COMPETITIVENESS OF CZECH AGRICULTURE IN THE EU-MARKET - THE CASE OF PORK -

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Summary:

Numerous political and economic reforms in the Czech Republic since the early 90s have caused considerable adjustment problems in the economy and particularly in the agricultural sector, thereby increasing the fear of insufficient competitiveness. This holds especially given the planned accession to the EU. Thus, an analysis of the competitive position of Czech agriculture is important.

In this study we will concentrate on the Czech pork market. In the descriptive part ist is shown that supply of and demand for pork has experienced a sharp decline since the beginning of the transformation process. Since the former decreased stronger than the latter, net exports have fallen considerably. In 1994 this development has even led to a trade reversal.

The most important attributes which determine the competitiveness of a sector include the factor conditions, the firm strategy and structure, the existence of efficient related and supporting industries, the demand conditions and agricultural as well as macro policies. With respect to the Czech pork sector especially the relative low factor prices but also the demand conditions are favourable. Detrimental for the competitiveness of the Czech pork industry are in contrast the overvaluation of the Czech Koruna, the low factor productivity, the inefficiency of the meat industry, and the lack of policy and market incentives to secure a high product quality.

To give first answers with respect to the competitiveness of the Czech pork sector Balassas indexes of Revealed Comparative Advantage are calculated. From the examination of the results it can be presumed that the competitive position of the Czech pork sector as of today is rather moderate. To secure future competitiveness of Czech pork production in the EU market a stronger market orientation and the adaption to the consumer desire for high quality products are needed.

Souhrn:

Četné politické a ekonomické reformy v České republice od začátku 90. let způsobily značné přechodné problémy v ekonomice a zvláště v zemědělském sektoru, tím zvýšily obavy z nedostatečné soutěživosti. To platí zvláště s ohledem na plánovaný vstup ČR do Evropské Unie. A tak se stává důležitou analýza konkurenčního postavení českého zemědělství.

V této studii se soustředíme na český trh vepřového masa. V popisné části je ukázáno, že nabídka a poptávka po vepřovém mase prodělala výrazný pokles od počátku transformačního procesu. Vzhledem k tomu, že se nabídka snížila více než poptávka, došlo ke značnému poklesu čistého vývozu. Tento vývoj dokonce vedl ke zvratu v obchodu v roce 1994.

Nejdůležitější znaky, které určují konkurenceschopnost odvětví zahrnují momentální podmínky, strategii a strukturu firmy, existenci souvisejících výkonných a podpůrných průmyslových odvětví, stav poptávky, zemědělskou politiku a makropolitiku.
Pokud jde o sektor českého vepřového masa jsou zvláště poměrně nízké ceny, ale i stav poptávky je příznivý. Škodlivě na konkurenceschopnost českého průmyslu vepřového masa působí na rozdíl od přecenění české koruny, nedostatečně výkonný masný průmysl, nedostatek politických a tržních stimulů.

K zajištění vysoké výrobní kvality. Abychom odpověděli pokud jde o konkurenceschopnost sektoru českého vepřového masa, vypočítali jsme Ballassasův index odkryté komparativní výhody. Ze zkoumání výsledků můžeme předpokládat, že konkurenční pozice českého sektoru vepřového masa je dnes spíše průměrná. K zajištění budoucí konkurenceschopnosti české produkce vepřového masa na trhu Evropské Unie bude třeba se výrazněji orientovat na trh a přizpůsobit se přání spotřebitele, který chce výrobky vysoké kvality.

Key words:
Competitiveness, Czech pork sector, EU-accession, production costs, agricultural policies, exchange rate, market analysis, meat industry

Klíčová slova:
Konkurenceschopnost, česká sektor vepřového masa, vstup do Evropské Unie, výrobní náklady, zemědělská politika, devizový kurz, analýza trhu, masný průmysl.

1 Introduction

The transformation from a socialist system into a market economy as well as the separation from the Slovak Republic has led to pronounced changes in the entire Czech economy and particularly in the agricultural sector. Further adjustment pressure due to external developments such as changes in the Common Agricultural Policy of the EU (CAP), implementing EU regulations as provided in the white book and the GATT/WTO agreement are to be expected. Given this state of change it seems difficult to obtain a precise assessment of the competitive position of Czech agriculture. This, however, is necessary in order to adjust

effectively to the opportunities and the threats facing this sector. Thus an analysis of the competitiveness of Czech agriculture is important. In our study we will concentrate on pork as one crucial product in the Czech Republic (CR).

The paper is organized as follows. In section 2, a brief overview of the current economic situation in the Czech Republic (CR) is provided. Developments of supply, demand and trade in pigs and pork in the Czech Republic are analyzed in section 3. Thereafter, the main determinants of competitiveness are discussed with regard to the Czech pig sector. In the fifth section, the Czech competitive position is discussed utilizing market share indicators and finally some conclusions with respect to the further development of the pig sector in the Czech Republic are drawn (section 6).

2 The State of the Czech Economy and the Agricultural and Food Sector

Due to the restructuring process of the Czech economy beginning with the post-socialist time, GDP declined until 1994 and since then expands at a currently still moderate rate. The agricultural sector as a whole but especially the animal sector contracted even stronger than the entire economy. Measured in current prices the share of agriculture in total GDP went down from 6.2 % in 1990 to 3.1 % in 1994.

The process of privatisation of the Czech economy enhanced substantially. While the share of GDP produced by the private sector was only 12.3 % in 1990, in 1994 more than half of all goods and services originated from private companies. Though income declined the share of GDP spent on food remained constant at approximately 32 % over the last 5 years. This implies that expenditures on food declined at the same rate as GDP.

The share of the agricultural labor force in total employment went down from nearly 10 % in 1989 to slightly over 4 % in 1994. This decline reflects the contraction of the agricultural sector and the reclassification of agricultural labour. The share of total investment going to agriculture went also down from 12 % in 1989 to 3 % in 1994.

Another point worth mentioning is the low rate of people officially registered unemployed. In comparison to other countries in transition this rate was very low over the entire period since economic transformation started. It reached 3.2 % at the end of 1994. This low rate is due to several factors. First, the rate of employment participation, which was one of the highest in the world under socialist time, became smaller. Second, wages and salaries are relatively low

reducing the pressure of substituting capital for labor. Finally, the Czech labor force is highly qualified making it easier to find work. At the same time, this low unemployment rate indicates that still considerable structural adjustment of the Czech economy is to be expected.

