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Influence of policy measures on the competitiveness of the sugar industry in the Czech Republic

Vliv politických opatření státu na konkurenceschopnost českého cukrovarnictví

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Abstract: The sugar industry in the Czech Republic is one of the branches of food production that since the end of nineties has been strongly protected by agricultural policy. Here, we will deal with the question how the Czech agricultural policy affected the competitiveness of the sugar industry during transformation. From the analysis, it can be derived that not only agricultural measures but also organisational changes inside the enterprises, as well as modernisation and increasing capacity of plants that all took place before the enforced political aid, supported the stabilisation of sugar beet farming and the sugar industry in the Czech Republic and its competitiveness in the national market.

Key words: sugar industry, agricultural policy, competitiveness

Abstrakt: Cukrovarnictví je jedním z odvětví českého potravinářství, které od konce devadesátých let užívá významných ochranných opatření zemědělské politiky. V předloženém článku by měla být zodpovězena otázka, jak česká zemědělská politika v době transformace ovlivnila konkurenceschopnost českého cukrovarnictví. V této souvislosti bylo zjištěno, že podpůrná opatření zemědělské politiky, ale i změny organizace stejně jako modernizace a zvyšování produkční kapacity cukrovarů vedly ke stabilizaci v odvětví cukrovka-cukr a k dosažení konkurenceschopnosti na domácím trhu.

Klíčová slova: cukrovarnictví, zemědělská politika, konkurenceschopnost

INTRODUCTION

Sugar production has a long tradition in the Czech Republic. The first sugar refinery was built in 1829. The research and development production of the Czech sugar industry in the area of sugar contributed to the development of the European sugar industry.

Nevertheless, after the Second World War, the sugar industry remained stagnant. During the socialistic period, the government did not supply any capital for innovations, so there was insufficient technological progress. Moreover, there was no increase of capacity in the sugar refineries like in Western Europe. As a result, productivity and efficiency of the sugar industry declined. The Eastern Bloc countries cut themselves off from the Western European sugar market and so protected their market against competitors. Until 1989, the Czech sugar policy had two main objectives, self-sufficiency and low consumer prices, that were realised by direct allocations to the producers (Csaki et al. 1999). After 1989, the Czech agricultural policy had new objectives. Producer and consumer interests should be harmonised. The objective was to reach liberal market conditions without protectionism (ZPZPV 1994). Liberalisation had to be implemented in mutual accordance with trade partners. Through extensive opening, the Czech domestic market sought a more intense competition.

Agricultural policy decisions play an essential role in developed industrial countries for competitiveness of national producers in the domestic market as well as in the world market because of the high competition in the world market for agricultural products. On the one hand, the domestic market is protected by tariff and non-tariff measures from cheap imported foreign products, and on the other hand, exports are subsidised in order to be able to sell the more expensive products in the world market. Those measures restrain the effect of market forces and it is necessary to implement further measures that prevent overproduction, as e.g. regulations for the domestic market. The sugar industry in the Czech Republic is one of the branches of food production that is also strongly protected by agricultural policy. Here, we want to answer the question how Czech agricultural policy affected the competitiveness of sugar industry in the nineties. Because of the complexity of this problem, we will only discuss the agricultural policy measures that are especially relevant for the competitiveness of the sugar industry.

The first part of this paper describes agricultural instruments in detail, then their effects as well as the effects of market interventions on the competitiveness of the sugar industry will be examined.

AGRICULTURAL POLICY AND MARKET REGULATIONS FOR SUGAR

Political instruments of the agricultural market

Because of wide-ranging sugar market regulations of the most important trading partners, eventually national and international regulations influencing the market result were enforced in the Czech agricultural policy that differed from the original agricultural objectives that were announced at the beginning of the nineties. The most important international regulations of the Czech Republic for sugar beets and sugar are tariff regulations and export refunds the national regulations refer to the organisation of the sugar market. One of the main objectives of those measures is the increased competitiveness of Czech sugar producers in the national market by eliminating the pressure of the world market. Thus, the cultivation of sugar beet and its positive effects on landscape conservation and rural development in the Czech Republic, as well as full self-sufficiency in sugar and by-products that are important for the downstream industry, e.g., molasses, will be ensured.

