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Sugar sector in Croatia: competitive or not?

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Abstract. *The sugar sector is small in agricultural sector, occupying 1.5% of the cultivable land area and accounting for approximately 1.2% of agricultural GDP (excluding processing which probably accounts for a further 1%). It does, however, account for 6.5% of all budgetary payments to agriculture, showing its disproportionate dependence on taxpayers' money. Sugar production in Croatia is characterized by high production costs, struggling with a strong competition at the world market. Despite the results of the competitiveness study, in which the DRC calculation showed that sugar production is not internationally competitive, one of the basic characteristics of our foreign trade in sugar till 2003 was high exports. Sharp shift in the EU sugar policy will result in sugar price decrease due to the WTO rules, which will affect the Croatian sugar industry. Therefore, Croatia will have to apply measures for decreasing production costs and increasing production, with the final goal of price decrease for about 20%. For these reasons, it will be necessary to strive for the quota at the level of average production of three Croatian sugar- plants.*

Keywords: Croatia, sugar, competitiveness, EU market

1. Introduction

The word "competitiveness" is very popular in transition countries in the period of EU accession: are we competitive?... which productions can be competitive?... with regard to whom?... how much? These questions are particularly interesting in agricultural sector analyses, considering that this sector still plays an important role in transition countries' economies, and so in Croatia. The pre- accession period intensifies debates about the question how to find the place for our agricultural and food products in already saturated EU markets.

However, despite the popularity of these debates, in Croatia there was only one quantitative analysis of agricultural sector competitiveness made in 2000. Unfortunately, but expected, it was determined that Croatian agriculture is in majority of sectors internationally uncompetitive, and in sugar production as well. Moreover, this sector was estimated as highly uncompetitive, so the fact that sugar is now one of the most successful export product is even more surprising. That is, of course, the result of trade liberalization (in 2000 European Union has abolished import tariffs on Croatian sugar) which enabled great export expansion and positive business results for our sugar processing factories. Due to our producers' opinion, under the new trade

circumstances, Croatian sugar is competitive on EU market by its price and quality.

That is why this paper discusses about of (un)competitiveness of domestic sugar production, and about different reasons that prove or not those estimates. Starting from knowledge on the most important elements that influence competitiveness in sugar production (production costs, foreign exchange rates, technical performance, liberalization of sugar marketing)[1], we suppose that the competitiveness of Croatian sugar industry depends on several reasons that go beyond those involved in the first competitiveness study.

Such starting point doesn't mean, however, that in competitive analysis we should ignore obvious facts that influence international competitiveness in sugar production, such as differences in costs of production between producers of beet sugar and cane sugar, efficient or distorting domestic sugar policies in developed countries, misallocation of resources in countries that have preferential access to developed country sugar market etc. [2]

1.1. Methodological remarks

The work paper is secondary analysis. Data that have already been calculated before, are used as basis for this elaboration of sugar sector competitiveness in Croatia.

The basic (and only so far) exact method used to evaluate Croatian agricultural competitiveness was the DRC (Domestic Resource Cost), which measures international competitiveness by comparing the cost of domestic resources used in producing a good with the value added of the good. Clearly, the value added should be greater than the cost of the resources used. The measure of *international* competitiveness comes from using world or economic prices to value farm output and inputs, rather than domestic prices which may reflect high levels of protection, domestic regulations which distort markets, monopoly pricing in the product or input markets, or other failures in the market which prevent an internationally competitive market price emerging.

In several commodity studies, within the Competitiveness study prepared for Croatian Ministry of Agriculture and Forestry in 2000 [4], the DRC is presented as a ratio of domestic costs to the real value added. A ratio greater than 1 indicates the sector is not competitive because the real costs are greater than the value added. Conversely, a ratio less than 1 indicates a competitive sector. While the DRC method is one of the best methods of measuring comparative advantage (and therefore current competitiveness), it does have some limitations which should be noted. There are also limitations in its application to Croatia:

