Portuguese export performance in the 2000s: an evaluation for the European Market

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I. Introduction

Portugal, along with other peripheral European Union economies, had several challenges to the traditional wage-cost model of specialization in the past fifteen years, including the emergence of new competitors in the niche occupied by Portugal with China's entry to the World Trade Organization in 2001, the end of the multi-fibre agreement in 2005 and the eastern enlargements of the EU in 2004 and 2007. Internally, adoption in Portugal of a strong currency (the euro) in 1999 not only contributed to a notable appreciation of the effective exchange rate[1] but raised real wages thus reducing cost competitiveness[2]. This paper focuses the performance of Portuguese merchandise exports in this period, more precisely from 1999

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[1] The effective exchange rate increased more than 20 per cent between 1988 and 2006 (Amador et al, 2009).

[2] See, for instance, Bento (2009) and Mendonça (2012).

to 2014, to the first fifteen Member-States of the European Union, in which Portugal is not included (EU15). Considering that more than 80 per cent of Portuguese merchandise exports were channelled to this group of countries[3] in the beginning of the period under scrutiny, the analysis of the performance of those exports to this particular market is particularly relevant.

The study is based on a descriptive analysis of the productive structure of merchandise exports to the EU15 and a Constant Market Share (CMS) analysis, which allows to disentangle the export growth into several components, analytically interpretable, including one usually related to competitiveness. The CMS used is the version of Leamer and Stern (1970), which allows to breakdown the variation of exports into several components including the contribution of the specialization pattern and the geographical orientation of trade on the aggregate behaviour of exports, and a residual term usually related to external competitiveness. This version, in turn, is adapted to include the correction proposed by Milana (1988).

We consider the exports of manufactured products as defined by the CHELEM (Comptes Harmonisés sur les Echanges et L'Économie Mondiale) – International Trade database created by the CEPII (Centre d'Etudes Prospectives et d'Informations Internationales) research centre. This database contains the bilateral flows of traded goods expressed in millions of current US Dollars[4] for 72 manufactured products.

Results are presented by grouping the 72 products into 12 groups (supply chains). The list of groups as well as the range of products comprising each group is available in Table 7 in the appendix. The 72 manufactured goods were also grouped into two different classifications of sectors based on Fernandes (2003): one

[3] Spain, Germany and France are the three most important export destinations.

[4] A drawback of using nominal values is that it is not possible to distinguish between the volume and the price components of export performance. Like most studies carried out in the past with CMA, this study was conditioned by the non-existence of data on external trade deflators disaggregated by country.

considering the technological intensity and another the specialization factors of the categories of manufactured products exported.

The paper is structured as follows: section 2 provides a brief description of the productive structure of Portuguese merchandise exports to the EU15, including revealed comparative advantages and trade complementarity towards the EU15, section 3 presents the CMS analysis and section 4 concludes.

II. Productive structure of Portuguese exports to the EU15

Table 1 provides a picture on the evolution of Portuguese merchandise exports to the EU15 in the period under analysis. In nominal terms, from 1999 to 2014, Portugal's merchandise exports to the EU15 grew 108 per cent. However, there are important differences in the export variation over the period analysed: after a two year decrease of 5 per cent, from 1999 to 2001, Portuguese exports to the EU15 grew unstoppably from 2001 until 2008 at an average of more than 10 per cent per year; in 2009, exports decreased 18 per cent, reaching a lower value than the one registered in 2006; then, until 2012, exports kept on growing once again at an average of 17 per cent per year, having registered a decrease of 8 per cent in 2012; from 2012 to 2014, exports grew at a pace of 5 per cent per year.

Table 1: Portuguese merchandise exports to the EU15

	Nominal exports*	Weight (%) in total exports	Market share (%) in the EU15
1999	20158,00	82,3	0,99
2000	19405,99	79,8	0,89
2001	19137,50	79,5	0,88
2002	20513,57	79,4	0,90
2003	25238,92	79,3	0,93
2004	28880,41	65,1	0,89
2005	27826,05	73,0	0,78
2006	31067,15	71,7	0,76
2007	35370,84	68,7	0,76
2008	36854,83	65,9	0,71
2009	30118,41	69,4	0,77
2010	33871,19	69,5	0,76
2011	41304,61	69,3	0,80
2012	38105,42	65,5	0,79
2013	41101,22	65,5	0,84
2014	41852,19	65,4	0,84

*millions of USD
Source: Own calculations from CHELEM Database

Despite the growth in exports, the market share in the EU15 decreased from almost one per cent in 1999 to 0,84 per cent in 2014, which points out that Portuguese exports lost competitiveness in this traditional destination market. A positive note is the slight increase in this quota in the end of the period in comparison to the previous seven years. The share of EU15 destination market in total Portuguese merchandise exports also decreased over the period analysed (17 p.p. from 1999 to 2014), to the extent that Portugal diversified its export destinations to non-European markets, in particular to Angola and USA.

