countries*	*Tangible results in addressing the most serious risks/threats for the EU sugar sector (preferably) or analogous risks/threats in sugar producing third countries*
Farming practices / use of specific inputs	Aimed at addressing the root causes of **production risks** in sugar beet farming through prevention or mitigation of negative impacts	Extremely wide uptake *Implementation/uptake may be constrained by policy-related limitations (e.g., ban on neonicotinoids, no GM beet seeds, etc.)*	Long-established use, proven effectiveness in addressing production risks from climatic and biotic factors in sugar beet farming
Crop insurance	Aimed at compensating the negative impacts from **production risks**	Significant uptake, increased in the post-quota period, often incentivised by public subsidies *Coverage limited to specific risks (hail, drought, etc.)*	Long-established use, proven effectiveness *Limitations related to minimum loss threshold*
Reserve funds – sugar producers	Smoothening out **variations in turnover / profitability**	Uptake has increased in the post-quota period	Contributed to address the decline of profitability in the post-quota period
Futures and options + hedging techniques – sugar producers, traders	Specifically designed to address **price volatility**	Uptake among EU beet sugar producers has increased in the post-quota period Wide uptake among EU sugar refiners and international sugar traders *Reluctance by EU customers to accept sugar pricing formulas that are linked with reference futures markets*	Long-established use, proven effectiveness in addressing price volatility on international sugar markets *Price dynamics on international sugar futures markets (London for white sugar, New York for raw sugar) are often not aligned with those in local markets in the EU*
State aids (including those falling under the *de minimis* clause)*	Aimed at compensating damages caused by a **natural disaster** or an **exceptional occurrence** *De minimis*: various forms of support to sugar beet growers that can address **production and market risks**	No cost for sugar beet growers Uptake has increased in the post-quota period *Disaster payments: uncertainty and lower indemnification of damage compared to insurance* *Ceiling of de minimis aid per farm*	Tangible results in improving the resilience of sugar beet growers against production and market risks

Solutions / strategies	**Assessment criteria**		
	Design	***Practical implementation and uptake***	***Results***
	Conceptually sound design	*Practical implementation and wide/significant uptake in the EU (preferably) or in sugar producing third countries*	*Tangible results in addressing the most serious risks/threats for the EU sugar sector (preferably) or analogous risks/threats in sugar producing third countries*
Temporary derogations for the use of certain production inputs (e.g., pesticides) banned at the EU level**	Allow for effective prevention of **production risks** in the absence of valid alternatives	Uptake has increased in the post-quota period *Potential distortions due to non-homogeneous application across the EU*	In the case of neonicotinoids, allowed for effective prevention of viral yellowing in the absence of valid alternatives
Voluntary coupled support to sugar beet**	Smoothening out **variations in farm income / profitability of sugar beet** due to yield and/or price volatility, through the granting of a payment per hectare	Implemented in 11 Member States where sugar beet has lower productivity No cost for sugar beet growers *Potential distortions due to non-homogeneous application across the EU*	Contributed effectively to safeguarding the profitability of sugar beet farming in the Member States where it was granted in the post-quota period
Decoupled direct payments**	Conceived to stabilise farm income; can **limit the negative effects of low or volatile yields and/or sugar beet prices**	Extremely wide uptake	Effectively contributed to safeguarding the economic viability of sugar beet farming in the EU in the post-quota period
Sugar beet supply agreements and contracts**	Aimed at ensuring effective **production planning** Variable implications in terms of **price risk management** (fixed vs. variable pricing formulas)	Essential elements established in Annex X to the CMO Regulation Generalised uptake in the EU sugar sector (written sugar beet supply conditions apply also in cooperative sugar companies)	Ensured effective production planning also in the most difficult phase of the market crisis of the post-quota period *Not always effective in safeguarding the profitability of sugar beet farming (via sugar beet pricing)* *Some issues concerning specific aspects (e.g., management and pricing of sugar beet pulps)*

