



LISBON  
SCHOOL OF  
ECONOMICS &  
MANAGEMENT

UNIVERSIDADE DE LISBOA

Department of Economics

*Maria Paula Fontoura & Pedro Serôdio*

**THE EXPORT PERFORMANCE OF THE  
2004 EU ENLARGEMENT ECONOMIES  
SINCE THE 1990S: A CONSTANT  
MARKET SHARE ANALYSIS**

WP16/2016/DE/UECE

---

WORKING PAPERS

ISSN 2183-1815



**THE EXPORT PERFORMANCE OF THE 2004 EU ENLARGEMENT ECONOMIES SINCE THE  
1990s: A CONSTANT MARKET SHARE ANALYSIS\***

Maria Paula Fontoura ISEG, Lisbon School of Economics and Management, University of  
Lisbon\* and UECE (Research Unit on Complexity and Economics)

Pedro Serôdio

ISEG, Lisbon School of Economics and Management, University of Lisbon

ABSTRACT

This study focuses the export performance of the 2004 EU enlargement economies between 1990 and 2013. The long time span analysed allows to capture different stages in the relationship of these new members with the EU before and after accession. The study is based on the Constant Market Share methodology of decomposing an *ex-post* country's export performance into different effects. Two different Constant Market Share Analysis (CMSA) were selected in order to disentangle, for the exports of the new members to the EU15, (i) the growth rate of exports and (ii) the growth rate of exports relatively to the world. Both approaches are applied to manufactured products first without disaggregating results by sectors and then grouping all products into two different classification of sectors: one considering the technological intensity of manufactured exports and another evaluating the specialization factors of the products exported. Results provide information not only on the ten economies' export performance as a group but also individually considered and on the importance of each EU15 destination market to the export performance of these countries.

KEYWORDS: Export performance, Constant Market Share, European Union, 2004 European Union Enlargement

JEL CLASSIFICATION: C43, F10, F14

\*Financial support from national funds by FCT (Fundação para a Ciência e a Tecnologia) is acknowledged. This article is part of the Strategic Project: UID/ECO/00436/2013. We are grateful to comments received at the 81<sup>st</sup> International Atlantic Economic Conference.

## Introduction

On May 1<sup>st</sup> 2004, a treaty of accession between the first fifteen Member States of the European Union (hereinafter “EU15”) and ten aspiring new Member States came into force. Geographically located in central and Eastern Europe, these ten aspiring countries included three former Soviet republics (Estonia, Latvia, and Lithuania), four former Soviet satellites (Poland, the Czech Republic, Hungary and Slovakia), a former Yugoslav republic (Slovenia) and two Mediterranean islands (Cyprus and Malta).

On the part of the accession countries, the 2004 EU enlargement led to high expectations of an increasing economic growth by having access to an economic union with high purchasing power. This study will focus in one of the major key-points to promote a country’s economic growth: the export performance. The period analysed is a long time span, between 1990 and 2013, in order to capture different stages in the relationship of these new members with the EU before and after accession. The total period is decomposed into four sub-periods<sup>1</sup>, as follows. (i) From 1990 to 1996, corresponding to the phase of the fall of the Soviet Union and the applications of these ten countries for the accession to the EU, being this sub-period not only a transition period but also a control period, in which accession negotiations had not yet started. (2) From 1996 to 2004, corresponding to the enlargement process. To prepare for EU membership, the EU supported the work of the candidate countries to adopt the Community's rules through a pre-accession strategy previously signed which included financial assistance for developing their institutions, infrastructure and economies. (3) From 2004 to 2008, corresponding to the period between the accession and the financial crisis. (4) From 2008 to 2013, a period marked by the economic crisis of 2008.

---

<sup>1</sup> See EUR-Lex (2007). *The 2004 enlargement: the challenge of a 25-member EU*. Available at:

[eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:e50017](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:e50017)

In order to evaluate these ten economies' export performance to the EU15, this study makes use of the Constant Market Share Analysis (hereinafter "CMSA")<sup>2</sup>. This technique decomposes a country's export performance into separate components, comprehending not only product and market structure components of exports but also a residual effect associated to competitiveness. Two different CMSA will be used, thus enabling a broad evaluation of the effective changes of these ten economies' export performance.

The first CMSA is based on Leamer & Stern (1970) and allows to breakdown the variation of a country's growth of exports; the second CMSA is based on Nyssens & Poulet (1990) and decomposes a country's growth rate of exports relatively to the world.

We consider the exports of 72 manufactured products as defined by the CHELEM database. Exports are given in value terms, in millions of US dollars.<sup>3</sup>

Results are presented for the whole set of the 72 products and by grouping them in two different classification of sectors based on Fernandes (2002), as shown in the appendix. The first is based on the classification of the Organisation for Economic Co-operation and Development (hereinafter "OECD") for technological intensity and is composed by three sectors: low, medium and high technological intensity. The second is based on the OECD's classification for specialization factors and is composed by five sectors: natural resources, labour costs, scale economies, product differentiation and R&D.

This study is organised as follows. Section 2 explains the methodology. Section 3 examines the results extensively by dividing them into four different subsections: one focusing on the different disentangled effects of both CMSA for the whole set of countries

---

<sup>2</sup> Although CMCA is a frequently used method to evaluate export performance, few studies apply it to the 2004 enlargement countries. Recently, Pavlickova (2013) used it for Slovak exports to the EU27.

