EUROPEAN SUGAR MARKET – IMPACT OF QUOTA SYSTEM

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Abstract

BENEŠOVÁ IRENA, ŘEZBOVÁ HELENA, SMUTKA LUBOŠ, TOMŠÍK KAREL, LAPUTKOVÁ ADRIANA. 2015. European Sugar Market – Impact of Quota System. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis,* 63(6): 1825–1838.

The European agricultural market has been criticized for its heavy regulations and subsidization. The sugar market is one of the most regulated ones; however, this will change radically in 2017 when the current system of production quotas will end. The aim of this paper is to present the basic characteristics of the EU quota sugar market. The analysis identifies the main drivers of EU sugar market and their position within the EU sugar market. The paper identifies especially those drivers/companies/alliances which take control over the EU sugar production realized under the quota production system. The paper also highlights the level of EU sugar market concentration and also identifies those countries and companies which are the main leaders in the sugar production area realized under the quota system. Based on the results deriving from the paper, it is possible to characterize the EU sugar market as a heavily concentrated one – nearly 75% (10 mil. tonnes) of the quota is controlled by five multinational companies only; these companies are operating more than 50% of all the available sugar plants located in the EU. These multinational alliances are also in control of the production capacities of their subsidiaries. In most countries, this causes serious problems as the given quota is controlled by one or two producers only. The EU sugar market is extremely concentrated especially if we take into consideration the location of each alliance's headquarters. The majority of production capacities are under (the) control of especially German and French companies. These two countries are also the main beneficiaries in relation to the EU sugar production quota system.

Keywords: sugar market, production quota, sugar, concentration, market leaders, profile, restructuralization

INTRODUCTION

Agriculture represents a regulated sector in many countries including the EU members. The EU agricultural policy represents a very powerful instrument protecting its farmers and foodstuff producers (Spettman, 2006). The Common agricultural policy made EU a significant food producer and the most significant food exporter in the world (Krick, 2000). EU countries in the past established a significantly higher number of special policies supporting selected sectors within the EU agriculture. The most specific CMO was applied for example in relation to cereals, milk and sugar, etc. However, the applied policy strengthened the position of EU farmers and fixed the EU agricultural and foodstuff market, its side effect being distortion of the EU market character both in relation to the EU single market and also in relation to the world market (Richardson, 2009). A very nice example of such distortion can be seen for example in relation to the EU sugar market. Its production capacities are heavily regulated by both the applied production quota system and import protection (Judzinška and Kovačevic, 2012). In the past,

the applied Common sugar market organization made the EU sugar market an isolated island existing within the world sugar market. The EU was heavily criticized because of its sugar policy especially by developing countries and WTO authorities. The long term critique together with the process of EU agricultural policy transformation made EU countries carry out several gradual reforms affecting the EU agriculture policy, structure and character (Budzynska, 2013). These changes also affected the EU sugar market – which has become very concentrated during the last several decades (Féménia and Gohin, 2013). Currently, the problem of EU sugar market future development is being strongly discussed especially in connection with the expected abolition of the sugar quota system. The future character of the EU sugar market is not really clear. The EU sugar market has already been working under CMO for a rather long time and its ability to face the world is questionable.

The Common Market Organisation (CMO) for sugar has been one of the pillars of the Common Agricultural Policy since its establishment. In comparison with other agricultural sectors, CMO for sugar was not considered as a big political problem (Bureau *et al.*, 1997) even though 80% of the world sugar production was connected with some kind of support (Mitchell, 2005). The original sugar policy used two instruments: price guarantees for sugar producers within the EU together with import restrictions from the third countries (Fransen *et al.*, 2003). By combining the previous instruments with levies, the price exceeded the world market price (Bogetoft *et al.*, 2007; Elobeid and Beghin, 2006). This could guarantee the original aim that is to ensure income for EU growers and assure as well as EU's self-sufficiency. This situation also has had budgetary consequences. Since sugar is by far the most subsidized commodity in the world, a similar situation has appeared in other countries as well (Beghin and Elobeid, 2015).

The Common Market Organisation for sugar has been based on the quota system. Pinkerton and Edwards (2010) mention that in order for a quota market to function well, a number of conditions must exist, otherwise market imperfections might occur (Williams and Isham, 1999).

Since its creation until 2005, CMO for sugar remained mostly unchanged (Ackrill and Kay, 2009; Šustrová, 2014). Van Meijl and van Tongeren (2002) point out that lowering import protection for other agricultural products may have led to the rise of sugar supply.

The first substantial sugar reform is connected with the Council regulation (EC) No. 318/2006. It brought a significant intervention price reduction for sugar and sugar beet, merging of the quotas and incentives to reduce production (European Commission, 2006). Although some authors (Buysse *et al.*, 2007) mention that additional actions would be necessary, the introduced measures caused the closure of 83 sugar factories and resulted in 22,000 direct and more than 100,000 indirect job losses (EFFAT, 2013).

Many authors (Abler *et al.*, 2007; Řezbová *et al.*, 2013) mention the negative impact on the producers; however, in general it was agreed that the reform should have resulted in welfare gains for the EU (Gohin and Bureau, 2006; Špička and Janotová, 2013) as well as for other states (Koo, 2002; Svatoš *et al.*, 2012; Nolte *et al.*, 2010). An analysis showed that for the least developed countries (LDC's) or African, Caribbean and Pacific (ACP) countries the EU has remained the most profitable export market. On the other hand, Richardson-Ngwenya and Richardson (2014) emphasize that the benefits may be overwhelmed by the ongoing liberalization process.

Another significant change to CMO for sugar is abolition of the quota system that will take place. A number of models show that the quota abolition will increase the EU's production from 13.3 to 15.5 m tonnes (Nolte *et al.*, 2012). The quota management will end as of 30 September 2017 (European Commission, 2015).