Solutions / strategies	**Assessment criteria**		
	Design	***Practical implementation and uptake***	***Results***
	Conceptually sound design	*Practical implementation and wide/significant uptake in the EU (preferably) or in sugar producing third countries*	*Tangible results in addressing the most serious risks/threats for the EU sugar sector (preferably) or analogous risks/threats in sugar producing third countries*
Price monitoring and reporting systems**	Provide essential quantitative and qualitative information for: i) analysing price dynamics; ii) elaborating price forecasts; iii) elaborating risk management solutions	Extensive use in the EU sugar sector Several public (including EC Sugar Market Observatory) and proprietary systems available *Some systems are affected by specific shortcomings*	All have provided useful indications on the general trends of relevant sugar prices in the post-quota period *Views of sectoral stakeholders on their usefulness for elaborating risk management solutions are mixed*
Strategies aimed at strengthening cost competitiveness of sugar production***	By reducing production costs, they contribute to safeguarding the **economic viability** of sugar production	Long-established, wide implementation in the EU sugar sector	Effectively contributed to safeguarding the economic viability of sugar production in the EU also when sugar prices were depressed
Strategies aimed at geographical diversification***	Can contribute to reduce production costs → safeguard the **economic viability** of sugar production Result into a **diversification of production, market and policy risks** *Ineffective to address market risks in case of geographically widespread price crises*	Long-established, wide implementation in the EU sugar sector *Can expose producers to risks that they were previously not facing* *Their implementation drastically decreased in the post-quota period*	Effectively contributed to address production risks in the post-quota period. *No significant contribution to addressing market and price risks in the post-quota period, since the crisis had an EU-wide and global reach*

Solutions / strategies	**Assessment criteria**		
	Design	***Practical implementation and uptake***	***Results***
	Conceptually sound design	*Practical implementation and wide/significant uptake in the EU (preferably) or in sugar producing third countries*	*Tangible results in addressing the most serious risks/threats for the EU sugar sector (preferably) or analogous risks/threats in sugar producing third countries*
Strategies aimed at product/sector diversification***	By providing additional revenue streams, they contribute to the overall **economic viability** of the concerned sugar producers Can help to address **market risks** especially if they concern activities whose profitability is not influenced by sugar price dynamics	Long-established, wide implementation in the EU sugar sector Their implementation significantly increased in the post-quota period *Can expose producers to risks that they were previously not facing* *Their implementation through internal development or acquisitions may be costly (possible alternative: partnerships and joint ventures)*	Proven effectiveness in smoothening the adverse effects on the economic viability of the concerned sugar producers of the prolonged EU sugar price depression of the post-quota period.
Strategies aimed at technical and product innovation***	Can contribute to reduce production costs and/or provide additional revenue streams → safeguard the **economic viability** of sugar production Can help to address **production, market and policy risks**	Long-established, wide implementation in the EU sugar sector Substantial public (EU/national) funding for research and development activities is available *Can expose producers to risks that they were previously not facing* *The switch to commercial production may be costly, and no public funding may be available (possible alternative: partnerships and joint ventures)*	Technical innovation has effectively contributed to safeguard the economic viability of sugar beet growers and sugar producers, in particular by addressing more effectively production risks There have been several cases of successful product innovation in the EU sugar sector *Price premia for innovative "niche" products can shrink if several producers enter the related markets*

Solutions / strategies	**Assessment criteria**		
	Design	***Practical implementation and uptake***	***Results***
	Conceptually sound design	*Practical implementation and wide/significant uptake in the EU (preferably) or in sugar producing third countries*	*Tangible results in addressing the most serious risks/threats for the EU sugar sector (preferably) or analogous risks/threats in sugar producing third countries*
Ethanol production directly from beets***	By converting sugar beets or intermediate products (e.g., syrup) into ethanol rather than sugar, it also acts as a powerful and flexible **supply management solution →** maintains or boosts sugar beet farming, but prevents oversupply of sugar	Long-established, wide implementation in the Brazilian sugar sector (cane ethanol) *Implementation in the EU sugar sector is limited mostly to France; may not be a feasible option in some Member States* *Ethanol production from molasses performs no supply management functions (sugar production is maximised)* *Policy-related constraints to more widespread and flexible recourse to this solution in the EU*	Proven effectiveness as a powerful and flexible supply management solution in Brazil (especially) and France *Effectiveness in the EU is constrained by an unfavourable attitude by policymakers and by inflexible implementation of RED II Directive (national ceilings instead of an EU-wide one)*

* Can be broadly considered as risk management tools
** Not designed as a risk management tool, but has/have significant implications in this regard
*** Overall business strategies that have significant risk management implications

10.2.2.2"Wait and see"

Some risk management solutions were found to have a conceptually sound design, but also to suffer from more or less serious **drawbacks in the related implementation mechanisms**, which have **limited or prevented**, to date at least, their **uptake in the EU sugar sector**. All these solutions were filed under the "wait and see" cluster, because the study findings were too preliminary to draw a conclusive judgment on their effectiveness in addressing the relevant risks and threats to the EU sugar sector in the post-quota environment.