- First, DRCs are data intensive; in Croatia, there is no farm management survey which could provide the farm level data on quantity and prices of inputs. In the absence of survey data, information was collected from representative farms by the project's local experts, and this was supplemented by farm visits by the international expert. This data therefore tends to reflect the better than average farmer.
- Second, in any country there are different production systems with different technologies and different scales of operation, and each will have a different cost structure. For the purpose of measuring competitiveness in Croatian agriculture data were used for family farms as distinct from the larger legal entities which are the successors of the former Agrokombinats. As family farms are regarded as the basic business unit, they are the main focus of policy.
- Third, the DRC ratio is a static measure, reflecting current world prices and currently used technologies. A change in either can change the conclusion on competitiveness. Sensitivity analysis has therefore been undertaken to test the impact of adopting new technologies (for example using performance measures from EU countries) or of world price changes.
- Finally, the performance of an entire sector with a single number is not recommendable. Every farm has its own unique DRC ratio, so the ratio was estimated only for what was consider a representative group of family-based farms which are likely to have a better than average performance.

The DRC ratio given in these studies therefore shows whether an important part (but still only a part) of the sector is or is not competitive under current conditions. The ratio does not, though, show the cause or source of the sector's comparative advantage or disadvantage. Insights into this are gained from the data behind the DRC ratio and in an examination of trade and domestic policies, technical performance and market structures (where market failures such as the under-provision of public goods and monopolistic/monopsonistic power may exist). It is these aspects which are fundamental to the analysis of competitiveness and on which the report's recommendations are based.

In addition to the results of the DRC analysis, in the final part of the paper we briefly discuss about other elements whose interaction makes the concept of so called systemic competitiveness. Systemic competitiveness is the interaction between four elements of competitiveness: Micro-level competitiveness (managerial competencies, entrepreneurial strategy, interaction between suppliers, producers, customers), Meso-level competitiveness (education policy, structural policy, regional policy), Meta-level competitiveness (socio-cultural factors, value orientations, basic configurations of political, legal and economic organizations, strategic and policy capabilities), and Macro-

level competitiveness (budgetary policy, competitive policy, trade policy, etc).[5]

2. Recent developments in the sugar industry in Croatia

2.1. Structure of the sugar production sector

According to the 2003 Agricultural Register, 2,454 family farms and 173 business entities have been cultivating sugar beet. As a rule, these producers have farms that are rather above Croatian average. More precisely, about 30% of family farms cultivate sugar beet on the area of 20 hectares or more, and further 20% on area between 10 and 20 hectares. The size of the business entities in this production is mostly more than 100 hectares.

Three factories process sugar beet and they employ about 1,200 employees in total. After a long and complex privatization process, two of these factories are now private-owned, while the third one is predominately owned by the state. Average daily sugar beet processing capacity in Croatia is 6,300 tones.

2.2. Production and trade

The sugar sector is small in agricultural sector, occupying 1.5% of the cultivable land area and accounting for approximately 1.2% of agricultural GDP (excluding processing which probably accounts for a further 1%). It does, however, account for 6.5% of all budgetary payments to agriculture, showing its disproportionate dependence on taxpayers' money.

With respect to arable land, beet growing is concentrated exclusively in the eastern part of Continental Croatia. Among the 10 beet growing counties in Panonia and the Eastern Central region, Osijek- Baranja and Vukovar- Srijem deliver more than 60% of all the sugar beets grown in the country.