Focusing now the Portuguese merchandise exports to the EU15 at the sectoral level (supply chains), Tables 2.a and 2.b show their evolution. We observe that the main sectors in the beginning of the period were, by decreasing order and in percentage of total exports, textiles (28%), automotive (17%), wood-paper (10%), chemical (10%), electrical (8%), machinery (9%), food (7 %) and electronic (7%); while in the end of the period, they were chemicals (17 %), textiles (16 %), food (13 %), automotive (12%), wood-paper (11 %), machinery (10 %), electrical (5 %) and electronic (4 %). The weight of each sector has thus undergone significant changes over the period analysed, being the greatest variation observed in textiles, which lost 12 percentage points (p.p.), in part replaced by chemicals, which increased 7 p.p.. Also noteworthy is the decrease in the share of the automotive industry in 5 p.p. and the increase in the share of food products in 6 p.p. Electric and electronic sectors, less represented in the beginning of the period, decreased their weight in 4 p.p. and 3 p.p., respectively. Important changes in the export structure may, of course, also have occurred inside sectors.

Table 2.a: Structure of Portuguese merchandise exports to the EU15 by supply chains (%)

	Energy	Food	Textiles	Wood-Paper	Chemical	Iron-Steel
1999	0,78	7,16	28,61	10,32	9,75	1,51
2000	1,18	7,34	26,08	11,53	10,37	1,79
2001	0,86	7,52	26,85	10,80	10,24	1,65
2002	1,04	8,06	25,41	11,06	11,07	1,79
2003	1,22	8,16	22,98	11,77	12,04	2,08
2004	1,58	8,47	20,85	11,57	13,20	2,97
2005	3,13	9,20	18,76	8,87	13,93	3,26
2006	2,93	9,12	16,84	8,52	14,13	3,84
2007	2,05	10,36	17,17	8,67	15,78	4,43
2008	3,72	11,40	16,26	8,56	15,26	3,78
2009	2,57	12,35	16,71	10,83	15,02	2,43
2010	3,26	12,60	16,41	10,53	16,73	2,84
2011	3,36	12,00	16,15	11,01	16,76	2,78
2012	4,85	12,49	15,64	10,83	17,14	2,39
2013	7,77	12,70	15,46	10,76	17,21	2,23
2014	6,34	13,30	16,34	10,93	16,83	2,37

Source: Own calculations from CHELEM Database

Table 2.b: Structure of Portuguese merchandise exports to the EU15 by supply chains (%) (cont.)

	Non-ferrous	Machinery	Automotive	Electrical	Electronic	Others
1999	1,19	7,56	17,16	8,26	7,30	0,40
2000	1,61	7,78	16,47	8,90	6,51	0,45
2001	1,52	7,77	17,79	6,94	7,69	0,37
2002	1,35	8,55	16,84	7,68	6,79	0,35
2003	1,38	8,53	17,36	6,41	7,66	0,41
2004	2,05	9,29	16,84	5,48	7,29	0,43
2005	2,58	9,16	16,13	4,47	6,54	3,95
2006	3,79	9,97	14,80	4,58	7,76	3,71
2007	3,74	10,70	14,11	4,94	5,58	2,47
2008	3,50	10,93	13,43	4,72	5,55	2,89
2009	2,52	9,37	12,82	4,15	4,68	6,54
2010	3,32	9,31	13,74	4,38	4,83	2,05
2011	3,10	8,79	14,88	4,79	4,52	1,86
2012	2,64	9,52	12,61	5,17	4,15	2,57
2013	2,04	9,53	11,86	4,83	4,21	1,38
2014	1,85	10,11	12,22	4,78	4,07	0,86

Source: Own calculations from CHELEM Database

Turning to the structure of Portuguese exports by specialization factors, presented in Table 3, we group the 72 products of the CHELEM database according to Fernandes (2003) typology. It is worth highlighting that products based on product differentiation and R&D lost importance over the period analysed, meaning a modest weight of 8 %. and 7 %, respectively, of total exports in the end of the period. In turn, natural resources based products significantly increased their importance, in 9 p.p. (reaching 28 %. of total exports in 2014), mainly due to exports of mineral fuels, while products based on labour costs lost more than 11 p.p. between the

beginning and the end of the period, as expected due to increased international competition, though sill weighting 28 % of total exports in 2014. Sectors based on scale economies, which include the automotive industry, maintained a relatively constant weight over the 15 years analysed, near 30 % of total exports.

Table 3: Structure of Portuguese merchandise exports to the EU15 by specialization factors (%)

	Natural Resources	Labour Costs	Scale Economies	Product Differentiation	R&D	Others
1999	18,86	39,79	29,22	12,14	10,49	0,74
2000	18,49	33,70	26,02	11,71	9,13	0,95
2001	17,38	34,87	27,36	9,66	9,88	0,85
2002	18,34	33,63	27,23	10,61	9,40	0,78
2003	18,92	31,86	28,77	9,43	10,15	0,88
2004	18,91	31,23	29,99	8,55	10,17	1,15
2005	18,53	29,28	29,62	7,29	9,95	5,33
2006	18,50	28,67	29,39	7,70	11,12	4,62
2007	19,33	29,64	29,99	8,51	9,38	3,15
2008	21,52	28,58	28,81	8,11	9,42	3,54
2009	23,38	27,97	27,11	6,92	7,82	6,81%
2010	24,47	28,25	29,68	7,17	8,49	1,94
2011	24,77	27,72	30,50	7,54	8,23	1,23
2012	27,66	27,31	28,18	7,96	8,09	0,79
2013	29,41	26,69	26,84	7,69	8,45	0,93
2014	27,78	28,09	27,68	7,99	7,45	1,02

Source: Own calculations from CHELEM database and typology of Fernandes (2003)

Considering exports disaggregated by the degree of technological intensity (according to the typology of Fernandes, 2003) we observe, in Table 4, that low technological intensive exports predominate (almost 56 % of total exports in 2000) and increased their share during the period analysed in 3 p.p.. On the contrary, exports

based in high technological intensity lost weight, as they were 17 % of total exports in 1999 and only 11 % in 2014. With respect to exports based in medium technological intensity, they increased from 26 % of total in 1999 to 29 % in 2014.

