



**LISBOA
SCHOOL OF
ECONOMICS &
MANAGEMENT**

**MASTER IN
INTERNATIONAL ECONOMICS AND EUROPEAN STUDIES**

**MASTERS FINAL WORK
DISSERTATION**

**THE EXPORT PERFORMANCE OF THE 2004 EU ENLARGEMENT
ECONOMIES: A CONSTANT MARKET SHARE ANALYSIS.**

PEDRO MIGUEL DA SILVA SERÔDIO

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ABSTRACT

On May 1st 2004, ten countries joined the European Union. For these ten States, the enlargement meant, among other aspects, an opportunity to develop their economies by having access to an economic union with high purchasing power. Using two different Constant Market Share Analysis, this study evaluates the export performance of these ten countries to the first fifteen Member States of the European Union. The results show that the best performing economies – the Czech and Slovak Republics – had their best results in medium to high tech capital intensive exports, being Germany the main destination market.

RESUMO

A 1 de Maio de 2004, dez países aderiram à União Europeia. O alargamento significou, para estes dez Estados, uma oportunidade para desenvolverem as suas economias, tendo acesso a uma união económica com elevado poder de compra. Recorrendo a duas análises de Quotas de Mercado Constante, é avaliada a performance exportadora destes dez países para a União Europeia a quinze. Os resultados demonstram que as economias com melhor performance – a República Checa e a Eslováquia – apresentam os seus melhores resultados em exportações de nível tecnológico médio/alto e intensivas em capital, e a Alemanha como principal mercado de destino.

KEYWORDS: Export Performance, Constant Market Share, European Union, Fifth EU Enlargement

JEL CLASSIFICATION: C43, F10, F14

ACKNOWLEDGEMENTS

To Professor Maria Paula Fontoura Carvalhão Sousa, for all the support and thoughtful critiques throughout the development of this work.

To my family and Rita, for believing in my capabilities more than you should.

To all my friends and especially to Luís, Robin and João, for the kind and helpful reviews and all your friendship.

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1. Introduction

On May 1st 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 (Official Journal of the European Union, 2003). 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) (EUR-Lex, 2007; Murphy, 2006).

The 2004 EU enlargement was highly anticipated both by the European Union and the ten adhering countries. On the EU’s perspective, the 2004 enlargement marked the reunification of a Europe which had been divided for half a century by the Iron Curtain and the Cold War (EUR-Lex, 2007). On the accession countries’ perspective, the enlargement meant a way to consolidate their democracies, to ensure peace in their territories and to promote economic development by having access to an economic union with high purchasing power.

Given the relevance of the EU’s accession to these countries’ economic development, this study will focus in one of the major key-points to promote a country’s economic development: the export performance. There are various reasons for whether a country’s economic development is in part dependent of its export performance. For starters, it’s a major component of a country’s GDP, especially in smaller or less developed economies. Likewise, it is commonly assumed by mainstream economics as an impelling cause to promote long-term sustainable economic growth (Krugman *et al*, 2012). Having that in regard, this study will analyse the 2004 enlargement countries’ export performance to the EU15 in the period between 1990 and 2013.

In order to evaluate these ten economies' export performance to the EU15, this study makes use of the Constant Market Share Analysis (hereinafter "CMSA") methodology. This accounting method allows an *ex-post* breakdown of a country's (or group of countries') export performance into different effects, providing a detailed descriptive analysis of a country's export behaviour by easily identifying its key features (Amador & Cabral, 2008). Two different CMSA are used, enabling a broader evaluation of the effective changes of these ten economies' export performance.

The first CMSA used is based on Leamer & Stern (1970) and allows to understand and disentangle the effective changes occurred in the exports growth rate of a country, based on several assumptions which maintain constant the market share of the analysed economy to the destination markets (the EU15, in the case of this study).

The second CMS identity used is based on Nyssens & Poulet (1990) and evaluates the performance of a country's relative exports specialization, comparing the country's relative specialization growth with the World's relative specialization growth. The use of this second CMSA provides a greater in-depth analysis both to these ten countries' export performance and to the CMSA based on Leamer & Stern (1970).

In order to have greater information on these ten economies' export performance, the considered categories of manufactured goods are grouped in two different classifications of sectors, based on Fernandes (2002): one considering the technological intensity of manufactured exports and another evaluating the specialization factors of the categories of manufactured products exported.

Three different aspects define the main contribution of this study: i) it descriptively analyses in detail the export performance of the 2004 enlargement economies to the EU15 over a long time span; ii) it makes use of two different CMSA

and the possibilities of their assessments, reviewing the merits and limitations of different CMSA since their first application by Tyszynski (1951), and developing enhancements in the methodology; iii) it considers two different classifications of sectors, enabling results which are both highly detailed and easy to read.

This study is organised as follows. Section 2 offers a state of the art of the relevant literature on the export performance of the 2004 enlargement economies. Section 3 explains the methodology. Section 4 overviews the used data and the selected periods. Section 5 examines the results extensively by dividing them into four different subsections: one focusing on the different disentangled effects from both CMSA; a second one assessing the results for the different sectors of 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 to the export performance of these ten countries. Section 6 concludes.

2. Literature Survey

Several studies have evaluated the export performance of the 2004 EU enlargement economies. Evaluated jointly, in a set (e.g. the Central and Eastern European countries) or individually, there are numerous reasons to focus on the export performance of these economies. Firstly and as already mentioned, seven of these economies were either Soviet republics or Soviet satellites, meaning they transited from a centrally planned economy to a market economy inside an economic union with high purchasing power member-states in a fifteen year period. Secondly, most of these economies are developing ones, making them prone to be evaluated. Thirdly, seven of these economies are part of the Economic and Monetary Union (the Euro). Fourthly, the impact of the enlargement itself

is a reason to focus on the export performance of the 2004 enlargement economies, considering their adaptation process in order to be competitive in a 25 Member-State European Union.

There are several approaches to empirically analyse a country's (or a group of countries) export performance, other than using a CMSA. Hoekman & Djankov (1997), for instance, analyse the exports structure, and specifically the comparative advantages, of the Central and Eastern Europe countries to the EU between 1990 and 1995, using the Revealed Comparative Advantages (hereinafter "RCA") index proposed by Balassa (1965) and the exports volume. Kovačič (2008) uses the RCA index, the exports volume and among other qualitative approaches, in order to evaluate the competitive and export performance of the Central and Eastern European countries.

Yet, regarding the CMSA, there are several studies which have been used in order to evaluate the export performance of some or all of the 2004 EU enlargement economies. A prior CMSA study to the 2004 enlargement was made by Simonis (2000). This study evaluated the structural trade patterns of the Central European countries and the former Soviet Union, (Malta, Cyprus and Slovenia were not included), from 1991 to 1997, using the CMSA formulation suggested by Milana (1988). Simonis (2000) concluded that the export performance of the Central European countries and the former Soviet Union, during the period 1991 to 1997, was mainly influenced by a favourable competitiveness effect, which led to an increase of these countries' World market share of 0,3% (from 1,2% in 1992 to 1,5% in 1997).

Pavličková (2013) evaluated the competitiveness of Slovak exports in the EU27 market using the CMSA formulation suggested by Nyssens & Pouillet (1990), among other indexes. The CMSA results presented the competitiveness effect as the most

relevant one and highlighted the importance of the automotive industry in the transition from a centrally planned economy to a competitive open economy.

Other studies, such as the Abreu *et al* (2005), Finicelli *et al* (2008), Cafiso (2009), Jiménez & Martín (2010) or Crespo & Fontoura (2011), use the CMSA methodology, although not focusing exclusively on the 2004 enlargement economies. Having this in regard, this is the one of the first studies to exclusively evaluate the export performance of the 2004 enlargement economies using the CMSA methodology. In the next section, a detailed explanation of the CMSA methodology is made.

3. Methodology: Constant Market Share Analysis

A common way to evaluate a country's export performance is by using a CMSA. The CMSA is a decomposition method of a country's export performance which allows to effectively separate and quantify the influence of different effects. This technique was initially referred as shift-share analysis and was used in the scope of regional economics, for explanatory analysis of variables such as labour productivity or employment (Amador & Cabral, 2008). Its first use in applied international economics, more specifically in international trade flows of goods, was done by Tyszynski (1951). Since then it has been extensively applied in analysis of trade flows and its application has generated a substantial methodological debates, which produced a variety of versions of CMSA (Crespo & Fontoura, 2011).

One of the most influential versions of the CMSA was made by Leamer & Stern (1970). This version specifically focuses on the effects underlying the absolute variation of exports of a country, using different dimensions of constant market shares to analyse

the different aspects affecting a country's export performance. Several authors, such as Jepma (1981), applied adapted versions of this CMSA.

Notwithstanding its influence, several reservations have been pointed out to Leamer & Stern's approach, especially by Richardson (1971). The main critique pointed by the author is that the product and market effects are calculated in an asymmetric way, making the effects vary substantially, depending on which one is calculated first (Richardson, 1971; Cheptea et al, 2005). Milana (1988) applied an extensive revision of CMSA method, both to Leamer & Stern's asymmetric calculation and to other formulations, such the double decomposition proposed by Fagerberg & Sollie (1987). Milana (1988) proposed a solution for the asymmetric method of calculation of the product and market effects presented in Leamer & Stern (1970): to calculate the interaction term between the product and market effects separately, in a residual term. This solution has been largely applied ever since, namely by Abreu *et al* (2005), Amador & Cabral (2008) and Crespo & Fontoura (2011).