<sup>3</sup> A drawback of using nominal values is that it is not possible to distinguish between the volume and the price components of export performance.

and sectors; a second one assessing the results for the two abovementioned classification of sectors for manufactured goods; a third one evaluating individually each of the ten economies' export performance; and a fourth one analysing the importance of each EU15 destination market in the competitiveness effect of these ten countries. Section 4 concludes.

### **Methodology: Constant Market Share Analysis**

One of the first and most influential versions of the CMSA was made by Leamer & Stern (1970). This version specifically focuses on the effects underlying the percentage change of exports of a country. Notwithstanding, several reservations have been pointed out to this approach, especially by Richardson (1971). The main critique is that the product and market effects are calculated in an asymmetric way, and depending on which one is calculated first, one of them will include the interaction between the two effects (Richardson, 1971; Cheptea et al, 2005). To solve this problem, Milana (1988) proposed to calculate this interaction effect (mixed effect) explicitly, a correction that has been largely applied ever since, for instance by the European Central Bank<sup>4</sup> (2005) and Amador & Cabral (2008).

Currently, several CMSA have been used in order to evaluate the export performance of a country. One of these versions was proposed by Nyssens & Poullet (1990) and allows to evaluate the change of a country's share of exports relatively to the world. In this study, we apply the versions of Leamer & Stern (1970) and Nyssens & Poullet (1990) with the interaction term proposed by Milana (1988) in both cases.

#### *Decomposing the growth rate of exports*

The Leamer & Stern (1970) CMSA version decomposes the export performance of a country (group of countries) taking into consideration the growth rate of exports.

The CMSA identity is expressed as:

---

<sup>4</sup> Hereinafter "ECB".

$$\underbrace{\frac{\Sigma_i \Sigma_j X_{ij,t} - \Sigma_i \Sigma_j X_{ij,t-1}}{\Sigma_i \Sigma_j X_{ij,t-1}}}_{\text{TOTAL EFFECT}} = \underbrace{\frac{\Sigma_i \Sigma_j S_{ij,t-1} \Delta X_{ij}^*}{\Sigma_i \Sigma_j X_{ij,t-1}}}_{\text{STRUCTURE EFFECT}} + \underbrace{\frac{\Sigma_i \Sigma_j \Delta S_{ij} X_{ij,t}^*}{\Sigma_i \Sigma_j X_{ij,t-1}}}_{\text{COMPETITIVENESS EFFECT}}$$

where  $X$  corresponds to the nominal value of a country's exports;  $X^*$  means the equivalent notion for world exports;  $i$  is the category of manufactured goods (hereinafter "product");  $j$  corresponds to the EU15 destination market;  $t - 1$  and  $t$  are the initial and final years, respectively;  $S$  is the share of the analysed country's exports in the world exports;  $\Delta X^*$  is the variation in world exports in period  $t$  and  $\Delta S$  in the variation in  $S$  in period  $t$ .

The total effect corresponds to the total growth rate of exports of manufactured goods of the new EU member(s) to the EU15. It can be decomposed into two main effects: the structure effect and the competitiveness effect.

The structure effect, which Leamer & Stern (1970) referred as the demand side of the phenomenon under study, expresses the part of the growth rate of exports due to the variation of the world exports (to the same destination market), given the export structure of the analysed country in terms of products and destination markets of the initial period.

The last term of the identity is the so-called competitiveness effect, which is commonly related to the exporter's price and non-price competitiveness.

The structure effect, in turn, can be decomposed into the following three effects:

$$\underbrace{\frac{\Sigma_i \Sigma_j S_{ij,t-1} \Delta X_{ij}^*}{\Sigma_i \Sigma_j X_{ij,t-1}}}_{\text{STRUCTURE EFFECT}} = \underbrace{\frac{\Sigma_i S_{i,t-1} \Delta X_i^*}{\Sigma_i \Sigma_j X_{ij,t-1}}}_{\text{PRODUCT EFFECT}} + \underbrace{\frac{\Sigma_j S_{j,t-1} \Delta X_j^*}{\Sigma_i \Sigma_j X_{ij,t-1}}}_{\text{MARKET EFFECT}} + \underbrace{\frac{\Sigma_i \Sigma_j S_{ij,t-1} \left( \Delta X_{ij}^* \frac{X_{ij,t-1}^*}{X_{i,t-1}^*} \Delta X_i^* - \frac{X_{ij,t-1}^*}{X_{j,t-1}^*} \Delta X_j^* \right)}{\Sigma_i \Sigma_j X_{ij,t-1}}}_{\text{MIXED STRUCTURE EFFECT}}$$

The product and market effects express, respectively, the importance of the product and the geographical structures of a country in the demand side (structure) effect. To complete the structure effect, there is a residual term - the mixed structure effect - resultant

from the solution proposed by Milana (1988), which does not have a straightforward interpretation (ECB, 2005).