The food processing industry was also strongly restructured over the last 5 years. The number of processing companies with more than 25 employees increased from 62 in 1989 to nearly 600 in 1994. Together with the decline in output this indicates a strong fall in concentration of this industry. At the same time the share of total investment going to food processing increased reflecting the need to upgrade this industry.

The trade balance of the CR became heavily negative over the first 7 months of 1995. During this period the overall trade deficit reached more than 53 billion Czech Koruna (CK) while it was still slightly positive during the same period of 1994. The Czech Republic trades mostly with developed market economies of which the EU is of special importance. In 1994, 54 % of total exports were shipped to the EU and in the first 7 months of 1995 this number was 56 %. The small increase is largely due to the accession of the three countries Austria, Finland and Sweden. The same picture emerges with regard to imports. 55 % of all imports originated from the EU in 1994 and in the first 7 months of this year this share rose to 56 %. Germany is the largest trading partner of the CR. Approximately a quarter of all Czech imports is produced in Germany while more than 30 % of all Czech exports are shipped to this country.

The development of trade in agricultural products depicts the same trend as that of total trade. Trade in these products (SITC code 0, 1 and 4) reached a deficit over the first 7 months in 1995 of about 8.2 billion CK which is more than a doubling compared to the same period of last year. In both periods, the trade deficit with the EU alone was approximately that high; implying that the CR had an almost balanced trade in agricultural products with all other countries together.

3 The Market for Pork in the Czech Republic

3.1 Supply

Measured in gross revenue pig and milk production are by far the most important industries of Czech agriculture. While the share of milk in total value of output experienced a sharp drop from 37% in 1989 to 31% in 1993, that of pork increased from 29% to 36% over the same period, making pork the dominant agricultural product in the CR.

Nevertheless, as for the entire sector in the CR, the pig sector experienced a cost-prize squeeze, inducing a decline in pig production. Output prices for pigs could not keep up with increasing input prices, and have even been on a downward track since the beginning of 1995 (Agra-Europe - East Europe Agriculture and Food, No. 153, June 1995, p. 23). Especially feed prices, the dominant cost category in pig production (see section 4.2) increased considerable in the 90s. Thus, the number of total pigs declined from 4.7 mill. animals in 1989 by approximately 18 % to 3.9 mill. animals in 1995 (see Table 1). However, it should be noted that the pronounced drop in the statistic of total pig numbers in 1993 is not only due to an actual decrease, but also due to a change in data collection methods (OECD, 1995, p. 36). In 1994 the total number of pigs dropped further by 5 %, while the number of sows even showed a slight increase (0.2 %).

Table 1: Pig Numbers in the Czech Republic

	Pigs	
	Total	**of which sows**
1989	4 685 333	312 414
1993	4 598 821	324 345
1994	4 070 898	294 610
1995	3 866 568	295 328

Source: Agra-Europe - East Europe Agriculture and Food, No. 152, May 1995, p. 22.

Although production of all categories of meat experienced a decrease in the 1990s, the magnitude of the decline was quite different among the various meat types. For example, in 1994 pork production decreased by 7.1%, beef and veal production even dropped by 11.5%, and poultry only showed a decline of 4.3%. One of the reasons for such a divergent development of production among alternative meat categories is due to different changes in demand. Especially beef and veal was consumed less. Compared to these two meat items, pork experienced only a moderate fall in consumption while poultry demand even remained fairly stable (see Table 2).

Table 2: Development of Production and Consumption of Pork in the Czech Republic

(in carcass weight)

Year	Production (1000 t)	Consumption (1000 t)	Exports (1000 t)	Imports (1000 t)	Consumption per caput (kg)
1989	552	543	10	0	52
1990	548	547	1	0	53
1991	490	480	14	0	47
1992	525	497	28	0	48
1993	504	490	17	0	48
1994	465	480	5	12	46
1995[1]	373	383	4	14	

1) forecast

Source: European Commission, Agricultural Situation and Prospects in the Central and Eastern European Countries. Czech Republic. Working Document. Brüssel, April 1995, p. 22. Agra-Europe - East Europe Agriculture and Food, No. 155, August 1995, p. 27.

3.2 Demand

The Czech domestic market with more than 10 million inhabitants, is characterised by declining pork sales. Consumption has dropped from about 543 000 tons in 1989 to 480 000 tons in 1994, which equals a reduction in per-capita consumption from 52 kg to 46 kg (see Table 2). This decline in demand for pork is mainly due to eliminating consumer subsidies by the government and thus rising consumer prices and decreasing real income. Nevertheless, in 1994 pork still has accounted for more than 57 % of total meat consumption (Ministry of Agriculture of the Czech Republic, 1995, p. 36). This is based on high consumer preference for pork meat which is by far the most favoured meat in the CR. However, competition from poultry meat has increased in recent years. The rising consumption of poultry meat is mainly due to two factors. First, poultry meat has been abundant on the market, and thus cheap and second it has been promoted as a healthy food.

3.3 Trade

178 tons of live pigs and 269.7 tons of pork have been imported into the CR in 1993. The export numbers for the same year were 1399.6 and 9634.8, respectively, leading to a positive trade balance for pigs of 1222 tons and for pork of 9365 tons. This picture changed, however, dramatically in 1994. As revealed above, production had decreased far more pronounced than consumption in 1994, inducing a trade reversal in the pig sector (see Table 2). In the first quarter of 1995, exports of pork virtually dried up, while imports showed a pronounced further increase. If this development continues for the rest of the year, the trade balance in the pig sector will deteriorate even more (Agra-Europe - East Europe Agriculture and Food, No. 155, August 1995, p.26).

Trade in pigs and pork primarily takes place between countries in the same continent. It seems that the costs of conservation and transport are such that it is advantageous to locate production in or near the areas of consumption. This is also reflected in the trade flows of pig and pig products originating from and leading into the CR (see Table 3). Czech exports are primarily geared to the East European markets. Slovakia alone accounted for about 60.8 % of total Czech pig exports in 1994 which also is indicative that close economic relations still exist between the two countries. An additional 19.2 % were exported to Poland. The remaining 20 % have been shipped to the Netherlands. This export orientation towards Eastern Europe is even more pronounced with respect to pork. In 1994 more than 97 % of all pork exports went to East European countries, in particular to Russia and the Baltic States (see Table 3).