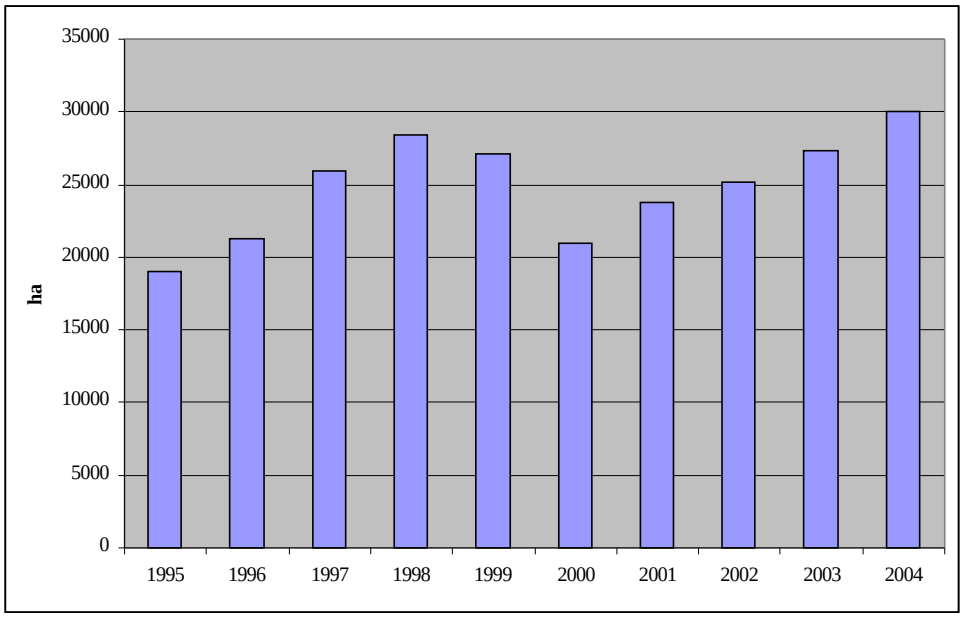

Figure 1. Areas sawn by sugar beets

Data on production and processing from the end of 1990s as well as trade flows of final products for the country as a whole reveal the moderate average yield of beets per hectare, around 43 tones compared to Austria's 55, and especially the low yield of sugar per unit of beet at the end of 1990s, about 11- 12%, compared to Austria's 15%. The average production of the beet root is about one million tones annually.

The sugar production in Croatia is characterized by high production costs caused by rather low technical efficiency of the sugar factories compared to their EU counterparts, low yield per hectare and low level of sugar produced per ha. Among the principal reasons, however, there seems to

be the small-plot pattern of farming, which for its proper functioning relies on a costly intermediary tier of agents, the contractors, heirs in some ways to the former agro-kombinats.

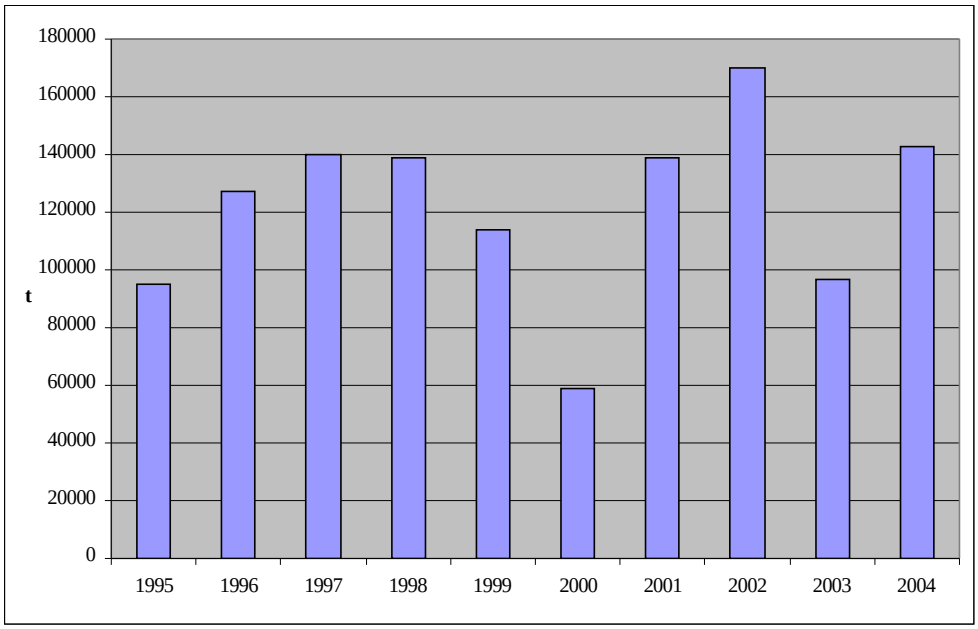

Figure 2. Sugar production in Croatia

Table 1. Characteristics of Croatia's sugar factories, 1997-1999 average

Description	Osijek	Zupanja	Virovitica	Total
Nominal Processing Capacity (t beet/24 hours)	6,000	5,500	4,500	16,000
Beets Processed, t	439,000	355,663	349,521	1,144,184
Total Number of Crop Days	73	82	80	
Av. Daily Slicing Rate, t	6,026	4,354	4,044	
Sugar Produced, t	48,906	41,096	39,837	129,839