Several decades of application of CMO concerning the sugar market resulted in a constantly decreasing number of sugar plants operating on the EU market. Because of CMO, the profile of the EU sugar market has become very limited and the process of re-structuralization has survived only in about 100 sugar beet plants spread in circa 19 EU countries. These plants are operated by only a few international alliances and the number of independent sugar plants is constantly decreasing and, year by year, a couple of independent plants collapse.

Higher market concentration was the result of CMO reforms including the reform from 2006. Each sugar market reform made the production and the market more effective and forced the less effective companies to leave it. However, this kind of decision lead to some kind of market inefficiency or even market imperfection (reduction of the level of competitiveness – the market became highly concentrated especially in several EU countries). This is intensified by another problem – the existence of the sugar quota. Imperfect competition leads to the increase of returns and thus to higher profitability of the producers operating under the quota system.

The aim of this paper is to present the basic characteristics of the EU quota sugar market. The analysis identifies the main drivers of the EU sugar market and their position within the EU sugar market. The paper identifies especially those drivers/companies/alliances which take control over the EU sugar production realized under the quota production system. The paper also highlights the level of the EU sugar market concentration and it also identifies those countries and companies which are the main leaders in the sugar production area realized under the quota system.

MATERIALS AND METHODS

The paper is divided into two parts. The first part of paper focuses on description of the sugar market in the European Union with regards to production, consumption and trade. The second part is related to the market structure. The ownership structure of sugar factories and refineries is analysed. Our approach focuses on the relationship between different factories and their owners. We assume that though there is a considerable number of producing capacities, the structure of the market will not be too fragmented as a result, and only a limited number of key companies will take control of it.

In order to conduct the analysis, data from the F.O. Licht database have been used that help to describe the ownership structure of current sugar producers. Graphical decomposition is used to examine all the relations between different factors. The analysed data cover the period of the last five years (2010–2014). The aim is to analyse the situation after the world economic crisis (2009). The data cover the following areas: sugar production, trade, consumption, prices, stocks, daily production capacities, sugar quotas and their distribution, companies operating within the EU market and their ownership structure.

In order to analyse the level of concentration of quota sugar production capacities – the proposed methodology identifies the real power and the position of the countries and firms operating under the EU sugar CMO, that is under the production quota system.

The degree of concentration of production capacities (under the quota system) is measured by the CR_5 concentration index (CR_n) and Herfindahl-Hirschman Index (HHI):

$$CR_n = \sum_{i=1}^{n} s_i = s_1 + s_2 + \dots s_n \,, \qquad (1)$$

where Si is the quota share of a firm i, n represent the number of surveyed subjects within a given sector. The share of firms/alliances was expressed as their partial share in the quota beet sugar production.

Classification of the CR_n index given by the DG Comp (2007) results in three categories:
a) Low concentration (0–50%) – from perfect competitiveness to oligopoly.
b) Moderate concentration (50–80%) – pure oligopoly.
c) High concentration (80–100%) from oligopoly to monopoly.

"HHI" is applied as an additional indicator to the CRn. HHI is used to measure quota holder system concentration and to monitor antimonopoly policies. The index ranges from 0 (no concentration and a highly competitive system) to 10,000 (pure monopoly) (Hirschman, 1964). The index is calculated by squaring the quota share of each firm competing in the quota system and adding the resulting numbers together:

$$HHI = \sum_{i=1}^{N} s_i^2 = s_1^2 + s_2^2 + s_N^2 \,, \qquad (2)$$

where s_i is the quota share of the firm/alliance „i" in the quota system and N represents the number of firms/alliances on the market. This article uses HHI classification defined by the US Department of Justice. If HHI is lower than 0.01 (or 100), the market (quota system) is highly competitive. HHI ranging from 0.01 and 0.15 (100 and 1,500 respectively) indicates an unconcentrated market (quota system) with significant positions of several companies. The values of HHI from 0.15 to 0.25 (1,500 and 2,500 respectively) reveal significant market (quota system) concentration (mostly monopolistic competition) and HHI above 0.25 (2,500) indicates a highly concentrated market (mostly oligopoly). HHI close to 1 (10,000) suggests a monopoly.

The level of concentration of EU sugar quota production is also illustrated using a modified "Lorenz curve". Originally, the Lorenz curve was a tool used to represent income distributions as proposed by Lorenz (Lorenz, 1905). However, for our purposes the Lorenz Curve is modified as follows. The x-axis records the cumulative proportion of the number of sugar market subjects (sugar companies or alliances) ranked by their "daily sugar production capacities". The share of companies in the total number of companies is in percentage. The y-axis records the cumulative proportion of "daily production capacities of sugar factories" for a given proportion (number) of sugar companies/alliances. The y-axis also provides the results in percentage.

RESULTS AND DISCUSSION

EU Sugar Market Character

The European Union sugar market has been operating under very special circumstances. It is isolated by the application of the EU CAP and trade policy from a direct influence of the world market. The production quotas together with (applied) import restrictions made EU a "sugar island". While the world sugar market is developing fast, the EU sugar production has been stagnating. Annual sugar production across the world is higher than its consumption. In the production year 2014/2015, the world production was 182 mil. tonnes and consumption 176 mil. tonnes. The surplus was 6 mil. tonnes. During the last four decades, production of sugar has more than tripled. On the other hand, EU sugar production within the last four decades has recorded mere 25% growth and since the 1990s the production capacities installed in EU countries have been decreasing.

The following Tab. I provides basic information about the structure of production, consumption and sugar trade during the last 5 years. It is evident that the production itself is oscillating between 16 mil. tonnes and 20 mil. tonnes. However,

the EU sugar market is heavily protected and the production volume is stabilized. The European Union is considered to be the net sugar importer – this is especially true regarding raw sugar, however, concerning white sugar, EU is still the net exporter (however, it is necessary to highlight that despite the fact that the EU is a net sugar importer, it is also an extremely developed net exporter of sweeteners. If we also take into consideration sugar included in sweeteners, the EU sugar trade can possibly be characterized by positive balance.). The following Tab. II provides a basic overview of EU trade activities development in connection with raw and

white sugar. Based on the data available, it is evident that the volume of EU sugar export has recorded a significant decline during the last 5 years.