Instruments of international trade

a) Tariff regulations

In the nineties, the CR tariffs reacted according to the development of world prices. In order to support the competitiveness of Czech producers in the national market, tariffs had to be increased because of declining prices in the world market.

Until 1994, sugar was one of the products that were not affected by WTO/GATT negotiations. Therefore, member countries could appoint their autonomous agricultural policy measures concerning the sugar market. In its WTO/GATT negotiations, the Czech Republic contracts to a stepwise reduction of the sugar tariff until 2000, beginning from the 1st of January 1995. The agreed tariff was 68.3% in 1995 and had to be reduced to 59.5% by 2000 (Table 1). This tariff was considered to be high enough to prevent imports and therefore to attain stability of the domestic sugar market. Because of CEFTA trade agreements, additionally a bilateral preference tariff was set at 40% with Poland. The tariffs were calculated 'ad valorem', which means a determination of tariff as a percentage of the declared price at the border.

A large amount of sugar was imported because of extremely low world prices in 1998. Thus, the national sugar industry suffered from considerable sales problems (Duffek 2000). Because of the increasing imports, the government introduced a protective tariff with an interim measure in March 1999 with a validation limited to 200 days. The valid tariffs fixed by the Czech Tariff Code – a governmental regulation from 1998 – or by contract were increased by 80%.

The measures that were undertaken to protect the domestic market were insufficient, as importers discovered gaps that gave access to the market. At the border, they declared extremely low sugar prices (between 1–2 CZK/kg), consequently not only large amounts of sugar went into the Czech Republic, but also the government had to deal with the lost tariffs. Eventually, this was prevented by a new interim measure (valid from 20th September 1999). The final measure was set for 4 years and replaced the interim measure. With this measure, a maximum import quota was fixed for the importing countries. The tariffs for the imported sugar quota were set according to the Tariff Code. All countries exceeding their fixed import quota had to pay, by 80%, increased tariffs for the additionally imported sugar. The minimum tariff for imported sugar was 14 CZK whereby this regulation does not concern sugar imports from developing countries that are WTO-members with an import quota into the CR less than 3%.

Another gap was created by sugar that was imported for the downstream production of sugary products. Such kinds of products were not exported out of the Czech Republic, as originally declared. This problem was not adequately considered in the tariff policy (Duffek 2000), and the export of sugary products was insufficiently monitored. Trade with Slovakia was free because of the Customs Union. But in 1999, import contingents were fixed for sugar and iso-glucose.

It should be emphasised that high tariffs on sugar lead to an increasing sugar price in the domestic market. Thus, downstream branches of industry, e.g., producers of sweetened drinks, are being outsold by foreign producers. Moreover, opportunity costs for import tariff, are high because protecting one sector (sugar industry) by fixing factors of production weakens other sectors.

b) Export allowance

Export allowances should support the competitiveness of Czech sugar in the world market, which could other-

Table 1. Basic tariff (%) for import of sugar in the CZ 1991–2000

1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
35	70–80	70–80	70–80	68.3	66.5	64.8	63.0	61.3	59.5

Source: ZSZ (1994); SVZ (1994–2000)

Table 2. Subsidised sugar exports from the Czech Republic from 1991 to 1993

Year	Subsidy		
	thousand t	mio. CZK	CZK/t
1991	–	36.0	–
1992	39.4	138.0	3 503
1993	20.0	66.1	3 303

Source: ZSZ (1994)

wise not be achieved because of comparatively high production costs. For the long term it has made sense to reduce production to the level of national consumption. So the government would save the money spent for allowances. According to this aim, in the nineties export allowances were considerably decreased. As a consequence the competitiveness of Czech sugar producers on the world market was restrained.

