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WHAT IS BEHIND THE RECENT EVOLUTION
OF PORTUGUESE TERMS OF TRADE?

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March 2008

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What is behind the recent evolution of Portuguese terms of trade?*

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March 2008

Abstract

This paper analyses the evolution of Portuguese terms of trade over the last decades. Firstly, their evolution is described: (i) terms of trade registered an upward trend since the second half of the 80s, after the apparent stability observed since 1950; (ii) this was a generalized phenomenon across OECD countries; (iii) and it was specially linked to a very contained evolution of import prices. Secondly, terms of trade are broken down by groups of products, and their evolution is decomposed into two components. The first component results from differences in the composition of import and export baskets of goods (inter-sector specialization), while the second emerges from deviations from the law of one price in each sector (intra-sector segmentation). The results show that terms of trade developments were dominated by the specialization effects related to the evolution of oil prices. Excluding energy and focusing in the manufactured goods, the increase in terms of trade is strongly connected with the positive evolution of relative prices inside each sector, in particular in the usually designated traditional sectors: textiles, clothing and footwear. The effects of globalization on import prices and the structural changes in those manufacturing sectors in Portugal are pointed out as explanations for this phenomenon.

Key words: Terms of trade, globalization

JEL classifications: F10, F14

1. Introduction

Fluctuations in terms of trade are a traditional source of concern for policy makers. Besides having direct effects on welfare – measuring the domestic resources that must be assigned to assure the same level of imports – terms of trade are extremely volatile, being an important source of economic fluctuations. Thus, in particular after the first

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oil shock, it started to be frequent to use formulas to measure mechanically the effect of terms of trade on GDP [see Gutman (1981)] and to consider terms of trade as an important source of the business cycle fluctuations [Backus and Crucini (2000)].

The aim of this paper is to analyze the recent evolution of Portuguese terms of trade. The objective, which is much simpler than finding a full explanation, is just to contribute to a better understanding of this phenomenon. The focus is on trade excluding energy, as the short and medium-run effects of energy import prices on the terms of trade are well visible and easy to quantify, given the strong volatility of international oil prices, the high share of net imports of oil and the low price-elasticity of demand.

Firstly, before looking at some possible explanations, Section 2 describes the available data, trying to characterize the recent evolution of terms of trade and to evaluate its relevance. It is important to investigate if this increase was an unusual phenomenon in recent history and if it was a special feature of the Portuguese economy. Additionally, it may be important to identify if this behaviour of the terms of trade is more related to the evolution of export or import prices.

Secondly, the evolution of terms of trade is broken down by products. Section 3 decomposes it in two components, following very closely the approach proposed in Baxter and Kouparitsas (2006). The first component measures the effects of product specialization. An economy tends to face an increase in its terms of trade if it is more specialized in products which international prices are growing faster. Those effects can be interpreted as being relatively exogenous at least in the short run, assuming that is not easy or even possible to change quickly the production across products. Typically this type of specialization depends on endowments of labour, capital and natural resources. The second component is related to differences between export and import prices for each product, and thus to the position of national production along the several market segments and also to the country's ability to import from cheaper markets. Besides explaining the evolution of the Portuguese terms of trade, these results may also contribute to a better understanding of recent changes in export sector.

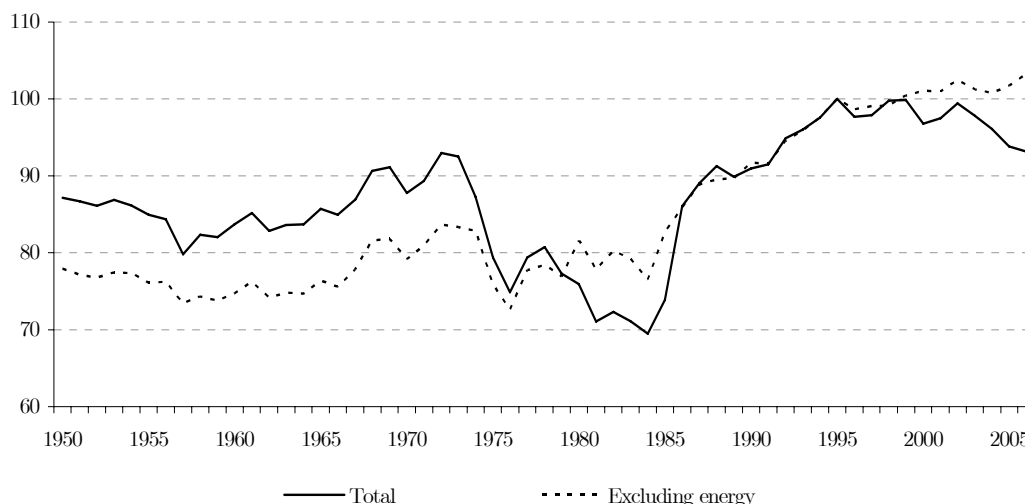
Finally, Section 4 summarizes the main conclusions, pointing out some possible explanations for the results obtained.