Source: Republic of Croatia, Competitiveness in Agriculture and EU accession. The Commodity Studies. The Sugar Sector Competitiveness Report. MAFWM, 2000

Till the end of 1990s, Croatia was not a large trader in sugar, neither as an importer nor exporter. But, the most significant impact on Croatian sugar market was caused by EU decision on abolition of tariffs on imports the products from Croatia (about 17%), which applies since the end of

2000. By tariff elimination Croatian sugar became competitive on European market, and since than Croatia realizes considerable increase in exports.

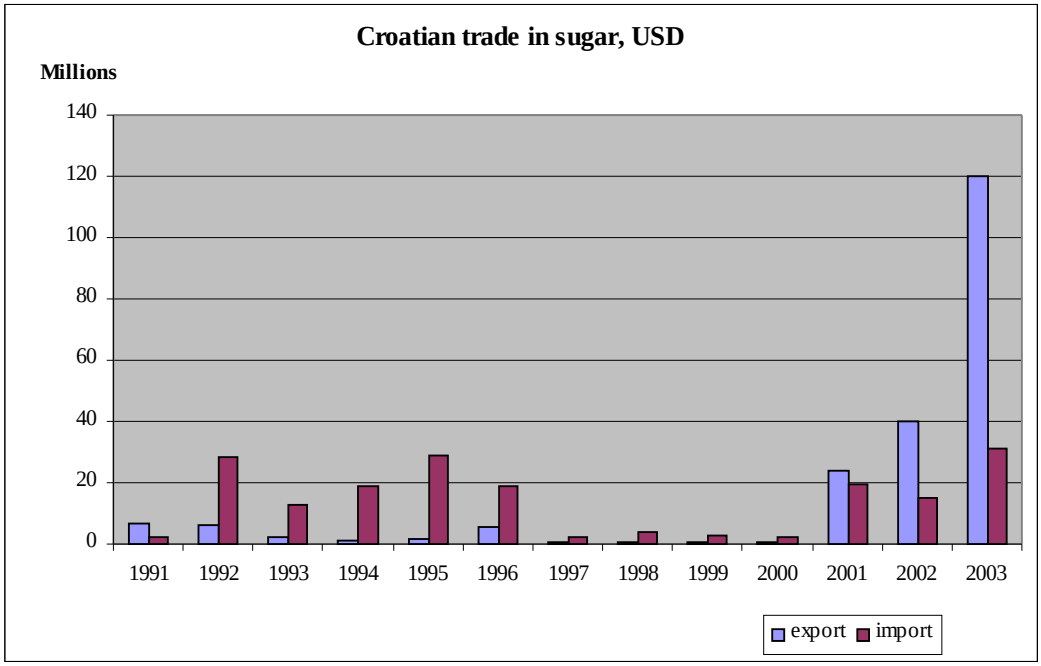

Figure 3. Croatia: value of foreign trade in sugar, USD

Table 2. Export orientation of sugar in Croatia

(t)

Year	Sugar production	Exports of sugar	Export orientation rate
1999	113.966	271	0,24
2000	58.950	807	1,37
2001	138.617	40.364	29,12
2002	170.000	70.813	41,65
2003.	96.796	176.637	182,5
2004.	142.857	180.000	126,0

Source: Central Bureau of Statistics of the Republic of Croatia

2.3. Changing sugar policy in Croatia

Till the year 2000, in addition to the import tariff, the government supported the growing of sugar beets by paying an area- based subsidy.

High production costs, specifically those caused by the purchase of inputs such as fertilizers and plant protection chemicals, were generally given as a reason. These payments, however, were restricted to land included in the existing quota system.

