Integration of the Hungarian cereal market into EU15 markets

Attila Jambor

Assistant lecturer, Corvinus University of Budapest (attila.jambor@uni-corvinus.hu)

Abstract

The Hungarian cereal market, similar to the national economy, has significantly changed during the last decade. Due to the collapse of eastern markets and accession to the European Union, the focus markets, value and product structure of Hungarian cereal trade have also changed. Changes between 1995 and 2006 are analyzed in this paper through a competitiveness analysis which employs the CMS method. Results show that the competitiveness of the Hungarian cereal market changed for the better in EU15 countries from the average of the period 1995-1998 to the average of the period 2003-2006. This implies that overall integration increased.

Keywords: integration, competitiveness, cereals, CMS-method

1. Introduction

The Hungarian cereal market, similar to the national economy, has significantly changed during the last decade. Due to the collapse of eastern markets and accession to the European Union, the focus markets, value and product structure of Hungarian cereal trade have also changed. Changes and trends between 1995 and 2006 are analyzed and revealed in this paper through a competitiveness analysis which employs the CMS model. This method is used to analyse how a special market is integrated into international markets through competitiveness. The target market for analysis is the EU15 countries. Results show that the competitiveness of the Hungarian cereal market changed for the better in EU15 countries from the average of the period 1995-1998 to the average of the period 2003-2006, which indicates overall integration increased. Detailed results by country and product can answer the question "to which countries is it worth trading cereals with?". According to the second and third level analyses of the model, however, Hungarian cereal export structure was not favoured by EU15 markets which showed above-average market growth (thus Hungary exported 'bad' products to 'bad' markets in these cases).

2. Method used

Trade theories highlight the constant market share method (CMS) as a prominent tool for measuring competitiveness (particularly for analysing the causes of changes in exports). The CMS model – which was re-popularized at the end of the 20th century – was first used by Tyszinski in 1951 for trade in industrial products, while the works of Rigaux and Sprott involved analysis of changes in trade patterns of agricultural products (Fertő [2004]). The model was used by Dyrsdale-Lu (1996) to examine the export performance of Australia

between 1984 and 1994 and Brownie-Dalziel (1993) undertook similar analyses of New-Zealand for the period 1970-1984 (Ahmadi-Esfahani [2006]).

The method may be used to investigate trade trends and laws in order to determine those factors affecting a country's export-performance (Ahmadi-Esfahani [2006]). In the original model, price and non-price factors obviously affect competitiveness; nevertheless, export-competitiveness can be examined without taking them into account. The basic presumption underlying the CMS model is that a country's export share in a given market remains constant at the same level of competitiveness (Ahmadi-Esfahani [1995]). It follows that any change in a country's exports can be traced back to changes in the composition of competitors and competitiveness.

2.1. The basic model

The basic model determines a country's share in the reference market as follows:

$$(1)\ S = q/Q$$

where S is the country's share in the reference market, q is the export to the reference market and Q is the overall export of a country. Transforming the formula by visualizing time (Δ), product type (i = 1,….,I) and focus market (j = 1,….,J) changes in variables we generate the following equation:

$$(2)\ \Delta\ q_{ij} = S_{ij}\Delta\ Q_{ij} + Q_{ij}\Delta\ S_{ij}$$

The traditional CMS-model explains changes in export through two effects: scale-effect ($S\Delta\ Q$) and competitive effect ($Q\Delta\ S$), so the second formula's first term explains presumed changes in export or scale-effect, while the second part explains the difference between actual and expected change or competitive-effect (Fertő [2003]). The second formula; however, is only true over the short term. If the CMS-model is adopted to discrete intervals, the equation can be written in several ways, depending on the initial and final moments. Latest adaptations of CMS-model use the formula below:

$$(3)\ \Delta\ q_{ij} = \underbrace{S^0_{ij}\Delta\ Q_{ij}}_{\text{scale-effect}} + \underbrace{Q^0_{ij}\Delta\ S_{ij},}_{\text{competitive-effect}} + \underbrace{\Delta\ Q_{ij}\Delta\ S_{ij}}_{\text{second-order effect}}$$

Scale effect, therefore, analyses the average change in export supposing that individual market shares are permanent. Similarly, the competitive-effect shows the average change in export supposing that imports are fixed, while second-order effects refer to the relationship between export growth and market share growth.

2.2. Extensions of the basic model

In traditional economic models, the profit of a competition-winner is equal to the losses of other players. The basic model thus assumes that one party's profit is another party's loss (in the competition between exporter countries for given reference markets). In the case of more players, it is not so easy to tell who wins market share from whom; different extensions of the model deal with this question (Fertő-Hubbard [2001]).

The second level analysis of the model decomposes scale- and competitive-effects further in order to answer the question of whether changes occur because of export market growth or reference market growth. The following table shows the possibilities for second level decomposition.