From 1991 to 1993 the SFTR (State Fund of Market Control) subsidised sugar exports (Table 2). In 1992 the amount of 3 503 CZK/t was paid for the export of 39.4 thousand t. In 1993 only 20 thousand t of sugar were subsidised. In 1993 one exported tonne of sugar was subsidised with 3 303 CZK.

According to the decision of the Sate Fund of Market Regulation (SFTR) concerning the retraction of interventions on the sugar market, the export subvention was abolished in 1993. But this fact supported the aimed concentration in the sugar industry because many refineries were not able to compete under these conditions and went bankrupt. Since 1997, within the framework of Support and Guarantee Farm and Forestry Fund (PGRLF), the government has been supporting credits that were granted by banks to exporting enterprises on agreed export contracts (except for contracts with Slovakia). They consisted of the interest subsidy of 10% of the interest rate. This financial aid was limited to 100 million CZK per 115 thousand t of sugar.

In the above-mentioned WTO/GATT agreements, the Czech Republic contracts the reduction of the subsidised sugar exports to 4 900 t in 2000, for that amount export refunds could be granted up to 63.5 million CZK. Compared with the development of exports in the past, the agreed export volume seems to be lower. It makes up only about 1% of the domestic sugar consumption. The Czech Republic wishes to increase the export volume (Kozák 2000). Here, the question arises of how much financial aid is needed in order to achieve competitiveness of the exported sugar in the saturated world market and what are the (financial) consequences for the consumers and possibly for the taxpayers.

Sugar market organisation for the domestic market

The introduction of a sugar market organisation in the Czech Republic has been discussed since the early nineties. The intended accession to the EU, and therefore the necessary adaptation to the EU system, is one of the most important reasons for the sugar market organisation in the Czech Republic. The present Czech sugar market organisation is based on principles of the current EU sugar market organisation. Among the Central European countries that intend to join the EU, in 1994 Poland was the first country to implement a sugar market organisation after the EU model.

By implementing a sugar market organisation, the Ministry of Agriculture was expecting a stabilisation of the sugar market and of the sugar production, less deviation of price and of cultivation area, and declining risks in order to support long-run investments. Thus, the following disadvantages are considered for this system: the problem of allocation of quotas at a high number of producers, the reduction of efficiency as a consequence of disconnecting the market as a regulating mechanism, the support of inefficient sugar beet farmers and producers, the increase of consumer prices, and the delaying, if not even the end, of the rationalisation process (Kalina 1998).

The sugar market organisation came into force on March 14, 2000 by the governmental decree No. 51/2000 Coll. It fixes the measures and the repartition of the government on spending to ensure a continuing sugar production as well as the stabilisation of the sugar market in the Czech Republic (SVZ 2000).

The stabilisation system is financed by itself, it does not burden the national budget because each quota holder has to generate a financial reserve of 1 950 CZK per 1 ton of sugar sold within the quota. Such financial gains are used by the firms to support their own exports (except exports to Slovakia) in the same financial year.

Nevertheless, the above-mentioned risks are to be considered, which are the decline in efficiency and the support of inefficient sugar beet farmers and producers as well as delaying the rationalisation process. These are the negative consequences of disconnecting the market through regulating mechanism, which leads to an increase of consumer prices.

Support of sugar production

In the following, the support of sugar production will be analysed by using the Nominal Protection Rate (NPR) and the Producer Support Estimate (PSE) for sugar.

The Nominal Protection Rate of sugar (Table 3) was 19.2% in 1997 and increased to 116.3% in 1999 because of declining world prices. Similar to the sinking world price in 1998 and 1999, protective measures of the government increased (augmentation of tariffs, quotas for exporters), in order to effectuate the stabilisation of the sugar industry. Regarding the NPR of EU-member Germany, it appears that the prices there were much higher above the world price than in the Czech Republic. After the accession of the Czech Republic, a similar development of prices as in Germany is expected.