Currently, several CMSA are used by different authors in order to evaluate the export performance of a country (or group of countries). One of these versions was proposed by Nyssens & Pouillet (1990) and allows to evaluate a country's (or group of countries') relative export specialization performance, compared to the World. Abreu *et al* (2005) and Amador & Cabral (2008) are some of the studies which applied versions based on this CMSA.

3.1. CMSA based on the exports growth rate

The first CMSA applied in this study is based on Leamer & Stern (1970) and uses the solution proposed by Milana (1988) for the asymmetric method of calculation of the

product and market effects. This CMSA decomposes the export performance of an economy taking into consideration the growth rate in the value of manufactured exports of goods. It gives a first assessment of the reasons why a country's export performance resulted in such a way.

The CMSA identity based on the exports growth rate can be expressed as:

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

where X corresponds to the nominal value of a country's / group of countries' exports of manufactured goods to the EU15; 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 evaluated in the selected period, respectfully; S corresponds to the share of the analysed country's exports over the total World exports to the same destination market, in the initial year; and ΔX^* (ΔS) expresses the difference in total World exports (or the difference in a country's / group of countries' market share) from $t - 1$ to t .

The total effect corresponds to the total growth rate of exports in manufactured goods of the analysed country to the EU15, in the studied period. 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 growth rate in exports of the analysed country (or group of countries), to EU15, if it has varied together with the World's exports to the EU15, considering each category of goods and destination market. In other words, it

expresses the growth rate in exports if the initial market share is maintained. The structure effect can be decomposed into three effects and can be expressed as:

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

The product effect expresses the difference in exports of the analysed country if it has varied alongside the World’s exports, analysed by product, to the EU15. It indicates which portion of a country’s export growth rate is due to a higher market share, in the initial moment of the period, in certain products. If the value is positive, it means there is a growing demand from the EU15 economies in the products the analysed country (or group of countries) had a higher initial market share (Jepma, 1981).

The market effect expresses the difference in exports of the analysed country if it has varied alongside the World’s exports to the EU15 destination markets. It indicates whether or not the destination market positively affects the exports growth rate as it specifies which portion of a country’s exports growth rate is due to a higher market share, in the initial moment of the period, in certain EU15’s destination market. If the value is positive, it means there is a growing demand in the EU15 economies that the considered country had a higher initial market share to (Jepma, 1981).

To complete the structure effect, there is a residual term: the mixed structure effect. This effect results from the solution proposed by Milana (1988) to solve the asymmetric calculation of the product and market effect in Leamer & Stern (1970) and Jepma (1981). Consequently, its interpretation is not completely straightforward (Abreu *et al*, 2005).

Finally, there is the competitiveness effect. The competitiveness effect is the difference in market shares, between the initial and the final moment of the studied period multiplied by the World's export value to the EU15, in the final moment of the studied period. It is commonly assumed that if the exports growth rate cannot be explained by the previous effects (i.e. by the difference in exports if the market share of the analysed country in the product and EU15 destination market is maintained), it is explained by the competitiveness level (Jepma, 1981). Yet, the interpretation of the competitiveness effect has been rarely limited to a residual term of an accounting identity which solely accounts the value of a country's market share gains (or losses). As Leamer & Stern (1970) point, the term competitiveness brings unwarranted emotional reactions, as being competitive is ordinarily a desirable thing. Apart from the discussion over the importance of competitiveness¹, there are several economic reasons and criteria for a country to improve its competitiveness. As Siggel (2007) demonstrates, the concept of competitiveness itself is not consensual. This study will not further the discussion over the concept of competitiveness. Nevertheless, it will use a second CMSA in order to have a greater in-depth analysis of the analysed countries' export performance, and specifically their competitiveness performance. This second CMSA evaluates the performance of a country's relative export specialization compared to the World.

3.2. CMSA based on the relative specialization performance

The second CMSA used in this study is adapted from Nyssens & Pouillet (1990) and uses Milana's solution for the asymmetric method of calculation of the product and market effects, in the same way that is used by the Abreu *et al* (2005), Amador & Cabral (2008)

¹ See for instance Krugman (1994) for a critique on such "obsession".

and Pavlíčková (2013). This second CMSA allows to decompose the relative specialization performance of an economy taking into consideration the difference in the growth rate of a country's export specialization when compared to the World. Contrary to Leamer & Stern's CMSA, which uses the market share to access the growth rate in total exports, this second CMSA enables a deeper evaluation of the development of the competitive performance - considering the relative specialization structure of exports - of the selected economies.

The CMSA based on the relative specialization performance can be expressed as:

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

where $g_{ij} = \frac{X_{ij,t} - X_{ij,t-1}}{X_{ij,t-1}}$ is the exports growth rate of a country's / group of countries' exports of product i , to the EU15's destination market j , from the initial $(t - 1)$ to the final year (t) , which is equivalent to the exports growth rate CMSA's total effect; $\theta_{ij} = \frac{X_{ij,t-1}}{X_{t-1}}$ is the share of product i to EU15's destination market j in the country's total exports, in the initial year $(t - 1)$; and g_{ij}^* and θ_{ij}^* are the equivalent notions for World exports (excluding the reporting country) (Amador & Cabral, 2008).

According to the formulation suggested by Nyssens & Pouillet (1990), the total change in the analysed country's relative specialization performance in the EU15 market (the total effect) is the difference between the growth rate of relative specialization exports' structure from the analysed country and the growth rate of relative specialization exports' structure from the rest of the World (Abreu *et al*, 2005; Amador & Cabral, 2008). If the result of the total effect is positive it indicates that the growth rate of a country's

exports occurred in sectors with higher initial relative specialization compared to the World. The total effect can be decomposed into two main effects: the structure effect and the competitiveness effect.

The structure effect is the product of the growth rate in World exports, in each product and destination market, with the difference in relative specialization of the country and the World. The term in brackets, the relative specialization term $(\theta_{ij} - \theta_{ij}^* = \frac{X_{ij,t-1}}{X_{t-1}} - \frac{X_{ij,t-1}^*}{X_{t-1}^*})$, gives equivalent information to the traditional Balassa (1965) RCA index, as it compares the exporting country's specialization structure with the World's one (Amador & Cabral, 2008). As a result, the structure effect will be positive if the country's relative export specialization structure is more concentrated on high-growth products and markets than the World's specialization structure (Idem).

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

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

The product effect evaluates which part of the structure effect resulted from the initial specialization in products with growing EU15 demand. The market effect calculates the impact of the relative geographical specialization by measuring whether the relative export specialization of the analysed country is directed towards dynamic EU15's market destinations (Abreu *et al*, 2005; Amador & Cabral, 2008). The mixed structure effect is a residual term resulting from the interaction between the product and market effects as proposed by Milana (1988).

Finally, there is the competitiveness effect or “pure” market share effect. This effect compares the growth rates of the analysed country’s exports and the World’s exports, by product, and by each EU15 destination market, maintaining the product and geographical relative specialization of the analysed country’s exports (Amador & Cabral, 2008).

Some reservations must be made to the CMSA methodology and the results of its applications. A commonly presented limitation of the analysis is the incapability to distinguish the influence of price and volume of exports, leading to differences in market share which are influenced by variations in the exchange rate of the currency used (Amador & Cabral, 2008; Coutinho & Fontoura, 2012). Another limitation arises from the growth rate from a null initial values. In some cases, the growth rate of the group does not coincide with the growth rate of the sum of the categories products which compose the sector, due to the impossibility of calculation of growth rate from a null initial value. A more in-depth analysis of the possible solutions to this limitation is provided in the annex.

Still, the foremost critique pointed to this technique is the lack of theoretical foundations (Richardson, 1971; Cabral & Esteves, 2006). As already mentioned, the CMSA is an accounting method, which some authors consider as an index number approach (Milana, 1988). In fact, Baldwin (1958) and Richardson (1971) pointed that different weights of aggregation can be chosen in order to obtain consistency in the analysis, thus suggesting the possibility of CMSA with several conceptual flaws (Idem).

In this study, the CMSA methodology was used in order to have a descriptive evaluation of 2004 enlargement countries’ export performance. By itself, the CMSA may

not be a fully-fledged theoretical approach. However, if carefully applied, this methodology provides an exhaustive analysis of a country's export performance. Having that in regard, the selected time span and the classification of sectors have to be prudently selected *vis-à-vis* the object and the purpose of the study.

4. Data

The present study uses data from the CEPII – CHELEM database, comprising 72 categories of manufactured goods² from the CHELEM sectorial nomenclature, grouped into two different classifications of sectors, based on Fernandes (2002)³. The first classification is based on the one provided by 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 research & development.

As the study uses the CEPII – CHELEM database, the values from are given in thousands of US Dollars, in current prices⁴. Therefore and as mentioned earlier, developments in market shares are mechanically influenced by changes in the US dollar exchange rate.