The government also guaranteed the price of beets. For 1999, this was 200 HK per ton (about 26 EUR), the reference sucrose content being 15.5%. For 2000, the floor price was reduced to 190 HK (25 EUR), and the reference sucrose raised to 16.0%. The law provides for the state to acquire any beet that cannot be sold at or above this price. In practice, however, this situation has never occurred, the factories being committed by "gentlemen's agreement" not to let the beet price drop below the stipulated level.

In addition, the government absorbs part of the cost of certified seed. Subsidy payments for the purchase of NPK fertilizers have existed in the past, but were discontinued. Tractor fuel, the so-called "blue diesel", priced at a reduced rate of initially HK 2.60 (0.34 EUR), and later HK 3.00 (0.4 EUR) per litre, is being made available to beet growers since mid 2000.

Since 2000, the government has no obligation of intervention purchase in cases of market fluctuations (if market prices decrease below the guaranteed prices). Also, the year 2000 was the last year when guaranteed prices were used, when they were 0.19 kn/kg (0.025 EUR) with the sucrose content of 15.5%. Since the subsidy system were changed during the 1999 reform, incentives for the sugar beet growing are predicted at the level of 3,000 kn per ha (about 400 EUR per ha), and the maximum annual support per farm could be 2 mill. kn (about 267,000 EUR), but the minimal farm size should be 3 ha. In the period 1995-2003 subsidies for sugar beets participated with about 6.5% in all budgetary payments to agriculture.

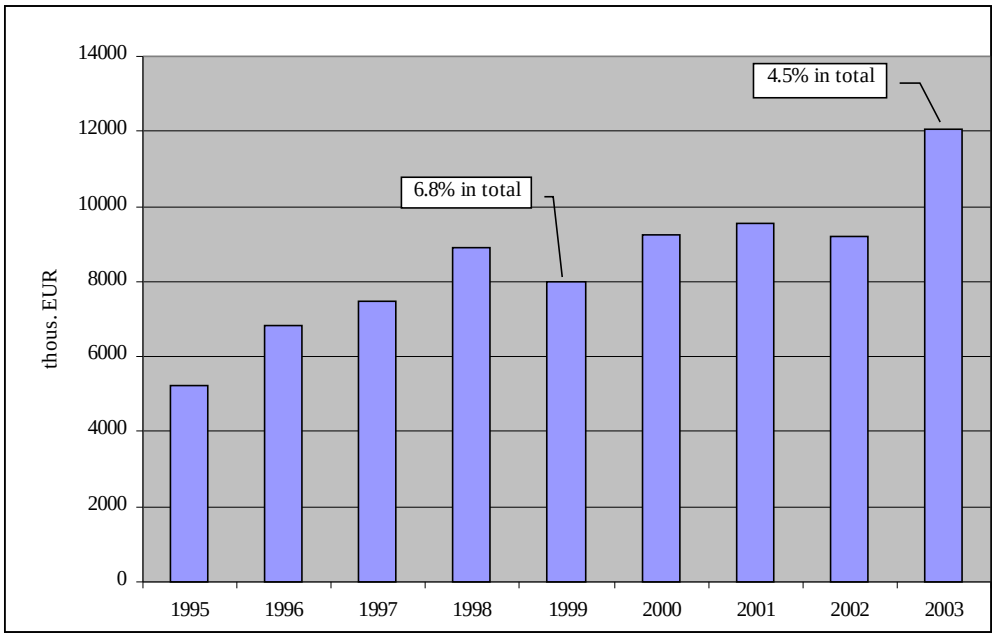

Figure 4. Subsidies for sugar beet production

During the last decade, Government used different intervention schemes in agriculture, due to actual international trade agreements (WTO, bilateral, and recently within the Stabilization and Accession Agreements with the EU – SAA). Combination of market price protection measures together with different policies of domestic support in agriculture, and in sugar sector as well, resulted with rather high protection indicators. Nominal protection rates for sugar beets were averagely 70%, and for sugar more than 135% in the period 1993- 1997, and the Producer subsidy equivalents for the same period were about 64% for the sugar beets, and about 30% for sugar. However, the indicators of effective protection were considerably higher for processed products (sugar), reflecting disadvantage of domestic sugar beet producers regarding their high costs of inputs in relation to those in developed countries. [6] Some preliminary results of government intervention analysis under different scenarios of international policy arrangements (such as SAA, or Mid- Term Review) showed that indicators of nominal protection for sugar beet would be around 30%, and effective around 26%.