The picture is quite different with respect to trade partners on the import side. These are almost exclusively West European countries. With a share of 89 %, Austria is by far the most important origin for pig imports into the Czech Republic. An additional 10 % of all Czech imports of this product category are produced in France (4.1 %), Denmark (3.9 %) and the U.K. (2.0 %). With respect to pork the most important trade partners on the import side are Denmark, France and Finland, accounting for a share of 38.7 %, 28.2 % and 19.4 %, respectively. Other West European countries exporting pork into the Czech Republic are the U.K. and Italy. With a percentage of 5 % and 2.2 %, respectively, their share in total pork imports into the Czech Republic is, however, of minor importance.

Table 3: Trade Flow Patterns of the Czech Pig Sector in 1994

Product Category	Total Quantity Traded (t)	Country of Origin/Destination Country	Percentage of total Imports/Exports
Imports			
Live Pigs	586.8	Austria	88.8
		France	4.1
		Denmark	3.9
		United Kingdom	2.0
		Others	1.2
Pork	11721.0	Denmark	38.7
		France	28.2
		Finland	19.4
		United Kingdom	5.0
		Italy	2.2
		Others	6.5
Exports			
Live Pigs	131.3	Slovakia	60.8
		Netherlands	20.0
		Poland	19.2
Pork	4652.1	Russia	43.9
		Latvia	29.0
		Lithuania	11.4
		Slovakia	8.8
		Poland	4.7
		Others	2.2

Source: Agricultural Ministry of the Czech Republic , Veprove Maso. Prag 1995, p. 9.

The main reasons for the pronounced deviation in origin and destination of Czech trade in pigs and pork are differences in product quality and in sanitary standards of pig production between East and West European countries. In general, the quality of pigs and pork produced

in the Czech Republic is low which makes it difficult to export these products to the highly sophisticated and demanding consumer markets in Western Europe. Additionally, stricter standards in EU and EFTA countries impose often further limitations with respect to Czech exports to West Europe. In the extreme case this has even lead to an import ban towards countries with lower sanitary standards. This happened during parts of 1993 and 1994 when the EU banned all imports of pork originating from the CR and other Middle and East European countries due to pig feaver. This ban as well as the poor quality of pork explains why the preferential import quotas for Czech pigs and pig products granted by the EU in the Europe agreement have hardly been used during the last years (see also section 4.6.2).

The situation is quite different with respect to the other Central and East European countries. Compared to those nations, the quality and standards achieved in the Czech pig sector is rather high, opening up export chances into those countries.

4 Determinants of Competitive Advantage and their Significance in the Czech Pork Sector

4.1 Determinants of Competitive Advantage

Competitiveness can be defined as the sustained ability to profitably gain and maintain market shares (Martin et. al., 1991, p. 1456). What, however, determines, whether a sector is competitive? The theory of National Advantage developed by the American economist PORTER can be applied to gain some insight into the main determinants of competitive advantage (Porter, 1990, p. 71). According to PORTER competitive advantage is promoted or impeded by four broad attributes (see Figure 1).

The first attribute refers to factor conditions. Already the standard theory of trade stresses the importance of factor endowment of a country for its competitiveness. In Porter´s theory, however, it is not just a nations stock of basic production factors such as labour, land, capital, natural resources and infrastructure, that is crucial for its competitive position. More important seems to be the ability of a nation to create, upgrade and to make productive use of its production factors.

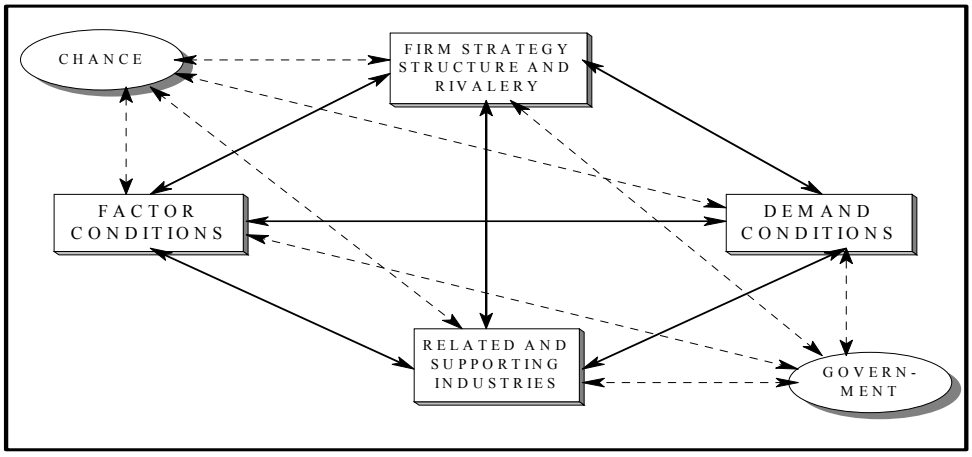
The firms strategy and its structure is the second group of determinants of national competitive advantage (see Figure 1). Attention is given to the goals of firms, the entrepreneurial spirit (willingness to take risks), the management practices, the international

orientation but also aspects of motivating and training labour. Additionally, the nature of domestic rivalry is acknowledged to play an important role in the process of gaining and maintaining international competitiveness.

Thirdly, the competitive power of an industry is greatly influenced by the demand conditions for this sector. With respect to this determinant it is again not just the quantity aspect that is of importance. The quantity of domestic demand can induce static efficiencies through its influence on economies of scale, the dynamic efficiencies are, however, often of greater relevance. These are created through the quality of domestic demand. A critical and anticipatory home market often leads to a high level of innovation thereby, in general, upgrading competitive advantage.

The fourth important attribute of national competitive advantage of a sector is the existence of related and supporting industries that are as well internationally competitive. A productive supplier industry on the one side renders possible an efficient, rapid, and sometimes preferential access to high quality inputs. An international competitive demand industry on the other side opens up a large domestic sale market for the raw materials and due to low transport costs might also lead to price advantages for domestic suppliers.