The total period evaluated begins in 1990 and ends in 2013. The total period is decomposed in four subperiods: from 1990 to 1996, corresponding to the phase of the fall

² See CHELEM (2015) for a detailed description of the categories of products.

³ For a description of the categories of products which compose the groups of the two classifications used, see Annex's Table IX – Product Classification.

⁴ See De Saint-Valry (2008) for a detailed description of the CEPII – CHELEM database.

of the Soviet Union⁵ and the submission of the applications of these ten countries for the accession to the EU (EUR-Lex, 2007); from 1996 to 2004, corresponding to the enlargement process (Idem); from 2004 to 2008, corresponding to the period between the accession and the financial crisis; and the period from 2008 to 2013, marked by the economic and financial crisis.

5. Main results

5.1. Overall assessment

As expected, the ten countries of the 2004 EU enlargement had a major improvement in their export performance to the EU15 from 1990 to 2013. In these past twenty three years, the exports of manufactured goods to the EU15 increased more than 285 million USD, corresponding to a growth rate of 1118,3%, and an increase of 4,56% in the World market share to the EU15, reaching 6,25% of the EU15's market share in 2013 (with an average variation of market share to the EU15 of 0,2% per year). The performance of relative specialization (i.e. the product of the growth rate in the selected period with the initial relative exports specialization) of these ten economies totalled 894,39% when compared to the World's performance, in the period between 1990 and 2013. Table I presents these results.

⁵ Although not all the countries of the 2004 enlargement were part of the Soviet Union, such as Slovenia, Cyprus and Malta, the other seven countries were either former Soviet republics or former satellites of the USSR, justifying its importance.

TABLE I
MAIN RESULTS OF THE CMSA⁶

		1990-2013	1990-1996	1996-2004	2004-2008	2008-2013
MARKET SHARE VARIATION ⁷		4,56%	0,96%	1,82%	0,99%	0,79%
EXPORTS GROWTH RATE	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 SPECIALIZATION PERFORMANCE	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%

Source: Own calculations from CHELEM database.

Of the positive variation in manufactured exports, the influence of the competitiveness effect played a major role, accounting for more than 224 million USD (877% of the value of these ten countries' exports in 1990). The structure effect had a positive impact on this increase as well, contributing more than 61 million USD. Of the growth rate of 241,29% provided by the structure effect, 222,17% were caused by an increasing EU15 demand in products exported by these ten countries (i.e. the product effect), and 228,45% resulted from the growing demand of the EU15 destination markets

⁶ The results are presented considering the "technological intensity" classification of sectors. The results for the "specialization factors" classification slightly differ in the market effect and mixed structure effect of the Relative Specialization Performance CMSA due to the different composition of sectors used.

⁷ The market share variation evaluates the difference in these ten countries' market share (ΔS) to the EU15, from $t - 1$ to t .

to which these countries exported (i.e. the market effect). The interaction term had a negative contribution of 209,32%.

Considering these ten countries' relative specialization performance, it is clear the major improvement in the total effect is given by the competitiveness effect. Accordingly, the higher increase of these ten countries relative specialization performance, compared to the World, is given by a higher growth, again compared to the World, in categories of manufactured goods with significant relative specialization. On the other hand and although it had a positive influence, the structure effect played a significant minor role, meaning the positive performance did not occur due to an increased EU15 demand for those products in which these ten economies were relatively more specialized.

Analysing the different subperiods, the subperiod which registered the highest market share variation per year was the post-accession one, from 2004 to 2008, registering an average increase of 0,25% per year in the EU15's imports share. The lowest market share variation per year was the period afterwards, from 2008 to 2013, registering a market share increase of 0,16% per year.

5.2. Contribution of the different sectors

Taking into account the ten countries' export performance of manufactured goods to the EU15 by sectors under the technological level classification (table II), a positive progress in all sectors, in the overall period, is acknowledgeable. The weakest export performance was registered in the exports of low technology manufactured goods, increasing a little less than 84 million USD, a growth rate of 527,77%, between 1990 and 2013. Although it registered the lowest values in all three sectors, the low technology manufactured goods

had a positive performance of 222,45% in the relative specialization of these ten countries and a market share increase of 2,03%.

TABLE II
CMSA FOR THE TEN ECONOMIES BY TECHNOLOGICAL LEVEL⁸

		MARKET SHARE VARIATION	EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
			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%

Source: Own calculations from CHELEM database.

The exports of medium technology goods registered the highest export performance, with an export growth rate of 1768,12%, more than 106 million USD and a market share increase of 6,89%. The development of relative specialization had also the highest performance of all three sectors, registering an improvement of 360,54%. High technology exports registered the second highest export performance. It registered an

⁸ The remnant effects are presented in table II-II in the Annex.

increase in market share of 6,7%, an export growth rate of 3172,95%, accounting for 77 million USD; and a positive relative specialization performance of 255,97%.

Evaluating the different effects in table II in the overall period, it is observable the important positive contribution of the competitiveness effect, both in the exports growth rate and the relative specialization performance CMSA. Understandably, the competitiveness effect has different meanings in both CMSA. As previously mentioned, in the exports growth rate CMSA, the competitiveness effect expresses the variation in market shares, highlighting the fact that the exports growth rate in all three sectors was mainly driven by an increase of these ten countries' EU15 market share, in the overall period. Such is also acknowledgeable in the majority of the sectors in the subperiods present in table II. In the relative specialization performance CMSA, the highly positive contribution of the competitiveness effect – although not always prevalent – is expressed by the importance of the higher growth of exports when compared to the World.

Analysing the structure effect in both identities, it is observable a positive, though less determinant, structure effect in the exports growth rate CMSA and a negative contribution of the structure effect in the medium and high technology sectors in the relative specialization performance CMSA in the overall period and all the subperiods except the one from 2004 to 2008. The structure effect in the exports growth rate CMSA stresses the contribution of a growing demand from the EU15 Member States: even if the 2004 enlargement economies maintained their market shares in the EU15, from 1990 to 2013, their exports would have grown in all sectors and subperiods, until 2008. In the relative specialization performance CMSA, the results of the structure effect in the medium and high technology manufactured goods can be assumed as a result of a higher

World specialization in products and EU15 markets with growing demand (considering the product and market effects).

Looking closer into the different subperiods and considering the gains in the share of imports of the EU15, it is clear the export performance in medium and high technology sectors took off from 1996 onwards (and specially in the pre-accession subperiod, from 1996 to 2004). Such indicates that the preparation for the adherence and the accession to the EU had a positive impact on the technological development of exports to the EU15 of these countries. As Murphy (2006) points out, the reforms and rules adopted in the accession process' period have helped modernize these economies, bringing greater macroeconomic stability and opening new opportunities for businesses. As mentioned, the capacity to grow above the World's variation in the categories of manufactured goods with higher relative specialization (the relative specialization performance's competitiveness effect) played a key role in the development of both sectors in the different subperiods.

Table III presents the results by specialization factors. Such as the results presented in table II, the ten countries improved their export performance in every specialization factor to the EU15, in the overall period, both in terms of market share variation and exports growth rate. The relative specialization of these ten countries had a positive performance in every specialization factor, in the overall period, underscoring its contribution to the export performance.

Focusing in the overall period, the highest market share increase was registered in the product differentiation sector, with a market share increase of 9,58% from 1990 to 2013. The scale Economies sector registered both the highest exports value increase, over

84 million USD, and the best relative specialization performance, of 293,23%. Research and Development intensive products registered the highest exports growth rate, of 2402,79% pointing out the strong improvement of this sector from being the smallest of these sectors, in 1990, for these ten countries, to become higher, in 2013, than the labour costs sector and close to the natural resources sector (both sectors associated with low technological manufactured goods). Comparing the export performance of these three sectors with the results from table II, it is visible that these ten States improved their export performance in more capital intensive sectors, leading to an improvement of the added value in exports rather than in the growth of the exported quantity. This fact is even more evident if the poorer performance of the natural resources and labour costs intensive sectors is considered.

Analysing the different effects, the competitiveness effect has, once more, played an important role in the performance of all sectors and a determinant role in the best performing sectors (the scale economies, product differentiation and R&D sectors), in both CMSA. As mentioned, considering that these three last sectors are more associated with medium and high technology sectors, these results are coincident with the results presented in table II. Same as in table II, there is a negative influence of the relative specialization performance CMSA's structure effect in the three best performing sectors, and, similarly to table II, the product and market effects play are determinants in this negative role, in the overall period. The explanation, as pointed in table II, is given by the higher initial relative World's specialization (compared to the ten country's relative specialization) in both in products high with growing demand and in high growing EU15 destination markets, rather than a negative growth of the EU15 demand.

TABLE III

CMSA FOR THE TEN ECONOMIES BY SPECIALIZATION FACTORS⁹

		MARKET SHARE VARIATION	EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
			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%

Source: Own calculations from CHELEM database.