Regarding foreign trade regime, applicable duty rates are determined by the Customs Tariff Regulation each year. In the Regulation, MFN duties, as well as preferential import conditions, are listed for each product. Import of agricultural products is not conditioned by import licensing.

Table 3. MFN tariffs for sugar beet and sugar

Product description	Basic duty rate	
	2005	2006
Sugar beet	12%	10%
Raw sugar produced from sugar cane, not containing added flavouring or colouring matter	10%+18.8 €/100 kg	5%+1.3 €/100 kg (for refining) 10.0%+17.7 €/100 kg (other)
Raw sugar produced from sugar beets, not containing added flavouring or colouring matter	10%+21.8 €/100 kg	5%+1.3 €/100 kg (for refining) 10%+20.5 €/100 kg (other)
Cane or beet sugar, refined	28.5 €/100 kg	27 €/100 kg

Source: MAFWM

Preferential sugar trade conditions have been agreed upon and are applied in trade with the European Union, Bosnia and Herzegovina, Macedonia, Serbia and Montenegro, Moldavia, Bulgaria and Albania.

3. How competitive is sugar production

3.1. Domestic resource cost

The analysis of domestic cost of resources and, consequently, costs of production, is based on previously mentioned Competitiveness study, within is completed the Policy Analysis Matrix (PAM) for each of two systems of the sugar sector. The first one captures a former Agro-Kombinat involved in beet growing on a large scale farm (200 ha). The second one represents a commercial family farm of about 100 ha, 20 ha of which are sown to sugar beets. The PAMs for these two multi-activity systems, identifying accounting and economic values for revenues and costs, as well as the corresponding DRC ratio calculations, appear in Table 4 and 5 respectively.

Table 4. DRC analysis – PAM and the DRC ratio

System	**Beet Sugar**		**Currency: USD**	
Activities:	Prod.+Proc. of Beets, **Ex-Kombinat, 1999**		Activity Unit (AU): t of Sugar	
Item		Accounting Values	Economic Values	Differentials
		Kn/AU	Kn/AU	$/AU

Output Revenues	708.15	366.93	341.23
Cost of Tradable Inputs	302.83	192.69	110.14
Domestic Resource Costs	627.55	585.29	42.26
Profits	- 222.23	- 411.05	188.83
DRC Ratio: 585.29/(366.93- 192.69) =			**3.3591**

Source: Same as in Table 1

Table 5. DRC analysis – PAM and the DRC ratio

System	**Beet Sugar**		**Currency: USD**
Activities:	Prod.+Proc. of Beets, **Family Farm, 1999**		Activity Unit (AU): t of Sugar
Item	Accounting Values	Economic Values	Differentials
	Kn/AU	Kn/AU	$/AU
Output Revenues	699.66	357.78	341.88
Cost of Tradable Inputs	209.17	132.25	76.93
Domestic Resource Costs	513.24	472.82	40.42
Profits	- 22.76	- 247.29	224.54
DRC Ratio: 472.82(357.78- 132.25) =			**2.0965**

Source: Same as in Table 1

The DRC ratios for the two sugar systems, the ex- kombinat and the commercial- family- farm beet growers respectively, are 3.4 and 2.1. This indicates that under prevailing conditions it is not profitable for the Croatian economy to be engaged in the production of beet sugar under either of the two systems. Both ratios are larger than one, attesting to the fact that the domestic resources spent in this pursuit exceed the value created. The difference between the two ratios does corroborate the relatively higher efficiency of the family- farm- based operation. Nevertheless, its relative advantages do not make it efficient in absolute terms.

The reasons for this lack of competitiveness lie in a number of factors: beet yields, beet quality (sucrose levels), technology, labor use, and management. Nonetheless, even with reasonable improvements in all these aspects, Croatian sugar production would not be competitive on world markets with sugar at price levels like in 1999.

How sensitive is the conclusion on uncompetitiveness to changes in some of the prices and technical performances? Tables 6 and 7 show changes in

the DRC ratios with changes in world prices, yields, sucrose content of beets and factory efficiencies.