Table 4: Structure of Portuguese merchandise exports to the EU15 by technological intensity (%)

	Low technological intensity	Medium technological intensity	High technological intensity	Others
1999	55,73	26,29	17,32	0,67
2000	54,87	26,83	17,35	0,95
2001	54,95	27,78	16,42	0,85
2002	55,12	27,67	16,43	0,78
2003	54,27	29,11	15,75	0,88
2004	54,03	30,26	14,56	1,15
2005	51,65	30,33	12,69	5,33
2006	50,21	31,06	14,11	4,62
2007	52,98	31,20	12,67	3,15
2008	54,02	29,87	12,57	3,54
2009	54,70	27,25	11,23	6,81
2010	55,63	30,93	11,51	1,94
2011	55,33	32,11	11,32	1,23
2012	57,73	29,89	11,59	0,79
2013	59,13	28,76	11,18	0,93
2014	59,22	28,89	10,88	1,02

Source: Own calculations from CHELEM database and typology of Fernandes (2003).

In sum, it is possible to witness over the period under analysis that sectors characterized by an intensive use of natural resources and low technological level registered the highest increases in Portuguese exports (mainly explained by exports of mineral fuels, classified as a low technological product, which meant around 10

% of Portuguese exports in the end of the period), and predominate together with sectors based in labour costs and scale economies. However, textiles and automotive products, the predominant sectors in Portuguese exports in the beginning of the decade, lost weight (12 p.p. and 5 p.p., respectively), while the food supply and the chemical sectors, a type of predominantly low and medium technology products, have gained share (6 p.p. and 7 p.p., respectively). The share of high technology sectors decreased more than 6 p.p. , explained by the simultaneous decrease of the exports of vehicles, electronic and electrical products.

Portugal´s revealed comparative advantages and trade complementary to the EU15

A popular way of evaluating the potential of a country's export structure is using the index of Balassa to capture the revealed comparative advantage (RCA)[5]. It can be defined as:

$$RCA_{i,s} = \frac{\frac{X_{i,s}}{X_i}}{\frac{M_{j,s}}{M_j}}$$

where *s* is the product; *i* is the exporting country; *j* is the importing area (UE15); *X* are the exports; and *M* are the imports.

Applying this index to Portuguese exports to the EU15 by supply chains, we observe, in Table 5 below, that the sectors recording revealed comparative advantage (RCA greater than one) in all the sub periods analysed in this table were, by increasing order, electrical, automotive, wood-paper and textile; while chemical reaches a value greater than one only in the last sub-period (2011-14) and the food supply chain since 2007-2010.

[5] For criticism on this index, see Yeats (1985).

Table 5: Portugal's revealed comparative advantage to the EU15* by supply chains

Energy	0,13	0,21	0,22	0,34	0,22
Machinery	0,59	0,75	0,85	0,83	0,76
Non-ferrous	0,60	0,93	1,10	0,81	0,86
Food	0,81	0,99	1,26	1,26	1,08
Automotive	1,59	1,53	1,52	1,56	1,55
Textiles	3,78	3,14	2,81	2,62	3,09

*arithmetical average of the selected period.
Source: Own calculations from CHELEM database.

In addition to the Balassa index, we present the Trade Complementarity Index (TCI) proposed, for instance, by Castilho and Flores (2005). This Index allows to understand if the bilateral trade flows are complementary, i.e. if the comparative advantage in products exported by Portugal is complemented by a comparative disadvantage in these products in the case of the EU15 countries. It analyses the correspondence between the supply from the exporter country with the demand from the trade partner and it is defined as follows:

$$TCI = C_{ij}^{s} = \frac{\frac{X_{iW}^{s}}{\sum_{s} X_{iW}} * \frac{M_{jW}^{s}}{\sum_{s} M_{jW}}}{\left(\frac{M_{WW}^{s}}{\sum_{s} M_{WW}^{s}}\right)^{2}}$$

where, *s* is the product; *i* is the exporting country; *j* is the importing area (EU15); *W* is the World; *X* are the export; and *M* are the imports.

If TCI is greater than 1 it signals trade complementarity, as the exporter country shows a superior competitiveness and satisfies the demand of the trade partner. Table 6 shows the results for the TCI by supply chains.

Table 6: Portugal's Trade Complementary Index to the EU15 by supply chains*

Energy	0,15	0,20	0,24	0,36	0,24
Iron-Steel	0,61	0,65	0,65	0,68	0,65
Machinery	0,67	0,74	0,83	0,89	0,78
Chemical	0,97	1,06	1,25	1,45	1,18
Automotive	1,72	1,66	1,77	1,73	1,72
Textiles	3,54	2,88	2,94	2,98	3,08

*arithmetical average of the selected period.
Source: Own calculations from CHELEM database.