During the last year, all sugar-processing companies announced a drop in their turnover and profit.

During the last few years, the share of beet sugar has declined compared to cane sugar, production of which has increased. In general, there are two factors influencing the current production. Firstly, it is increasing acreage and, secondly, increasing yields. These two factors have an impact on the price that has reached its minimum for the last years (Fig. 1). On the other hand the EU sugar producing companies

I: *Characteristics of the European sugar market (1,000 tonnes)*

	2010	2011	2012	2013	2014
Initial stock	18,589.0	16,414.5	18,863.1	19,118.1	19,646.6
Production	15,741.7	18,595.7	17,513.3	16,678.5	18,807.6
Consumption	18,804.5	19,031.9	18,849.1	18,916.5	18,984.8
Import	9,134.8	10,149.2	9,264.0	9,360.5	9,486.5
Export	8,246.4	7,264.5	7,673.1	6,594.0	7,130.9
Net imports	886.4	2,882.7	1,588.9	2,764.5	2,353.6
Ending stock	16,414.5	18,863.1	19,118.1	19,646.6	21,825.0

Source: own calculation based on F. O. Licht, 2015

II: *Trade with raw and white sugar*

	2010	2011	2012	2013	2014
	raw sugar				
Import	3,346.0	4,167.1	3,578.1	3,795.9	3,559.6
Export	490.5	420.5	405.2	402.7	495.6
Net imports	2,855.5	3,746.6	3,172.9	3,393.2	3,064.0
	white sugar				
Import	5,788.8	5,982.1	5,686.0	5,564.6	5,926.9
Export	7,755.9	6,844.0	7,267.9	6,191.3	6,635.3
Net imports	1,967.1	861.9	1,581.9	626.7	708.4

Source: own calculation based on F. O. Licht, 2015
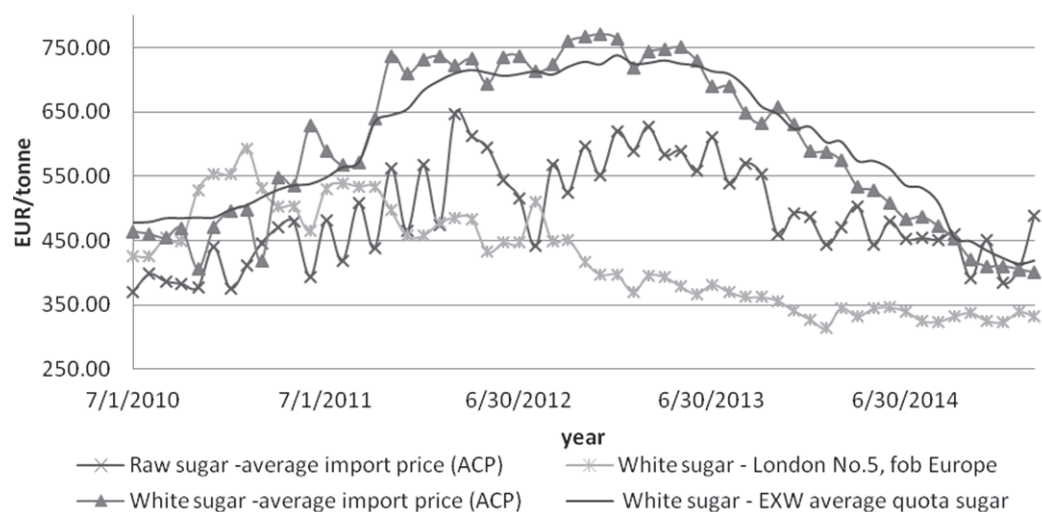
1: *Sugar price development (1. 7. 2010–1. 3. 2015)*
Source: own processing based on F. O. Licht, 2015
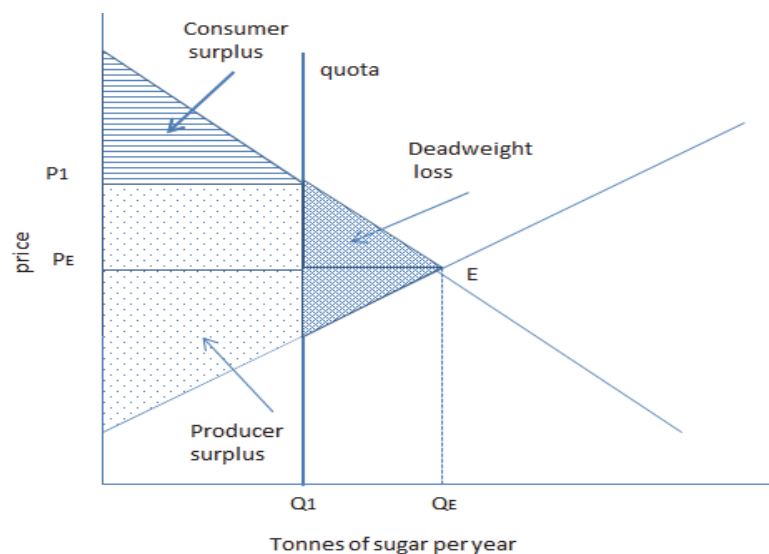
2: *Production quota*
Source: own processing, 2015

are in nowadays heavily affected by increasing competition from ACP countries (operating within the EU market under the GSP regime) and their trade activities are also negatively influenced by constantly increasing supply of low caloric and dieteticall sweeteners e.g. isoglucose. The constantly increasing competition is reducing the level of sugar price not only at the global level, but also at the level of the European Union – for details see Fig. 1. In nowadays many production facilities operating within the EU market are surviving only because of CMO. The quota system provides their holders the privilege to operate within the EU market, which is still protected against the import from many third countries.