*Decomposing the relative growth rate of exports*

The second CMSA used in this study is adapted from Nyssens & Poulet (1990) and also adopts Milana’s solution. In this case, the total effect is the difference between the exports’ growth rate of a country (group of countries) and the exports’ growth rate of the rest of the world in the same destination market, weighted by the product and geographical structures of the exporting country(ies). It can be decomposed as follows:

$$\underbrace{\sum_i \sum_j \theta_{ij} g_{ij}}_{\text{TOTAL EFFECT}} - \underbrace{\sum_i \sum_j \theta_{ij}^* g_{ij}^*}_{\text{STRUCTURE EFFECT}} = \underbrace{\sum_i \sum_j g_{ij}^* (\theta_{ij} - \theta_{ij}^*)}_{\text{STRUCTURE EFFECT}} + \underbrace{\sum_i \sum_j \theta_{ij} (g_{ij} - g_{ij}^*)}_{\text{COMPETITIVENESS EFFECT}}$$

where  $g_{ij} = \frac{X_{ij,t} - X_{ij,t-1}}{X_{ij,t-1}}$  is the export growth rate of a country of product  $i$  to the destination market  $j$ , in period  $t$ ;  $\theta_{ij} = \frac{X_{ij,t-1}}{X_{t-1}}$  is the share of product  $i$  to destination market  $j$  in total exports of the analysed country, in period  $t - 1$  and  $g_{ij}^*$  and  $\theta_{ij}^*$  are the equivalent notions for world exports (excluding the reporting country). A positive (negative) total effect means a total market share gain (loss) of the analysed country in the destination market.

The total effect is decomposed into the structure and the competitiveness effects.

The structure effect captures the difference between the export structure (by product and destination market) of the analysed country and the world weighted by the growth rate of world exports. It will be positive if the country’s export structure is more concentrated on high-growth products/markets than the world structure. Note that the term in brackets provides equivalent information to the traditional Balassa’s exports performance index of Revealed Comparative Advantage (Amador & Cabral, 2008).

The competitiveness effect is a “pure” market share effect as it measures the aggregated impact of changes in market shares of each product/ destination market. It

compares the growth rates of the exports of the analysed country and the world that are not due to differences in the export structure.

The structure effect can be decomposed into three effects expressed as follows:

$$\underbrace{\Sigma_i \Sigma_j g_{ij}^* (\theta_{ij} - \theta_{ij}^*)}_{\text{STRUCTURE EFFECT}} = \underbrace{\Sigma_i g_i^* (\theta_i - \theta_i^*)}_{\text{PRODUCT EFFECT}} + \underbrace{\Sigma_j g_j^* (\theta_j - \theta_j^*)}_{\text{MARKET EFFECT}} + \underbrace{\Sigma_i \Sigma_j g_{ij}^* \left[ (\theta_{ij} - \theta_{ij}^*) - \frac{\theta_{ij}^*}{\theta_i^*} (\theta_i - \theta_i^*) - \frac{\theta_{ij}^*}{\theta_j^*} (\theta_j - \theta_j^*) \right]}_{\text{MIXED STRUCTURE EFFECT}}$$

The product (market) effect evaluates which part of the structure effect is due to the product (market) specialization of the country analysed. The mixed structure effect is the residual term comprising the interaction between the product and market effects as proposed by Milana (1988).

### **Main results**

This section evaluates the export performance of the ten countries of the 2004 EU enlargement to the EU15, i.e. the total effect of the growth rate and the relative growth rate methodologies above presented (hereinafter referred as growth rate and total growth rate, respectively). Market share variation is also presented, though it is not decomposed.

#### *Overall assessment*

As expected, this new group of EU members had a major improvement in their export performance to the EU15 from 1990 to 2013, as shown in table 1. In these past twenty three years, the exports of manufactured goods to the EU15 increased more than 285 billion USD, corresponding to a growth rate of 1118.3%, and a market share increase in the EU15 of 4.56%, reaching 6.25% of the EU15's market share in 2013.

The sub-period which registered the highest export performance to the EU15 was the pre-accession one, from 1996 to 2004, with an export growth rate of 186.5 % and a relative export growth 118.62% - a consequence of country's progresses as preparation for accession.

The lowest performance occurred in the aftermath of the economic crisis of 2008, as expected.

With respect to the effects obtained with the decomposition performed in each CMCA, in table 1 we observe that the competitiveness effect played a dominant and major role in export performance over the whole period. This effect is mainly relevant in the pre-accession sub-period.

In the case of the market and product effects, it is necessary to consider separately the impact on the export growth and the relative export growth

TABLE 1  
DECOMPOSITION OF THE EXPORT PERFORMANCE WITH THE CMSA (%)

		1990-2013	1990-1996	1996-2004	2004-2008	2008-2013
MARKET SHARE VARIATION*		4.56	0.96	1.82	0.99	0.79
EXPORT GROWTH	TOTAL EFFECT	1118.30	102.18	186.65	95.04	7.78
	STRUCTURE EF.	241.29	22.83	58.27	56.70	-9.83
	<i>Product Effect</i>	222.17	23.72	62.72	52.33	-12.02
	<i>Market Effect</i>	228.45	28.42	64.52	63.29	-4.76
	<i>Mixed Str. Ef.</i>	-209.32	-29.31	-68.97	-58.92	6.95
	COMP. EF.	877.00	79.35	128.38	38.34	17.61
RELATIVE EXPORT GROWTH	TOTAL EFFECT	894.38	74.48	118.62	36.61	14.15
	STRUCTURE EF.	13.32	-7.79	-11.59	-3.22	-4.88
	<i>Product Effect</i>	-3.35	-5.72	-7.13	-8.46	-7.19
	<i>Market Effect</i>	-6.47	-4.68	-11.67	2.95	-0.55
	<i>Mixed Str. Ef.</i>	23.14	2.60	7.21	2.29	2.86
	COMP. EF.	881.06	82.27	130.22	39.83	19.03

\* Percentage variation in the ten countries' market share ( $\Delta S$ ) in period  $t$ .