Interesting enough, qualitative results for TCI are very similar to the previous ones for RCA, thus reinforcing the advantage of supply chains with revealed comparative advantage in the EU15 market. Textiles supply chain presents, as it did in the RCA index, the greatest trade complementarity, while food, automotive and wood-paper supply chains also present positive complementarity.

Comparing the results of Portugal's revealed comparative advantages and trade complementarity towards the EU15, it is possible to witness that Portuguese external competitiveness is highly inclined towards low technology sectors, highly intensive in la-

bour and natural resources, such as food, wood-paper and textiles. The automotive supply chain also presents a revealed comparative advantage and trade complementarity towards the EU15, explaining the significant presence of scale economies and medium technology in exports.

III. Constant Market Share Analysis

In this section, we complement previous results with a constant market share (CMS) analysis. Its implementation is based on the 72 products of the Chelem database. The first use of this technique in 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.

As mentioned in the introduction, we use in this study one of the most influential versions of the CMS analysis, made by Leamer and Stern (1970). This version decomposes the export growth into several components including one usually related to competitiveness after controlling the contribution of the specialization pattern and the geographical orientation of trade on the aggregate behaviour of exports.

Notwithstanding the widespread use of Leamer and Stern (1970) version, several limitations have been pointed out to their approach, especially by Richardson (1971)[6]. The main critique pointed by the author is that the product and market effects are calculated in an asymmetric way, making the effects to vary substantially, depending on which one is calculated first. Milana (1988) proposed as a solution for this problem to calculate the interaction term between the product and market effects separately, in a residual term.

[6] For a discussion of the main shortcomings of this type of methodology, see Ahmadi-Esfahani (2006).

Note that the interpretation of this new term in not straightforward (Abreu *et al*, 2005) and is usually not taken into consideration. Milana's proposal has been largely applied ever since (see, for instance, Abreu *et al*, 2005).

This study uses the Leamer and Stern (1970) decomposition with Milana (1988)´s proposal. The identity is based on the export growth and can be expressed in two steps. First we aggregate the product and market effect into a so-called structure effect, as follows:

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

where X corresponds to the nominal value of Portuguese exports of manufactured goods to the EU15; X^* means the equivalent notion for world exports; i is the category of manufactured goods; j corresponds to the EU15 destination market; $t - 1$ and are the initial and final years of the selected period, respectively; S corresponds to the share of Portuguese exports over the total world exports to the same destination market, in year t-1; and ΔX^* (ΔS) expresses the variation of X* (S) between and $t - 1$.

The total effect corresponds to the total growth of exports in manufactured goods of Portugal to the EU15. It can be decomposed in two main effects: the structure effect and the competitiveness effect.

The structure effect, which Leamer and Stern (1970) referred as the demand side of the phenomenon under study, expresses the growth of Portuguese exports to the EU15 if it had varied alongside the world exports to the EU15, considering each category of goods and destination market.

The competitiveness effect is the difference in market shares between periods t and $t - 1$ multiplied by the value of world exports to the EU15 in period t. It is commonly related to the exporter´s price and non-price competitiveness.

In a second step, the structure effect is decomposed taking into the consideration the correction of Milana (1988). The result is as follows:

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

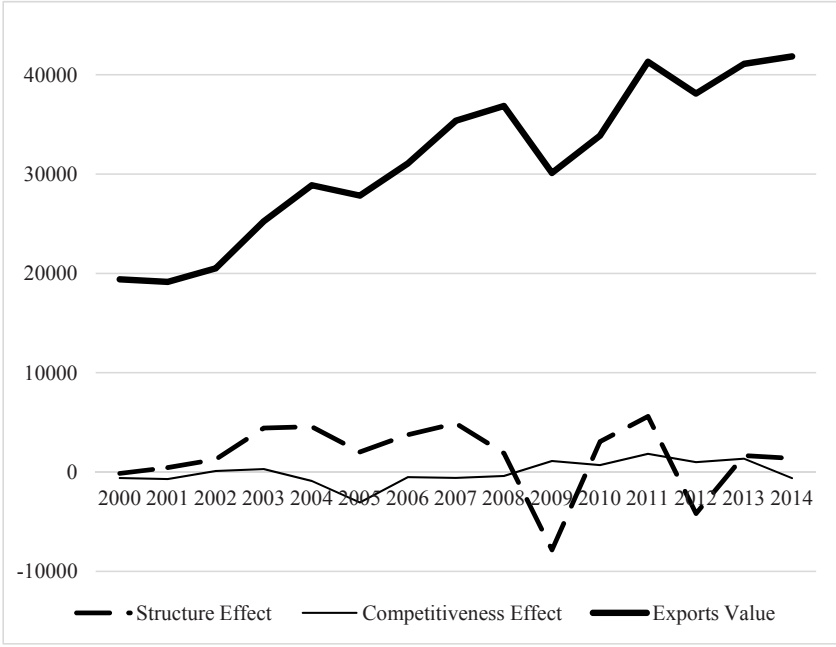
The product effect shows the contribution of the export specialization pattern of Portugal for the total export variation of the country. It indicates which portion of Portuguese export growth is due to a higher market share, at period $t - 1$, in certain goods. If the value is positive, it means there is a growing demand from the EU15 economies in the products in which Portugal had a higher initial market share.