Sugar beet capacities are mostly connected with the former colonial power (such as the UK). The European Union is considered a very important actor on the world sugar market. It is one of the most important producers as well as consumers.

The Tab. I also points to another problem, which is the high ending stock. These huge sugar inventories cause problems with gradual market liberalization. They could also jeopardize the system after the quota abolition. The European Union cannot increase its export because of the WTO volume regulation.

The European sugar market is very specific and connected with protectionism. The sugar quota presents a typical example of a government regulatory mechanism to promote the original objectives of the CMO for sugar. The production quota reduces the quantity of production and, consequently, the surplus of domestic consumers through higher domestic prices. This means that the deadweight loss occurs which could be referred to as a reduction of the net benefit (Fig. 2). On the other hand, the market is distorted. As has been mentioned, having a quota is some kind

of a privilege for those operating within the EU market. This privilege is extremely profitable for current quota holders, but it is not so profitable for consumers.

The problem is that this kind of protection is not universal but limited only to the producers or rather to the quota holders, that is, very often, multinational corporations. By abolishing the sugar quota, we can expect the price to fall. We witnessed the same situation in 2006 when the European Union presented the first changes to the market organization for sugar. An intervention price was replaced by reference sugar prices and was reduced by 36%. The quota system changed (A and B quotas were put together into one group – called 'quota' only). At the same time, a payment to companies willing to give up quotas was introduced. However, this action resulted in the current situation when small players have already left the market, and it is dominated by only a few key players. The problem of the current quota regime and its possible abolition is the fact that independent producers will not be able to survive the competition immediately after the elimination of the quota system. The experience was analogous in 2015 immediately after the milk quota system was abolished.

Production Capacities Distribution Under EU Sugar Quota System

In comparison with the rest of the world, more than ¾ of European sugar-processing factories can process only in sugar beet. Some of them can process sugar cane only (10%) and the rest (approximately 12%) are combined factories. Tab. III demonstrates the structure of processing capacities across the European Union. It is evident that concentration of sugar factories in all member states varies. Concerning the old member states, only Ireland and Luxembourg do not have any sugar

factories. The highest number of sugar factories is located in Germany and France. In regard to the new member states, there is no processing capacity in Estonia, Latvia, Cyprus, Malta and Slovenia. Poland is the biggest producer of the new member states. Poland together with France and Germany account for nearly 50% of the sugar processing factories. However, we can conclude that there is no statistically significant difference between the total number of sugar processing factories (including sugar beet factories + combined factories + sugar cane processing factories) in either old or new member states (p value ≥ 0.05).

During the last few years, there have been approximately between 50 and 60 companies operating across the European Union (one company could operate more than one sugar plant). The number of companies differs across the member states (Tab. IV) and across years as well. As is evident from Tab. III and Tab. IV, the market shows enormous potential. The high number of companies should be regarded as positive and should indicate a competitive environment. However, the reality is different. What is not evident is the inner structure of the market. Most of these companies are closely related through multinational alliances or other agreements. Individual alliances are then controlling many production facilities spread all over the Europe (In practise there are

only about 21 independent players operating under the quota regime). Those multinational alliances following their aim and ambitions and in many cases they already made a decision having the fatal impact on individual national sugar production capacities.

It is evident from Fig. 3 that only few companies control the whole sugar market. It might be stated that the following alliances are the market leaders: Suedzucker, Nordzucker, Tereos Group, Pfeifer & Langen, Cristal Union, Associated British Food Alliance and Tate & Lyle.

The following Fig. 4 provides the overview of EU production sugar quotas distribution among 21 alliances and independent companies controlling nearly hundred sugar plants operating under the quota regime (quota owners). On the base of results coming from Fig. 4, it is evident that EU market is heavily concentrated – cc 70% of sugar producers control only about 10.5% sugar quota volume. On the other hand cc 7 biggest alliances have taking control nearly over 90% of production quota volume.

The following Fig. 5 provides the overview of top 10 producers according to their share in sugar quota production volume.

Suedzucker control Suedzucker AG, Suedzucker Polska, Raffinerie Tirlemontoise, Saint Louis Sucre and AGRANA. Suedzucker AG controls 24% of the market. Its plants are located in Germany,

III: *Structure of sugar factories in the European Union*

Country	Sugar beet factories	Combined factories	Cane-processing factories	Total	Quota (thousand tonnes)	Annual crash/year (thousand tonnes)
Austria	2	0	0	2	351	3,302
Belgium	5	0	0	5	676	7,051
Bulgaria	0	4	2	6	0	1,215
Croatia	1	2	0	3	192	2,070
Czech Republic	7	0	0	7	372	3,680
Denmark	1	1	0	2	372	3,375
Finland	1	0	1	2	80	560
France	25	0	1	26	3,437	37,821
Germany	20	0	0	20	2,898	27,571
Greece	4	0	0	4	158	510
Hungary	1	0	0	1	105	825
Italy	3	2	1	6	508	3,540
Lithuania	2	0	0	2	90	954
Netherlands	2	0	0	2	804	7,000
Poland	16	2	0	18	1,405	12,962
Portugal	0	1	3	4	9	10
Romania	4	1	3	8	104	1,085
Slovakia	2	0	0	2	112	1,045
Spain	3	2	0	5	498	5,082
Sweden	1	0	1	2	293	2,730
UK	3	1	1	5	1,056	7,515

Source: own calculation based on F. O. Licht Sugar and European Commission – Sugar balance sheet, 2015
Note: The numbers represent: sugar beet factories/combined factories/sugar cane processing factories
Quota distribution – marketing year 2014/2015