Porter`s Diamond of Competitive Advantage



Source: Porter, M.: The Competitive Advantage of Nations. New York 1990

Figure1:

According to Porter these four determinants form the national **diamond** of competitive advantage, which is a mutual-reinforcing system. Thus, the effect of one of the determinants

always depends on the state of the others (Porter, 1990, p. 72). Two additional variables influence the competitiveness of a sector in a decisive way. These are chance and government. Chance has little to do with the fundamental conditions of a nation and it is in general beyond a firms and even a governments influence. For this reason chance will not be discussed in more detail in this chapter. The second variable, necessary to complete the diamond, is government. Almost all governmental interventions influence in some way the international competitiveness of the industries of a nation and for this reason economists often regard government as the most important determinant of international competitiveness.

By examining the Czech pig sector with respect to Porters four determinants as well as to the variable government the functioning of the diamond with respect to this industry will be discussed in the following sections.

4. 2 Factor Conditions

A comparison of Czech prices with those prevailing in the EU gives an indication of the competitiveness of Czech products in the EU. Instead of using average prices of the EU those of Germany are taken due to the proximity of the two markets. In 1994, German farmers received a price for pork which was about 40 % higher than that of their colleagues in the CR (see column 2 in Table 4). Only for broilers and eggs are the producer prices between the two countries less apart than for pork. For other commodities the difference is larger, in some cases, like milk, considerably larger.

Table 4: Comparison of Producer Prices between the Czech Republic and Germany

Commodity	Ratio of Producer Prices in Germany to those in CR in 1994	Ratio of relative prices[1)] in Germany to those in the CR in 1994
pork	1.44	1.00
beef	1.57	1.09
broilers	1.17	0.81
eggs	1.20	0.83
milk	2.87	1.99
wheat	1.81	1.26
rye	1.60	1.11
feed barley	1.75	1.22

1) Relative price is that of the commodity in the row to pork

In the last column of Table 4 the ratio of the variable 'product price relative to that of pork' in Germany to the same variable in the CR is indicated. The higher this ratio the larger is the difference between the commodity price as indicated by the row name to that of pork in Germany relative to the same difference in the CR. The figure for milk is 1.99. It indicates that the ratio of milk to pork price in Germany is nearly twice as high as that in the CR. Again, this points to the fact that Czech milk has a comparative advantage to German milk.

The figures shown in Table 4 for pork are also indicative of a relatively high competitiveness of Czech pork with that of Germany assuming the products are of the same quality in both countries and no trade restrictions exist. However, taking into account quality aspects of the final product a somewhat different picture emerges. As was discussed in section 3.3, Czech pork is competitive on the international market only at the low quality segment. This is mainly due to the following factors:

- insufficient classification according to quality differences[1];
- unsatisfactory yield of muscle meat.

4. 2. 1 Feed Use

Compared to other countries, feed accounts for a relatively high share of total variable cost of pork production in the CR which is about 68 % (Table 5). Yet, the ratio of the various cost items in Western Europe to those in the CR is smaller for feed than for the other types. This is most likely caused by the high feed conversion rate[2] of Czech breeds, the low quality of feed and the inappropriate feed mix used in the CR which lead to low daily weight increases[3].

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[1] From 1991 to 1994 the average pork price differed from the top quality price between 5.5% and 7.3% in Germany, and between 3.1% and 3.9% in the Czech Republic.

[2] Feed conversion rate is measured as feed input per unit of meat production.

[3] Podebradsky, Z. et al. Vliv kvality krmnych smesi na ekonomiku vykrmu prasat. Agroekonomika 3 vol. 8-9/94, p.374-376.

Table 5: Cost Structure of Pig Production (CK/kg carcass weight)

	Western Europe[1)]	Czech Republic	Ratio of costs in Western Europe to those in the CR
Labour	7.88	4.55	1.73
Feed	28.88	21.70	1.33
Remaining Inputs	18.38	5.60	3.28
Total	53.13	31.85	1.67

1) Simple average of the Netherlands, France and Denmark

4. 2. 2 Labor Costs

The input of labour per pig or per unit of output and the wage rate determine total labour costs of a product. In the Czech Republic, there is a ratio of 42 sows per labourer or 51.6 working hours per sow and year. For fattening operations, the ratio is 520 feeding pigs per labourer or 4.2 hours per feeding pig and year (calculations by VUZE). Although the labour productivity in the Czech Republic rose by 26% over the period 1989 to 1993, these figures correspond only to 40 - 50% of those in Western Europe[4].

As a result of the low hourly wages, total labour costs are still low. But it has to be taken into consideration that nominal wages in agriculture rose substantially since 1991. Wages went up by about 35 percent from 1991 to 1993 outweighing increases in productivity. In the long run, this development is going to diminish the competitive advantage due to low labour costs.

4. 2. 3 Remaining Inputs

Among the remaining inputs, investment costs (interest, depreciation, repair,) are of special importance. Investment costs per fattening place are 3000 - 4000 CK and per sow place 12000 - 14000 CK[5]. These figures are substantially smaller than those prevailing in Western Europe. This explains the large difference of the cost item remaining inputs (see Table5). Investments render possible the use of modern production techniques, thereby improving labour

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4 Growth in labor productivity was calculated according to „Zprava o stavu ceskeho zemedelstvi 1994“, 1994, Table A15 and A22. Labor productivity for raising piglets in Western Europe is 20 working hours per sow and year and for feeding pigs and year 2 to 2.5 hours.

5 Figures were obtained from VUZE.

productivity as well as sanitary conditions. These costs are expected to rise stronger in the future than those of other cost items.

4.2.4 Conclusions

To summarize, though costs of pork production in the CR are substantially below those in Western Europe there is still room for further reductions by increasing input productivity; especially of feed and labour. The future development of factor prices as well as the large amount of investments needed to improve production techniques are very likely to outweigh this potential of cost cutting. Therefore, an increase of production costs can be expected over the long run.

4.3 Firm Strategy, Structure and Rivalry

Economic factors that are considered to have the strongest influence on competitiveness of an enterprise are

- productivity,
- economy of scale,
- product quality.

Kearney[6] analysed pig production in the Netherlands, France and Denmark and determined coefficients as target values which pig producers should use for strategic orientation. These target values are already achieved by the best pig farms in these three countries and are summarized in Table 6.