Source: Own calculations from CHELEM database.

In the first case, the impact is positive in all sub-periods but the last one, marked by the economic crisis of 2008. It is worth noting that the structure effect surpassed in size the competitiveness effect in the 2004-08 period, showing the importance of full access to the EU15 dynamic market. In the second case, the sign is negative for both the product and market effects in all sub-periods, showing that although the product and market structures of these countries contributed positively to the growth of their exports in the first three sub-

periods analysed, the world was relatively more specialized in products and markets with dynamic demand.

*Export performance by sectors*

Taking now into account the ten countries' export performance of manufactured goods to the EU15 by sectors according to their technological level (table 2), a positive progress in all sectors is acknowledgeable.

TABLE 2

CMSA BY TECHNOLOGICAL LEVEL (%)

		MARKET SHARE VARIATION*	EXPORT GROWTH			RELATIVE EXPORT GROWTH		
			TOTAL EF.	STR. EF.	COMP. EF.	TOTAL EF.	STR. EF.	COMP. EF.
90-'13	LOW	2.03	527.77	242.35	285.42	222.45	47.13	175.32
	MEDIUM	6.89	1768.12	221.94	1546.18	360.54	-7.90	368.44
	HIGH	6.67	3172.95	244.25	2928.71	254.97	-25.57	280.54
90-'96	LOW	1.03	72.88	18.72	54.16	37.17	0.86	36.31
	MEDIUM	1.05	130.68	23.78	106.89	22.18	-3.27	25.45
	HIGH	1.14	249.48	43.55	205.94	15.30	-4.52	19.83
96-'04	LOW	0.59	79.19	45.05	34.14	20.71	2.56	18.16
	MEDIUM	2.56	250.07	65.22	184.85	47.67	-3.97	51.64
	HIGH	2.88	357.33	66.61	290.71	40.78	-8.21	48.99
04-'08	LOW	-0.02	79.35	66.17	13.19	-3.97	-8.08	4.10
	MEDIUM	1.61	101.12	54.34	46.78	18.62	2.57	16.05
	HIGH	2.11	98.16	39.31	58.86	17.24	1.15	16.09
08-'13	LOW	0.42	12.99	-3.66	16.65	3.25	-2.22	5.47
	MEDIUM	1.67	15.02	-7.68	22.70	7.81	-0.79	8.59
	HIGH	0.55	3.34	-7.75	11.09	1.88	-1.23	3.11

\* Percentage variation in the ten countries' market share ( $\Delta S$ ) in period  $t$ .

Source: Own calculations from CHELEM database.

Considering the overall period, the weakest export performance occurred in the low tech exports, with a growth rate of 527.77% and a market share increase of 2%. The highest export performance took place in high tech exports, with a growth rate of 3172.95% and a market share increase of 6.67%. Medium tech exports grew at a rate of 1768.12%, registering a market share increase of 6.89%.

Looking closer into the different sub-periods, it is clear that the preparation for the accession to the EU had a positive impact on the technological development of exports from these countries to the EU15. Note, for instance, that the highest market share variation occurs in high tech products in all sub-periods but in the post 2008 crisis; however, this improvement is mainly evident in the pre-accession sub-period, followed by the post accession one.

Evaluating the different effects in table 2, it is noteworthy the important positive contribution of the competitiveness effect in both CMSA, mainly in the pre-accession sub-period. This effect is higher for high and medium tech products and particularly in the case of the first. Not surprisingly, considering previous results, the structure effect impacts positively in export growth, even if it is lower than the previous effect, and negatively on relative export growth of medium and high technology intensity in all sub-periods but the one from 2004 to 2008. The inversion in this last period expresses the increased demand.

Turning now to the analysis by specialization factors, table 3 shows that this group of countries improved their export performance to the EU15 in all sectors but in those based in natural resources in the immediate post-accession period.

Interestingly enough, preparation for accession gave an impetus to the R&D intensive exports as this sector registered the best export performance in this period, followed by product differentiation and scale economies sectors. In the pre-accession sub-period, export growth and relative export growth of these sectors clearly surpassed the labour cost sector.

If we look at the different effects, we conclude that the competitiveness effect has played an important role in the export performance of all sectors and a determinant role in the best performing ones- R&D, product differentiation and scale economies sectors-, namely, once more, in the pre-accession sub-period.