Evaluating the different subperiods, every sector increased its market share throughout the different subperiods. Still and similarly to the results presented in table II,

⁹ The remnant effects are presented in table III-II in the Annex.

the pre-accession subperiod (1996-2004) must be highlighted due to its contribution in the growth of the best performing sectors. In fact, in this subperiod, the product differentiation sector increased its share in 4,5%, the scale economies sector grew 2,38% and the R&D sector grew 2,16% (almost half of the market share variation registered in the overall period). The subperiods in which the other two sectors grew the most were the application phase subperiod (1990-1996), in which the labour costs sector grew 2,3%; and the subperiod of the economic and financial crisis (2008-2013) in which the natural resources sector grew 0,6%.

5.3. Results by countries

Focusing the analysis by different countries, it is possible to witness a great amplitude of results in the export performance of these ten economies, considering the market share growth rate, the exports growth rate and even the relative specialization performance.

The best performing countries in terms of market share growth rate were, respectfully, Slovakia (1095,05%), the Czech Republic (658,91%), Estonia (452,22%), Poland (344,23%), Hungary (224,94%) and Lithuania (154,86%). Latvia has a small growth rate in its market share (6,7%), while the worst performing countries were Malta (-30,34%), Slovenia (-20,06%) and Cyprus (-16,51%). The results' order are maintained unaltered when considering the exports growth rate: Slovakia registered the highest growth rate of 3846,38%, the Czech Republic had a growth rate of 2406,12% and Estonia a growth rate of 1723,58%. Still, there is a difference when comparing the exports growth rate's results to the ones of the market share growth rate: none of the ten countries registered a negative exports growth rate. Considering this difference in the exports growth rate and market share growth rate, the positive influence of the structure effect in

all countries is worth underlining. Together, the product and market effects had a positive impact in the export growth rate in every analysed country, determining the positive influence of the EU15 demand in the exports growth rate of these ten countries. Table IV presents these results.

TABLE IV
CMSA FOR EACH COUNTRY (1990-2013)¹⁰

	MARKET SHARE GROWTH RATE ¹¹	EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
		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.

Regarding the exports growth rate CMSA’s competitiveness effect, there is an interesting occurrence in table IV. As earlier mentioned, when a country registers a positive market share growth rate, it is commonly assumed that it was due to the competitiveness effect, as the structure effect evaluates the export growth rate if the

¹⁰ The results are presented considering the “technological intensity” classification of sectors. The remnant effects are presented in table IV-II in the Annex.

¹¹ 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. The market share growth rate is given by $\frac{\Delta S}{S_{t-1}}$.

market share had remained constant. In most cases, this assumption is verifiable. However, Latvia and Malta register contrasting values between the competitiveness effect in the exports growth rate CMSA and the market share growth rate. The justification for this occurrence is methodological: in Latvia's case, some of the highest market shares variations occurred in low volume World exports of manufactured goods in the final year, to the EU15, while the highest negative variation coincided with high volume World exports to the EU; in the case of Malta, the opposite occurred, leading to a positive competitiveness effect in a country which registered a negative market share variation.

In the case of the performance in relative specialization, both Malta and Latvia had a negative performance. Cyprus and Slovenia had a negative result as well, coinciding with their negative exports growth rate CMSA's competitiveness effect and negative market share growth rate. Slovakia and the Czech Republic were, once more, the highest performing countries when considering their relative specialization, with an increase of, respectfully, 3364,54% and 2126,66%. Poland was the third best performing country (1106,88%). The competitiveness effect was the most determinant effect, in the relative specialization performance CMSA, for every country except Lithuania, where the product and the residual term, the mixed structure effect, determined the positive performance of the country. The product effect also had an important impact in Cyprus and Slovenia's negative performance of the relative specialization.

Evaluating the export performance by technological level for each country (table V), it is observable that the medium and high technology manufactured goods were the ones which had the best export performance. In fact, excluding Malta, every other country

had the lowest market share and exports growth rate in the low technology sector and the highest market share and exports growth rate in the high technology sector.

Notwithstanding, these results hinder an important fact: evaluating the percentage change can be misleading as it inflates results for sectors with a lower development in the initial period. As mentioned, these economies suffered an intense modernization, becoming more capital intensive, from 1990 to 2013. Considering such, it is expectable that with the same increase in value, the percentage change would be higher for less developed sectors in the initial period. In fact and supporting this explanation, the only country which had an higher increase in the value of exports to the EU15 in the high technology sector than in the other sectors is Estonia. The other best performing economies had other sectors in which the increase in value of exports was higher: while for Poland and Lithuania¹² it was the low technology sector, for the Czech Republic, Hungary and Slovakia it was the medium technology one. Table V-III, in the annex, expresses these results.

The exports growth rate CMSA's competitiveness effect follows the same order of sectorial performance in each country of the total effect and is the determinant effect in the exports growth rate of the best countries' best performing sectors. In the same CMSA, the structure effect does not always follow the same sectorial performance order of the total and competitiveness effect. Still and opposed to the competitiveness effect, it has a positive contribution in every sector and in every country, guaranteeing the positive growth rate of exports in countries' sectors which have a loss in market share, such as Cyprus and Latvia's low technology manufactured goods, Malta's low and technology manufactured goods and Slovenia's low and medium technology manufactured goods.

¹² Notwithstanding, Lithuania has a negative competitiveness effect in the low technology sector.

This positive contribution to the exports growth rate is given by a significantly positive product and market effects, while the mixed structure effect absorbs the negative contribution.

Considering the results of the relative specialization performance, it is verifiable that these results do not always coincide with the ones from the market share and exports growth rate. In order to justify this behaviour it is necessary to take a closer look at the main effects composing the relative specialization performance CMSA. Scrutinizing these two main effects, it is possible to verify that the most contrasting results are due to the influence of the structure effect in the total effect. On the other hand, the competitiveness effect has a similar pattern to the one in the exports growth rate CMSA. Having this in regard and considering the structure effect is given by a comparison of the initial relative specialization between the evaluated country and the World, it is acknowledgeable that the erratic results of the relative specialization performance resulted from the relative specialization evolution rather from the growth rate of exports *per se*. An example of such is given by Latvia and Lithuania's export performance in the high technology sector: both countries have a high market share and exports growth rate, while having a negative relative specialization performance given by a significant negative structure effect.

TABLE V

CMSA BY TECHNOLOGY INTENSITY FOR EACH COUNTRY (1990-2013)¹³

		MARKET SHARE GROWTH RATE	EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
			TOTAL EF.	STR. EF.	COMP. EF.	TOTAL EF.	STR. EF.	COMP. EF.
CY	LOW	-63,1%	24,57%	180,84%	-156,27%	-109,08%	43,72%	-152,81%
	MEDIUM	131,0%	617,97%	178,48%	439,49%	-7,48%	-39,06%	31,58%
	HIGH	326,6%	1349,43%	246,56%	1102,87%	3,84%	-38,89%	42,73%
CZ	LOW	218,6%	976,48%	173,44%	803,04%	428,73%	-8,77%	437,50%
	MEDIUM	1098,5%	3624,49%	225,44%	3399,05%	859,67%	-3,84%	863,50%
	HIGH	2110,8%	7412,26%	282,09%	7130,18%	666,27%	-21,66%	687,93%
EE	LOW	173,8%	825,15%	226,60%	598,55%	234,51%	67,00%	167,51%
	MEDIUM	515,2%	1811,77%	234,47%	1577,30%	76,35%	-20,10%	96,45%
	HIGH	14514,4%	49559,39%	198,74%	49360,65%	410,51%	-47,11%	457,61%
HU	LOW	16,0%	291,82%	213,20%	78,62%	70,62%	29,55%	41,07%
	MEDIUM	534,4%	1871,63%	241,11%	1630,52%	324,07%	-10,22%	334,29%
	HIGH	1093,3%	3954,66%	315,60%	3639,07%	320,91%	-20,05%	340,96%
LV	LOW	-9,78%	204,80%	673,33%	-468,53%	56,26%	546,91%	-490,65%
	MEDIUM	23,48%	283,74%	207,39%	76,35%	-46,47%	-43,75%	-2,71%
	HIGH	1326,20%	4746,21%	325,55%	4420,66%	-31,17%	-47,93%	16,76%
LT	LOW	91,5%	547,06%	760,31%	-213,26%	280,09%	550,31%	-270,23%
	MEDIUM	330,0%	1236,37%	173,79%	1062,59%	101,00%	-34,95%	135,95%
	HIGH	1765,1%	6237,50%	228,78%	6008,72%	-5,19%	-47,29%	42,11%
MT	LOW	-28,8%	140,61%	147,77%	-7,16%	-91,02%	-58,88%	-32,14%
	MEDIUM	158,5%	703,23%	250,50%	452,73%	-24,18%	-43,99%	19,81%
	HIGH	-59,7%	37,04%	58,09%	-21,05%	-41,99%	-14,84%	-27,15%
PL	LOW	155,9%	764,41%	173,96%	590,45%	389,91%	14,66%	375,25%
	MEDIUM	586,3%	2032,86%	221,71%	1811,15%	413,02%	-8,56%	421,58%
	HIGH	1412,8%	5040,31%	277,03%	4763,28%	232,41%	-33,81%	266,22%
SK	LOW	334,1%	1366,49%	175,00%	1191,49%	828,57%	12,77%	815,80%
	MEDIUM	2889,8%	9191,48%	237,60%	8953,89%	1662,40%	-15,17%	1677,57%
	HIGH	5133,1%	17681,89%	405,77%	17276,12%	768,33%	-26,81%	795,13%
SI	LOW	-46,9%	79,27%	151,87%	-72,60%	-67,98%	-29,01%	-38,97%
	MEDIUM	-5,3%	194,22%	214,28%	-20,06%	4,99%	13,88%	-8,89%
	HIGH	30,6%	343,83%	274,55%	69,28%	-7,50%	-15,49%	7,99%

Source: Own calculations from CHELEM database.