Table 1: Second-level decomposition of the CMS-model

	Denomination	Formula
Scale-effect	Scale-aggregate growth effect (SAGE)	$\Delta Q=\sum_{ij}\Delta Q_{ij}/\sum_{ij}\Delta Q^{0}_{ij}$
	Scale-market effect (SME)	$\sum_{ij}(\Delta Q_{ij}-\Delta Q)$
Competitive-effect	Competitive aggregate growth effect (CAGE)	$\Delta S=\sum_{ij}\Delta S_{ij}/\sum_{ij}\Delta S^{0}_{ij}$
	Competitive market effect (CME)	$\sum_{ij}(\Delta S_{ij}-\Delta S)$

Source: Author's composition based on Ahmadi-Esfahani [2006]

The scale-aggregate growth effect supposes that scale-effects are uniform across markets, while scale-market effect analyses the average impact of different scale effects across markets. In the same way, competitive aggregate growth effect assumes that competitive-effects are uniform across markets, while competitive market effect analyses average impacts of different competitive effects across markets. "Market" effects thus examine whether a country's export-structure has something to do with export growth: for instance, a positive "market" effect suggests that a given country has been targeting the "right" markets.

Third level decomposition of the CMS-model goes even further and analyses competitiveness more deeply in order to answer the question of whether competitiveness changes because of changes in products, target markets or, by accident, a combination of the two. Possibilities for third level decomposition are shown in Table 2.

Table 2: Level three decomposition of the CMS-model

	Denomination	Formula
Scale market effect	Scale regional effect (SRE)	$\sum_{ij}(\Delta Q_{ij}-\Delta Q_{i})$
	Scale product effect (SPE)	$\sum_{ij}(\Delta Q_{ij}-\Delta Q_{j})$
	Scale interaction effect (SIE)	$\sum_{ij}(\Delta Q_{ij}-\Delta Q)-\sum_{ij}(\Delta Q_{ij}-\Delta Q_{i})-\sum_{ij}(\Delta Q_{ij}-\Delta Q_{j})$
Competitive market effect	Competitive regional effect (CRE)	$\sum_{ij}(\Delta S_{ij}-\Delta S_{i})$
	Competitive product effect (CPE)	$\sum_{ij}(\Delta S_{ij}-\Delta S_{j})$
	Competitive interaction effect (CIE)	$\sum_{ij}(\Delta S_{ij}-\Delta S)-\sum_{ij}(\Delta S_{ij}-\Delta S_{i})-\sum_{ij}(\Delta S_{ij}-\Delta S_{j})$

Source: Author's composition based on Ahmadi-Esfahani [2006]

Scale regional effect assumes that scale market effect differs across regions alone, independently from product-effects, while scale product effect analyses just the opposite: how scale market affects change if product market changes are taken into consideration independently from region market change. In other words, "product effects" will be positive where the export structure favours those markets in which market growth is above average (scale product effect) or in which growth in market share is above average (competitive product effect). "Interaction effects" in turn examine what kind of relationship exists between markets of products and regions; that is, whether regional and product effects reinforce or offset each other. Third level competitive effects indicate exactly the same factors but they decompose competitive-effects instead of scale-effects.

In line with the facts above, I applied the CMS-model to analyze the competitiveness of Hungarian cereal exports. The target market for analysis is the EU15 countries. The study covers the period 1995-2006; I chose four years' average as reference points due to the base year sensitivity of the method (1995-1998, 2003-2006). In my calculations I used UN trade data in SITC3 format, four digit decomposition, two decimal places, at three levels of analyses. Data are based on shipments of trade by value given in USD (or percentages).

3. Results

3.1. First level analysis

Aggregated results of the first level analysis on country-group level using the CMS-model are shown in Table 3.

Table 3: Results of the first level analysis on country-group level for cereals using for the CMS-model

Target market (EU15)	2003-2006	
	USD	%
Scale effect	29 160 286	12.30
Competitive-effect	151 781 338	64.01
Second-order effect	56 195 876	23.70
Total profit	237 137 500	100.00

Source: Author's calculations based on UN [2008]

The growth in value of Hungarian cereal exports to EU15 was around 237 million USD from the average of 1995-1998 to the average of 2003-2006 (Table 3). This change is due to three effects, according to the basic CMS model. Firstly, to a scale effect which accounts for 29 million USD, equivalent to 12% of total profit. Second, to a competitive effect, equivalent to 152 million USD; 64% of export value growth. Finally, to a second-order effect, which accounts for 56 million USD (24% of export change). Significant changes in national cereal exports in the period analyzed were due decisively to positive competitive effects; that is, to

the fact that the Hungarian market share grew in parallel with national cereal export growth. In other words, Hungary's competitiveness in terms of cereals has significantly improved compared to other exporters in the EU15 markets from the average of 1995-1998 to the average of 2003-2006.

Table 4 shows results detailed by EU15 member state. One can observe that Hungary continuously gained market share in the cereals sector of the main markets of the EU15 from the average of 1995-1998 to the average of 2003-2006 (from 0.49% to 1.44%), which relates to an increase of the market share of 13 countries, according to detailed data. The highest market share was obtained in Greece on average in 2003-2006, while the lowest was in Luxemburg. Moreover, Table 4 also shows that Hungary increased its competitiveness in the cereal markets of 13 countries (except for Ireland and Portugal) where competitive effects were positive from the base period to the average of 2003-2006. According to results of first level analysis, export performance growth concerning the 13 member states was less due to market growth and more due to growth in competitiveness.