TABLE 3

## CMSA BY SPECIALIZATION FACTORS (%)

		MARKET SHARE VARIATION*	EXPORT GROWTH			RELATIVE EXPORT GROWTH		
			TOTAL EF.	STR. EF.	COMP. EF.	TOTAL EF.	STR. EF.	COMP. EF.
90-'13	NAT. RES.	1.08	490.97	321.49	169.48	80.90	32.85	48.05
	L. COSTS	3.91	543.66	167.74	375.92	124.81	17.35	107.47
	SCALE ECON.	7.62	1859.67	187.36	1672.31	293.25	-10.12	303.37
	PROD. DIF.	9.58	2308.10	230.95	2077.15	195.59	-1.72	197.31
	R&D	4.44	2402.79	252.15	2150.64	143.41	-24.69	168.10
90-'96	NAT. RES.	0.08	21.88	12.18	9.70	2.54	-1.33	3.88
	L. COSTS	2.33	124.15	25.45	98.70	31.07	2.25	28.82
	SCALE ECON.	1.12	141.25	24.91	116.33	18.45	-2.74	21.19
	PROD. DIF.	2.26	258.82	35.99	222.84	20.84	-0.39	21.23
	R&D	0.40	117.02	33.14	83.89	1.75	-4.72	6.47
96-'04	NAT. RES.	0.40	82.34	59.78	22.56	3.24	-0.09	3.33
	L. COSTS	0.80	68.44	33.23	35.21	14.24	2.55	11.69
	SCALE ECON.	2.38	238.76	65.19	173.57	35.11	-3.17	38.28
	PROD. DIF.	4.50	255.30	60.35	194.95	36.15	2.07	34.08
	R&D	2.16	448.73	78.75	369.98	20.41	-10.99	31.40
04-'08	NAT. RES.	0.00	96.50	79.47	17.03	-9.46	-11.12	1.66
	L. COSTS	0.15	61.70	56.00	5.70	3.57	2.45	1.12
	SCALE ECON.	2.00	111.59	53.86	57.73	17.29	1.88	15.41
	PROD. DIF.	1.47	80.92	53.26	27.66	11.04	4.98	6.06
	R&D	1.67	108.20	35.00	73.20	9.44	-2.54	11.99
08-'13	NAT. RES.	0.59	35.33	4.01	31.32	1.87	-2.25	4.12
	L. COSTS	0.63	5.43	-3.66	9.09	1.46	-0.15	1.61
	SCALE ECON.	2.12	13.33	-10.30	23.63	6.96	-0.31	7.27
	PROD. DIF.	1.34	4.40	-1.45	5.86	1.86	0.71	1.15
	R&D	0.21	0.94	-15.52	16.47	0.79	-2.23	3.03

\* Percentage variation in the ten countries' market share ( $\Delta S$ ) in period  $t$

Source: Own calculations from CHELEM database.

With respect to the structure effect, it is positive for export growth in all sub-periods but in the post-2008 crisis. In this last sub-period, only the natural resources sector resists the demand shrinkage. In line with previous results, the sign of this effect is in general negative in terms of the relative growth rate of exports in all sub-periods, with exception of the labour

intensive sectors in the first three sub-periods, product differentiation sectors since the pre accession period and scale economies sectors in the post-accession sub-period.

*Export performance by countries*

Previous results were obtained for the countries analysed as a whole. Yet, analysis by countries shows, according to table 4<sup>5</sup>, a great amplitude of results in the export performance of these ten economies.

TABLE 4

CMSA FOR EACH COUNTRY (1990-2013) (%)

	MARKET SHARE GROWTH RATE <sup>6</sup>	EXPORT GROWTH			RELATIVE EXPORT GROWTH		
		TOTAL EF.	STR. EF.	COMP. EF.	TOTAL EF.	STR. EF.	COMP. EF.
CY	-16.51	175.70	183.78	-8.08	-104.96	-43.87	-61.08
CZ	658.91	2406.12	206.94	2199.18	2126.66	-23.74	2150.40
EE	452.22	1723.58	231.98	1491.60	783.35	2.16	781.19
HU	224.94	973.05	237.71	735.33	736.65	13.05	723.60
LV	6.70	252.34	629.37	-377.03	-18.77	445.08	-463.85
LT	154.86	741.61	662.81	78.79	393.42	458.04	-64.62
MT	-30.34	130.02	113.65	16.38	-153.71	-113.07	-40.63
PL	344.23	1366.96	197.77	1169.19	1106.88	-24.32	1131.19
SK	1095.05	3846.38	205.89	3640.49	3364.54	-28.67	3393.21
SI	-20.06	163.98	191.09	-27.12	-69.11	-36.91	-32.20

Source: Own calculations from CHELEM database.

On the one hand, we have the group of the best performing countries; in the overall period analysed - 1990-2013- they were, in terms of both the export growth and the relative export growth rates, by decreasing order, Slovakia, the Czech Republic, Estonia, Poland, Hungary and Lithuania. On the other hand, some countries registered negative relative export growth rates; it is the case of Latvia, Slovenia, Malta and Cyprus, being these last three the most affected, even showing negative market share growth rates.

<sup>5</sup> See ISO codes for country names.

<sup>6</sup> Due to the different sizes of these ten economies, the market share variation of the previous tables was substituted by the market share growth rate. It is given by  $\frac{\Delta S}{S_{t-1}}$ .

In terms of the different effects, analysis of table 4 puts into evidence the importance of the competitiveness effect for export growth of the best performing countries. An interesting result is this effect is negative in the case of all the worst performing countries above mentioned.