When evaluating such data, it has to be considered that the sugar world price is distorted by agricultural policy

Table 3. National and world reference prices of sugar (CZK) in the CZ and in Germany as well as the NPR

Year	National price (CZK/t)		World price* (CZK/t)	NPR (%)	
	CZ	Germany		CZ	Germany
1995	15 610	19 662	10 554	47.9	86.3
1996	15 450	18 820	10 025	54.1	87.7
1997	11 940	19 475	1 0010	19.2	94.0
1998	13 850	19 435	8 244	68.0	135.8
1999	15 000	19 997	6 934	116.3	188.4

Source: Zuckerwirtschaft Europa (2001)
* at the stock exchange in Paris

measures. In most sugar exporting countries, the national consumer price is much higher than the price of sugar that is destined for export. Therefore, most countries object is total self-sufficiency in sugar. They fear an increase of prices for contracted imports in the case they become dependant on exports.

In 1999, the sugar price in the Czech Republic was about 116% above the world price. The low world price can be explained firstly by the large surplus of sugar and therefore the high export subsidisation and protective measures of the developed countries, and secondly by low prices of producers of raw sugar in the developing countries.

Producer Support Estimate (PSE)

The PSE is a more comprehensive measure for defining the degree of protectionism than the NPR (OECD 2001). Besides measures for influencing prices, it also reflects other transfers concerning production as e.g. direct income transfers, land premiums, tax breaks, budget transfers etc.

The share of PSE in the total gains of the enterprises in the sugar industry was higher in the socialist Czechoslovakia than in the EU. After the collapse of the planned economy in 1989, the subsidies share sank from 52% (1989) to –11% (1994). Until 1999, the share of PSE grew to 38%, which was caused by a rising tariff that was implemented to hinder the increase of sugar imports.

There it should be concluded, that because of the above-mentioned international and national economic regulations, the national producers are earning a higher income than they could gain on totally liberalised markets. But this strict regulation is inconsistent with the principles of free-market economy, because economic forces are being weakened in the national market.

COMPETITIVENESS OF THE SUGAR INDUSTRY

The following definition of competitiveness is based on Weindelmaier: "The food industry is competitive when it is sustainable in successfully gaining and defend-

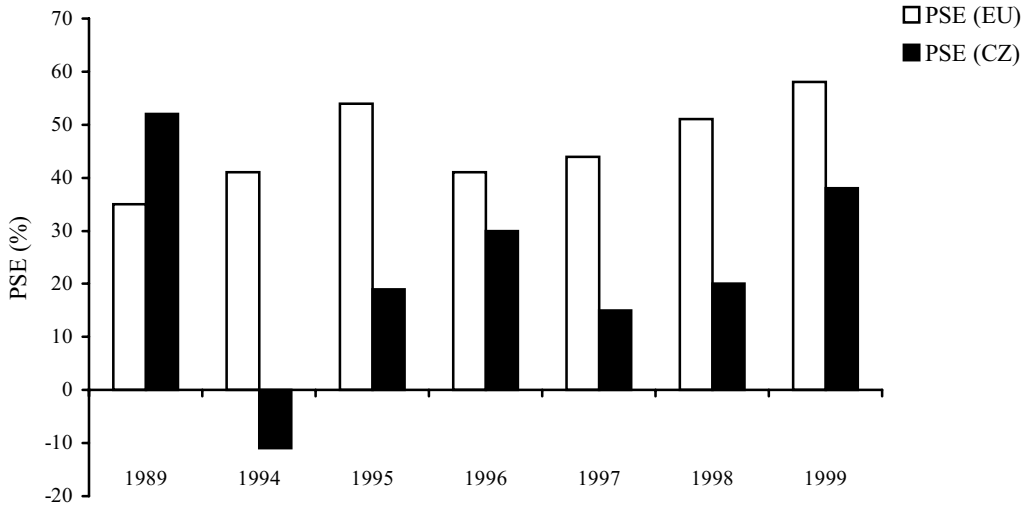

Figure 1. % PSE for sugar in the CZ compared to the EU, 1989–99

Source: OECD (1996 and 2001)

ing its market shares in national and international markets" (Weindelmaier 1999).