Mutual funds against pest and diseases allow for a reduction in the cost of protection from these specific **production risks** thanks to the concept of "risk pooling", which has been successfully implemented to address production and market risks in sugar cane and sugar beet production in third countries (e.g., Australia, USA).

The **Income Stabilisation Tool (IST)** emerged as a theoretically well-designed tool to address sharp **variations in farm income**. Similar to mutual funds, it is based on the concept of "risk pooling", and covers against a decline in sugar beet prices and/or an increase in input prices. However, a number of significant drawbacks in its implementation mechanism[184] prevented practical implementation of this tool in the EU sugar sector in the post-quota period.

In the case of **saving accounts**, too limited evidence available on the concrete results achieved in the EU sugar sector did not allow to draw robust enough conclusions on their effectiveness as a solution for smoothening out **variations in the income of sugar beet growers** stemming from variations in sugar beet prices.

As for **hedging techniques based on futures and options**, this tool was found to be **generally not available to EU sugar beet growers**. Nevertheless, this solution showed proven effectiveness in addressing sugar cane **price volatility** for growers in, e.g., Australia.

Since most of the aforementioned solutions and strategies, or at least the key concepts on which they are based, have shown to be effective in sugar-producing third countries, it is reasonable to expect that – once the identified drawbacks are addressed – a **wider uptake in the EU** will allow for a **more robust judgment on their actual contribution to improved resilience** of the EU sugar sector.

A number of **policy instruments foreseen by the CMO Regulation** that are explicitly designed to perform – among others – **risk management functions**, and which could – in theory - contribute to increased resilience of the EU sugar sector in crisis situations, saw **no practical application in the sector in the post-quota period**. All those instruments (aid to for private storage at Art. 17; measures against market disturbance at Art. 219; measures to resolve specific problems at Art. 221; derogation from Article 101(1) TFEU under Art. 222; the safeguard measures under Art. 194 and 195) are cross-sectoral, i.e., they are not tailored to the specificities of the sugar sector. As explained at § 7.4.4, the **main reasons for the non-application of those instruments** are the following:

- After a careful and detailed examination, the High Level Group on sugar (HLG, 2019) deemed that regular market instruments in the CMO Regulation were mismatched to deal with the specific market situation experienced during the post-quota period, but did not exclude that they could be used in the future. More precisely, most members of the Group agreed that to intervene during the transition period, when market fundamentals are changing, was not

[184] Potentially high administrative and reinsurance costs; reluctance of EU sugar producers to contribute to the fund needed for its functioning; high (30%) loss threshold in the case of non-sectoral ISTs; the protection offered declines in case of consecutive years of low farm gross margins.

straightforward and risked interfering with the ongoing adaptation process in an undesirable way.

- **Aid for private storage** is used to reduce temporarily the impact of short-term oversupply during a difficult market situation. However, apart from the first marketing year without quotas (2017/18), the EU sugar production continued to decline, leading to tighter stock levels. Under these circumstances, the activation of this measure would have either not been picked up by operators, or could have compromised sugar supply.
- The organisational structure for an effective implementation of **Article 222** is currently not in place in the sugar sector, as it would require the participation of the large majority of both beet growers and sugar producers; however, the current number of recognised Producer Organisations (POs) or Inter-branch Organisations (IBOs) is limited in most sugar producing Member States.
- The exclusion of collective bargaining or price-fixing activities in the context of the supply management measure under **Article 222** is needed to ensure the respect of the competition rules in force.
- The safeguard measures under **Article 194** of the CMO Regulation were not activated because - except for the first marketing year without quotas (2017/18) - the sum of sugar consumption and exports was above the domestic production, with the difference to be covered by imports. Also, in the last three marketing years EU sugar imports have been declining.
- As for the lack of application of the suspension of processing and inward processing arrangements under **Article 195** of the CMO Regulation, the analysis of the evolution of sugar imports/exports under these arrangements showed that in the first three years after the end of quotas sugar imports under inward processing have remained at fairly similar levels compared to the last two years of the quota period, while exports have increased quite significantly over the same period.
- Despite criticism from sectoral stakeholders on the lack of a triggering mechanism for their activation, aid for private storage and other market measures were implemented for other agricultural sectors (i.e., milk, livestock and olive oil[185]) over the years, thus demonstrating – wherever the conditions for their use are met - their effectiveness in addressing crisis situations faced by EU agri-food sectors.