IV: *Companies operating in the common market*

Country	Company name	Daily crush t/day	DRC t/day	Country	Company name	Daily crush t/day	DRC t/day
Austria	Agrana Zucker (2)	25,400			COPROB (2)	31,000	2,800
Belgium	ISCAL Sugar (1)	12,000			Eridania Sadam (1)	16,000	
	Raffinerie Tirlemontoise S.A. (4)	52,100	1 000	Italy	Sfir Raffineria di Brindisi (1)		1,350
Bulgaria	Burgarski Zaharni zavodi Ltd. (1)	5,000	650		Zuccherificio del Molise S.p.A. (1)	12,000	
	Litex Commerce JSC (4)	3,000	2 295		Sermide S.p.A. (1)	4,500	
	Zaharen Kombinat Plovdiv AD (1)	1,500	250	Lithuania	Nordic Sugar (1)	5,900	
	Zaharni Zavodi (1)	4,000	580		UAB (1)	2,400	
CR	Cukrovar Vrbátky a. s. (1)	2,000		Netherlands	Suiker Unie (2)	50,000	
	Hanácká potravinářská společnost, s. r. o. (1)	2,300			Krajowa Spolka Cukrowa (7)	48,459	
	Litovelská cukrovarna, a. s. (1)	2,800		Poland	Nordzucker Polska S.A (2)	12,627	800
	Moravskoslezské cukrovary, a. s. (2)	8,700			Pfeifer & Langen (4)	27,533	1,200
	Tereos TTD, a. s. (2)	21,000			Suedzucker Polska S.A. (5)	24,100	
Croatia	Tvornica Secera Osijek d.o.o. (1)	8,000			RAR Refinarias de Acucar Reunidas, S.A. (1)		800
	VIRO Tvornica secera d.d. (2)	15,000	2,000	Portugal	Sociedade de Industrias Agricolas Acorianas, S.A. (1)	1,000	
Denmark	Nordic Sugar (2)	25,000	2,000		Sociedade de Desenvolvimento Agro-Industrial, S.A. (1)		1,300
Finland	Sucros Oy (2)	8,000	650		Tate & Lyle Acucares Portugal S.A. (1)		1,000
France	Cristal Union (10)	94,500			Agrana Romania S.A. (2)	4 000	2 000
	Lesaffre Fréres (1)	7,200			Fabrica De Zahar Bod SA (1)	2,000	
	Ouvré Fils S. A. (1)	9,000	95	Romania	Marr Sugar Romania SRL (1)		800
	Saint Louis Sucre S.N.C. (5)	51,130	900		Mimo Trading (1)	3,000	
	Tereos (9)	141,000			Pfeifer & Langen (1)	3,000	
Germany	Nordzucker AG (5)	70,100			SC Zaharul Liesti S.A. (1)		400
	Pfeifer & Langen (5)	56,500			Tereos Ludus (1)	3,500	
	Suedzucker (9)	101,900		Slovakia	Povazsky cukor, a.s. (1)	6,000	
	Suiker Unie (1)	11,250			Slovenské cukrovary s.r.o. (1)	5,000	
Greece	Hellenic Sugar Industry S.A. (3)	8,500		Spain	AB Sugar (4)	32,900	1,200
Hungary	Magyar Cukor ZRT (1)	7,500			Acor Sociedad Cooperativa (1)	12,000	750
				Sweden	Nordic Sugar (2)	21,000	850
				UK	AB Sugar (4)	50,100	300
					Tate & Lyle (1)		3,200

Source: own processing based on F. O. Licht, 2015
Note: The number in brackets represents the number of factories owned by the company
Greece – only 1 factory is taken into consideration – the rest are not operating, this also applies to Sermide S.p.A. I (Italy) and SC Zaharul Liesti S. A. (Romania)
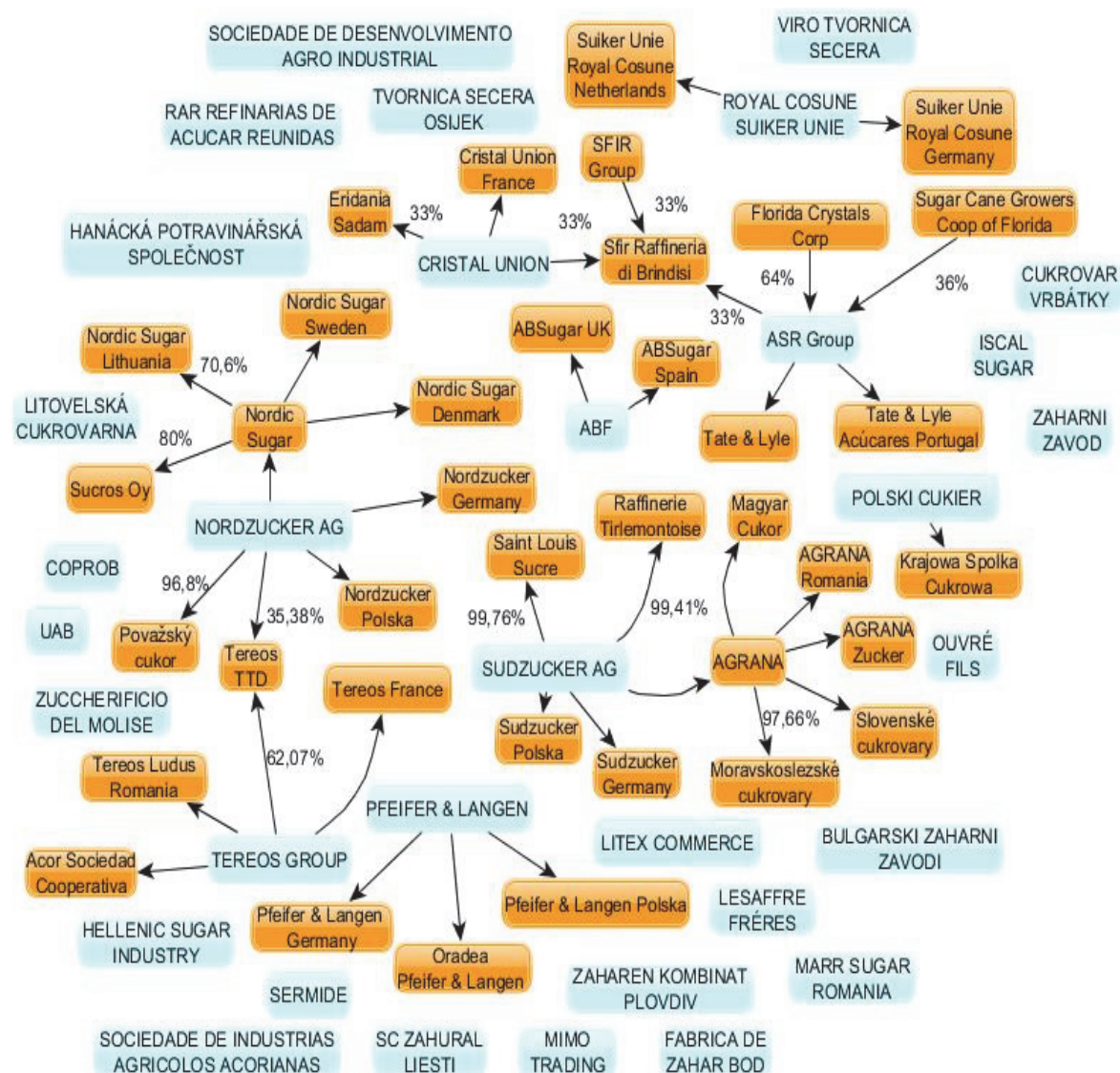
3: *Structure of the sugar producers in the EU*
Source: own processing based on F. O. Licht, 2015
Note: if the share is not mentioned in percentage, it is 100%