¹³ The remnant effects are presented in table V-II in the Annex.

TABLE VI

CMSA BY SPECIALIZATION FACTORS FOR EACH COUNTRY (1990-2013)¹⁴

		MARKET SHARE GROWTH RATE	EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
			TOTAL EF.	STR. EF.	COMP. EF.	TOTAL EF.	STR. EF.	COMP. EF.
C Y	NAT. RES.	-54.9%	76.51%	155.76%	-79.26%	-60.71%	-5.92%	-54.79%
	L. COSTS	-77.1%	-37.26%	219.63%	-256.90%	-45.07%	55.08%	-100.15%
	SC. ECON.	44.7%	324.36%	149.96%	174.40%	-30.43%	-27.97%	-2.47%
	PROD. DIF.	87.4%	429.27%	150.57%	278.70%	-11.62%	-18.33%	6.72%
	R&D	679.7%	2794.73%	295.86%	2498.88%	35.10%	-37.08%	72.19%
C Z	NAT. RES.	107.5%	711.83%	211.26%	500.57%	92.12%	-20.72%	112.84%
	L. COSTS	528.2%	1620.52%	147.13%	1473.38%	259.84%	-2.39%	262.23%
	SC. ECON.	983.4%	3077.76%	184.31%	2893.44%	730.01%	2.14%	727.87%
	PROD. DIF.	1330.1%	3938.87%	176.66%	3762.21%	459.01%	-1.01%	460.02%
	R&D	1128.3%	4460.28%	320.83%	4139.45%	413.68%	-12.29%	425.97%
E E	NAT. RES.	68.0%	557.31%	236.47%	320.84%	149.99%	84.41%	65.59%
	L. COSTS	523.1%	1606.54%	175.73%	1430.81%	84.71%	-3.29%	88.00%
	SC. ECON.	968.4%	3033.80%	240.91%	2792.89%	48.08%	-23.46%	71.54%
	PROD. DIF.	4579.5%	13116.29%	246.00%	12870.29%	105.88%	-16.94%	122.82%
	R&D	4615.8%	17408.86%	220.11%	17188.75%	332.71%	-40.93%	373.64%
H U	NAT. RES.	1.6%	297.50%	267.50%	30.00%	12.16%	10.54%	1.62%
	L. COSTS	29.8%	255.55%	177.76%	77.79%	46.81%	24.53%	22.28%
	SC. ECON.	536.5%	1766.99%	189.55%	1577.44%	193.67%	-17.92%	211.59%
	PROD. DIF.	982.1%	2956.14%	246.78%	2709.37%	276.56%	2.18%	274.38%
	R&D	711.8%	2914.22%	320.61%	2593.61%	186.41%	-20.04%	206.45%
L V	NAT. RES.	-34.3%	157.00%	688.39%	-531.38%	42.36%	571.71%	-529.34%
	L. COSTS	144.7%	570.25%	197.80%	372.45%	5.58%	-15.41%	20.99%
	SC. ECON.	177.9%	715.18%	189.76%	525.42%	-23.84%	-36.42%	12.58%
	PROD. DIF.	1650.7%	4844.50%	242.41%	4602.10%	-11.73%	-21.87%	10.14%
	R&D	408.9%	1789.37%	341.71%	1447.66%	-33.74%	-42.78%	9.03%
L T	NAT. RES.	23.1%	381.60%	808.17%	-426.57%	160.51%	566.14%	-405.62%
	L. COSTS	674.7%	2021.79%	174.40%	1847.39%	125.90%	-13.87%	139.77%
	SC. ECON.	394.7%	1351.11%	182.98%	1168.14%	93.67%	-21.78%	115.45%
	PROD. DIF.	971.5%	2926.19%	230.88%	2695.32%	2.88%	-19.64%	22.51%
	R&D	925.3%	3706.59%	256.12%	3450.46%	-7.06%	-42.78%	35.72%
M T	NAT. RES.	383.1%	1789.68%	274.14%	1515.54%	-46.33%	-68.21%	21.88%
	L. COSTS	-82.7%	-52.52%	135.79%	-188.31%	-44.45%	13.42%	-57.86%
	SC. ECON.	243.4%	907.35%	270.11%	637.24%	-9.67%	-30.72%	21.05%
	PROD. DIF.	33.4%	276.64%	187.92%	88.73%	-8.61%	-12.57%	3.97%
	R&D	-66.6%	23.82%	46.95%	-23.13%	-48.14%	-19.62%	-28.52%
P L	NAT. RES.	99.7%	681.19%	183.46%	497.73%	174.46%	1.70%	172.77%
	L. COSTS	250.1%	858.77%	177.95%	680.82%	215.62%	20.86%	194.76%
	SC. ECON.	773.4%	2461.77%	169.44%	2292.33%	323.89%	-17.56%	341.45%
	PROD. DIF.	1102.0%	3294.66%	244.38%	3050.28%	205.60%	-5.58%	211.18%
	R&D	614.2%	2551.83%	294.62%	2257.21%	115.77%	-27.13%	142.90%
S K	NAT. RES.	256.8%	1295.57%	251.82%	1043.75%	221.30%	-16.82%	238.13%
	L. COSTS	918.2%	2688.69%	133.75%	2554.94%	525.75%	-0.48%	526.22%
	SC. ECON.	1497.1%	4584.37%	164.47%	4419.90%	1571.84%	15.30%	1556.54%
	PROD. DIF.	3113.0%	8974.52%	181.66%	8792.86%	471.58%	-12.18%	483.76%
	R&D	2188.5%	8396.69%	386.64%	8010.05%	468.82%	-15.03%	483.84%
S I	NAT. RES.	-11.9%	244.52%	151.25%	93.27%	-49.72%	-59.88%	10.16%
	L. COSTS	-56.8%	18.24%	158.54%	-140.30%	-21.39%	37.97%	-59.36%
	SC. ECON.	18.0%	246.14%	204.80%	41.35%	18.09%	8.54%	9.55%
	PROD. DIF.	22.3%	245.35%	247.22%	-1.87%	15.57%	15.95%	-0.37%
	R&D	6.8%	296.38%	278.23%	18.15%	-33.04%	-33.19%	0.15%

Source: Own calculations from CHELEM database.

¹⁴ The remnant effects are presented in table V-II in the Annex.

Evaluating the export performance of each country by specialization factors (table VI), in the overall period, it is observable that the product differentiation sector was the one with the best performance among the best performing economies. With the exception of Estonia, which had the highest market share and exports growth rate in research and development intensive goods, as well as Lithuania and the Czech Republic, which had the its highest exports growth rate in the same sector, all the other best performing States (Slovakia, Poland and Hungary) had their highest market share and exports growth rate in product differentiation exports. Such is coincident with the results exposed in section 5.2, table III, for the overall period. In the same note, the R&D and scale economies intensive sectors also present significantly positive export performances for these countries, in the overall period.

As previously mentioned, the excellent export performance of these countries on these sectors - scale economies, product differentiation and R&D - denotes an improvement of their export performance in more capital intensive sectors, meaning these States were able to grow from an export profile based on labour costs and exported quantity to one more based in added value. It is also denotable a strong link between the improved sectors, the more capital intensive export profile and the importance of a stronger specialization in the mechanical engineering industry, especially in the automotive sector. In fact, the two highest categories of manufactured goods exported to the EU15, in 2013, by the Czech Republic and Slovakia (the two best performing countries), were private automobiles and elements of automobile vehicles¹⁵. Both categories of manufacture goods are intensive in scale economies, rather than on product differentiation. Yet, product differentiation, as well as R&D intensive exports (with

¹⁵ According to the CEPII - CHELEM database.

medium to high technology level) are an important part of both countries' exports performance if the automotive sector and the mechanical engineering industry are considered: electrical products, a product differentiation intensive category of manufactured goods, is Czech Republic's third highest export (and Slovakia's fifth) to the EU15 in 2013; computer hardware and engines is Czech Republic's fourth and fifth highest export, respectfully; while Slovakia's fourth highest export to the EU15 in 2013 is consumer electronics, a R&D intensive category of manufactured goods.

The change in the export performance profile of the two best performing countries (the Czech Republic and Slovakia) is even more evident if it is taken into consideration the fact that in 1990 the highest exported category of goods of both countries to the EU15 was iron and steel, a scale economies intensive low technology level category of manufactured goods.

5.4. Contribution of the different destination markets

Finally, this study focuses on the influence of the EU15 destination markets to the competitiveness effect of the 2004 EU enlargement countries. In order to do so, the exports growth rate CMSA's competitiveness effect is decomposed by the influence of each EU15 destination market, in all considered periods, for the ten States of the 2004 EU enlargement, in the following way:

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

where each destination market j is evaluated in their contribution to the whole exports growth rate CMSA's competitiveness effect.