2. How to characterize the recent gain in Portuguese terms of trade?

How unusual was it?

An overview of the evolution of the Portuguese terms of trade over the last 60 years is presented in Chart 1, using Banco de Portugal's historical series [Pinheiro et al. (1999)] for the period before 1995 and deflators from the Portuguese National Statistical Institute – INE (*Instituto Nacional de Estatística*) for the period after 1995.

Chart 1 – Portuguese terms of trade
(goods prices, 1995=100)



Sources: INE and Banco de Portugal [Pinheiro et al. (1999)]

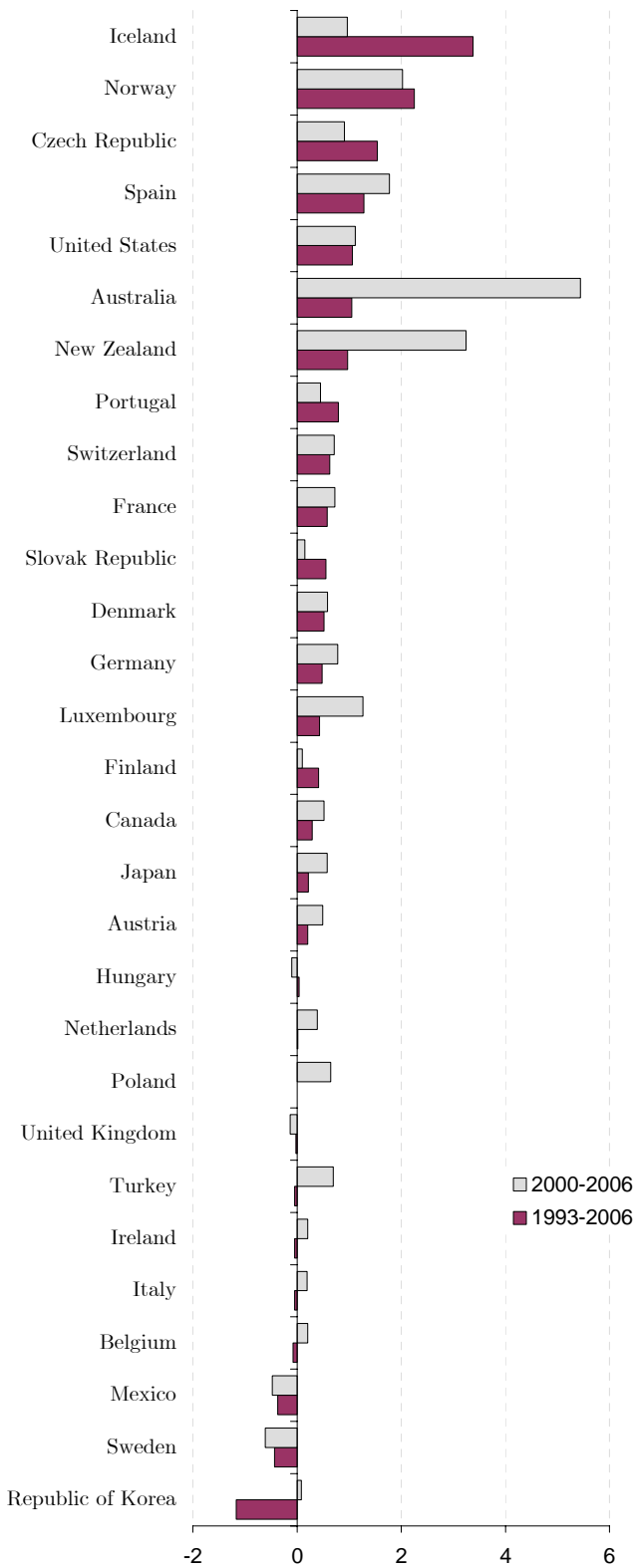
Since the end of the 80s and contrasting with its past apparent stability, terms of trade started to evidence a positive trend, interrupted in the most recent years, in a context of a marked increase in oil prices. Nevertheless, this increasing path was not connected with the direct effect of oil prices. Terms of trade excluding the energy component registered an even more pronounced upward trend since the end of the 80s.