Potential of competitiveness

After accession into the EU, not only competitiveness in the world market, but especially the competitiveness in the common EU market becomes extremely important for the sugar producers in the Czech Republic. Within the EU, the Czech sugar industry will no longer be advantaged over the EU competitors by agricultural policy measures that also include the national market. The potential to stand up against competition is decisive for the future competitiveness of an economic sector (Weindlmaier 1999). Here, the potential of competitiveness of the Czech sugar industry will be derived from the development of concentration, labour productivity, technology, and profitability in the nineties and will partially be compared with the EU countries.

a) Increase of concentration

A higher concentration of enterprises in the market has positive effects on costs and gains for the enterprise and therefore its efficiency by gaining effects of scale. Because of the growing experience of the enterprise at a higher concentration, production costs are being reduced. In the sugar industry, costs are being reduced at a higher daily production capacity because in a modern sugar refinery, the demand for labour is rather independent from its production capacity (Duffek 2000). Therefore, in bigger firms, labour productivity is rising.

As Zemplinerová and Stíbal (1997) point out, in the Czech Republic, the branches of converting industry with one or a few dominant enterprises are more resistant to import pressure. The reasons for that are a higher efficiency and the ability to restrain imports by political decisions.

The process of increasing concentration as well as capacity, which will be described in the following, started in the Czech Republic at the beginning of the nineties. During the campaign 1989 in the Czech Republic, 52 sugar refineries were working with the average capacity of 1 362 t of sugar beet per day (Table 4). Until privatisation, the government as an owner at that time intervened into the change of structure and arranged closing of redundant refineries. Until 1993, in the process of rationalisation, the number of refineries was reduced to 39 (Table 4), which were organised in 28 autonomous institutions. The production capacity rose fractionally until 1993/94 up to 1 534 t of sugar beet per day. The successful privatisation of all existing sugar refineries led to a high competition between the sugar enterprises. At the beginning, also sugar refineries without any future perspective were producing. This not only led to large financial losses (because of investing in modernising such sugar refineries), but also delayed the process of production reduction and increase of concentration in the sugar industry.

Table 4. Number of sugar refineries in the CZ and their average production capacity compared with the EU

Year	Number of refineries	Average production capacity (t beets/day)	
	CZ	CZ	EU-15
1989/90	52	1 362	–
1990/91	47	–	–
1991/92	43	–	–
1992/93	41	1 439	–
1993/94	39	1 534	–
1994/95	31	1 649	–
1995/96	29	1 760	7 685
1996/97	28	1 841	7 550
1997/98	26	1 901	8 825
1998/99	16	2 619	8 280
1999/00	11	3 364	9 380

Source: SVZ, various issues; Zuckerwirtschaft Europa, various issues
Business year: 1. October–30. September

During the campaign in 1997, still 26 sugar refineries were working. The average production capacity increased only slowly and was about 1991 t of sugar beet per day (Table 4). The ownership structure was rather complex, because many incorporated companies were joined together.

Participation of foreign entrepreneurs enabled, for the most part, increasing concentration. At the end of the nineties, there were only 11 refineries. The average production capacity increased to 3 364 t of sugar beet per day (Table 4). This was still only one third of the production capacity of sugar refineries in the EU where the average capacity was 7 685 t of sugar beet per day in 1995/96, still rising up to 9 380 t per day in 1999/2000. With a similar capacity in the Czech Republic, about five refineries would be able to produce the present amount of sugar.