Belgium, France, Poland, Austria, Romania, Slovakia, the Czech Republic and Hungary. Suedzucker has 18.5 thousand employees and an annual turnover of €7.7 billion €. Farmers constitute 55% of its shareholders. In the 2013/2014 campaign, they processed 27 m tonnes of sugar beet and produced 4.7 m tonnes of sugar.

Nordzucker is the 2nd largest sugar producer in the EU. Its market share is 15% (Fig. 5). This alliance is operating in Poland, Slovakia, Finland, the Czech Republic, Denmark, Lithuania, and Sweden. In total, this alliance has a daily production capacity of 148,627 t/day for raw sugar. In 2014, they produced 2.9 m tonnes of sugar from sugar beet in 13 plants.

The third largest company is Tereos with an 11% market share. Tereos operates in France, Spain, Romania and the Czech Republic. It is followed

by Associated British Food (ABF) with the same market share, connected with Spain and the United Kingdom.

The last company belonging to the "big five" according to CRn is Pfeifer & Langen. Its market share is 8%. Pfeifer & Langen operate in Germany, Poland and Romania. Fig. 6 shows the structure of the quota holders in the European Union. There are 8 big companies that own the majority of the quota and thus can control the market.

The European sugar market is represented by horizontal as well as vertical mergers. Through the horizontal mergers, most of factories have been connected together to create sugar alliances. The vertical merger then represents a connection between different stages of production. As an example, we can use the Tereos group that has