Regarding the structure effect, it is worth noting the positive influence for export growth in all countries and a negative one for the relative export growth rate in countries with a negative market share growth rate, namely Cyprus, Malta and Slovenia. Such underlines, respectively, the positive importance of the EU15 demand and the negative influence of the specialization pattern initially traced by these three countries, thus reinforcing by negative impact of a poor (negative) competitiveness performance. Other countries were also penalized by the initial specialization pattern but the change in their specialization pattern and increased competitiveness led to notable positive results for exports; it is the case of the Czech Republic, Poland and Slovakia.

Using the two sectoral classifications<sup>7</sup> enlightens the previous picture. Briefly, we conclude that: (i) all countries but Malta had the highest (lowest) export growth and relative export growth rates in the high (low) technology sectors, considering the overall period analysed (1990-2013); (2) the best performing countries were able to grow from an export profile based on labour costs and/or natural resources to an export pattern based on other factors more prone to increase value added, as it is the case of R&D, product differentiation and scale intensive sectors<sup>8</sup>.

---

<sup>7</sup> Given the physical limitation requested for this study, results for the CMSA by technological intensity and specialization factors for each of the ten economies are not presented. They are available upon request.

<sup>8</sup> Since the beginning of the transition process, these countries witnessed a remarkable increase in FDI flows, mainly to Poland, the Czech Republic, Hungary, Slovenia and Slovakia which contributed to the restructuring process and productivity growth in manufacturing (see, for instance, Carstensen & Toubal (2004))

The export performance profile of the two best performing countries to the EU15 (the Czech Republic and Slovakia) illustrates previous results. In 1990, the highest exported category of goods of both countries was iron and steel, a scale economies intensive and low tech category of manufactured goods. In 2013, the two highest categories of manufactured goods exported were private automobiles and elements of automobile vehicles, with a medium technology level. In that final year, electrical products - a product differentiation and high tech intensive category of manufactured goods-, were Czech Republic's third highest export (and Slovakia's fifth); computer hardware and engines was Czech Republic's fourth and fifth highest export, respectively; while Slovakia's fourth highest export was consumer electronics, i.e. a high tech and R&D intensive category of manufactured goods.

*Relation between the destination market and the competitiveness effect*

Finally, we have decomposed, in the export growth CMCA, the competitiveness effect of the ten States of the 2004 EU enlargement by destination market. The purpose is to evaluate how much of each EU15 destination market absorbs of the variation in the share of the EU enlargement exports over the world exports, i.e. the competitiveness effect. Table 5 presents the results for the ten economies aggregated.

The decomposition procedure was as follows:

$$\frac{\sum_i \Delta S_{ij} X_{ij,t}^*}{\sum_i \sum_j \Delta S_{ij} X_{ij,t}^*}$$

where  $X^*$  corresponds to the nominal value of world exports;  $i$  is the category of manufactured goods;  $j$  corresponds to the EU15 destination market;  $t$  is the final year and  $\Delta S$  is the variation in the share of the analysed country's exports in the world exports in period  $t$ .

We conclude that Germany was the most relevant destination market in all considered periods. Given its economic weight, such would hardly be a surprise. France, Italy and the United Kingdom have, after Germany, the highest shares, namely in the post-accession period (from 2004 to 2008).

TABLE 5

WEIGHT OF EACH EU15 MARKET IN THE TEN COUNTRIES' COMPETITIVENESS EFFECT\* (%)

	1990-2013	1990-1996	1996-2004	2004-2008	2008-2013
DE	45.72	55.64	48.40	20.63	40.78
AT	5.16	9.22	4.50	0.11	4.94
DK	2.35	1.83	1.71	3.88	1.82
ES	4.19	1.30	5.42	6.43	6.13
FI	1.95	1.69	2.02	1.41	2.14
FR	9.51	6.73	8.83	16.32	3.81
GR	0.66	-0.20	0.43	2.21	1.27
IE	0.37	0.08	0.47	1.23	0.39
IT	7.65	5.53	6.80	15.73	7.86
NL	3.54	4.22	3.87	8.58	9.08
PT	0.66	0.36	1.04	-0.13	1.19
GB	9.34	6.26	7.34	14.49	13.17
SE	4.39	3.52	4.61	4.75	2.86
BE	4.31	3.67	4.39	3.58	4.67
LU	0.21	0.14	0.17	0.78	-0.11

\* in the export growth CMSA

Source: Own calculations from CHELEM database.

The same analysis was also performed for each country of the 2004 enlargement. Table 6 presents the results in the period from 1990 to 2013. The first line (C.E.) of that table indicates whether the respective 2004 enlargement country registered a positive or a negative competitiveness effect in the overall period.

In table 6 we detect an interesting pattern: the destination markets which absorbed most of the variation in the market share of the 2004 enlargement countries were those geographically closer. In fact, Germany was the most important destination market for the Czech Republic, Hungary, Poland and Slovakia's competitiveness effect and Austria was the most important for Slovenia's competitiveness effect; considering the Baltic countries, Estonia's most relevant destination markets were Sweden and Finland; for Latvia it was Netherland, Denmark, Finland and the United Kingdom; while for Lithuania it was Germany

and Sweden. Distinctively, for Mediterranean countries were Greece, in the case of Cyprus, and Spain, in the case of Malta.