[6] Sectorobservaties: Varkensvlees. Ministerie van Landbouw, Natuurbeheer en Visserij, 1994

Table 6: Indicators for Comparing Productivity in Pork Production between Target Values and the Average Values of the CR

	Unit of Measurement	Target values[1]	Czech Republic
Productivitv			
Raised piglets/Sow/Year	Head/Sow/Year	>21	19.7/17.3[2)]
Live weight gain/Day (fattening period)	g/day	>700	628
Feed use/kg weight gain (fattening period)	kg	<2.75	3.45
Cost/kg carcass weight	DM/kg	<3.15	1.82
	CK/kg	<55.13	31.85
Economv of scale			
(advantages of large scale operations)			
Pigs in operations with >400 head	%	>85	-
average stock/operation	Head	>550	-
Oualitv			
Yield of muscle meat	%	>55	47.26[3)]
Health control			
(closed production cycle)	%	>75	-

1) Figures for the Netherlands, France and Denmark
2) Farrowed and raised piglets, respectively
3) Calculated according to: Nas chov 2/95 (VUZV Praha-Uhrineves)
Source: VUZE Personal communication with VUZE and own calculations based on data from VUZE

Table 6 shows substantial differences in the level of productivity of the pig production in the CR and in Western Europe. However, total costs of the final product are still lower in the Czech Republic, due to the low factor prices. A comparison of the production costs of 31.85 CK/kg carcass weight for the primary product with the average price of 38.45 CK/kg carcass weight indicates a considerable difference.This substantial difference must be considered to be temporary since long run profits will be zero in a competitive industry with increasing average costs. In Western Europe the margin between production costs and product price is

much smaller. For example, from November 1993 to March 1994 the pork price in Denmark fluctuated between 45.68 CK/kg and 58.45 CK/kg carcass weight. This implies that the price did not always cover total costs of production, assuming that in Denmark the production costs equal the average of those in Western Europe (see Table 5).

Under socialist conditions agriculture seemed to enjoy high profit margins. This, however, was a book keeping effect which led to a too low book value of capital assets. In turn, this was due to a rise in the price of investment goods which was not considered in determining the book value. Rather this value was based on investment prices which were updated only in irregular time intervals (e.g. sometimes less than once in a decade). Although profits calculated in this way were high they had to be entirely reinvested for replacement of assets.

The average stock of 872 pigs per co-operative and 698 per company of all other types of legal enterprises result in a sufficient economy of scale[7]. In comparison, the average stock of all family farms was only 23 feeding pigs and 94 in family farms with more than 100 ha. Since those farms still fatten pigs in old barns which are already entirely depreciated their production costs can be expected to rise as soon as they have to invest in new buildings.

The quality assessment according to the classification system EUROP has not yet been introduced in the CR. So far, four processing plants have been equipped with the technology meeting the requirements of this classification. It is expected that implementing this classification scheme will lead to stronger price differentiation according to quality. Additionally, it is going to provide incentives to adapt new breeding programs with the aim of higher pork quality and feed efficiency.

In Western Europe the tendency is to have integrated pig enterprises, i.e. to combine raising piglets and fattening pigs. This development is due to two factors. First, the ability of farms to fatten pigs themselves if piglet prices are low. Second, the risk of getting an epidemic is much lower given such a combined enterprise. The future structure of pig production in the CR will be influenced by these tendencies as well.

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[7] Zprava o stavu ceskeho zemedelstvi 1994, 1994.

4.4 Demand Conditions

With about 10 million inhabitants the Czech pig sector can only rely on a rather small domestic market. However, pig consumption per capita is fairly high in the Czech Republic and especially the neighbouring countries to the east provide an additional sizeable market potential. Thus it should be possible to utilize economies of scale in the future. As stated in section 4.1, the static efficiencies determined by the quantity of home demand are often, however, of less relevance than the quality of demand. Therefore the quality of domestic demand needs to be analyzed as well. Compared to West European countries, Czech consumers are less sophisticated. However, there is some indication that consumer behaviour is changing. The demand for high quality, a greater variety and healthier products is rising with growing income. Thus, especially compared to other East European countries the domestic market in the CR can also be regarded in qualitative respect as interesting.

4.5 Related Industries - The Meat Industry

The meat industry in the pre-1990 era consisted of state-owned and highly concentrated enterprises. The entire meat industry in 1989 was composed of just nine large state companies. All animal products were supplied directly by farms to the food industry. Competition between different enterprises in the meat industry did neither exist on the supply side nor on the demand side, since all companies had a defined territory within which raw material could be purchased, as well as a defined territory to which final production was supplied. Food marketing chains were vertically co-ordinated by state planners; prices were fixed by the government. These facts ensured total state control of all activities relating to the food industry. As a wholesale market did not exist under these conditions, services, such as storage and transport activities had to be provided by the meat industry as well (OECD, 1995).

In the process of privatisation the different meat processing companies were transformed into state owned joint stock companies and then privatised, a large majority in the form of voucher privatisation. Smaller companies were either given back to the original owners by restitution or sold during small-scale privatisation. Thus in 1994 a total of 113 meat processing industries with more than 25 employees existed in the Czech Republic. Compared to 1989 this is equal to an increase of 1125 %.

Parallel to this development food consumption in the transformation process declined leading to a decrease in food industry output measured in gross revenue. This holds especially with respect to the meat industry, thus reflecting an increasing problem of over-capacity in this sector. The shift in consumer preferences, and consequently demand, has been reflected in changes in the structure of the food industry. The lower demand for animal products has resulted in a decline of its share in food industry gross revenue from more than 60 per cent in the pre-reform era to about 43 per cent in 1993. Despite that development, meat and milk continue to be the dominant products accounting respectively for 22 per cents and 21 per cent of the total value of food industry ouput (Agrarinformationsdienst Osteuropa, 1994/05, p. 19).

With the introduction of economic reforms vertical co-ordination in the food marketing chain, so far co-ordinated by state planners, collapsed. This has led to unnecessary high levels of instability and insecurity for farmers and the meat industry alike. To hedge against these risk factors, meat processors have started to reinitiate vertical integration by offering farmers guarantees for forward contracts and future prices. That way they secure the supply of raw material for their processing facilities.