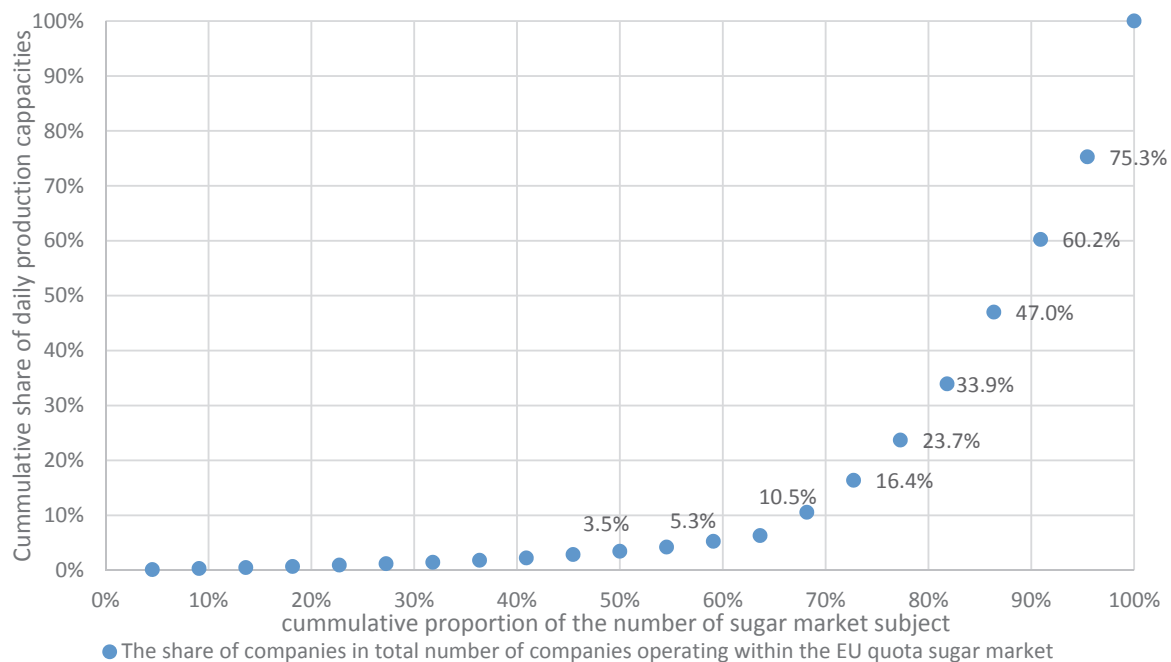
4: *The level of concentration of EU sugar quotas production capacities*
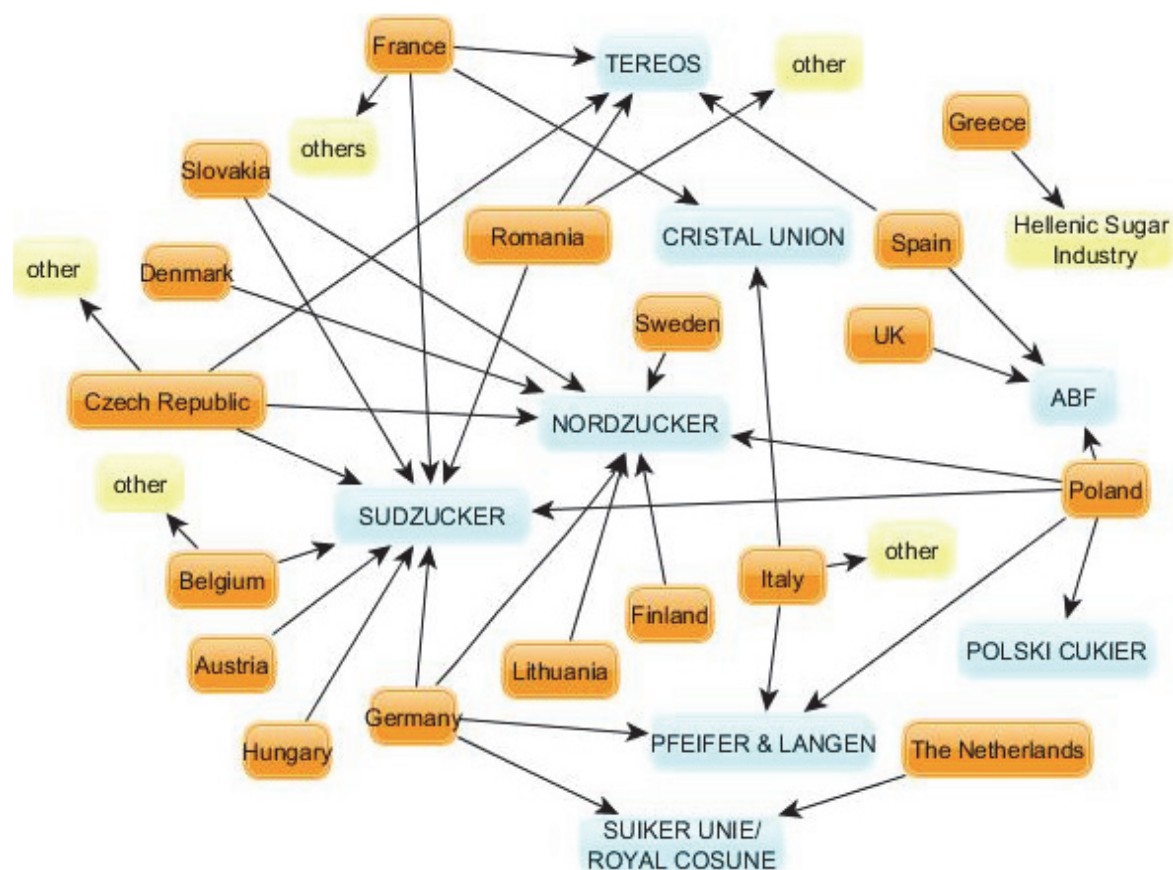Source: own processing based on F. O. Licht, 2015
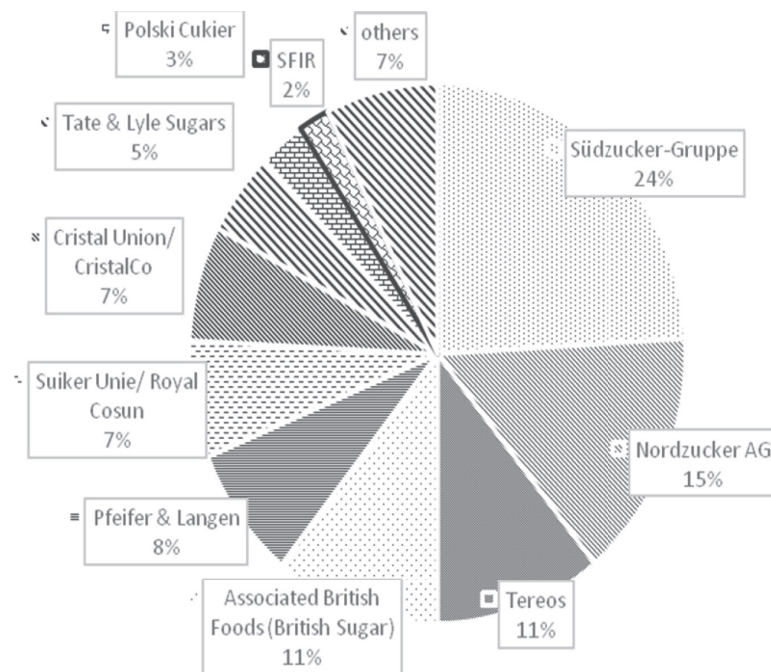
5: *EU sugar market – top 10 producers according to their market share*
Source: own calculation based on F.O.Licht, 2015

been considered the 3rd largest sugar producer in the world. This company is based on cooperative principles and apart from sugar beet factories, it also includes sugar cane/beet grower organizations or, on the other hand, a distillery, a bioethanol plant, liquid and special sugar refineries, a starch production plant or even a packing centre.

It is also important to mention the international dimension of the above-mentioned companies.

They do not operate in Europe only, but also expand into Latin America, Africa or China. Therefore, they could be referred to as global multinational corporations. As an example, we can use Tereos that operates in Latin America, or the Associated British Food Alliance which expanded into South Africa (51% of shares in Illovo – a major sugar company) or China (China also is the second biggest importer of raw sugar – however, its self-sufficiency

6: *Quota holders in the European Union*
Source: own processing based on F. O. Licht, 2015

is increasing. The second part is the influence of foreign companies on traditionally European sugar producers and processers. This strategy is mostly connected with sugar cane production.

