ECONOMIC CHARACTERISTICS OF SUGAR SECTOR IN SERBIA

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Abstract: *Serbia belongs to countries whose economic structure of agriculture has a high importance (the share of agriculture in the total population is 10.9%, the share in GDP from about 10%, and if you include food industry about 17%, while the share of exports is about 20%). In addition to major natural resources, Serbia has significant food industry capacities as well. In the field crop production structure of Serbia, besides cereals, the share of industrial crops predominates: sugar beet, sunflower and soybean. Sugar beet-growing areas amount to about 65 thousand hectares, and they produce about 3 million tons of sugar beet, whereas sugar plant capacities produce about 400 thousand tons of sugar. Since the 2000-ths, sugar became one of the most important export product of Serbia (primarily due to EU countries export and Autonomous Trade Measures-ATM). The study focused on some major economic characteristics of the sugar production sector in Serbia during the period 2000-2008, displaying the basic indicators of the importance of this sector in the economic development of Serbia, i.e. the share of GDP, employment and total exports. Economic efficiency of sugar beet production on family farms of Serbia and its competitiveness in relation to some other important field crops was analyzed as well. The main data source was a publication of the Republic Institute for Statistics. The analysis of the economic efficiency of sugar beet production was based on gross margin calculations using elements sampled in a survey. The survey was conducted on 50 selected family farms involved in field crop production only.*

Key words**:** *sugar beet, sugar, macroeconomic indicators, gross margins, family farms*

INTRODUCTION

The aim of this paper was to analyse the situation and the economic characteristics of the sugar sector and the contribution of this sector to economic development of Serbia in the last decade which was characterized with significant socio-economic changes. Establishing of basic indicators was intended to point out the position and importance of the sugar sector in the economic structure of the country and to identify key constraints to increasing the competitiveness of this, for Serbia, very significant sector of the economy. The survey covered the entire chain of sugar beet production (on small family farms, in companies and cooperatives), through processing to sales. Over the past few years, the sector has significantly recovered compared to the bad operation during the 1990s. This is primarily reflected in a significant increase in exports, or the area under sugar beet; the prices have become relatively stable, the consumption in the domestic market has increased, a significant level of profitability has been achieved for both the manufacturers and the processors of sugar beet. The sector has made significant progress, primarily due to obtaining a preferential status for exports to the EU market (the introduction of Autonomous Trade Measures as of 2000), the successful privatization of sugar refineries and the increased investments, as well as certain agricultural policy measures aimed at stimulating the production of sugar beet. However, the disturbed parity prices of primary agricultural products, and so the sugar beet and the industrial inputs used in this production (mineral fertilizers, fuel, declared seeds etc.), which appeared in the recent years, threaten to significantly disrupt the economic position of a manufacturer in this sector, and to minimize his importance for the overall economic development of the country.

Sugar beet has a significant share in the value of gross agricultural output, and the sugar industry is important in the formation of GDP (or GVA) of the food and drink industry of Serbia. Sugar sector employs a significant contingent of the Serbian population and, especially since 2000 and the introduction of EU ATM measures, sugar has become one of the key export products of the Serbian agriculture and an important component of equilibration of the trade balance of the country.

MATERIAL AND METHODS

The main source of information was the publications of the Republic Office of Statistics, as well as the documentation of this institution. The data of the Serbian Ministry of Agriculture, Forestry and Water Management were also used. In order to establish the basic economic characteristics of the sugar sector regular mathematical and statistical methods were applied. The assessment of the importance of the sector in the economic structure of the country was done using basic macroeconomic indicators (the share of sugar beet output in total Gross Agricultural Output – GAO, and share of Gross Value Added – GVA of the sugar industry in total Food and Beverage Industry GVA and share of this sector in the foreign trade).

The analysis of the economic efficiency of sugar beet production was based on gross margin calculations using elements sampled in a survey. The survey was conducted on 50 selected family farms involved exclusively in field crop production including the production of sugar beet.