TABLE 6

WEIGHT OF EACH EU15 MARKET IN EACH TEN COUNTRIES' COMPETITIVENESS EFFECT\* (%)

	CY	CZ	EE	HU	LV	LT	MT	PL	SK	SI
C.E.	-	+	+	+	-	+	+	+	+	-
DE	109.39	48.20	-0.10	51.43	12.57	175.86	-64.24	43.61	44.32	140.65
AT	-115.56	6.78	0.54	2.74	-0.49	11.24	2.65	1.69	9.36	-60.06
DK	-37.84	1.45	4.84	1.71	-7.12	47.13	30.90	2.54	1.11%	-7.91
ES	56.69	3.87	0.87	5.57	-0.88	-85.76	144.99	4.25	4.58	-0.22
FI	54.87	0.71	37.13	-0.05	-4.43	48.77	-0.78	1.13	0.73	-2.03
FR	77.03	8.33	4.30	8.43	5.41	79.00	0.51	10.05	10.62	5.29
GR	-839.40	0.23	0.11	0.71	-0.21	3.27	79.23	0.47	0.34	-3.81
IE	72.91	0.48	0.34	0.31	1.64	10.75	3.89	0.37	0.24	1.80
IT	29.03	6.29	1.32	8.30%	-1.48	56.13	-121.21	8.03	9.59	33.94
NL	-153.21	7.43	0.56	5.60	103.45	-194.45	37.94	6.24	4.25	-4.52
PT	-5.46	0.50	0.39	0.69	-0.12	8.54	12.77	0.65	0.54	-2.85
GB	1041.86	8.28	3.47	9.59	-6.00	-120.03	-54.27	11.89	8.03	-5.56
SE	-19.93	2.14	40.73	1.29	1.10%	110.94	33.94	4.57	2.88	3.87
BE	-165.08	5.17	5.46	3.43	-3.25	-51.91	-7.00	4.23	3.26	1.46
LU	-5.28	0.14	0.05	0.25	-0.18	0.53	0.68	0.26	0.15	-0.04

\* in the export growth CMSA for the 1990 to 2013 period.

Source: Own calculations from CHELEM database.

## Conclusions

From the results of this study, we conclude that the 2004 enlargement countries, when aggregately considered, registered a major improvement in their export performance to the EU15 in all the considered periods from 1990 to 2013. This evolution is most notably in the pre-accession sub-period, as a result of reforms implemented by these countries and EU support preceding full membership.

A decisive contribution to export performance to the EU15, measured either with the export variation in either absolute terms or relative to the world, as used in this study, was given by increased competitiveness. The structure effect of this group of economies was also favorable to increased exports but the competitors at the world level in the EU15 market

were, in general, more specialized in products and destination markets with dynamic demand. Note, however, that with accession to a larger market in 2014 demand suffered a positive push observable in the reversal of the negative (relative) structure effect for several products, both traditional and recently developed. However, the 2008 economic crisis reversed for most products this positive trend.

We concluded that the best performing economies of the 2004 EU enlargement counteracted the unfavourable initial specialization pattern with a rapid change in their specialization pattern and increased competitiveness. Yet, even for the whole set of the 2004 enlargement countries, the highest export performance occurred in high tech exports of manufactured goods followed by medium tech exports while, concerning the specialization factors, stand out R&D, followed by product differentiation and scale economies, rather than natural resources or labour costs.

Divergent export performances between the ten countries were, nevertheless, observed. While Cyprus, Malta and Slovenia registered a negative market share growth rate to the EU15, which this study associates to a negative competitiveness effect and a unfavourable productive specialization in relation to global competitors, others displayed remarkable positive export performance, supported by increased competitiveness and alteration of the traditional specialization pattern. Such is the case of Slovakia and the Czech Republic, which present the highest values for both growth rates of exports considered in this study in the period 1990 to 2013. Estonia, Poland, Hungary and Lithuania also presented very positive results.

Bearing in mind the ten economies aggregated, the results also show that Germany absorbed most of the export growth explained by the competitiveness effect, namely for five of the six best performing economies: the Czech Republic, Hungary, Lithuania, Poland and Slovakia. This is an expected result if we take into account the size of this market. Yet, if the

results are evaluated considering each of the ten economies of the 2004 enlargement, a geographical influence is also verifiable, suggesting that those countries tend to drive the most dynamic exports, i.e. those related to competitiveness gains, for countries geographically close.