As the quota should be abolished in 2017, the European market will become more interesting for investors from outside the EU. Many foreign companies have bought shares in traditionally European companies (American Sugar Refining has taken over 50% of SFIR Raffineria di Brindisi in Italy. This company also owns Tate & Lyle Sugars.). The current development can radically change the structure of the European sugar market. Recently, the EU has become the 7th biggest importer of raw sugar. This sugar is primarily imported from African – Caribbean – Pacific countries (ACP) or the least developed countries (LDC's) with preferential access to the market (Economic Partnership Agreement – EPA). This import is duty-free and it is not included in the quota. Another possible source of sugar import is the Free Trade Agreement with Latin American countries.

The Level of EU Sugar Quota System Production Volume Concentration

HHI leads to the statement that there is no reasonably competitive environment in any member state. Only a limited number of companies/

alliances operate in the sugar beet quota system in EU-countries. France, Germany, Poland, Czech Republic and Romania, where the number of operating subjects is higher, are certain exceptions; nevertheless, these are also highly concentrated due to a high share of sugar quota leaders. In the Czech Republic, the sugar quota system is operated by seven sugar factories that are under control of five companies. From this perspective, the Czech sugar quota system is one of the least concentrated.

When examining the European quota beet sugar holder system, a paradox will appear. While the quota holder system of individual EU-Member States is highly concentrated, the EU-quota holder system as a whole seem to be relatively low concentrated. The HHI of the quota holders operating on the single market reaches 0.1444, that is 1,444. The HHI reflecting the quota distribution according to national allocation indicates a low level of concentration as well: 0.13648, that is 1,364.8. When applying HHI methodology to the EU-quota holder system and assigning quotas controlled by companies/alliances to individual countries according to company headquarters, a strong concentrated quota holder system at the oligopoly level will result. The data show significant discrepancy between political efforts to distribute equitable sugar quotas among states and

V: *Sugar market concentration according to allocated production quotas in EU member states*

HH > 6,000	6,000 > HH > 4,000	HH < 4,000
UK	Belgium	France
Netherlands	Italy	Germany
Denmark	Slovakia	Poland
Austria		Czech Republic
Sweden		Romania
Greece		
Hungary		
Lithuania		
Finland		
Spain		

Source: CEFS, F.O. Licht Sugar, EU DG Agri, own calculation (2014)

the reality. While the EU-quota holder system does not indicate extreme concentration (HHI 1,364.8; an unconcentrated system), the analysis according to the headquarters' location and quotas allocated to the owners of production capacities indicates that the quota holder system will appear extremely concentrated (HHI 3,222; oligopoly). When performing the analysis over the last twenty or thirty years, it will be evident that the sugar quota holder system in the EU is becoming constantly more and more concentrated.

The high level of concentration of the EU sugar production quota market is also proved using the CR_5 index. Only five companies control almost 70% of the production quota – for details, please see Fig. 5. These four companies (Suedzucker, Nordzucker, Tereos, ABF and Pfeifer Langen) and their production capacities represent the key pillar of EU quota sugar production. After the CR_5 index methodology is applied, the EU quota sugar market can be characterized as highly concentrated with a significant oligopolistic character.

It is the oligopolistic character of the EU sugar market which might result in some possible cartel agreement among the main market leaders. An analogous problem was already recorded in the past (McGowan, 2005).

CONCLUSION

Our results indicate that the current European sugar market with its quota system is oligopolistic and highly concentrated. There is a limited number of companies that control most of the market with this very homogeneous product. This system is even worse due to the quota distribution. Majority of the sugar processing capacities are controlled by multinational corporations. However, the question remains whether the quota abolition will have the expected outcome as most of the competitors have already left the market.

The 2006 Sugar reform brought significant changes to the European sugar market. We have witnessed a decline in the production in connection with the change of the position of the EU on the international market. Regarding white sugar, we are now the net importers rather than exporters.

All the measures have led to higher market concentration together with more effective production. However, market concentration also means narrow connection between the key players on the market. As it is evident from the previous text, only a small number of firms control the homogeneous sugar market. Our findings correspond with the results of McCorriston (2002) who suggests that food market in Europe is typically oligopolistic. Lopez and Bhuyan (1998) suggest that a market with more frequent and low cost products is more difficult for the consumer to be organized at, and the producers can increase their oligopolistic power. The companies altogether are highly integrated, which corresponds with the findings of Moss and Schmitz (2002) regarding the US market.

The quota abolition should lead to an increase in EU sugar production together with the price decline, thus we can expect a welfare gain. However, Bouamra-Mechemache *et al.* (2001) point out that, with regard to the abolition, it is also necessary to liberalize trade; otherwise the quota removal will not have the desired effect.

Consequently, this will lead to an increase in sugar consumption. According to the International Sugar Organization, the annual growth of consumption is 1% per year. Another question that has arisen is whether another increase in consumption is desirable owing to health problems connected with it. A similar situation has already occurred.

The quota system in the European sugar market represents a typical kind of economic regulation which restricts availability of a product. We can consider it as preference of several selected groups or producers. Unfortunately, this type of "government support" is intended for the large sugar

producers located in few European states. Nedergaard (2006) mentions that it is very difficult to change the structure of any kind of agricultural policy due to strong lobbying. The structure of quota holders has been interconnected; they cooperate together to preserve the current situation.

Currently, only 21 companies/alliances are taking advantage of the quota regime. The top five companies/alliances are operating as much as 70% of the production quota volume. These alliances are also operating over 75% of available production capacities (technological capacity). The EU sugar market has never been as highly concentrated as it is now. The number of small and independent players is constantly decreasing and the surviving giants are becoming more and more powerful. In 2017, after the expected abolition of CMO related to sugar market – it is possible to expect even higher level of sugar market concentration especially because small sugar plants are expected to collapse. On the other hand, it is also possible to expect that the giant alliances will also start fighting with each other to gain control over the EU sugar market.

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