The market effect measures the impact of the geographical specialization on the variation of total exports. It specifies which portion of Portuguese export growth is due to a higher market share, at period , in certain EU15 destination markets. If the value is positive, it means there is a growing demand in the EU15 economies in which Portugal had a higher initial market share.

To complete the structure effect, there is a residual term, as suggested by Milana (1988), the mixed structure effect.

To implement the CMS analysis were considered the 72 products of the CELEM database. Graph 1.a and Table 8.a in the appendix present the results for Portugal of the first step of the CMS analysis above explained, calculated for annual variations. One of the main conclusions to be extracted is that the competitiveness effect is low and positive only in the years 2002 and 2003 and from 2009 onwards; however, in the last year of this analysis the competitiveness effect became again negative.

Graph 1.a: CMS decomposition of the export growth of Portuguese nominal merchandise exports into the structure and competitiveness effect

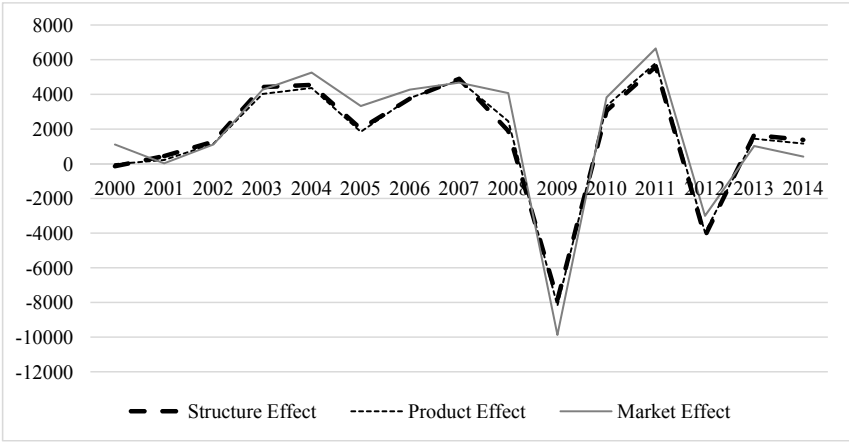


Source: own calculations from CHELEM database.

In what concerns the structure effect, related to demand in the EU15 market, it is always positive since 2001 but during the worse period of the 2008-9 crisis and again in 2012, confirming the importance of EU15 demand for Portuguese exports´ growth.

Decomposing now the structure effect, Graph 1.b and table 8.b in the appendix show that the positive evolution of the product and the market effects are very similar, reinforcing the importance of the EU15 demand for Portuguese growth of exports as its variation (either positive or negative) affects similarly both the demand for products in which Portugal is more specialized (product effect) and the demand of the main destination EU15 markets of Portugal (market effect).

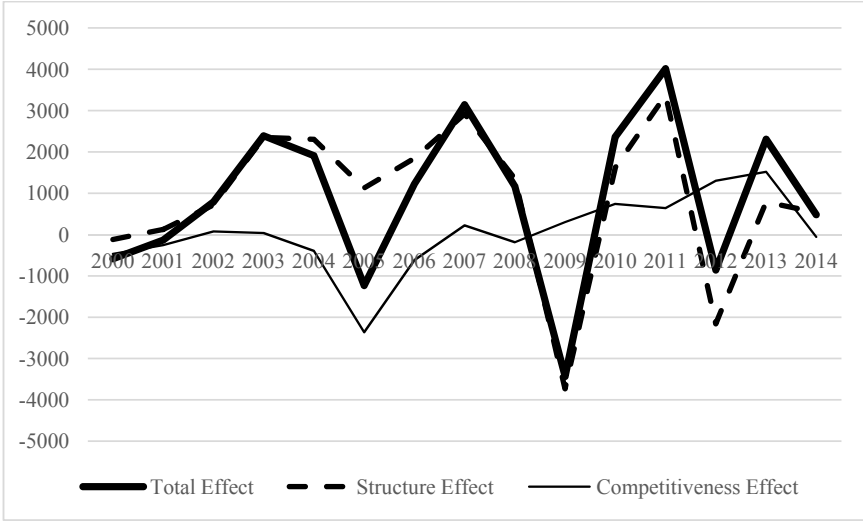
Graph 1.b: CMS decomposition of the structure effect



Source: own calculations from CHELEM database.

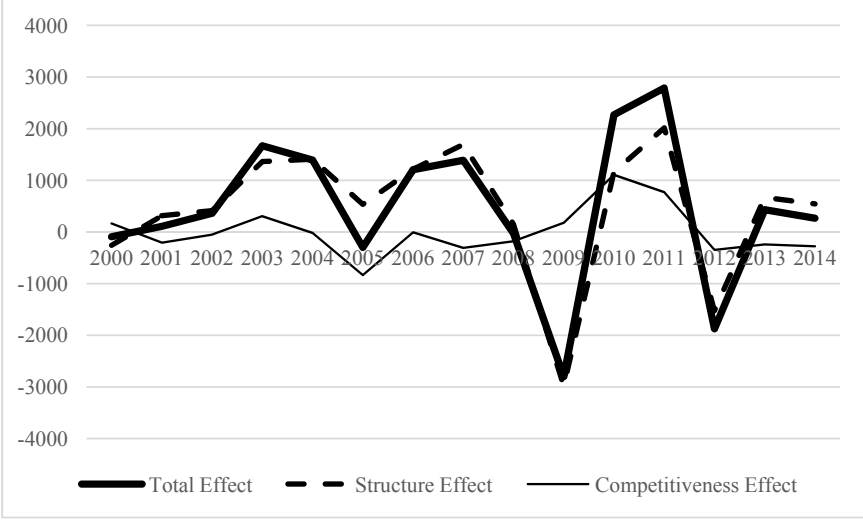
Finally, we have decomposed the export growth by grouping the 72 sectors of the CHELEM database according to Fernandes (2003)'s typology for the technological level (group of graphs 2 and Table 9 in the appendix). For ease of presentation we show only the results for the first step. Results for the second step are available upon request.