Table 4: Results of first level CMS-model analysis for cereals for the EU15 member states, by country

Country	Market share*, %		Effects, USD		
	1995-1998	2003-2006	Scale-effect	Competitive-effect	Second-order effect
Austria	2.44	7.34	4 295 121	18 873 193	8 618 186
Belgium	0.00	0.19	0	0	0
Denmark	0.07	0.10	123 491	82 754	39 005
Finland	0.00	0.03	0	0	0
France	0.22	0.46	1 614 292	4 357 282	1 752 676
Germany	0.86	1.84	7 126 768	22 115 754	8 100 728
Greece	0.04	11.26	62 833	41 370 820	16 314 514
Ireland	0.07	0.03	155 482	-171 283	-90 200
Italy	1.06	2.67	7 202 193	33 573 891	10 992 166
Luxemburg	0.00	0.01	0	0	0
Netherlands	0.42	1.38	2 350 984	17 642 060	5 424 206
Portugal	0.04	0.01	97 941	-204 808	-73 883
Spain	0.87	1.23	5 323 644	5 707 438	2 146 168
Sweden	0.12	0.14	154 052	72 402	35 296
United Kingdom	0.05	0.31	355 020	4 790 131	2 079 599
Total	0.49	1.44	29 160 286	151 781 338	56 195 876

* Share of Hungary's cereal exports of EU15 cereal imports

Source: Author's calculations based on UN [2008]

3.2. Second and third level analysis

Results of second and third level analyses by scale and competitive effect are shown in Table 5.

Table 5: Results of second and third level analyses of the CMS-model by scale and competitive effect, to the period 2003-2006 (%)

Denomination	Scale-effect	Scale effect		Scale market effect (SME)		
		SAGE	SME	SRE	SPE	SIE
EU15	12.30	37.02	-24.73	-10.73	-61.94	47.94
Denomination	**Competitive effect**	**Competitive effect**		**Competitive market effect (CME)**		
		CAGE	**CME**	**CRE**	**CPE**	**CIE**
EU15	64.01	192.71	-128.71	36.85	-32.63	-132.93

Source: Author's calculations based on UN [2008]

The cereal sector market size of the EU15 grew from 1995-1998 to 2003-2006 by 12.30% (Table 5). This is for two reasons: the change of scale-aggregate growth effect and scale market effect. Scale aggregate growth effect refers to the extent to which EU15's cereal imports changed from the period 1995-1998 to 2003-2006 (an increase of 37.02%). Scale market effect, moreover, shows to what extent Hungary's cereal exports were able to keep pace with these changes; that is, to what extent national cereal export structure facilitated adoption to rapidly-changing markets. Based on these facts, it can be concluded that Hungary's cereal export position with the EU15 group was unfavourable; national cereal exports grew at a faster rate than the rate of market increase justified. As scale aggregate growth effect was higher in the case of EU15 countries than the decrease of scale market effect, however, the market increased for Hungary as a whole.

Furthermore, it is clear from competitive effects that Hungary was able to increase competitiveness in EU15 cereal markets over the period analyzed. Competitive aggregate growth effect (CAGE) shows how Hungary's cereal market share has increased by 192.71% in EU15 markets from the average of 1995-1998 to the average of 2003-2006. This growth, however, was not endorsed by the fact that Hungarian export structure did not match the import needs of EU15; that is, in most cases Hungary exported higher quantities to descendant markets and vice versa. In other words, Hungary gained huge market share in unimportant markets and a small market share of significant markets. On the whole, national competitiveness improved against EU15 markets as competitive effect was positive.

Third level decomposition further analyses drivers. As Table 5 shows us, Hungary's cereal exports did not respond to changes in market sizes in the EU15; that is, did not transport the theoretically-determined ideal quantity to proper markets. It follows that Hungary could not position its products and quantities on the ideal markets. Scale interaction effects, moreover,

show that the latter two effects strengthened each other. According to second and third level analyses of scale effect, it can be thus concluded that Hungarian cereal export structure did not favour EU15 markets which showed above average market growth (Hungary thus exported 'incorrect' products to 'incorrect' markets). As competitive interaction effects extinguished positive competitive region effects, Hungary choose a bad market strategy on EU15 markets.

4. Conclusion

This paper presented results of calculations based on the CMS model on cereal market competitiveness and integration. In this paper I state that, on the whole, the competitiveness of the Hungarian national cereal sector increased from the average of 1995-1998 to the average of 2003-2006 in relation to EU15 member states. Specification of results by country can solve the challenge of finding the correct markets for export. In connection with these analyses it transpires that it is worth transporting cereals to EU15 member states (with the exceptions of Ireland and Portugal).

It turned out from the second and third levels of analysis using the CMS model that Hungarian cereal export structure did not favour EU15 markets where market growth was above average (Hungary exported "bad" products to "bad" markets). Despite of the fact that Hungary gained huge market share in unimportant markets and a small market share of significant markets, national competitiveness improved against EU15 markets.

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