The economic performance of the meat industry has declined in the 90s mainly due to higher energy and input prices and especially high overcapacities. Also labour costs have increased quite considerable, while labour productivity in the meat industry has in general not grown. This leads to an increase in the costs of processing meat. Thus, in 1993 the profitability rate of the meat industry only reached a value of 2.21 % (Agrarinformationsdienst Osteuropa, 1994/05, p. 19). Since production and raw material use had even further decreased by 17 % in 1994 the rentability rate has probably dropped further. (Agrarinformationsdienst Osteuropa, 1994/06, p. 13).

The discussion so far reveals that the Czech meat industry is facing serious structural problems. To regain competitiveness in this industry the following challenges have to be met (OECD, 1995):

- Reduction of overcapacity in such a way that the future processing capacities are in accordance with the lower demand level;

- Increase in labour productivity to keep at least pace with rising labour costs;

- Improvement of the co-ordination of purchasing, processing and selling operations, to assure the supply of raw material for processing facilities but also to guarantee the sale of the processed products;

- Improvement of the distributional network such as transportation, administration and goods handling;

- Investments in improved processing facilities to guaranty not only a better efficiency but even more important to secure a higher quality of meat products;

- Investments into advertising.

In general there is a need for a more market oriented attitude in the Czech meat industry. Competition requires not only to produce at low costs, but also the willingness to explore and expand product varieties and to secure a high quality standard.

4.6 The Role of Government in the Czech Republic

4.6.1 Macroeconomic Policies

Agriculture is influenced by many macro economic variables. This holds especially with respect to the exchange rate. Due to its development over the last 5 years, the value of the Czech Koruna had a strong influence on agricultural trade of the CR. When the new government assumed power in January 1991, the exchange rate was devaluated sharply (by 50 %). This devaluation was seen necessary since during the last years of socialist rule the exchange rate was heavily overvalued. Since then the Czech/Czechoslovakian government has pursued a policy of fixed exchange rates towards a basket of currencies. Originally, this basket consisted of five currencies. Since May, 1995 only two currencies are included in this basket; the German Mark making up 65 % of the basket and the US Dollar accounting for the remaining 35 %. The CK was kept constant against this weighted currency basket allowing only small changes in nominal terms towards individual currencies of the basket. Since october 1995 there has been a further liberalization of the exchange rate policy. Nevertheless, it remains declared policy of the Czech government to further keep the exchange rate constant against this basket.

To provide an example of past changes of the exchange rate, the CK evaluated against the ECU from beginning to end of 1993 by 4.2 % and against the German Mark by 2.7 %. These rather stable exchange rates do not indicate the alterations taking place in real terms. If the differential of the inflation rates between the CR and Germany is added to the change in the (nominal) exchange rate a different picture emerges. Based on the Consumer Price Index (CPI), this difference amounts to 16.6 % leading to a total (implicit and explicit) evaluation of approximately 19 % of the CK against the German Mark in 1993[8]. A similar appreciation of the CK took place over all the years since the devaluation took place. Thus, by the end of 1994 the depreciation effect of 1991 had been wiped out almost entirely.

The strong devaluation toward currencies of most western countries at the beginning of 1991 enhanced exports into these countries considerably; including those of agricultural goods. At the same time it protected Czech industries and made structural adjustments easier. The appreciation of the Czech currency in the following years explains a good deal why the trade balance becomes negative. This is, however balanced by net capital inflows.

Important for future development of the agricultural sector are also the trade agreements signed in recent years by the Czech government; the agreement among the Visegrad countries (CEFTA)[9], the GATT/WTO Agreement and the Europe Agreement. All agreements contain provisions regarding agricultural trade and in the case of the GATT/WTO Agreement also regarding domestic support offered to agriculture.

4.6.2 Agricultural Policies

The overall objective of agricultural policies is to create a sector which responds to market conditions, is efficient and can compete on the international market. In addition, many short-term oriented policies were introduced and taken off again with the aim of dampening the impact the transition of the economy has on agriculture.

Two major macroeconomic effects were discussed above; the decline in income and the appreciation of the Czech currency. The former contributed to the fall in domestic demand for some home produced agricultural goods and the latter to that in foreign demand. Beyond

[8] Over 1992 the CPI increased by 11.1 % and over 1993 by 20.8 % in the CR (Èeský Statistický Úøad, Statistická Roèenka Èeské Republiky 1994, Praha 1994, Table 7-8 while it increased over 1993 by only 4.2 % in the Germany (Bundesministerium für Wirtschaft, Wirtschaft in Zahlen`94, Bonn 1994, p. 29).

[9] Central European Free Trade Agreement

these developments foreign demand for Czech goods went also down due to factors such as sanitary and phytosanitary restrictions imposed by importing countries. However, these factors were not the only ones which induced a decrease in demand. An additional one is the removal of consumer subsidies and the resulting change in the structure in food prices. Furthermore, goods are nowadays available as imports which consumers prefer largely over domestic ones and which during socialist time were absent from Czech stores. The decline in demand for fruits grown in temperate food zones and the concurrent increase for subtropical and tropical fruits is a reflection of this change in consumer preferences.

In the Europe Agreement (EA), the EU agreed to import 3140 tons of pork duty free from the CR in the 1st year (1992) after entry into force. This preference quota was set to increase successively over time to reach 4270 tons in the 5th year, the one after which the phasing-in period of the EA is completed and the quota remains constant. Comparing this quota with quantities exported by the CR in 1991, the year prior to the Europe Agreement, one obtains some indication of what these preferences imply for the CR. In 1992, the first year of the agreement, the preference quota granted by the EU accounted for 35.3 % of total Czech pork export[10] in 1991. This percentage rose to 44.3 % at the end of the phasing-in period (1995).

However, up to now, the CR could hardly take advantage of the granted preferences. In 1993, only 2.2 % of this quota were fulfilled. Information indicates that this percentage is even less (below 1 %) in 1994. At the same time, the CR exported a total of 9634.4 tons of pork in 1993 and 4606.8 tons during the first 9 months of 1994. These quantities would have been sufficient to fulfill the preference quota in both years. Out of total export of pork about 3 % was exported to the EU in 1993 and less than 1 % in 1994. During the last three months of 1994, no export of pork to the EU took place.