Was it a special feature of the Portuguese economy?

Chart 2 presents the evolution of terms of trade for OECD countries. The figures were collected from the OECD Economic Outlook database (December 2006) for external trade on goods and services excluding commodities. It seems clear that there was a generalized gain in terms of trade across OECD countries since the beginning of the 90s, and that those gains were more pronounced when only the most recent period is taken into account. Considering the non-weighted average, the annual increase in OECD countries was 0.8 per cent from 2000 onwards, against the annual gain of 0.5 per cent observed since 1993.

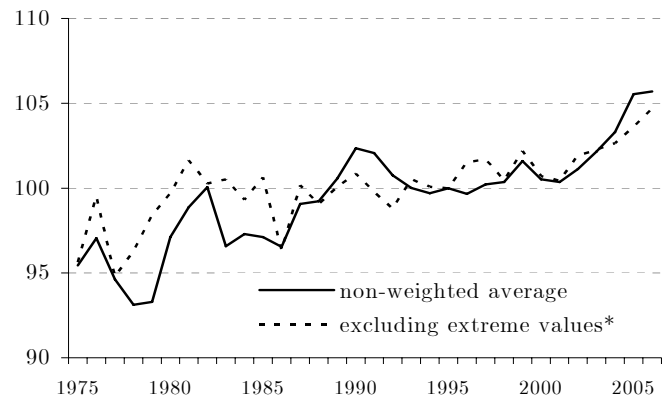
The same evidence seems to emerge when a longer period is considered. Chart 3 presents the evolution of terms of trade (goods and services excluding commodities) for the period starting in 1975, using a sample of 23 OECD countries. Terms of trade stood at higher levels in the second part of the sample, being this upward trend particularly pronounced over the most recent years, when terms of trade reached maximum figures.

Chart 2 – Terms of trade in OECD countries
(goods and services excluding commodities, annual average changes)



Source: OECD

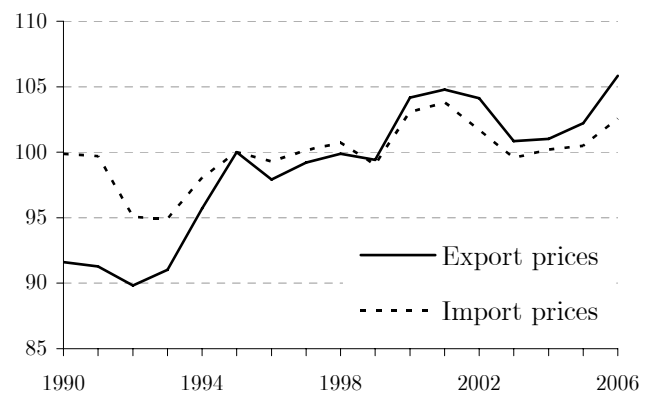
Chart 3 – Terms of trade in OECD countries
(goods and services excluding commodities, 2000=100)



* excluding observations outside the range defined by two standard deviations around the non-weighted average.

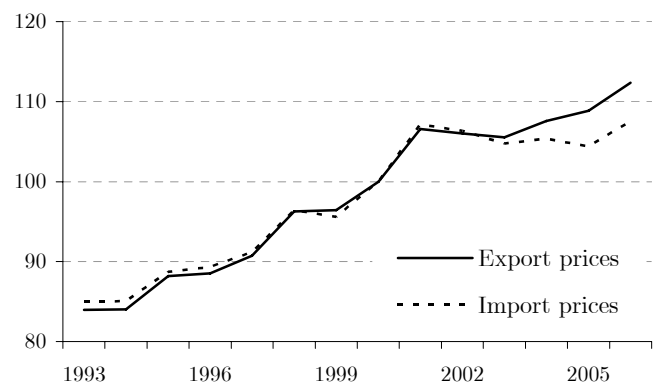
Source: OECD

Chart 4 – Portuguese external trade prices
(goods excluding energy 2000=100)



Source: INE and Banco de Portugal [Pinheiro et al. (1999)]

Chart 5 – OECD countries external trade prices
(goods and services excluding energy 2000=100)



Source: OECD

Was it mostly due to a change in import or export prices or both?