RESULTS AND DISCUSSIONS

The main characteristics of the production of sugar beet in Serbia

Production of sugar beet in Serbia takes place on family farms, as well as in companies and cooperatives. Total area under sugar beet in Serbia, in the analysed period, mostly increased to reach the maximum of almost 80 000 ha in 2007 (Table 1). In the last year of analysis, the harvested areas under this industrial culture were significantly reduced (to about 43 000 ha), due to deteriorated economic position of the farmers. The largest part of the total area is concentrated in the AP of Vojvodina (reaching 96% in some years). Production of sugar beet was more than tripled, from about 1 to about 3 million tons, which was significantly contributed by the measures of agricultural policy (premiums for sugar beet production, subsidizing inputs, incentives to purchasing of machinery, etc.).

Table 1

The harvested areas, production and realized yields of sugar beet in Serbia

Year	Harvested areas and production		Realized yields	
	Area (ha)	Production (t)	Total	Family farms
2000	44695	1070033	23.9	22.3
2001	43161	1806425	41.9	40.5
2002	51906	2098080	40.4	39.2
2003	64310	1738044	27.0	28.0
2004	60438	2813972	46.6	45.8
2005	64326	3101176	48.2	46.5
2006	71581	3188905	44.6	44.3
2007	79016	3206380	40.5	37.8
2008	48028	2299773	47.9	42.4

Source: Authors' calculation based on data from the Statistical Yearbook of Serbia, for the relevant years, the Republic Statistical Office, Belgrade.

Realised sugar beet yields in Serbia significantly increased, in some years they were doubled compared to the yield realised at the beginning of the analysed period. It can be noticed that the yields higher than those in Serbia were achieved in Hungary and Slovakia, and in some years also in Turkey and Croatia. Other countries in the region achieved lower yields of sugar beet compared to those in Serbia (Graph 1).

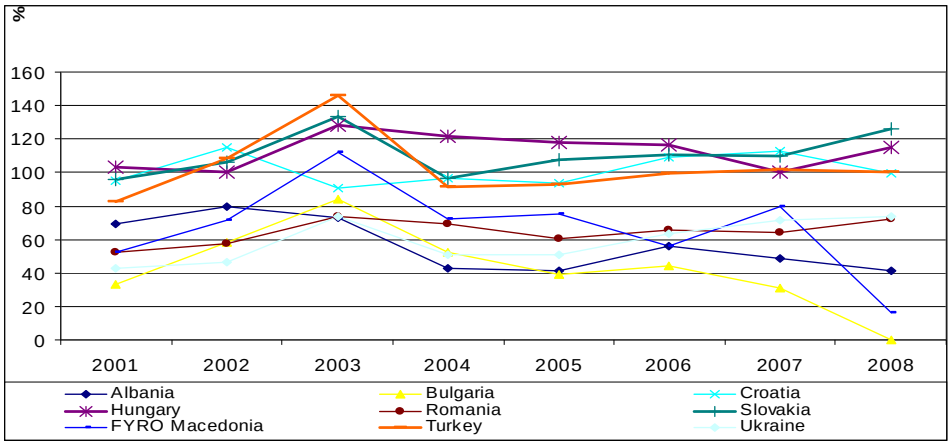

Figure 1: Yields of sugar beet in Serbia and in the neighbouring countries

After the year 2003 the share of family farms involved in sugar beet production was reduced to about 36% (Table 2), which, among other things was driven also by the economic position of this production, primarily price disparities of sugar beet and production materials, or inputs of industrial origin that are used in this production, as well as greater efficiency of production on large farms.

Table 2

Sugar beet production, according to ownership sectors, in the period 2000-2008.

Year	Sugar beet production		
	Total production (t)	% production on family farms	% production in companies and cooperatives
2000	1070033	38.0	62.0
2001	1806425	39.0	61.0
2002	2098080	45.7	54.3
2003	1738044	56.0	44.0
2004	2813972	47.4	52.6
2005	3101176	43.1	46.9
2006	3188905	40.1	59.9
2007	3206380	36.3	63.7
2008	2299773	35.7	64.3
I=2008/00	214,9	-	-

Source: Authors' calculation based on data from the Statistical Yearbook of Serbia, for the relevant years, the Republic Statistical Office, Belgrade.