As the two competitiveness effects evaluate similar objects (the evolution in market shares) and present similar outcomes, the results for the relative specialization

performance CMSA’s competitiveness effect are presented in the annex (table VII-II and VIII-II). Table VII presents the results of the exports growth rate CMSA’s competitiveness effect for ten economies aggregated.

TABLE VII

EU15 MARKETS’ CONTRIBUTION TO THE TEN COUNTRIES’ COMPETITIVENESS EFFECT¹⁶

	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%
UK	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%

Source: Own calculations from CHELEM database.

Germany had the biggest contribution to the competitiveness effect of the 2004 enlargement economies, in all considered periods. In fact, in the first period (from 1990 to 1996), Germany’s contribution is greater than the rest of the EU15 summed together. Given its geography, economic weight and manufacturing profile, such would hardly be a surprise. France, Italy and the United Kingdom have, after Germany, the highest

¹⁶ The results are presented considering the exports growth rate CMSA and the “technological intensity” classification of sectors.

contributions, being the post accession period (from 2004 to 2008) the one which led to the highest contribution of the three Member States.

Table VIII evaluates the contribution of the different EU15 destination markets to the exports growth rate CMSA's competitiveness effect of each country of the 2004 enlargement, from 1990 to 2013. The first line (C.E.) indicates whether the respective 2004 enlargement country registered a positive or a negative competitiveness effect in the overall period.

TABLE VIII

EU15 MARKETS' CONTRIBUTION TO EACH TEN COUNTRIES' COMPETITIVENESS EFFECT
(1990-2013)¹⁷

	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%
UK	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%

Source: Own calculations from CHELEM database.

¹⁷ The results are presented considering the exports growth rate CMSA and the "technological intensity" classification of sectors.

The presented results show an interesting pattern: the destination markets which had the highest influence in the competitiveness effect of the 2004 enlargement countries were the ones geographically closer to these economies. In this line of thought and considering the central and eastern countries of the 2004 enlargement, Germany was the most influential destination market for the Czech Republic, Hungary, Poland and Slovakia's competitiveness effect; and Austria was the most influential market for Slovenia's competitiveness effect. Considering the Baltic countries, Estonia's most influential destination markets were Sweden and Finland; for Latvia it was both Denmark, Finland and the United Kingdom; while for Lithuania it was Germany and Sweden. Distinctively, Greece presented a strong influence for the Mediterranean countries' competitiveness effect, having the highest influence in Cyprus and the second highest in Malta, only surpassed by Spain.

6. Conclusions

This study descriptively evaluated the export performance of the 2004 enlargement economies to the first fifteen members of the European Union. For that end, two CMSA were used to evaluate two different classification of sectors, which enabled results that were both highly detailed and accessible.

From the given results, the 2004 enlargement countries, when aggregately considered, registered a major improvement in export performance to the EU15, in all the considered periods from 1990 to 2013. The post-accession one, from 2004 to 2008, was the one which registered the highest market share increase to the EU15 per year (with an average increase of 0,25%). Still, these ten countries present divergent export performances. While some countries registered a negative market share growth rate to the

EU15, such as Cyprus, Malta and Slovenia, others presented a significant positive export performance. Such is the case of Slovakia and the Czech Republic, which presented the highest value for market share and exports growth rate as well as the best relative specialization performance from 1990 to 2013. Estonia, Poland, Hungary and Lithuania also presented very positive results.

The best performing States of the 2004 EU enlargement share their highest market share and exports growth rate in more capital intensive categories of manufactured goods: under the technological level classification, medium and high tech exports had the best performance; while under the specialization factors it was scale economies, product differentiation and research and development intensive exports which presented the best results. Simultaneously, a better performance of more capital intensive categories of manufactured goods is observable for the ten countries as a whole, especially in the period of the preparation for the accession and onwards.

Bearing in mind the ten economies aggregated, the results present Germany as the most influential destination market for the promotion of the competitiveness effect (both in the exports growth rate CMSA and in the relative specialization performance CMSA) in every considered period. Yet, if the results are evaluated considering each of the ten States of the 2004 enlargement, a geographical influence is verifiable, relating the proximity to the destination market with its influence on each country's competitiveness effect.

Of the six best performing economies, five – the Czech Republic, Hungary, Lithuania, Poland and Slovakia - share Germany as the destination market which had the biggest impact on their competitiveness effect. In Estonia's case, it was Sweden and Finland which accounted as the most influential markets. Considering that from these

five States, four presented their best export performance in mechanical engineered categories of goods, more concretely in the automotive industry¹⁸, it is possible to witness a relation between the results: the Czech Republic, Hungary, Poland and Slovakia, countries which share borders with each other, have the same main destination market in the EU15 (Germany) and have their best export performance in one of Germany's main industry, the automotive industry. Considering the global value chains of German multinational enterprises and the main features of the German industry, it is observable that these countries integrate the value chains of Germany's mechanical engineering industry, and especially the automotive industry (Pavličková, 2013).

All taken into consideration, future research can explore the impact of the German automotive industry's value chain in the export performance of the 2004 EU enlargement economies, particularly the ones with the highest export performance. On a different note, it can also explore other CMS identities (such as the one used by Crespo & Fontoura, 2011) in order to have an even greater in depth analysis of the export performance of the 2004 EU enlargement States, and to corroborate (or defy) the results presented in this study.

¹⁸ Hungary's highest categories of manufactured goods exported in 2013 were, respectfully, engines, electrical products, private automobiles and elements of automobile vehicles; while Poland's had among the highest exported categories of goods elements of automobile vehicles, engines and electrical products. Lithuania's highest exported categories of manufactured goods do not relate with the mechanical engineering industry or the automotive industry.

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ANNEX

Growth rate from a null initial value

Amador & Cabral (2008) substitute 0 by a very small number (0,0...1). The problem with such approach is that it gives an incorrect value for the evaluated variation, as the number of decimal places is not indifferent. For instance, if the value in t is 1, the value in $t-1$ is 0 and this last one is substituted by 0,001, the variation would be $999 \left(\frac{1-0,001}{0,001} \right)$; but if the value in $t-1$ is substituted by 0,0001, then the variation would be 9999, hence the error in estimating growth rate with the proposed solution.

Although it does not exclude the error itself, the solution adopted in this study substitutes the error given by a division for 0 (when $t-1$ equals 0) by the value 0. This solution presents problems as well. For instance, a two sector economy which completely changes the exporting sectors in the evaluated period (sector 1 is the non-exporting sector in $t-1$ and becomes the exporting sector in t ; while sector 2 is the exporting sector in $t-1$ and becomes the non-exporting in t ; the economy exports 1 unit value which remains constant in the analysed period) with no growth of exports, should register a null growth rate; yet, as a result of the applied solution it will register a negative growth rate when the results of the groups are summed $\left(\frac{0-1}{1} + \frac{1-0}{0} = -1 \right)$.

TABLE IX

PRODUCT CLASSIFICATION¹⁹

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

¹⁹ Non-included except in the Total group: Non specified manufactured articles; Electricity; Non-ventilated.

	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	R&D	FQ	Electric material
	FH	Weapons		FR	Electrical products
	FI	Measuring instruments		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

Source: CHELEM database and Fernandes (2002).

TABLE II-II

CMSA FOR THE TEN ECONOMIES BY TECHNOLOGICAL LEVEL

		EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
		<i>Product Ef.</i>	<i>Market Ef.</i>	<i>Mixed Str. Ef.</i>	<i>Product Ef.</i>	<i>Market Ef.</i>	<i>Mixed Str. Ef.</i>
90-'13	LOW	222,75%	224,13%	-204,53%	33,37%	30,90%	-17,13%
	MEDIUM	209,78%	218,48%	-206,31%	-9,48%	-10,57%	12,15%
	HIGH	237,91%	244,50%	-238,16%	-25,58%	-24,85%	24,86%
90-'96	LOW	17,40%	20,28%	-18,96%	1,03%	2,88%	-3,06%
	MEDIUM	24,94%	29,42%	-30,58%	-2,95%	-2,08%	1,76%
	HIGH	54,31%	37,12%	-47,89%	-3,39%	-5,04%	3,90%
96-'04	LOW	54,50%	42,81%	-52,25%	7,57%	0,43%	-5,44%
	MEDIUM	68,60%	67,16%	-70,53%	-2,23%	-3,34%	1,60%
	HIGH	67,77%	85,71%	-86,86%	-7,82%	-4,75%	4,35%
04-'08	LOW	66,28%	79,88%	-79,99%	-8,35%	-3,49%	3,77%
	MEDIUM	48,04%	59,06%	-52,76%	0,17%	4,40%	-2,00%
	HIGH	37,43%	39,68%	-37,80%	0,21%	1,28%	-0,33%
08-'13	LOW	-5,64%	2,19%	-0,21%	-3,03%	-0,22%	1,04%
	MEDIUM	-10,04%	-6,68%	9,04%	-1,50%	-0,22%	0,93%
	HIGH	-10,79%	-2,47%	5,51%	-2,18%	0,17%	0,78%

Source: Own calculations from CHELEM database.