## APPENDIX

### PRODUCT CLASSIFICATION BASED ON CHELEM DATABASE AND FERNANDES (2000)

Technological Level			Specialization Factors		
Low	BA	Cement	Natural Resources	BA	Cement
	BB	Ceramics		EA	Manufacture of wood
	BC	Glass		EC	Paper
	CA	Iron and Steel		HC	Not elsewhere specified minerals
	CB	First processing of iron		IA	Coal
	DA	Yarns and Fabrics		IB	Crude oil
	DB	Clothing		IC	Natural Gas
	DC	Garment		IG	Coke
	DD	Carpet		IH	Refined petroleum products
	DE	Leather		JA	Cereals
	EA	Manufacture of wood		JB	Other agricultural products
	EB	Furniture		JC	Inedible agricultural products
	EC	Paper		KA	Cereal-based products
	ED	Prints		KB	Fats
	FA	Metal structures		KC	Fish and Meat
	FB	Hardware		KD	Animal conserves
	HA	Iron ore		KE	Vegetable conserves
	HC	Not elsewhere specified minerals		KF	Sugar
	IA	Coal		KG	Animal feed
	IB	Crude oil		KH	Beverages
	IC	Natural Gas		KI	Manufactured tobaccos
IG	Coke	NA	Jewellery		
IH	Refined petroleum products	NB	Non-monetary gold		
JA	Cereals	CC	Non-ferrous metallurgy		
JB	Other agricultural products	DA	Yarns and Fabrics		
JC	Inedible agricultural products	DB	Clothing		
KA	Cereal-based products	DC	Garment		
KB	Fats	DD	Carpet		
KC	Fish and Meat	DE	Leather		
KD	Animal conserves	EB	Furniture		
KE	Vegetable conserves	FA	Metal structures		
KF	Sugar	FB	Hardware		
KG	Animal feed	HB	Non-ferrous ores		
KH	Beverages	Scale Economies	BB	Ceramics	
KI	Manufactured tobaccos		BC	Glass	

	NA	Jewellery		CA	Iron and Steel
	NB	Non-monetary gold		CB	First processing of iron
Medium	CC	Non-ferrous metallurgy	Product Differentiation	ED	Prints
	FC	Engines		FS	Elements of automobile vehicles
	FD	Farms Equipment		FT	Private automobiles
	FE	Machine tools		FU	Utility Vehicles
	FF	Construction Machines and Equipment		FV	Vessels
	FJ	Watchmaking		GB	Fertilizer
	FS	Elements of automobile vehicles		GD	Paintings
	FT	Private automobiles		GE	Toiletries
	FU	Utility Vehicles		GG	Plastics
	FV	Vessels		GH	Plastic articles
	GA	Basic mineral chemistry		GI	Rubber articles
	GB	Fertilizer		HA	Iron ore
	GC	Basic organic chemistry		FC	Engines
	GD	Paintings		FD	Farms Equipment
	GE	Toiletries		FE	Machine tools
	GG	Plastics		FF	Construction Machines and Equipment
GH	Plastic articles	FG	Specialised machinery		
GI	Rubber articles	FJ	Watchmaking		
HB	Non-ferrous ores	FP	Appliances		
High	FG	Specialised machinery	FQ	Electric material	
	FH	Weapons	FR	Electrical products	
	FI	Measuring instruments	R&D	FH	Weapons
	FK	Optical instruments		FI	Measuring instruments
	FL	Electronic components		FK	Optical instruments
	FM	Consumer electronics		FL	Electronic components
	FN	Telecommunications equipment		FM	Consumer electronics
	FO	Computer hardware		FN	Telecommunications equipment
	FP	Appliances		FO	Computer hardware
	FQ	Electric material		FW	Aeronautics and Space
	FR	Electrical products		GA	Basic mineral chemistry
	FW	Aeronautics and Space		GC	Basic organic chemistry
GF	Pharmaceuticals	GF		Pharmaceuticals	

## REFERENCES

- Amador, J. & Cabral, S. (2008). *The Portuguese export performance in perspective: constant market share analysis*. Economic Bulletin, Banco de Portugal, 201-221.
- Carstensen, K. And Toubal, F. (2004), Foreign Direct Investment in Central and Eastern Countries: a dynamic panel analysis”, *Journal of Comparative Economies*, 3-22.
- Cheptea, Gaulier, G. & Zignago, S. (2005). World trade competitiveness: A disaggregated view by shift-share analysis. CEPPi working paper, 23 December.

- ECB (2005). *Competitiveness and the export performance of the euro area*. Occasional Paper Series, n° 30.
- Fernandes, C. (2002). The Changes in International Trade Structure and the Evolution of Portugal Trade Specialisation Compared to the “Triad”: the Challenges of International Competitiveness, Paper delivered at the 5<sup>th</sup> International Workshop on European Economy (CEDIN/ISEG, Lisbon, 22-23 November).
- Jepma, C. (1981). An Application of the Constant Market Shares Technique on Trade between the Associated African and Malagasy States and the European Community (1958-1978). *Journal of Common Market Studies*, 20(2), 175-192.
- Leamer, E. & Stern, R. (1970). Constant-Market-Share Analysis of Export Growth. In: Leamer, E. & Stern, R. (Eds.) *Quantitative International Economics*, 1<sup>st</sup> Ed. Chicago: Aldine Publishing Company, 171-183.
- Milana, C. (1988). Constant-Market-Shares Analysis and Index Number Theory. *European Journal of Politic Economy*, 4(4), pp 453-478.
- Murphy, A. (2006). The May 2004 Enlargement of the European Union: View from Two Years Out. *Eurasian Geography and Economics*, 47(6), 635-646.
- Nyssens, A. & Pouillet, G. (1990). Parts de marché des producteurs del’UEBL sur les marchés extérieurs et intérieur. Cahier 7, Banque Nationale de Belgique.
- Pavličková, V. (2013). The competitiveness of Slovak foreign trade in the European market. *Economic Annals*, LVIII(196), 7-49.
- Richardson, D. (1971). Some sensitivity tests for a “constant-market-shares” analysis of export growth. *The Review of Economics and Statistics*, 53(3), 300-304.