The increase in Portuguese terms of trade excluding energy in the first half of the 90s was related to a faster rise in export prices (Chart 4). But the story seems to be different from 2000 onwards, when both export and import prices ceased to increase.¹

This evolution of import prices did not occur only in Portugal. Chart 5 presents the evolution of export and import prices (excluding energy) for OECD countries, emphasizing that the gains in terms of trade since the end of the 90s was due to a stagnation of import prices.

3. Decomposing terms of trade evolution

3.1 A decomposition formula

External trade deflators are built using a Paasche index to measure growth from the previous period.² Hence, in the case of exports, this index (P_x) can be written as

$$P_{x,t} = \frac{\sum_{i=1}^n p_{x_i,t} q_{x_i,t}}{\sum_{i=1}^n p_{x_i,t-1} q_{x_i,t}} \quad (1)$$

where p_{xi} and q_{xi} represent the price and quantity of the i component. The overall deflator may be written as a weighted average of the several components

$$P_{x,t} = \sum_{i=1}^n \frac{p_{x_i,t}}{p_{x_i,t-1}} \omega_{x_i,t} \quad , \quad \omega_{x_i,t} = \frac{p_{x_i,t-1} q_{x_i,t}}{\sum_{i=1}^n p_{x_i,t-1} q_{x_i,t}} \quad (2)$$

Doing the same for the import side, the terms of trade could be expressed as

$$P_{x,t} - P_{m,t} = \sum_{i=1}^n \left(\frac{p_{x_i,t}}{p_{x_i,t-1}} \omega_{x_i,t} - \frac{p_{m_i,t}}{p_{m_i,t-1}} \omega_{m_i,t} \right) \quad (3)$$

Following Baxter and Kouparitsas (2006), the manipulation of equation 3 allows decomposing the evolution of terms of trade in two components:³

¹ This evolution is even more evident when intermediate goods are excluded – in this case both export and import prices declined since 2000 (4.9 and 1.8 per cent, respectively).

² For more information concerning the computation and the use of the external trade deflators, see Dridi and Zieschang (2002).

³ Baxter and Kouparitsas (2006) presented this type of decomposition to explain terms of trade volatility, labeling their two parts as “goods price” and “country price” effects. The dependency of the results from the level of disaggregation considered should be pointed as a caveat of this type of decomposition.

$$P_{x,t} - P_{m,t} = \sum_{i=1}^n (\omega_{x_i,t} - \omega_{m_i,t}) \frac{P_{i,t}^*}{P_{i,t-1}^*} + \sum_{i=1}^n \left(\frac{P_{x_i,t}}{P_{x_i,t-1}} - \frac{P_{m_i,t}}{P_{m_i,t-1}} \right) \omega_{i,t}^*, \quad (4)$$

$$\frac{P_{i,t}^*}{P_{i,t-1}^*} = \frac{\frac{P_{x_i,t}}{P_{x_i,t-1}} + \frac{P_{m_i,t}}{P_{m_i,t-1}}}{2}, \quad \omega_{i,t}^* = \frac{\omega_{x_i,t} + \omega_{m_i,t}}{2}$$

The first term may be designated as an **inter-sector specialization effect**, measuring the effects of the differences in the import and export baskets of goods. A country tend to obtain a terms of trade gain (loss) if is more (less) specialized in goods whose prices are growing faster (slower). The obvious example is related to commodities, in particular oil. When oil prices increase, importer countries tend to suffer terms of trade losses.

The other term may be called the **intra-sector segmentation effect**, being related to the relative prices of exports and imports for each good. Its evolution is related to the position of national production along the several market segments and also to the country's ability to import from low-cost markets.

3.2 Overall results

The results of this decomposition for the period after 1995 are presented in Chart 6, while Table 1 contains detailed information on the evolution of import and export prices across groups of products and their contribution to the evolution of terms of trade through these two effects. Two main conclusions seem to emerge.

Chart 6 – Portuguese terms of trade
(contributions to accumulated growth, in p.p.)