The high level of competition in the middle of the nineties had its positive effects on the structure and the concentration of the Czech sugar industry. Foreign investors not only brought the necessary capital and more efficient technologies but they also accelerated the concentration process. Thus, regarding the experiences with the development of concentration in the sugar industry of the EU, this seems to be the right direction towards an increasing competitiveness.

b) Labour productivity

Educated workers and low labour costs are the positive factors of Czech enterprises. 5 039 employees were working in the sugar industry in 1996 (Table 5). Until 1998, this number decreased continuously to 1 837. This made a share of 5.0% in the total number of employees in the food industry in 1996 (2.2% in 2000).

Table 5. Employees in the sugar industry (SI) and food industry (FI); Portion of SI of the total FI in the CZ

Year	Employees		Portion sugar industry (%)
	sugar industry	food industry	
1996	5 039	100 709	5.0
1997	3 930	104 447	3.4
1998	3 340	129 355	2.6
1999	1 929	92 835	2.1
2000	1 837	82 345	2.2

Source: Information VÚZE (2002), included only enterprises with 100 and more employees; MZe and VÚZE (2001)

Table 6. Labour productivity in the SI and FI in the Czech Republic

Year	Added value/ employee SI (thousand CZK)	Added value/ employee FI (thousand CZK)	SI/FI (%)
1996	180.0	334.2	53.9
1997	271.6	406.1	66.9
1998	492.5	377.6	130.4
1999	887.4	436.6	203.3
2000	1 067.4	478.9	222.9

Source: Information VÚZE (2002); MZe und VÚZE (2001)

Labour productivity (added value per 1 worker) increased from 180 thousand CZK in 1996 to 1 067.4 thousand CZK in 2000 (Table 6). Compared with the whole food sector in 1996, labour productivity of the SI was at the level of 53.9% of the labour productivity of the whole food sector (= 100%), but it increased to 222.9% in 2000, and therefore exceeded the average labour productivity in the FI.

The positive effects of the economic opening for foreign investors were also reflected by the increase of productivity. This is important, because increasing labour productivity caused by new, high-performing technologies as well as the above-mentioned increase of production capacity is required for competitiveness in the saturated sugar market.

c) Technology

The efficiency of the Czech sugar industry improved considerably due to innovations and structure changes. By reconstructing the sugar industry, energy input (fuel as well as electricity) could be lowered. The use of fuel decreased from 8.8 units of specific heat per ton of sugar beet on average in 1985–1989 to 4.2 units per ton in 1999. The energy input in sugar refineries referring to one ton of sugar beet sank from 30.6 kWh (average 1985–1989) to 25.4 kWh in 1999 (Čížˇ 2000).

Because of the short storage ability of sugar beet refineries can only be used for a short period of time per year – the so-called campaign. In order to augment the efficiency of the capacity and to profit from the effects of scale, an extension of the campaign is recommended. On the other hand, under the climatic conditions in the Czech Republic, a too long campaign would be too costly. In the Czech Republic, the campaign lasts only about 75 days (Table 7). In the EU, campaigns last longer (about 90 days). The economic optimum in the Czech Republic is estimated at 80 days.

The obsolete facilities in the refineries in 1989/90 caused a lower yield of sugar from the beets than in the EU countries. In the Czech Republic, the yield was about 72.3% in 1989/90: in the EU countries, 86.4% (Table 7).