Graph 2.1: CMA decomposition of the export growth of Portuguese nominal merchandise exports with low technological intensity



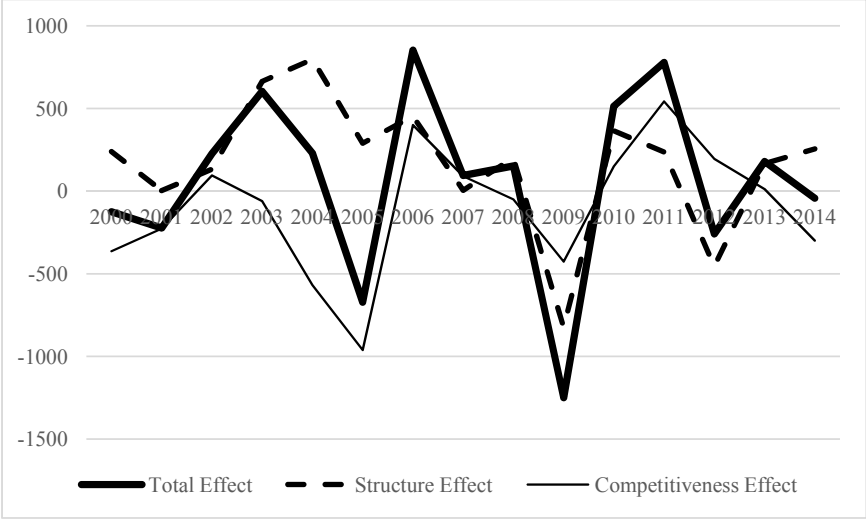
Source: Own calculations from CHELEM database

Graph 2.2:NCMA decomposition of the export growth of Portuguese nominal merchandise exports with medium technological intensity



Source: Own calculations from CHELEM database

Graph 2.3: CMA decomposition of the export growth of Portuguese nominal merchandise exports with high technological intensity



Source: Own calculations from CHELEM database

Graphs 2 denote a positive and increasing competitiveness effect in the case of low and medium technological intense products since the end of the first decade of the new century, signalling that Portuguese producers most likely moved into more sophisticated and technology-intensive production as a reaction to the significant increases in world-wide competition resulting from the intensive participation of new players in international trade in the beginning of the 2000s[7].

However, Graphs 2 also highlight that the deterioration of global competitiveness observed in the end of the period analysed is explained by the trend occurring in all categories of technological intensity exports. Namely, low technology exports registered a negative value in 2014 due to an intense decrease after growing from 2011 to 2013; medium technology exports registered a negative

[7] With the rigid classification of the different sectors over the period analysed inherent to the adopted typologies, it is not possible to carry out this type of analysis.

value since 2012; and in high technology exports the competitiveness effect has been decreasing since 2011, registering a negative value in 2014. Noting that exports kept on growing due to a positive impact of the structure effect, these results are worrying in terms of prospects for future exports in times of demand contraction.

IV. Concluding Remarks

In the period analysed, the export growth of Portuguese merchandise exports to the EU15 was mainly sustained by the demand (structure) effect, both in terms of the demand for products in which Portugal is more specialized (product effect) and the demand in the main destination EU15 markets for Portuguese exports (market effect); a relevant exception was, as expected, the period marked by the economic crisis of 2008-9. Therefore, the alterations registered in the product composition of exports made a positive contribution to export growth to the EU15 in the first decade and a half of the 2000s.

On the contrary, the competitiveness effect detected with the CMS analysis for Portugal is low and frequently negative, namely between 2004 and the 2008-9 economic crisis. Such performance is registered in spite of Portuguese revealed comparative advantages being detected in many supply chains, namely textile, wood-paper, automotive and electrical supply, and the existence of complementarity between Portuguese supply and import demand in the destination markets of the EU15 in the case of these sectors.

Several factors explain the poor competitiveness of Portuguese merchandise exports in the community market in the 2000s but we highlight two[8]. First, traditional exports suffered increased competition in destination markets with increasing unit labour costs until 2010, as average wages outgrew productivity growth at home and wages paid in trading competitors[9]. Second, joining the euro

[8] For other constraints on Portuguese export performance, see Arnold (2015).

[9] See Arnold (2015).

in 1999 produced an expansionary monetary shock which greatly stimulated domestic demand and created an excess of expenditure on domestic production capacity; while the channelling of excess demand for imports worsened the external current account balance of the country, another part of the demand was addressed to the non-tradable goods sector, raising real wages above productivity growth[10] and the cost of intermediate inputs from non-tradable sectors, thus contributing to deterioration of the export competitiveness.