Statistics available do not provide sufficient indication of why only a small share of total pork export was shipped into the EU even with the Europe Agreement being in force. The major cause seems to be that the EU banned pork imports from the CR (and other Middle and East European countries) during parts of 1993 and 1994 due to sanitary precautions. However, there must be other reasons since the restrictions were not effective during all times of this period. Export prices obtained provide another hint. The unit value (fob) of all pork exports

[10] Excluding exports of slaughter pigs.

was 36 790 CK per ton in 1993 and 34 440 CK per ton in 1994 while pork was exported into the EU at 54 450 CK per ton in 1993 and 30 000 CK in 1994[11]. This indicates that at least for 1993 a higher quality of pork was exported to the EU than into other countries. However, the same argument does not hold for 1994. During that year, not enough high quality pork might have been available to meet the quality demanded in the EU. On the other hand, domestic markets became tighter during the period 1991 to 1994 but still leaving sufficient quantities to be exported.

There are additional causes for having the preference quota not fulfilled by the CR. Among those is the high possibility that the preference value does not accrue to the traders and producers in the CR. Furthermore, the procedure followed in issuing export licences by Czech authorities is likely to lead to rents to those who obtain a permit. This occurs when demand for such licences exceeds supply and due to the first-come-first-serve procedure followed. In addition, not sufficient information may be available for Czech exporters to know all details of the trade arrangements with the EU and which importer in the EU holds import licences.

Pork producers were granted relatively high support in the past. Based on Producer Subsidy Equivalents, only milk producers enjoyed a similar level of protection. Though support to pig enterprises was offered in several ways most of it was granted through border protection. Import duties were about 30 % over the period 1992 to 1994 and in 1995 the tariffied duty is 45.8 % and the bound rate 38.5 %[4]. Tariff quotas for minimum market access are 30 %.

Pig producers were negatively affected by the support offered to grains. In the past, most grains received support but currently only food wheat is subsidized by the State Fund for Market Regulations in Agriculture (SMFR). This effect is likely to be not very strong since the level of protection offered to grain producers is not very strong.

Border protection levels currently in force in the CR according to the GATT Agreement indicate a high level of nominal protection of all animal products in comparison to crops (see Table 7). Butter is protected most. Though at a considerably lower rate cereals are also protected by import duties. This leads to an increase in feed costs and thereby to a reduction in the effective rate of protection for animal products.

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[11] Volosin, J., a kol., unpublished tables on agricultural exports, Výzkumný Ústav Zemedelske Ekonomiky (VUZE), Praha 1994.

In comparison, the EU does not protect livestock at such equal rates across all products as this is the case in the CR. For example, the import duty for broilers in the EU is one fifth of that of the CR and for pork one half. Beef, eggs and butter have similar import duties in both countries. Import tariffs of cereals, however, are vastly different between the EU and the CR. The EU got a special permission in the GATT/WTO-agreement to still use a variable levy system for grains; fixing the duty-paid import price to 155 ECU per ton.

As for the other main commodities the Czech Ministry of Agriculture set up a commodity council for pork. Members of this council are from agriculture and the food industry together with officials of the ministry. The role of these councils is to provide policy guidance on short-term issues.

Table 7: Comparison of tariff schedules according to GATT-Agreement between Czech Republic and the EU

	Tariff schedules according to GATT-Agreement (in %)	
	CR	**EU**
pork	45.8	21.2
beef	41.7	47.9
broilers	54.1	10.8
eggs	20.0	15.7
butter	81.5	97.7
wheat	25.0	variable levy
rye	25.0	variable levy
feed barley	25.0	variable levy

Source: Department of External Relations, Czech Ministry of Agriculture

Some intervention purchases of pigs for slaughter by the SMFR were carried out in 1993 at above the guaranteed price. However, less than 3 % of total pork production in 1993 was bought in this way. Most of these stocks (60 %) were exported. 2600 tons of pig meat were exported with export subsidies in 1994[12]. The remaining ones were sold again at domestic markets later in the same year and in 1994.

[12] Agrarinformationsdienst Osteuropa, 95/02, p.17.

Other market interventions by the government consisted of putting a ceiling of 13 % on the margin of retail trade during a short period in 1991. The same measure was imposed on pork roast over a period of 1 month in 1992. Pig producers received also subsidies for reducing environmental pollution. In 1992, the last year these subsidies were paid, they amounted to 64 million CK.

As an additional way of support the Czech government established in June of 1993 the Agricultural and Forestry Support and Guarantee Fund. The main task of this fund is to provide guarantees on loans to farms and other primary producers and to subsidize part of the interest to be paid on these loans. The fund provides support through three basic programs:

- A program called operation which aims at ensuring that farmers do not run into liquidity problems
- The program 'farmer' is designed to support farms in their long run development capacity; especially by raising their effectiveness.
- The program 'services' fosters the development of providing services through primary producers.

This brief listing of the various programs and instruments used by the Czech government to support agiculture and, especially, pig enterprises indicates that aid is provided in several ways and also at considerable level. How strong the advantage is for pork production will be analysed in the next section.

5 Competitive Advantage of CR Pork Production in Perspective -Development of Market Shares

As pointed out at the beginning of section 3 profit and market shares are relevant measures for competitiveness. With respect to profits gained in pig production in the CR compared to other countries some information has been already given above (see section 4.2 and 4.3). In this section the competitive position of the Czech pig sector will be analyzed using market share indicators.

There are many potential market share indicators. In this paper we will rely on the „Revealed Comparative Advantage Indicators" developed by Balassa (1989, p. 81). According to Balassa two alternative concepts can be applied: the export indicator and the net export

indicator. The Revealed Comparative Advantage Export Index (XRCA) is defined as a countries´ export share in the world market with respect to the considered product category as a percentage of a countries world export share with respect to all commodities.

$$(1) \qquad XRCA_{ij} = (X_{ij} / \sum_{j} X_{ij}) / (\sum_{i} X_{ij} / \sum_{i}\sum_{j} X_{ij})$$

X refers in formula 1 to exports and the subscripts i and j denote the product category and the country, respectively. The level of this measure indicates the degree of competitiveness. Values above 1 suggest that the country has a comparative advantage in the considered product category, values below 1 point out comparative disadvantages.