TABLE III-II

CMSA FOR THE TEN ECONOMIES BY SPECIALIZATION FACTORS

		EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
		<i>Product Ef.</i>	<i>Market Ef.</i>	<i>Mixed Str. Ef.</i>	<i>Product Ef.</i>	<i>Market Ef.</i>	<i>Mixed Str. Ef.</i>
90-'13	NAT. RES.	267,96%	288,67%	-235,14%	12,17%	17,30%	3,38%
	L. COSTS	180,47%	167,77%	-180,50%	21,84%	16,40%	-20,89%
	SCALE ECON.	183,47%	193,85%	-189,97%	-9,27%	-9,45%	8,59%
	PROD. DIF.	201,95%	216,28%	-187,27%	-3,29%	-3,01%	4,58%
	R&D	275,31%	263,44%	-286,60%	-23,15%	-24,69%	23,14%
90-'96	NAT. RES.	9,92%	17,65%	-15,39%	-1,60%	1,12%	-0,86%
	L. COSTS	25,09%	25,17%	-24,81%	2,56%	2,35%	-2,66%
	SCALE ECON.	25,14%	30,61%	-30,83%	-2,55%	-1,68%	1,50%
	PROD. DIF.	33,38%	32,89%	-30,29%	-0,45%	-0,67%	0,73%
	R&D	52,53%	34,63%	-54,03%	-3,27%	-4,73%	3,27%
96-'04	NAT. RES.	56,00%	51,64%	-47,87%	-1,63%	-2,90%	4,44%
	L. COSTS	49,90%	34,37%	-51,04%	8,37%	3,03%	-8,85%
	SCALE ECON.	72,67%	65,99%	-73,47%	-1,09%	-3,18%	1,09%
	PROD. DIF.	58,96%	57,64%	-56,25%	2,43%	1,59%	-1,95%
	R&D	83,87%	96,02%	-101,14%	-10,56%	-9,51%	9,08%
04-'08	NAT. RES.	83,35%	95,34%	-99,21%	-10,85%	-9,37%	9,11%
	L. COSTS	54,69%	60,40%	-59,09%	2,12%	3,44%	-3,11%
	SCALE ECON.	46,20%	57,12%	-49,47%	-0,17%	3,02%	-0,97%
	PROD. DIF.	50,85%	56,34%	-53,93%	4,36%	5,52%	-4,90%
	R&D	32,82%	40,24%	-38,06%	-3,43%	-1,76%	2,65%
08-'13	NAT. RES.	4,98%	8,87%	-9,84%	-2,27%	-1,61%	1,63%
	L. COSTS	-7,75%	-1,56%	5,64%	-0,79%	0,32%	0,33%
	SCALE ECON.	-12,42%	-11,72%	13,85%	-0,79%	-0,57%	1,05%
	PROD. DIF.	-6,54%	-3,43%	8,52%	-0,46%	0,27%	0,90%
	R&D	-16,57%	-3,12%	4,17%	-2,40%	0,04%	0,13%

Source: Own calculations from CHELEM database.

TABLE IV-II

CMSA FOR EACH COUNTRY (1990-2013)

EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
<i>Product Ef.</i>	<i>Market Ef.</i>	<i>Mixed Str. Ef.</i>	<i>Product Ef.</i>	<i>Market Ef.</i>	<i>Mixed Str. Ef.</i>

CY	175,16%	214,82%	-206,20%	-54,49%	-4,40%	15,02%
CZ	194,51%	232,92%	-220,48%	-34,68%	-1,17%	12,11%
EE	245,78%	230,96%	-244,77%	15,60%	-11,88%	-1,56%
HU	224,64%	231,14%	-218,07%	-4,28%	0,17%	17,16%
LV	460,68%	239,03%	-70,34%	236,52%	6,79%	201,77%
LT	453,03%	236,01%	-26,23%	227,24%	21,76%	209,04%
MT	164,82%	204,21%	-255,38%	-63,41%	-31,22%	-18,44%
PL	195,33%	230,98%	-228,53%	-33,80%	-2,27%	11,75%
SK	195,90%	232,89%	-222,90%	-33,54%	1,58%	3,29%
SI	193,20%	220,76%	-222,87%	-36,19%	-14,51%	13,80%

Source: Own calculations from CHELEM database.

TABLE V-II

CMSA BY TECHNOLOGY INTENSITY FOR EACH COUNTRY (1990-2013)

		EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
		<i>Product Effect</i>	<i>Market Effect</i>	<i>Mixed Str. Ef.</i>	<i>Product Effect</i>	<i>Market Effect</i>	<i>Mixed Str. Ef.</i>
CY	LOW	173,46%	235,66%	-228,28%	35,99%	86,90%	-79,17%
	MEDIUM	148,41%	168,08%	-138,01%	-43,08%	-40,74%	44,76%
	HIGH	270,75%	197,50%	-221,69%	-37,79%	-41,08%	39,98%
CZ	LOW	171,25%	224,93%	-222,74%	-10,45%	19,43%	-17,75%
	MEDIUM	215,73%	222,91%	-213,20%	-5,55%	-5,04%	6,75%
	HIGH	239,94%	270,39%	-228,24%	-25,74%	-23,13%	27,21%
EE	LOW	254,28%	211,09%	-238,78%	87,85%	54,77%	-75,62%
	MEDIUM	213,65%	239,07%	-218,24%	-23,79%	-19,37%	23,06%
	HIGH	172,28%	245,54%	-219,08%	-47,41%	-46,49%	46,80%
HU	LOW	211,68%	221,89%	-220,37%	24,54%	30,26%	-25,24%
	MEDIUM	226,76%	221,12%	-206,78%	-13,63%	-15,54%	18,94%
	HIGH	290,01%	269,24%	-243,66%	-22,20%	-24,12%	26,27%
LV	LOW	487,48%	235,21%	-49,36%	339,16%	105,45%	102,31%
	MEDIUM	196,47%	250,80%	-239,89%	-44,69%	-40,17%	41,10%
	HIGH	366,01%	259,73%	-300,19%	-47,70%	-48,31%	48,07%
LT	LOW	505,00%	252,60%	2,72%	317,20%	102,71%	130,41%
	MEDIUM	190,51%	247,99%	-264,71%	-32,63%	-23,70%	21,39%
	HIGH	253,34%	251,60%	-276,16%	-47,03%	-47,05%	46,78%
MT	LOW	182,49%	217,72%	-252,44%	-47,49%	-36,19%	24,80%
	MEDIUM	221,53%	195,78%	-166,81%	-45,95%	-47,69%	49,64%
	HIGH	140,48%	178,86%	-261,26%	28,43%	48,33%	-91,60%
PL	LOW	181,47%	225,49%	-233,00%	16,79%	46,20%	-48,34%

	MEDIUM	210,63%	226,26%	-215,18%	-11,08%	-8,41%	10,93%
	HIGH	253,99%	252,00%	-228,96%	-35,03%	-34,99%	36,22%
SK	LOW	168,88%	228,65%	-222,52%	12,95%	54,74%	-54,92%
	MEDIUM	229,12%	229,76%	-221,28%	-16,59%	-17,09%	18,51%
	HIGH	393,17%	269,96%	-257,35%	-27,37%	-34,36%	34,92%
SI	LOW	174,37%	210,04%	-232,53%	-18,33%	-0,70%	-9,97%
	MEDIUM	199,96%	205,30%	-190,98%	8,30%	10,07%	-4,49%
	HIGH	246,36%	255,49%	-227,31%	-19,07%	-17,94%	21,51%

Source: Own calculations from CHELEM database.

TABLE V-III

EXPORTS VALUE ABSOLUTE VARIATION BY TECHNOLOGY INTENSITY FOR EACH

COUNTRY FROM 1990 TO 2013²⁰

	LOW	MEDIUM	HIGH
CY	109,30	403,79	322,75
CZ	18930,14	31355,36	24459,59
EE	2388,36	1187,89	2410,57
HU	8506,19	18108,59	17468,61
LV	2251,33	287,45	331,20
LT	4541,43	1855,68	673,31
MT	391,35	408,29	171,50
PL	36712,09	33123,76	19709,66
SK	8691,79	15648,87	8802,30
SI	2240,42	3747,71	2394,98

Source: Own calculations from CHELEM database.

²⁰ The results are expressed in thousands of USD and are calculated using the original total effect proposed by Leamer & Stern (1970): $\sum_i \sum_j X_{ij,t} - \sum_i \sum_j X_{ij,t-1}$.