As discussed at § 7.3.4, in the views of several sectoral stakeholders some of the above instruments would suffer from what they identify as inherent weaknesses in their design and/or implementation mechanism, a position that is not shared by the European Commission.

Aid for private storage (Article 17) is designed to prevent further decline in prices. However, storage is perceived by several sectoral stakeholders as suffering from serious drawbacks as a risk management solution, both in general and with specific regard to the sugar sector. In their views, the stored sugar volumes weigh in any case on the sugar market fundamentals (thus depressing sugar prices): this basically shifts the adverse effects of oversupply on prices from one marketing year to the following (i.e., the release of stored sugar volumes in an already depressed market would only continue to deteriorate the situation), so that storage would become financially unsustainable if sugar prices remain depressed for consecutive years.

Derogation from Article 101(1) TFEU (Article 222) allows for **voluntary supply management agreements**, including production planning, market withdrawal, private

[185] Milk sector/livestock sector: Commission Implementing Regulations (EU) No 947/2014 and (EU) No 948/2014; Commission Implementing Regulations (EU) 2020/597 and (EU) 2020/598; Commission Implementing Regulations (EU) 2016/559 and 2020/599; Commission Implementing Regulations (EU) 2016/1612 and 2016/1613. Olive oil sector: Commission Implementing Regulations (EU) 2019/1984 and (EU) 2019/2187; Commission Implementing Regulations (EU) 2020/126 and (EU) 2020/278.

storage or orientation of production towards a specific outlet, but excluding collective bargaining or price-fixing activities. The main drawbacks that prevented its application in the EU sugar sector in the post-quota period were identified by sectoral stakeholders in: i) the voluntary nature of any related supply management agreements, which translates into the impossibility of making them applicable *erga omnes*, thus raising issues in terms of free riding and incentives to deal-breaking; ii) the risk of lack of financial support for its application by Member States' governments.

Other emergency measures under the CMO Regulation[186] also saw no practical application in the EU sugar sector in the post-quota period, despite their intervention mechanisms are theoretically suitable to address some of the relevant risks and threats for the sector; in the views of sectoral stakeholders, this may have happened because of drawbacks in their implementation details.

In general, the instruments foreseen by the CMO Regulation are perceived by several sectoral stakeholders as being characterised by a **discretionary application, following a thorough assessment of the market situation**. The absence of a predictable triggering mechanism is perceived by those stakeholders as a **serious obstacle to the practical implementation** of the measures in the EU sugar sector in the post-quota period. In this regard, it is important to consider that stability and predictability are of paramount importance to sectoral stakeholders (due to the peculiarity of the sugar industry business model: see § 5.1), whereas the European Commission attaches great importance to the consistency of risk management measures in the CMO Regulation with the market orientation of the CAP.

In conclusion, **since the instruments foreseen by the CMO Regulation saw no practical application in the sugar sector in the post-quota period**, and there are **no concrete elements suggesting that they might suffer from specific weaknesses,** these instruments were filed under the "wait and see" cluster. However, diverging views between sectoral stakeholders and the European Commission on the usefulness of those instruments for the sector exist. A possible solution would be to continue the dialogue between the parties and to identify the most suitable tools and strategies that could ensure the stability of the sugar sector **without conflicting with the general principles of the EU legislation, including the general and specific objectives of the CAP and its market orientation**. The main challenge in this regard is the need to avoid conflicts with EU competition law in a possible review of the derogation from Article 101(1) TFEU - Article 222 of the CMO Regulation: whereas collective bargaining or price-fixing activities may be powerful solutions to address market and price risks, they also have a clear anti-competitive nature.