Table 6. DRC analysis – sensitivity analysis for selected parameters – Ex-Kombinat

System:	**Beet Sugar**							
Activities:	**Production and Processing of Sugar beets of Ex-Kombinat**							
Parameters Included		1999 (Base)	Scenario Conditions Different from Base					
			#1	#2	#3	#4	#5	#6
World Market Price of Sugar	HK/Mt	1,820				2,500	3,500	3,500
Agricultural Yield of Sugar beets	Mt/ha	33.5	40.0	47.5	47.5	47.5	47.5	55.0
Sucrose Content of Sugar beets		13.1%	14.5%	16.0%	16.0%	16.0%	16.0%	17.5%
Corresp. Price of Sugar beets	HK/Mt	163.10	187.2	206.0	206.0	206.0	206.0	227.0
Factory Efficiency, Sugar on Sucrose		80.0%		82.0%	84.0%	84.0%	84.0%	86.0%
DRC Ratio:		**3.3591**	**2.464**	**1.8816**	**1.8336**	**1.3076**	**0.9196**	**0.7679**

Source: Same as in Table 1

Table 7. DRC analysis – sensitivity analysis for selected parameters – Family Farm

System:	**Beet Sugar**							
Activities:	**Production and Processing of Sugar beets from Commercial Family Farm**							
Parameters Included		1999 (Base)	Scenario Conditions Different from Base					
			#1	#2	#3	#4	#5	#6
World Market Price of Sugar	HK/Mt	1,820				2,500	3,500	3,500
Agricultural Yield of Sugar beets	Mt/ha	42.5	46.0	50.0	50.0	50.0		55.0
Sucrose Content of Sugar beets		14.1%	15.0%	16.2%	16.2%	16.2%	16.2%	17.5%
Corresp. Price of Sugar beets	HK/Mt	181.2	193.7	207.2	207.2	207.2	207.2	227.0
Factory Efficiency, Sugar		80.0%		82.0%	84.0%	84.0%	84.0%	86.0%

on Sucrose							
DRC Ratio:	**2.0965**	**1.8740**	**1.6169**	**1.5785**	**1.1477**	**0.8190**	**0.7153**

Source: Same as in Table 1

In each case, a total of six scenarios were specified, in which parameters reflecting conditions in beet production and beet processing, as well as the world market price of sugar were changed one at a time. It was concluded that even if solid agricultural and technical results were assumed, sugar in Croatia would not be competitive. That would only occur if the world price of sugar were to increase from its level of HK 1,820 per ton in 1999 (US¢10/lb) to somewhere between KH 2,500 and 3,500 per ton (US¢15/lb and US¢20/lb). At the time, that was an increase of between 50% and 100%.

The major factor which could make Croatian sugar competitive is the world market price of sugar, which is completely exogenous. The world market price that would make beet sugar production in Croatia competitive is somewhere between US¢15/lb and US¢20/lb, and occasionally the world market does reach these levels.

3.2. Trading terms

In year 2000 European Union has eliminated tariffs on sugar import from the Republic of Croatia, which enabled great export expansion and positive business results for all three sugar factories in Croatia. According to SAA regulations, Croatia had the possibility to export unlimited sugar quantities on EU markets free of tariffs. However, in 2004, European Commission proposed general reform of the subsidy system for the sugar production, under which producers would receive 40% less subsidies for production of sugar beets, together with gradually decreasing of production quota.

That is why from Croatia has been asked to negotiate about quota system, within the proposition regarding modification of the import regime for Western Balkans, in order to provide EU partners with a clear framework which, while allowing the respect of present trade concessions, prepares their sector for the adjustments needed to perform within a realistic and economically sustainable environment. [7]

Major shift in the sugar policy will reflects primarily on the sugar market price fall toward the WTO regulation, from the current 632 to 421 EUR/t, that is, an effective price reduction of 36%. That will reflects on Croatian sugar policy for sure, but, it is expected that, despite the announced decrease in subsidies and prices, EU sugar prices will stay considerably above the world prices which will make EU market attractive for countries that achieved preferential treatment, as Croatia.