TABLE VI-II

CMSA BY SPECIALIZATION FACTORS FOR EACH COUNTRY (1990-2013)

		EXPORTS GROWTH RATE			RELATIVE SPECIALIZATION PERFORMANCE		
		<i>Product Ef.</i>	<i>Market Ef.</i>	<i>Mixed Str. Ef.</i>	<i>Product Ef.</i>	<i>Market Ef.</i>	<i>Mixed Str. Ef.</i>
CY	NAT. RES.	173.00%	294.99%	-312.22%	1.48%	56.60%	-64.00%
	L. COSTS	177.13%	175.22%	-132.71%	37.86%	37.14%	-19.91%
	SC. ECON.	124.34%	148.16%	-122.54%	-30.80%	-28.35%	31.19%
	PROD. DIF.	218.22%	123.96%	-191.61%	-16.39%	-19.10%	17.15%
	R&D	297.13%	249.14%	-250.41%	-37.02%	-38.60%	38.54%
CZ	NAT. RES.	198.56%	289.74%	-277.05%	-24.92%	-1.15%	5.35%
	L. COSTS	154.50%	168.79%	-176.15%	-0.81%	1.54%	-3.12%
	SC. ECON.	173.62%	200.30%	-189.61%	0.27%	5.69%	-3.82%
	PROD. DIF.	165.37%	208.27%	-196.98%	-2.21%	2.35%	-1.15%
	R&D	304.65%	285.80%	-269.61%	-14.07%	-16.52%	18.30%
EE	NAT. RES.	266.61%	264.62%	-294.75%	104.55%	103.42%	-123.56%
	L. COSTS	165.17%	168.79%	-158.24%	-4.82%	-4.30%	5.82%
	SC. ECON.	219.48%	223.93%	-202.51%	-25.27%	-24.90%	26.70%
	PROD. DIF.	180.32%	238.06%	-172.38%	-18.43%	-17.12%	18.61%
	R&D	281.97%	234.78%	-296.64%	-39.39%	-40.55%	39.02%
HU	NAT. RES.	244.79%	283.48%	-260.77%	-0.81%	11.17%	0.17%
	L. COSTS	188.17%	168.72%	-179.13%	27.23%	21.22%	-23.92%
	SC. ECON.	186.55%	193.64%	-190.64%	-18.16%	-17.56%	17.80%
	PROD. DIF.	206.54%	226.80%	-186.56%	-1.53%	-0.09%	3.80%
	R&D	347.83%	272.00%	-299.22%	-18.03%	-24.23%	22.21%
LV	NAT. RES.	496.44%	305.53%	-113.58%	363.71%	191.55%	16.45%
	L. COSTS	189.04%	164.40%	-155.64%	-15.99%	-17.60%	18.18%
	SC. ECON.	190.87%	227.44%	-228.55%	-36.39%	-35.00%	34.97%
	PROD. DIF.	215.05%	222.35%	-194.99%	-21.96%	-21.93%	22.02%
	R&D	358.83%	301.46%	-318.59%	-42.60%	-43.21%	43.03%
LT	NAT. RES.	528.82%	305.90%	-26.55%	331.75%	156.98%	77.40%
	L. COSTS	158.58%	174.58%	-158.76%	-15.21%	-13.89%	15.22%
	SC. ECON.	228.74%	232.06%	-277.82%	-16.62%	-16.00%	10.84%
	PROD. DIF.	172.97%	257.08%	-199.18%	-20.39%	-19.30%	20.05%
	R&D	310.89%	272.45%	-327.22%	-42.00%	-42.55%	41.77%
MT	NAT. RES.	306.97%	315.08%	-347.91%	-67.03%	-66.76%	65.59%
	L. COSTS	168.50%	169.23%	-201.94%	23.33%	23.40%	-33.32%
	SC. ECON.	239.13%	184.02%	-153.05%	-32.17%	-34.80%	36.25%
	PROD. DIF.	171.04%	200.09%	-183.21%	-13.49%	-11.93%	12.85%
	R&D	138.06%	198.42%	-289.53%	24.36%	53.80%	-97.78%
PL	NAT. RES.	183.60%	289.45%	-289.58%	-1.94%	41.00%	-37.36%
	L. COSTS	183.95%	163.89%	-169.89%	23.16%	17.26%	-19.56%
	SC. ECON.	179.24%	194.06%	-203.87%	-15.96%	-14.37%	12.77%
	PROD. DIF.	217.16%	211.33%	-184.11%	-7.33%	-7.81%	9.57%
	R&D	293.69%	295.63%	-294.70%	-27.25%	-27.29%	27.41%
SK	NAT. RES.	212.40%	303.00%	-263.58%	-22.62%	-0.54%	6.34%
	L. COSTS	149.62%	162.64%	-178.50%	2.89%	5.39%	-8.76%
	SC. ECON.	163.26%	191.41%	-190.19%	15.24%	24.05%	-23.99%
	PROD. DIF.	167.28%	205.18%	-190.80%	-12.97%	-10.87%	11.66%
	R&D	404.24%	275.65%	-293.26%	-13.55%	-24.13%	22.65%
SI	NAT. RES.	159.77%	248.00%	-256.52%	-59.04%	-48.94%	48.09%
	L. COSTS	184.74%	169.76%	-195.95%	47.61%	41.66%	-51.30%
	SC. ECON.	191.63%	187.56%	-174.39%	5.06%	3.94%	-0.46%
	PROD. DIF.	212.46%	219.40%	-184.64%	10.44%	11.53%	-6.03%
	R&D	279.69%	267.98%	-269.44%	-33.18%	-33.75%	33.74%

Source: Own calculations from CHELEM database.

TABLE VII-II

EU15 MARKETS' CONTRIBUTION TO THE TEN COUNTRIES' COMPETITIVENESS EFFECT²¹

	1990-2013	1990-1996	1996-2004	2004-2008	2008-2013
DE	46,75%	56,29%	50,47%	22,81%	43,63%
AT	5,40%	9,54%	3,83%	-0,37%	4,23%
DK	2,35%	1,81%	1,68%	3,90%	1,75%
ES	4,12%	1,21%	5,41%	6,45%	6,05%
FI	1,67%	1,78%	1,59%	0,39%	2,12%
FR	9,55%	6,55%	8,78%	16,42%	3,58%
GR	0,67%	-0,21%	0,38%	2,21%	1,19%
IE	0,35%	0,07%	0,46%	1,16%	0,35%
IT	7,36%	5,28%	6,58%	15,63%	7,91%
NL	3,08%	4,10%	3,56%	8,66%	8,39%
PT	0,64%	0,32%	0,87%	-0,29%	1,15%
UK	9,26%	6,04%	7,32%	14,40%	12,61%
SE	4,38%	3,54%	4,55%	4,50%	2,72%
BE	4,22%	3,55%	4,37%	3,41%	4,48%
LU	0,20%	0,13%	0,16%	0,74%	-0,17%

Source: Own calculations from CHELEM database.

TABLE VIII-II

EU15 MARKETS' CONTRIBUTION TO EACH TEN COUNTRIES' COMPETITIVENESS

EFFECT (1990-2013)²²

	CY	CZ	EE	HU	LV	LT	MT	PL	SK	SI
C.E.	-	+	+	+	-	-	-	+	+	-
DE	17,75%	48,61%	-2,26%	52,44%	10,78%	-209,75%	26,46%	45,00%	47,58%	122,47%
AT	5,45%	6,84%	0,63%	2,12%	-0,31%	-8,81%	3,21%	1,07%	9,71%	-50,15%
DK	3,54%	1,43%	6,83%	1,66%	-4,42%	-42,33%	-4,82%	2,49%	1,04%	-6,30%
ES	10,67%	3,88%	0,56%	5,61%	0,02%	126,05%	-4,88%	4,08%	4,82%	0,21%
FI	8,69%	0,61%	4,53%	-0,22%	-2,99%	-40,93%	0,43%	0,80%	0,21%	0,19%
FR	13,85%	8,46%	3,47%	8,54%	4,83%	-84,84%	13,14%	9,84%	9,54%	4,81%

²¹ Results are given considering the relative specialization performance CMSA's competitiveness effect. The formula used for the calculation of the contribution of each destination market j is given by

$$\frac{\sum_i \theta_{ij}(g_{ij} - g_{ij}^*)}{\sum_i \sum_j \theta_{ij}(g_{ij} - g_{ij}^*)}$$

²² Results are given considering the relative specialization performance CMSA's competitiveness effect.

GR	-106,65%	0,18%	0,02%	0,64%	-0,08%	-2,04%	-26,40%	0,42%	0,33%	-2,86%
IE	10,04%	0,43%	0,07%	0,13%	1,58%	-9,38%	1,70%	0,27%	0,18%	1,86%
IT	6,09%	5,68%	1,11%	8,40%	-0,61%	-44,18%	58,86%	7,97%	10,07%	31,73%
NL	-16,23%	7,52%	-0,41%	5,65%	93,67%	260,05%	-3,40%	6,24%	4,47%	-2,67%
PT	0,17%	0,44%	0,58%	0,41%	-0,06%	-3,61%	-2,09%	0,44%	0,35%	-2,17%
UK	143,89%	8,42%	4,60%	9,75%	-4,51%	178,31%	23,08%	12,26%	5,23%	-4,23%
SE	1,43%	2,17%	77,35%	1,29%	2,24%	-106,07%	1,97%	4,69%	3,05%	3,80%
BE	1,98%	5,22%	2,91%	3,48%	-0,15%	87,36%	12,79%	4,25%	3,40%	2,42%
LU	-0,68%	0,11%	0,00%	0,09%	0,01%	0,17%	-0,05%	0,18%	0,04%	0,89%

Source: Own calculations from CHELEM database.