There is evident the existence of price scissors to the detriment of agricultural products, since the prices of the used production materials grew much faster so that the established parities, especially in the last year of the analysis, indicate a significant deterioration in the economic status of the sugar beet producers. The parity prices of sugar beet and the price of mineral fertilizers NPK 15:15:15 were significantly disturbed as well as the price of urea (Table 3).

Such disturbance of external parities caused significant increase in variable production costs and reduction of the realised gross margins. In the last year of analysis the achieved gross margin saw a decrease compared to the previous year, which is primarily due to significant increase of variable costs (Table 4).

Table 3

Parity prices of sugar beet and raw materials

Product/raw material	Year				
	2005	2006	2007	2008	2009
Sugar beet	1	1	1	1	1
Sugar beet seed	2200	2487	1848	1869	1853
Min.fertiliser15:15:15	7.7	7.8	8.0	11.2	14.0
UREA	8.1	9.1	8.8	10.7	10.7
Diesel fuel	29.2	29.6	26.6	32.1	26.6

Source: Authors' calculation based on results of the survey carried out on family farms

Table 4

Calculation of gross margin in sugar beet production

Elements	Year				
	2005	2006	2007	2008	2009
Yield t/ha	44.9	44.9	41.1	48.3	47.2
Market price euro/t	21.7	27.3	31.2	34.2	31.8
A) Production value euro/ha	**974.8**	**1226.6**	**1282.9**	**1651.1**	**1503.2**
B) Material euro/ha					
- Seed	57.3	78.9	69.2	76.6	70.8
- NPK 15:15:15	83.2	95.6	124.8	192.3	222.9
- UREA	61.2	87.3	96.1	128.2	118.9
- Plant protection agents	82.6	94.1	108.2	163.8	178.9
- Diesel fuel	88.6	113.1	116.2	153.8	126.3
- Custom combining	116.7	120.0	142.8	180.7	166.7
C)Total variable costs euro/ha	**489.7**	**600.2**	**657.6**	**895.4**	**884.5**
D) Gross margin G = (A-G) euro/ha	**485.1**	**626.4**	**625.4**	**755.0**	**608.0**

Source: Authors' calculation based on results of the survey carried out on family farms

Characteristics of the industrial sugar beet processing and sugar production in Serbia

In Serbia there are a total of 15 refineries built, but eight of them are in operation, and these are the ones which were privatized in the transition process. Due to the rationalisation of the processing capacities the non-privatised sugar refineries are not likely to work in the future either, mainly because of the limited scope of sugar market. Private company Sunoko (MK Komerc) owns four sugar refineries in Serbia, and the Greek Hellenic Sugar and Italian SFIR own two sugar refineries each. Sunoko is the largest producer, which owns more than half of the production capacities in the country and these are in operation. One of the characteristics of dislocation of sugar refineries in Serbia is that some of them are poorly located, or are away from the region of raw material production. The best located in that respect are sugar refineries owned by Sunoko (Bac, Kovačica, Pećinci and Vrbas), while the worst located are the sugar refineries of the company SFIR (Senta, Nova Crnja), which must supply sugar beet from relatively large distance (sometimes even nearly 100 km), what significantly increases operating costs. Hence, the sugar refineries of Sunoko have advantages compared to their competitors.

Sugar refineries in Serbia are of medium size, and their daily capacity is about 5,000 tons, but the daily sugar beet supplies are small. With relatively short season/campaign of sugar

beet processing (80-90 days), high costs of sugar beet transport and insufficient amounts for daily processing the utilisation level of sugar refinery capacities is lower. Therefore, the fixed costs per unit of final product, or tons of sugar, are relatively high significantly increasing the cost of sugar produced in Serbia, or reducing its competitiveness in the international market. The sugar price level is additionally influenced by quality of sugar beet supplied, primarily, the percentage of dirt and contents of sucrose-digestion, the cost of transport of sugar beet to the processing capacity, other costs, e.g. fuel, lime stone, work, etc. Importantly, the said weaknesses in the sector are eliminated towards decreasing the cost of sugar in the pre-accession period, which would ensure manufacturers certain stability after joining the EU, providing profitability at the anticipated price of sugar in the EU.