Any possible future adjustments to the concerned instruments could not be envisaged without **proper consideration of the legal framework for the future CAP**, and in particular of the **amended CMO Regulation**. In the context of the recent negotiations, different amendments were discussed and not retained, such as the introduction of triggering mechanisms for market measures. Such mechanisms may raise expectations and thus influence the behaviour of market actors: this would not be in line with the market orientation of the CAP[187].

The detailed results of the assessment of the risk management solutions and adaptation strategies filed under the "wait and see" cluster are outlined in synoptic Table 10.2.

[186] measures against market disturbance (art. 219); measures to resolve specific problems (art. 221); safeguard and inward processing measures (articles 194 and 195).

[187] It is also worth noticing that the European Commission did not accept recommendations by the European Court of Auditors (ECA) about introducing triggering mechanisms for the activation of exceptional measures in other sectors (see § 7.4.4).

*Table 10.2 - Risk management solutions and adaptation strategies to improve the resilience of the EU sugar sector: "**wait and see**"*

Solutions / strategies	**Assessment criteria**		
	Design	**Practical implementation and uptake**	**Results**
	Conceptually sound design	*Practical implementation but limited/negligible uptake in the EU AND/OR practical implementation and wide/significant uptake in third countries (only)*	*Limited/no results in addressing the most serious risks/threats for the EU sugar sector, but tangible results in addressing analogous risks/threats in sugar producing third countries*
Mutual funds against pest and diseases	Reduction in premium cost due to **pooling of risks**	Protection limited to certain pests and diseases Limited uptake in the EU beet sugar sector	The concept of risk pooling has been successfully implemented to address production and market risks in sugar cane and sugar beet production in third countries (e.g., Australia, USA)
Income Stabilisation Tool (IST)	Reduction in premium cost due to **pooling of risks** Covers against a decline in sugar beet prices and/or an increase in input prices Possibility of an index-based sectoral IST with a reduced threshold loss under Omnibus regulation Efficiency of public support for the **stabilisation of farm income**	Potentially high administrative and reinsurance costs Reluctance of EU sugar producers to contribute to the fund High (30%) loss threshold if no sectoral IST Protection declines in case of consecutive years of low farm gross margins No practical implementation in the EU sugar sector	The concept of risk pooling (on which IST is based) has been successfully implemented to address production and market risks in sugar cane and sugar beet production in third countries (e.g., Australia, USA) No evidence available on the practical effectiveness of IST in the sugar sector in third countries (due to lack of implementation of the tool).
Saving accounts – sugar beet growers	Smoothing out of **variations in farm income**	Not all farms have the capacity to save Ceiling on the tax-deductible amount Relatively limited uptake in the EU sugar sector	Too limited evidence available on the results achieved in the EU sugar sector to draw robust conclusions
Futures and options + hedging techniques – sugar beet growers	Specifically designed to address **price volatility**	Generally not available to sugar beet growers in the EU → no significant uptake	Proven effectiveness in addressing price volatility for growers in third countries (Australia)

Solutions / strategies	**Assessment criteria**		
	Design	**Practical implementation and uptake**	**Results**
	Conceptually sound design	*Practical implementation but limited/negligible uptake in the EU AND/OR practical implementation and wide/significant uptake in third countries (only)*	*Limited/no results in addressing the most serious risks/threats for the EU sugar sector, but tangible results in addressing analogous risks/threats in sugar producing third countries*
Storage of sugar by producers Aid for private storage – Article 17 of the CMO Regulation (in its current form)	Designed to prevent further decline in **sugar prices** In the views of sectoral stakeholders, would only shift the **adverse effects of oversupply** on sugar prices from one marketing year to the following	Storage of sugar: In the views of sectoral stakeholders, stored sugar volumes weigh in any case on market fundamentals, thus depressing prices → release of stored sugar volumes in an already depressed market only deteriorates the situation → storage becomes financially unsustainable if sugar prices remain depressed for consecutive years Aid for private storage: In the views of sectoral stakeholders: non-sector specific; discretionary application due to a lack of clear and predictable triggering mechanisms No practical implementation in the EU sugar sector in the post-quota period, but used to address market crises in other sectors	Storage of sugar by producers did not contribute significantly to address the depression of sugar prices on the EU market (the only tangible results derived from reduced production and improved global sugar price dynamics) Aid for private storage achieved no concrete results because it was not applied in the sector in the post-quota period due to declining sugar production and tight stock levels after the 2017/18 marketing year.