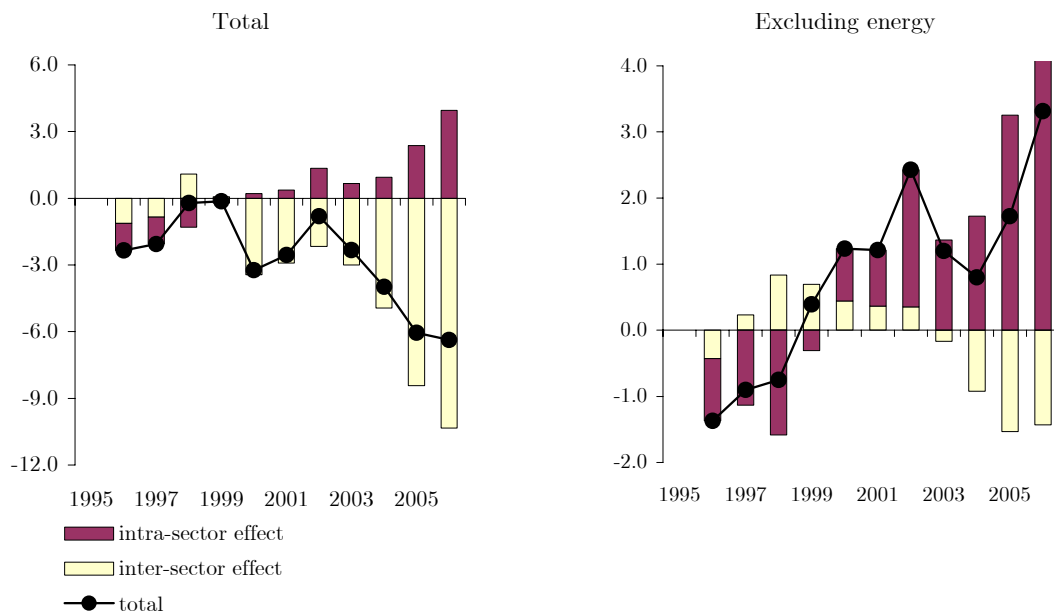


Table 1 - External trade and terms of trade (1995-2006)

	Implicit average weights (per cent)		Accumulated growth rate (per cent)			Contributions to terms of trade growth (percentage points)		
	Exports	Imports	Export prices	Import prices	Terms of trade	inter-sector effect	intra-sector effect	total effect
Agric, hunting and fishing	1.4	5.3	27.9	3.0	24.9	-0.6	0.7	0.1
Energy	2.2	9.0	189.3	219.1	-29.8	-8.9	-0.8	-9.7
Mining and quarrying	0.8	0.3	78.2	20.6	57.6	0.3	0.2	0.5
Manufacturing	95.6	85.4	5.1	2.5	2.6	-1.1	3.8	2.7
Food and beverages	6.3	8.5	6.5	11.7	-5.2	-0.2	-0.3	-0.5
Textiles, clothing and footwear	23.3	9.0	11.6	-14.1	25.8	0.3	3.9	4.2
Textiles	8.7	4.8	4.4	-14.9	19.3	-0.2	1.3	1.2
Clothing	8.8	2.2	8.3	-20.0	28.3	-0.1	1.5	1.4
Leather and leather products	5.8	2.0	30.7	-2.8	33.5	0.6	1.1	1.6
Wood, cork, pulp and paper products	9.2	3.8	-2.0	-2.2	0.3	-0.2	0.1	-0.1
Mineral and metal products	9.6	9.6	18.4	17.8	0.7	0.2	-0.2	0.0
Chemical products	5.5	10.8	28.0	12.4	15.6	-1.0	1.5	0.5
Rubber, plastic products	3.1	3.2	18.5	-13.0	31.5	0.1	1.0	1.1
Machinery and equipment	19.6	22.4	-8.8	-7.3	-1.5	-0.2	0.0	-0.2
Office machinery and computers	1.2	2.7	44.4	-41.9	86.3	-0.1	1.6	1.5
Radio, television and communication	6.3	5.8	-32.9	-0.2	-32.7	0.0	-2.2	-2.2
Other machinery and equipment	12.0	14.0	4.2	-0.5	4.6	-0.1	0.5	0.5
Transport equipment	16.0	15.6	-7.3	10.9	-18.2	-0.1	-2.7	-2.8
Other products	3.0	2.5	15.9	-2.5	18.3	0.0	0.6	0.5
TOTAL	100.0	100.0	8.9	15.7	-6.8	-10.3	4.0	-6.4
Total exc. Energy	97.8	91.0	5.8	2.6	3.3	-1.4	4.7	3.3

The evolution of Portuguese terms of trade was dominated by the inter-sector specialization effect, which is fully explained by the energy component (the contribution of the energy component and the overall evolution of terms of trade have a correlation coefficient higher than 0.8). The **energy component** contributed negatively in 9.7 p.p. to the 6.4 per cent decline in total terms of trade observed since 1995. This contribution was particularly negative during the most recent years.