Sugar production in Serbia in the analysed period increased from 115 to about 450 thousand tons, or by about 3.9 times (Table 5). The production in the sugar sector in the past period ensured the increased domestic consumption and significant quantities for export.

Table 5

Trends in sugar production in Serbia

	Year								
	2000	2001	2002	2003	2004	2005	2006	2007	2008
Production (000 t)	115	209	282	217	340	387	430	427	445
Index (previous year=100)	-	182	135	77	157	114	111	99	104

Source: Authors' calculation based on data from the Statistical Yearbook of Serbia, for the relevant years, the Republic Statistical Office, Belgrade.

The balance of sugar given in Table 6 shows the main trends in production, consumption and trade. It should be noted that this balance has been made on the basis of MAFWM data, and refers to the fiscal year (October current year – September the following year). Sugar production in Serbia has significantly increased exceeding 400 thousand tons, with the exception of the last year. Sugar exports significantly outstrip imports and Serbia is a net exporter of sugar. Production and imports together, minus exports and inventory changes give the amounts available for domestic consumption. Consumption of sugar has increased (according to FAO data, at the level of Serbia and Montenegro, with about 22 kg at the beginning of the analyzed period to about 27 kg per capita in 2005). Self-sufficiency rate increased from 116% to over 167% in the last years.

Table 6

Supply/demand balance sheet on sugar sector (000 tons) in Serbia, by fiscal years*

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	20008/09
Production	213	274	209	403	385	466	454	372
Imports	65	112	28	47	28	28	31	28
Exports	154	194	68	316	183	222	224	220
Stock variation	186	127	126	97	22	9	38	56
Supply available	399	319	295	231	252	281	299	236
Human consumption	83	92	92	95	99	99	99	95
Total consumption**	183	193	198	209	243	243	243	223
Self-sufficiency rate (%)	116	142	106	193	158	192	187	167

* fiscal year (October current year – September the following year)

** total consumption includes: human consumption and industrial consumption

Source: Calculation based on data by the Republic Statistical Office, Belgrade, and Ministry of Agriculture, Forestry and Water Management.

Economic importance of the sector in the economic structure and for the economic development of Serbia

Sugar beet production accounts for about 2% of GAO (gross agricultural output) of Serbia (Table 7). The data indicates the increase in this share, with some fluctuations in the observed period, while in the last year there was a decrease.

Table 7

Share of sugar beet production in total Gross Agricultural Output (GAO)

	2001	2002	2003	2004	2005	2006	2007	2008
Total GAO* (000 000 euro)	2463	3270	3131	3623	3161	3378	3561	4493
Share of sugar beet production in GAO(%)	1.4	1.9	1.6	2.0	2.3	2.4	2.5	1.6

* includes agriculture, hunting and related services

Source: Authors' calculation based on data contained in the Documentation of the Statistical Office of the Republic of Serbia..

Industry of food and beverages is a relatively small sector in Serbia, accounting about 5% of GVA (Gross value Added) of Serbia and about 6% of total employment. In the reporting period the participation of sugar industry in GVA of the industry of food and beverages reached 6.2% in 2005, and after that it showed the tendency of decline in 2008 accounting for 3.7% (Table 8).

Table 8

Share of Gross value Added (GVA)* of the sugar industry in total food and beverage industry GVA

	2002	2005	2007	2008
Total GVA in food and beverages industry (000 000 euro)	719,0	808,1	1126,2	1234,1
Sugar production GVA (000 000 euro)	38.4	49.9	52.2	46.0
Share of GVA of the sugar industry in total food and beverage industry GVA (%)	5.3	6.2	4.6	3.7

* relates to GVA companies

Source: the author's calculation based on data contained in the Documentation of the Statistical Office of the Republic of Serbia.