Table 7. Duration of the campaign, content of sugar, and yield of sugar in the SI in the Czech Republic

Year	Duration of campaign (days)		Content of sugar (% beet)		Yield (% beet)		Yield (% sugar)	
	CZ	EU-15	CZ	EU-15	CZ	EU-15	CZ	EU-15
1989/90	–	–	14.8	16.9	10.7	14.6	72.3	86.4
1990/91	79	90	16.3	16.7	12.8	14.0	78.5	83.8
1991/92	70	85	17.5	17.4	14.0	15.0	80.0	86.2
1992/93	72	96	16.0	17.0	13.6	14.8	85.0	87.1
1993/94	74	94	16.8	17.4	13.2	15.1	82.5	86.8
1994/95	81	85	15.6	17.2	12.1	15.0	77.6	87.2
1995/96	63	88	16.0	16.7	12.6	14.6	78.8	87.4
1996/97	76	87	17.0	18.2	13.8	16.0	81.2	87.9
1997/98	88	92	16.6	17.8	13.7	15.6	82.5	87.6
1998/99	72	87	15.8	17.1	13.1	15.0	82.9	87.7
1999/00	74	–	17.3	18.0	14.5	15.9	83.8	88.3
2000/01	72	–	17.7	17.6	14.5	15.7	81.9	89.2

Source: SVZ, various issues

This can also be connected with a lower quality and a high proportion of non-sugar contents in the supplied sugar beet in the Czech Republic, because deductions for low quality were not enforced consistently enough (Kalina 1998).

The yield of sugar rose with the modernisation of the refineries and increased to about 82% by the end of the nineties (Table 7). In spite of the positive development, the level of the EU (about 88%) could not yet be approached.

d) Profitability

In the nineties, profitability was very low, and in 1992, 1997, and 1998 even negative (Table 8), because of low profits and high costs. After augmenting the protective measures in 1999 and the implementation of the sugar market organisation in 2000, as well as increasing efficiency of the sugar production, profitability rose in the period 1999/2000 from 1.8 to 7.9%. It is to be assumed that with their declining number, enterprises became more powerful and they could enforce protective measures (higher tariffs, sugar market organisation) for the sugar market (comp. Increase of concentration). Another reason for increasing profitability are cost-reducing measures that came along with high investments into innovations, and re-structuring that were largely completed at the end of the nineties.

Because of the comparatively low production capacity and labour productivity, short campaigns, low yield as well as high energy input, the Czech sugar refineries have – in spite of lower labour costs – higher costs referring to one production unit than producers from the EU. After an analysis (Kalina 1998) in the nineties, costs were 12% higher than in the EU. But compared with the Central and Eastern European countries the Czech Republic, together with Hungary, is at the top among the accession countries due to the highest crops as well as the relatively high yield and lowest costs of beet farming and sugar production (Kozák 2000).

Table 8. Selected economic features of the Czech sugar industry

Year	Profit	Total costs	Profitability
	mio. CZK	mio. CZK	%
1990	191	6 097	3.1
1991	367	8 297	4.4
1992	–197	8 041	–2.5
1996	542	12 471	4.3
1997	–916	10 794	–8.5
1998	–371	11 329	–3.3
1999	174	9 769	1.8
2000	630	7 931	7.9

Source: ZPZPV (1994), Information VÚZE (2002)

Evaluation of the ex-post competitiveness

The above-described development of the Czech sugar industry in the nineties indicates an increasing competitiveness during the transition process. With the following trade indicators, we now want to examine how the positive development of the competitive potentials influenced the actual competitiveness.

The trade indicators provide measures in order to evaluate the ex-post competitiveness of a country, of a sector, or of a branch (Balassa 1989; Vollrath 1991). They are used in this article to evaluate the competitiveness of the Czech sugar sector. However, export indicators of sugar and for other goods of the food industry are restrained by a number of tariff and non-tariff trade restrictions (Breitenacher and Träger 1990). So, when interpreting those indicators, one has to consider the framework. The Relative Export Advantage Index (RXA) describes the proportion of the Czech sugar export to the total sugar export in relation to the proportion of the total Czech export for other goods. An RXA smaller than 1 indicates a disadvantage of Czech sugar exports. In the following formulas, X stands for exports and M stands for imports. The indices i and k are related to categories of products, whilst j and l relate to regions. All other products act as a reference group for sugar, and all other countries act a as reference to the CR.