For Croatia it means that – if our intention is to keep the current competitive price of sugar for exports in the EU market – we need to decrease our production costs and increase production in the next few year, while the price should fall for about 1 kn per kg (0.135 EUR), or

about 20%. Under the current circumstances, sugar is exported by the average price of about 650 EUR/t, while the average price in the EU is about 750 EUR, and that is the reason why almost all domestic produced quantities are exported on the EU markets, mostly Italian. This was the reason for Croatian government to take an additional effort to ensure the quota at the level of average production of all three Croatian sugar-plants.

3.3. Other reasons

Improvements on sugar markets, as a result of foreign trade liberalization, but also some improvements on domestic markets are noted as reasons for the recent optimism of domestic sugar producers. These reasons relate to some elements of economic environment, such as more favorable conditions on domestic financial markets, improved quality of domestic raw materials, improved quality of sugar and increased interest for the high- quality sugar on the foreign markets. Moreover, some of these reasons are found in the sphere of business behavior (business culture, as the element of socio- cultural capital): preventing illegal import, capability of domestic public administration to react on changes and distortions on international markets, ability of top managers to understand international circumstances and to create business decisions toward these circumstances (such as in privatization processes, technological adjustments, structural adjustments etc).[8]

One such "training" of adjustment in sugar sector was noted in 2002, when Croatian Customs administration had to prove their capability to correct mistakes and disrespect of preferences in international trade. On the other hand, positive business results of the sugar industry are reflected not only in their economic efficiency, but also in local communities and family farms, thanks to satisfactory and stable incomes that ensured adequately life standard for their members. However, such partial estimates have to be tested by additional research that would explain benefits and costs for this particular sector during the EU accession, as we can see to be done in some other transition countries.[9]

4. Conclusion comments

Due to the Competitiveness report, the sugar beet production and beet processing was not competitive in Croatia at the end of 1990s. It would require major improvements in management, technology and sugar prices for this to be achieved.

It is well known that the international sugar market itself is highly distorted because of the subsidized production of the EU and the USA. It

is also true that sugar from cane can be produced far more cheaply than from beet grown in Europe. Sugar production in the EU is not competitive because but it was started because of historic food security and strategic reasons - reasons which have little relevance to a modern economy - and is now maintained because the large industry which emerged from the protection has substantial lobbying power. The subsidy from sugar consumers to EU beet growers and processors is considerable, and has perhaps been considered politically acceptable in recent times because EU consumers have relatively high incomes and sugar is not an important part of their total consumption. However, recent developments under the WTO caused that the high level of protection would be whittled away over time.

The question for Croatia which is neither large nor rich is whether, given its domestic constraints and the value of the product, how to provide long term support for the sugar sector to keep the prices low and to keep the income of the sugar beet growers. This would ask a complex social cost- benefit analysis taking a long term view of world markets, Croatia's position in the EU, and EU sugar policy.

In the meantime, the Croatian authorities can improve the competitiveness of the sector (without making it competitive in absolute terms) by improving the market environment. Specifically, this means improvements in the land market, improvements in technological performance (through investments into the infrastructure for drainage and irrigation, further investments in the processing capacities modernization).

Moreover, it has to be intensified the use of professional and scientific research into administrative, but also business decision- making process. Concretely, it is suggested to examine the economics of production location and the quota allocation method (because some production areas are considerable distances from the nearest processing facilities). It is also expected that trade liberalization should result with reducing the input prices for agricultural producers, which would considerably decrease production costs.

According to positive trade balance in a last 4 years and increasing in agricultural yield per ha (45,66t/ha in 2005.) it can be said that sugar sector is competitive at the EU market and has comparative advantage at the World market, but that should yet be verified by further proper calculations.

General economic environment has to be arranged to encourage the operation of the commercial credit market, to improve contract enforceability and business discipline, which will hopefully contribute to the encouragement of foreign investments. These structural measures, together with other social and rural development policies should ensure

long-term rural efficiency and competitiveness in agriculture, and in sugar sector within, more resistant on factors on which they are powerless to control, as world prices, exchange rate or quota regimes.

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