However, from 2009 onwards the competitiveness effect became positive, registering the highest value of the period under scrutiny in 2011, standing out, with little difference, also the year of 2013. Improving export competitiveness was a reaction to the 2008-9 economic crisis and the shrinkage of domestic market, hinted by a sharp decline in unit labour costs (OECD, 2014). Such fall is in part a result of the "adjustment program" imposed by the external intervention of "Troika" (the European Commission, the European Central Bank and the International Monetary Fund) between 2011 and 2013, on the verge of bankruptcy of state finances. Though a large part of the decrease in unit labour costs was attained with decreases in labour wages, intensified by an intense increase in unemployment, some reforms enhanced productivity (OECD,2014). According to OECD's Product Market Regulation Database (idem), Portugal's network sector barriers lowered between 2008 and 2013, overtaking Germany and positioning itself as the second country, in the OECD, with the lowest regulation. Transport sectors regulation also decreased during this period. This study shows, nonetheless, a widespread negative competitiveness effect in the end of the period under analysis; whether this expresses a reversal of the previous trend is a topic for future research.

[10] Between 1999 and 2007, unit labour costs showed a positive difference of 24% compared to Germany and 12.5% compared to the euro area average (Bento, 2009; Mendonça, 2012).

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Appendix

Table 7: Product classification based on chelem database and fernandes (2003)

Technological Level	
Low	Cement
	Ceramics
	Glass
	Iron and Steel
	First processing of iron
	Yarns and Fabrics
	Clothing
	Garment
	Carpet
	Leather
	Manufacture of wood
	Furniture
	Paper
	Prints
	Metal structures
	Hardware
	Iron ore
	Not elsewhere specified minerals
	Coal
	Crude oil
	Natural Gas
	Coke
	Refined petroleum products
	Cereals
	Other agricultural products
	Inedible agricultural products
	Cereal-based products
	Fats
	Fish and Meat
	Animal conserves
	Vegetable conserves
	Sugar
	Animal feed
	Beverages
	Manufactured tobaccos
	Jewellery
	Non-monetary gold
Medium	Non-ferrous metallurgy
	Engines
	Farms Equipment
	Machine tools
	Construction Machines and Equipment
	Watchmaking
	Elements of automobile vehicles
	Private automobiles
	Utility Vehicles
	Vessels
	Basic mineral chemistry

Specialization Factors	
Natural Resources	Cement
	Manufacture of wood
	Paper
	Not elsewhere specified minerals
	Coal
	Crude oil
	Natural Gas
	Coke
	Refined petroleum products
	Cereals
	Other agricultural products
	Inedible agricultural products
	Cereal-based products
	Fats
	Fish and Meat
	Animal conserves
	Vegetable conserves
	Sugar
	Animal feed
	Beverages
	Manufactured tobaccos
	Jewellery
	Non-monetary gold
Labour Costs	Non-ferrous metallurgy
	Yarns and Fabrics
	Clothing
	Garment
	Carpet
	Leather
	Furniture
	Metal structures
	Hardware
	Non-ferrous ores
Scale Economies	Ceramics
	Glass
	Iron and Steel
	First processing of iron
	Prints
	Elements of automobile vehicles
	Private automobiles
	Utility Vehicles
	Vessels
	Fertilizer
	Paintings
	Toiletries
	Plastics
	Plastic articles
	Rubber articles

	Fertilizer		Iron ore
	Basic organic chemistry	Product Differentiation	Engines
	Paintings		Farms Equipment
	Toiletries		Machine tools
	Plastics		Construction Machines and Equipment
	Plastic articles		Specialised machinery
	Rubber articles		Watchmaking
	Non-ferrous ores		Appliances
High	Specialised machinery		Electric material
	Weapons		Electrical products
	Measuring instruments	R&D	Weapons
	Optical instruments		Measuring instruments
	Electronic components		Optical instruments
	Consumer electronics		Electronic components
	Telecommunications equipment		Consumer electronics
	Computer hardware		Telecommunications equipment
	Appliances		Computer hardware
	Electric material		Aeronautics and Space
	Electrical products		Basic mineral chemistry
	Aeronautics and Space		Basic organic chemistry
	Pharmaceuticals		Pharmaceuticals

Table 8.a: CMS decomposition of the export growth of Portuguese merchandise nominal exports into the structure and competitiveness effect

	Total Effect	Structure Effect	Competitiveness Effect
2000	-752,01	-142,25	-609,76
2001	-268,49	440,01	-708,50
2002	1376,08	1269,88	106,20
2003	4725,34	4424,08	301,27
2004	3641,50	4549,59	-908,10
2005	-1054,36	2019,36	-3073,73
2006	3241,10	3752,03	-510,93
2007	4303,70	4894,38	-590,69
2008	1483,99	1890,24	-406,26
2009	-6736,42	-7841,86	1105,45
2010	3752,78	3056,28	696,49
2011	7433,42	5604,67	1828,75
2012	-3199,19	-4186,94	987,75
2013	2995,80	1652,89	1342,91
2014	750,98	1377,17	-626,19

Source: Own calculations from CHELEM database.