In this paper we extent the index XRCA in two ways: first we relate exports of different categories of pig not just to all commodity exports but also to all agricultural export. Thus, besides measuring competitiveness of the Czech pig sector with respect to all merchandise trade, it is additionally analyzed with respect to the agricultural sector. The second extension concerns the country reference. Apart from relating Czech exports to world exports, we also compare it with exports of the

- EU-16, including the Czech Republic as a possible first eastern country to join the EU;
- Visegrad-countries;[13]
- EU-15 and the Visegrad-Countries.[13]

While the XRCA index is calculated exclusively on the ground of export values, the Revealed Comparative Advantage Net Export Index (NXRCA) considers export and import activities (M). This indicator is equal to the ratio of net exports to the sum of exports and imports of a product category corrected by the net trade position of all merchandise trade of the considered country.

13 Unfortunately no information was available with respect to exports of Slovakia. Thus this country is not considered in the aggregate "Visegrad Countries".

(2) $$NXRCA_{ij} = \left[NX_{ij} + (NX_{ij} \cdot NX_{Tj}) \right] \cdot 100 \qquad \text{if } NX_{Tj}<0$$

$$NXRCA_{ij} = \left[NX_{ij} - (NX_{ij} \cdot NX_{Tj}) \right] \cdot 100 \qquad \text{if } NX_{Tj}>0$$

with: $$NX_{ij} = (X_{ij} - M_{ij}) / (X_{ij} + M_{ij})$$

$$NX_{Tj} = \sum_i (X_{ij} - M_{ij}) / \sum_i (X_{ij} + M_{ij})$$

The range of the indicator lies in general between -100 and +100.[13] High positive NXRCA-values indicate a comparative advantage of the considered country in the respective product category, while high negative values hint at a comparative disadvantage. From a trade theoretical standpoint the net export index seems to be superior to the XRCA since it indicates the effects of comparative advantage on the relationship between exports and imports rather than on exports alone (Balassa, 1989, p. 81). This holds especially given the increasing importance of intra-industry trade. However, the net export index can be extremely distorted due to domestic measures of import protection. In the extreme case of an import ban or prohibitive high import taxes the index is equal to 100, but the considered sector is far from being international competitive. These consideration have led to the use of both indicators in this paper. While Table 8 summarizes the Comparative Advantage Export Index - for different pig products of the CR in comparison to alternative reference commodity groups and alternative reference regions, the export index and the net export index are revealed for 18 selected eastern and western European Countries in Table 9 and Table 10, respectively. All market share indicators are calculated for the year 1993. Additionally, it would have been desirable to indicate changes of these indicators over time. This holds especially, since the Czech pork sector has experienced a trade reversal since 1993. However, 1993 is the first and so far only year for which separate trade values for the CR was available. Thus, the results presented below have to be treated with cautious, and can only be indicative for the competitive position of the Czech pork sector in 1993. A more comprehensive analysis of the development of the competitiveness of the Czech pig sector over time remains a task for the future.

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[13] The NXRCA can take values above 100 (below-100) if a country almost exclusively exports (imports) the considered product/product category and experiences at the same time a deficit (surplus) in the trade balance.

Table 8 and 9 show XRCA numbers in most cases far below 1, thus indicating that the Czech pig sector has a considerable comparative disadvantage. This statement is, however, not confirmed by the values of the NXRCA values in Table 10. Those numbers are all positive, thereby hinting at a comparative advantage of the Czech Republic in the different pig and pig meat categories. Two questions arise due to these opposing results: What can be the explanation for the different outcome in the XRCA values compared to the NXRCA numbers and what conclusions can be drawn from these contradicting results?

There exist two main explanations for deviating XRCA and NXRCA values: a market and a policy one. From a market point of view XRCAs and NXRCAs can differ notably, if the considered product is very heterogeneous. In this case intra-industry trade flows are prevalent and it seems not appropriate to analyze competitiveness by exclusively considering exports. This, however is done by calculating the Export Index of Revealed Comparative Advantage. The NXRCA values in Table 10 give a hint with respect to the importance of intra-industry trade. Low absolute values indicate that imports in the considered product category almost equal exports. With respect to the Czech pig sector intra-industry trade is especially pronounced in the case of sausages. In this case, intra-industry trade explains more than 90 % of total trade (see Table 10). Thus, especially with respect to sausages the Export Index seems not appropriate as a measure for competitiveness. The high XRCA values in Table 8 and 9 for sausages, thus, very likely overestimate the competitive position of the CR in this product category.

On the other hand, the Net Export Index has as well its limitations if political intervention is prevalent. As has been already discussed above NXRCA values can be considerably distorted due to import protection measures. In fact import tariffs in the Czech pig sector are far higher than in the EU, indicating that the NXRCA values in Table 10 probably exaggerate the comparative advantage of the CR considerably.

Taking into account the above exposition, it seems that the competitiveness of the CR is rather moderate. Two additional results can be drawn from Table 8. First, the competitive position is generally higher with respect to all agricultural commodities than in relation to all merchandise products. This reveals that the competitiveness of the agricultural sector in the CR is lower than the average competitiveness in the whole traded sector. Second, the competitive position of the CR with reference to the world is higher than with reference to the

European Union, which shows that the EU possesses an above average comparative advantage in the pig sector. Thus, with the accession to the EU the competitive struggle of the Czech pig sector might even become more intense.

6 Concluding Summaries

The paper is indicative of the fact that macro policies and economic conditions in the post socialist time surrounding agriculture made adjustments of this sector inevitable. Czech agriculture went through a considerable process of restructuring. This process led to substantial reductions in output; especially in the livestock sector. This was accompanied by lowering the work force and idling a substantial part of the capital stock. The sector must now prepare for further integration into the world and, especially, into the EU market.

As was shown, pig fattening operations still offer possibilities for introducing cost cutting measures. This includes improvement of the feed conversion rate and labor productivity. However, the considerable amount of investment still needed for these operations could push changes in production costs in the opposite direction.

The pork processing industry including slaughter houses and the retail system needs to improve its competitiveness on international markets. As a precondition for this goal, the primary sector must be competitive. In addition, this industry requires substantial investments to produce high quality pork which consumers in western countries demand.

Over the past 5 years, agricultural policies provided means and incentives for smoothening the adjustment process and for strengthening the market orientation of the agricultural sector. This policy has worked fairly well. However, there is the need to refrain from becoming more protectionist in the near future; especially regarding the possible accession into the EU. By then the CAP will likely be adjusted to make accession a rather speedy process and less costly as it would be under current policy settings.

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