Solutions / strategies	**Assessment criteria**		
	Design	**Practical implementation and uptake**	**Results**
	Conceptually sound design	*Practical implementation but limited/negligible uptake in the EU AND/OR practical implementation and wide/significant uptake in third countries (only)*	*Limited/no results in addressing the most serious risks/threats for the EU sugar sector, but tangible results in addressing analogous risks/threats in sugar producing third countries*
Derogation from Article 101(1) TFEU - Article 222 of the CMO Regulation (in its current form)	Allows voluntary **supply management** agreements, including production planning, market withdrawal, private storage or orientation of production towards a specific outlet Does not allow **collective bargaining or price-fixing activities**	Voluntary nature of any related supply management agreements → impossibility of making them applicable *erga omnes* → issues of free riding and deal-breakers Risk of lack of financial support by Member States' governments In the views of sectoral stakeholders: non-sector specific; discretionary application due to a lack of clear and predictable triggering mechanisms No practical implementation in the EU sugar sector in the post-quota period as the organisational structure for an effective implementation is currently not in place in the sector, i.e., the current number of recognised Producer Organisations (POs) and Inter-branch Organisations (IBOs) is limited in most sugar producing Member States.	No concrete results because it was not applied in the sector in the post-quota period, mainly due to the characteristics of the organisational structure in the sugar sector (few recognised POs and IBOs).
Other emergency measures under the CMO Regulation (in their current form)*	Their intervention mechanisms are theoretically suitable to address some of the relevant risks and threats for the EU sugar sector in the post-quota period	In the views of sectoral stakeholders: non-sector specific; discretionary application due to a lack of clear and predictable triggering mechanisms No practical implementation in the EU sugar sector in the post-quota period but used to address market crises in other sectors.	No concrete results because they were not applied in the sector in the post-quota period

* measures against market disturbance (art. 219); measures to resolve specific problems (art. 221); safeguard and inward processing measures (articles 194 and 195).

10.2.2.3"What does not work"

Some risk management solutions – most notably, the instruments foreseen by the CMO Regulation[188] – saw no practical application in the EU sugar sector in the post-quota period. These instruments are cross-sectoral, i.e., they are not tailored to the specificities of the sugar sector. In their specific case, the assessment revealed that several sectoral stakeholders see some inherent weaknesses in their design and implementation: those weaknesses, in their views, contributed to prevent the application of the instruments in the sugar sector during the crisis. This position is not shared by the Commission, which underlined that those instruments were not used during the crisis because the conditions for their activation were not met (the underlying reasons are explained in detail under question 6 at § 7.4.4). In the absence of evident conceptual weaknesses in the instruments foreseen by the CMO Regulation, and since their non-application during the crisis implies that no concrete evidence is available to conclude on their actual effectiveness in addressing the risks faced by the EU sugar sector in the post-quota period, those instruments could not be filed under the "what does not work" cluster, and were instead filed under the "wait and see" cluster (§ 10.2.2.2).

10.2.3General considerations on the possible strategies to address the main risks and threats to the EU sugar sector.

The set of solutions and strategies classified under the "**what works**" cluster should constitute the **core of the "toolbox" to address the most serious threats to short, medium and long-term economic viability of the EU sugar sector**. To further improve the capacity of the identified solutions and strategies in that regard, **possible adjustments should be aimed at addressing the highlighted drawbacks in their implementation mechanisms**, in order to improve their practical effectiveness and/or to promote further widening of their uptake in the EU sugar sector.