The share of sugar industry in total employment of the industry of food and beverages is about 3%, with certain reduction in the number of employees.

Since 2005, Serbia became a net exporter of agro-food products. Since 2001, the value of sugar exports has significantly increased and exceeded the value of imports, which means that Serbia is a net exporter of this product. This is primarily the result of the increase in preferential exports to the EU, based on ATM agreement. The share of sugar in the structure of total agricultural exports of food products of Serbia increased from about 9.5% in 2000 to over 20% in 2004 (table 9), in the recent years it came down to about 9%.

In addition it can be noticed that the value of imports of sugar and sugar products mainly decreased, with some fluctuations, and that the amount in the first year of analysis has not been reached. In the structure of the value of imports of agro-food products the share of sugar is being reduced (from 18.2% in 2000 to about 3.5% in 2008).

Before the introduction of ATM, the export of sugar was very modest and mainly focused on the markets of the neighbouring countries (the Republic of Macedonia and Bosnia and Herzegovina). As of 2001, the dominant export market for sugar is the EU market, accounting for over 90% of the value of sugar and sugar products. Within these countries, most of exports go to Italy, Greece, Hungary, Germany and Austria, and thee exported goods are

primarily sugar, molasses and honey, while the sugar products (with very modest share in the structure of exports of this group of products, mainly less than 5%), mainly exported to the neighbouring countries (Bosnia and Herzegovina, the Republic of Macedonia, Croatia, Slovenia, and lately, Montenegro).

Table 9

Export and import, major destinations and origins, share of import and share of export of production (2000-2008)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Export (mil. USD $)	1558	1721	2075	2756	3523	4482	6427.9	8824.8	10973
-Total Agro-food products	295.6	316.7	534.1	584.0	800.1	924.4	1265.6	1685.8	1957.5
-Of wich sugar industry*	28.0	41.5	96.5	82.5	166.9	175.8	168.0	166.3	175.8
EU (%)	0.3	93.5	94.4	91.6	95.3	94.8	92.9	93.3	92.4
Imports (mil. USD $)	3330	4261	5614	7477	10753	10461	13172.3	18553.6	22875
-Total Agro-food products	286.7	453.1	548.7	654.2	855.6	772.8	905.6	1122.1	1467.9
-Of wich sugar industry*	5.2	30.7	34.5	42.4	29.1	40.8	37.5	44.5	50.7
EU (%)	53.8	59.0	33.0	45.5	58.4	65.9	50.9	44.3	39.0

* includes sugar, sugar products and honey

Source: Authors' calculation based on data contained in the Documentation of the Statistical Officeof the Republic of Serbia.

Imports of sugar and sugar products mainly originate from EU member states – Bulgaria, Germany, Hungary etc. (in some years even more than half), but significant quantities are imported from the neighbouring countries. This is primarily related to the imports of sugar, molasses and honey from Bosnia and Herzegovina, and import of sugar products from the Republic of Macedonia, Croatia and Turkey.

CONCLUSIONS

The importance of the sugar sector in the overall economic development of Serbia, and particularly in equilibration of the trade balance, can certainly be great also in the period to come (after the accession of Serbia to the EU). However, for that to be implemented an adequate support policy is required. Apart from the direct support to producers, it can be achieved by investment incentives (to sugar beet producers for the procurement of machinery and irrigation systems, which would contribute to increasing competitiveness; and to sugar refineries for investments which should result in cost price reduction and solving environmental issues). Significantly increased control is to ensure the reduction of illegal imports from Bosnia and Herzegovina as well as Montenegro. In this regard, it is important through agreements with countries in the region, the signatories of the CEFTA agreement, to ensure compliance with all agreed rules and procedures of trade. It is also important to provide support to the sector in the negotiation process within the WTO, as well as to joining the EU.

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