Table 8.b: CMS decomposition of the structure effect

	Structure Effect	Product Effect	Market Effect	Mixed Structure Effect
2000	-142,25	-24,99	1103,99	-1221,25
2001	440,01	212,73	21,17	206,10
2002	1269,88	1150,38	1108,40	-988,90
2003	4424,08	4023,77	4269,35	-3869,05
2004	4549,59	4367,29	5260,62	-5078,32
2005	2019,36	1844,11	3326,33	-3151,07
2006	3752,03	3794,96	4273,36	-4316,29
2007	4894,38	4820,05	4678,33	-4603,99
2008	1890,24	2452,07	4073,01	-4634,84
2009	-7841,86	-8181,60	-9872,21	10211,95
2010	3056,28	3329,10	3825,84	-4098,66
2011	5604,67	5815,84	6648,94	-6860,11
2012	-4186,94	-3950,11	-3008,22	2771,38
2013	1652,89	1443,57	1020,98	-811,66
2014	1377,17	1161,95	413,28	-198,06

Source: Own calculations from CHELEM database.

Table 9: CMS decomposition of the export growth of Portuguese nominal merchandise exports by technological intensity

		Total Effect	Structure Effect	Product Effect	Market Effect	Mixed Strucuture Effect	Competitiveness Effect
Low technological intensity	**2000**	-585,384	-119,02242	-144,098	921,1507	-896,075	-466,3616862
	2001	-132,223	124,1715	106,0541	-139,128	157,2454	-256,394034
	2002	790,3128	714,150811	588,4026	617,4867	-491,739	76,16197865
	2003	2389,355	2350,51372	2157,735	2449,41	-2256,63	38,84103002
	2004	1909,095	2303,32351	2119,135	2929,3	-2745,11	-394,2285305
	2005	-1234,18	1128,38819	946,7823	2300,565	-2118,96	-2362,568992
	2006	1227,404	1843,61861	1688,574	2316,586	-2161,54	-616,2150602
	2007	3142,45	2918,59028	2757,171	2493,252	-2331,83	223,8593144
	2008	1167,798	1352,49757	1729,939	3532,056	-3909,5	-184,6996251
	2009	-3432,38	-3733,576	-3936,97	-5643,39	5846,778	301,1993661
	2010	2366,24	1625,16085	1536,568	2298,578	-2209,99	741,0786751
	2011	4013,396	3374,44627	3469,163	4590,918	-4685,64	638,9501664
	2012	-858,458	-2160,0336	-2059,72	-1082,88	982,5689	1301,575641
	2013	2305,958	785,805812	774,3701	438,0244	-426,589	1520,151926
	2014	481,5121	537,876205	560,4269	-415,029	392,4782	-56,36412599
Medium technological intensity	**2000**	-91,6461	-256,50082	-200,954	-74,008	18,46141	164,8547112
	2001	108,2202	315,655418	167,787	141,7745	6,094011	-207,4351958
	2002	360,9552	413,119504	413,5592	358,2754	-358,715	-52,1642717
	2003	1670,333	1363,32323	1222,42	1233,763	-1092,86	307,0094446
	2004	1392,529	1410,03663	1411,84	1502,389	-1504,19	-17,50714746
	2005	-298,488	536,349619	575,4548	685,3241	-724,429	-834,8373783
	2006	1208,066	1212,88646	1200,329	1153,004	-1140,45	-4,820438134
	2007	1387,492	1696,11643	1757,41	1748,477	-1809,77	-308,6242286
	2008	-28,8448	150,35612	322,7875	49,07913	-221,511	-179,2008752
	2009	-2800,71	-2979,5912	-3097,22	-3175,56	3293,189	178,8782029
	2010	2268,466	1161,14784	1331,238	1168,245	-1338,33	1107,318456
	2011	2788,635	2018,06377	2118,462	1897,173	-1997,57	770,5709544
	2012	-1873,31	-1525,5791	-1418,84	-1529,51	1422,765	-347,7326241
	2013	430,661	669,70627	527,5407	459,5607	-317,395	-239,0452487
	2014	267,7148	543,784526	396,1963	528,636	-381,048	-276,0697333
High technological intensity	**2000**	-124,379	239,506809	321,7817	170,7106	-252,986	-363,8854262
	2001	-223,192	3,04730498	-62,2954	27,00161	38,34113	-226,238821
	2002	227,0579	132,389906	132,8741	128,3301	-128,814	94,66796099
	2003	604,2087	664,503056	607,9231	517,148	-460,568	-60,29432619
	2004	229,8373	797,950978	802,0081	798,927	-802,984	-568,1137059
	2005	-672,361	289,257857	254,8408	339,0071	-304,59	-961,6189109
	2006	853,2314	453,545867	429,7372	491,7224	-467,914	399,6855469
	2007	94,99711	4,80120548	257,5547	211,7128	-464,466	90,1959032
	2008	152,7353	202,862752	191,5916	339,6428	-328,372	-50,12741417
	2009	-1249,57	-823,16268	-842,728	-791,035	810,6011	-426,4114483
	2010	513,9799	364,503393	408,6095	387,193	-431,299	149,4764832
	2011	779,1115	236,333735	278,6104	222,4751	-264,752	542,7777307
	2012	-259,264	-454,13754	-428,787	-406,61	381,2597	194,8730879
	2013	179,0481	166,935311	147,476	166,6587	-147,199	12,11281359
	2014	-42,7205	256,047403	213,8217	278,146	-235,92	-298,7678572

Source: Own calculations from CHELEM database.