As for the solutions and strategies filed under the "**wait and see**" cluster, **adjustments aimed at addressing the highlighted drawbacks in their implementation mechanisms may be needed** in order to **improve the practical effectiveness** of those solutions and strategies in addressing the relevant risks and threats for the EU sugar sector, and to **promote a more adequate uptake/implementation** for them. For some of those solutions/strategies there is no sufficient concrete evidence, to date, to assess their practical effectiveness in the EU context. This implies that **further investigations will have to be made** in the future, when those solutions and strategies should (hopefully) see a more significant uptake/implementation, in order to come to a **robust assessment of their practical effectiveness** for addressing the relevant risks and threats. As for the **instruments foreseen by the CMO Regulation**, which **saw no practical application in the sugar sector in the post-quota period**, there are **no concrete elements suggesting that they might suffer from specific weaknesses**. In any case, possible future adjustments to those instruments could not be envisaged without proper consideration of the legal framework for the future CAP (in particular of the amended CMO Regulation) and of the market orientation of the CAP.

The assessment revealed the important contribution of **diversification strategies** (especially towards sectors/products that are not influenced by sugar price dynamics) and **process/product innovation strategies** to improved resilience of the EU sugar sector. However, the implementation of those strategies by companies that are still focused on the core business of sugar production presents significant challenges, especially because the prolonged crisis on the EU sugar market has left many of them

[188] Aid to for private storage at Art. 17; measures against market disturbance at Art. 219; measures to resolve specific problems at Art. 221; derogation from Article 101(1) TFEU under Art. 222; the safeguard measures under Art. 194 and 195.

with limited financial resources. Potential solutions to overcome this constraint may be offered by the development of **forms of cooperation** (e.g., joint ventures) among sugar companies, or between them and companies operating in the target sectors, as an alternative to the implementation of those strategies through direct investment and/or acquisitions.

The potential for **innovation in contractual relationships** along the sugar supply chain could also be explored, due to the important role that they play in the more market-oriented post-quota sugar regime. Efforts should especially be targeted at sugar beet supply contracts, with a view to improving their capacity to cope with increased market and yield volatility. The introduction of contractual innovations could be facilitated by a deepening and a wider use of inter-branch agreements. The end of the EU quota regime has led to diverging interests between sugar beet growers and sugar producers. Finding common ground through new contractual arrangements between all stakeholders, as well as making risk management a top priority, will be increasingly needed for the EU sugar production and marketing system to survive. The challenge is also for providers of risk management tools and solutions, to find new instruments and strategies appropriate to the changing business environment, and for the EU and Member States, to encourage the use of well-designed risk management tools.

The assessment showed that it is of paramount importance to consider that **there is a thin line, but a real difference, between managing risks and addressing structural weaknesses**. While risk management aims at making economic agents able to absorb temporary shocks through appropriate tools and strategies, including with public support, it cannot remedy a lack of competitiveness due to low productivity, high production costs, a declining market power in the food value chain or other systemic problems. The prolonged crisis that the EU sugar sector has experienced as a result of a long period of low world sugar prices may induce sectoral stakeholders to ask for far-reaching policy measures that would go beyond risk management *per se*, and provide them with effective means to maintain their financial viability until the crisis ends or recedes. In this regard, it is worth emphasising the **positive contribution of voluntary coupled support and other direct payments** to addressing structural difficulties faced by the sugar beet farming sector in certain Member States, thus increasing the overall resilience of sugar beet growers in those countries.

It should finally be underlined that **sectoral actors could play a more proactive role in strengthening their resilience**, especially by:

- obtaining access to the multiple tools available at EU level that could contribute to an increased resilience of the sector: for instance, measures under the second pillar of the CAP that are not, as such, part of the risk management toolkit, or the funds supporting investment in research and innovation (Horizon 2020 and Horizon Europe); in that regard, it is important to consider that the *NextGenerationEU* recovery plan[189] substantially increased funding for supporting – among others – research & development activities;
- participating in different good practice exchange platforms set at national /EU level, such as the European Network for Rural Development (ENRD).

[189] https://ec.europa.eu/info/strategy/recovery-plan-europe_en

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ANNEXES

Annex 1 – Free Trade Agreements containing provisions on sugar – detailed description

Annex 2 – Overview of national environmental and nutrition policies

Annex 3 – Detailed description of the World and EU sugar markets

Annex 4 – Detailed assessment of the influence of the relative bargaining power of the different actors along the sugar supply chain on the relevant arrangements and contracts

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Annex 6 – Risk management tools/approaches/strategies implemented by other major players at world level: detailed reply to question 9

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