$$RXA_{ij} = \left(X_{ij} \Big/ \sum_{l,l\neq j} X_{ij} \right) \Big/ \left(\sum_{k,k\neq i} X_{kj} \Big/ \sum_{k,k\neq i} \sum_{l,l\neq j} X_{kl} \right) \quad (1)$$

There is a similar index for the import, the Relative Import Penetration Index (RMP). An RMP higher than 1 indicates a competitive disadvantage, an RMP smaller than 1 indicates a competitive advantage of Czech producers towards importers.

$$RMP_{ij} = \left(M_{ij} \Big/ \sum_{l,l\neq j} M_{ij} \right) \Big/ \left(\sum_{k,k\neq i} M_{kj} \Big/ \sum_{k,k\neq i} \sum_{l,l\neq j} M_{kl} \right) \quad (2)$$

The Relative Trade Advantage Index (RTA) is based on Scott and Vollrath (1992) and describes the difference between RXA and RMP. Positive values indicate an advantage, negative values indicate a competitive disadvantage (Frohberg and Hartmann 1997).

$$RTA_{ij} = RXA_{ij} - RMP_{ij} \quad (3)$$

There might be some discrepancies within the statistical data of the CR trade up to 1994 because of the data collection during the socialistic period and during the transition process. Thus, in 1988–1989, extremely high sugar imports were indicated, which might stand in connection with the import of Cuban raw cane sugar for re-

Table 9. Trade indicators for Czech sugar

Year	RXA	RMP	RTA
1988	0.45	2.36	–1.91
1989	0.70	3.26	–2.56
1994	0.96	0.01	0.95
1995	0.39	0.08	0.31
1996	0.28	0.09	0.19
1997	0.87	0.05	0.82
1998	0.40	0.20	0.20
1999	0.11	0.24	–0.13

Source: Own calculations based on FAOSTAT data

finement. But this was not reflected in the export numbers. So the high RMP and the low RTA in 1988–1989 cannot be compared and therefore they will not be considered in our further explanations.

The RXA for the considered years is smaller than 1 (Table 9). This indicates a competitive disadvantage of Czech sugar compared with foreign producers on the world market. But Czech producers were advantaged on the national market, which is shown by a low RMP. The RTA was positive (except in 1999) and therefore Czech sugar had a competitive advantage.

Altogether, augmenting the competitive potential did not improve the international competitiveness of the Czech sugar sector. This is mainly influenced by the extremely low sugar prices that are distorted by strong concurrence and the resulting protective measures and trade barriers of developing countries. Czech producers were only able to compete in the domestic market. There they are protected by protective measures of the agricultural policy.

CONCLUSIONS

The objective of agricultural policy after 1989 was to provide liberal market conditions without protectionism. Regarding the influence of agricultural policy instruments to the stability of the sugar sector, it becomes clear that the liberal political measures from the beginning up to the middle of the nineties, together with a low protection of national products, led to the enforcement of competitiveness in the national market and to the decrease of sugar production down to the level of consumption in the CR. In order to protect these conditions that were aimed at by the agricultural policy, tariffs were augmented in 1989 which protected the national market from imports of cheap world market sugar. The production of sugar is regulated by the sugar market organisation that adapted the sugar policy of the CR to the EU and itself acts as another protective measure. Accession to the EU is expected to implement positive changes of the supporting framework for sugar producers and competitiveness is expected to improve compared with the world market. Further, an increase of protective measures is expected which will lead to higher consumer prices.

Not only agricultural measures but also organisational changes inside the enterprises, as well as modernisation and increasing capacity of plants which all took place before the enforced political aid, supported the stabilisation of sugar beet farming and sugar industry in the Czech Republic and the competitiveness in the national market.

As a conclusion, we can derive that the Czech sugar industry and its existence, as well as the EU sugar industry, depends on the protective measures of agricultural policy and will also depend on it in the future.

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