When energy is excluded and the focus is on manufactured goods, the intra-sector effect turns out to be the main responsible for the increase in terms of trade, particularly after 2001. The terms of trade of the **manufacturing** sector registered an increase of 2.6 per cent over the period considered. However, this increase was not generalized across the several goods considered.

Those effects were clearly related to the behaviour of external trade prices of **textiles, clothing and footwear** products, which contributed positively in more than 4 p.p. to the overall evolution of terms of trade. These gains were broadly based across the three groups of products, reflecting the strong decline in import prices, which recorded a negative growth rate of around 14 per cent from 1995 onwards, while export prices increased more than 11 per cent.

The same type of phenomenon occurred in the **rubber and plastics products**, the other sector with more important contributions to the terms of trade gains. The strong decline in import prices (around 13 per cent) and the maintenance of a positive growth of export prices (above 18 per cent) were translated into an increase in terms of trade of more than 30 per cent. The **chemical** products recorded also a positive contribution but not related to a decline in import prices, which continued to grow albeit at a slower pace than export prices.

The **machinery and equipment** item registered also a significant decline in import prices, but in this case the same occurred in export prices and the contribution to the overall evolution of the terms of trade was slightly negative. It should be mentioned that this result entails very different situations across the subsectors, reflecting the usual lack of homogeneity of this kind of products. In the classification considered, there was a strong increase in terms of trade in the item “**office machinery and computers**” reflecting the decline in import prices; the **radio, television and communication** sector registered a decline in export prices and thus in terms of trade; the **other machinery and equipment** registered small variations in import and export prices, and thus relatively stable terms of trade.

The external trade prices of **transport equipment** presented a singular evolution. Import prices continued to grow, while export prices registered some decline, and thus this sector made the most negative contribution to the evolution of terms of trade in the manufacturing sector. This type of fluctuations may be related to quality effects, linked to a different evolution of the composition of imports and exports.

3.3 The clothing sector: a case study

Given its important contribution, it is relevant to explore the evolution of terms of trade in the so-called traditional sectors. While the decline in import prices is often pointed to be related to the increasing competition from low-cost countries, the differentiated evolution of export prices may constitute a signal of some structural changes.

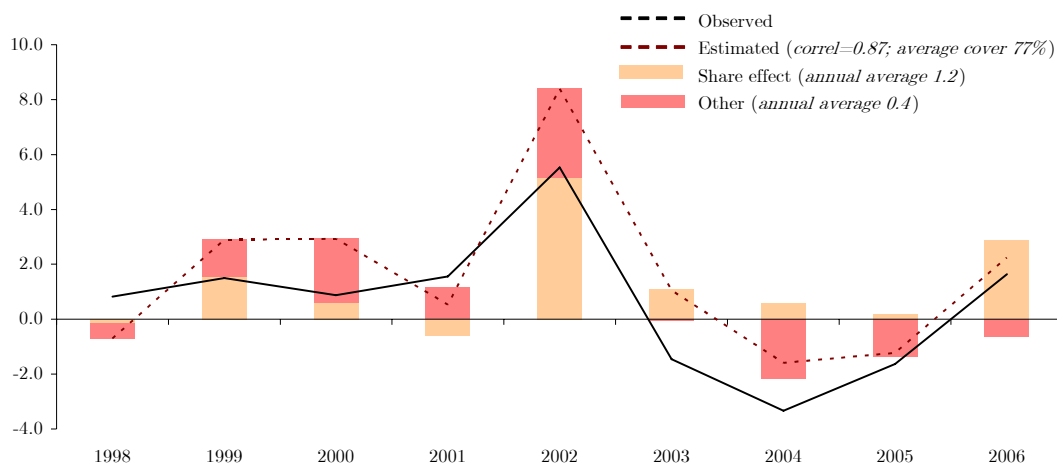
In general terms, the evolution of export unit values can be decomposed into: (i) the weighted evolution of individual prices; (ii) the changes in shares weighted by price levels; (iii) and the cross term accounting for both the variations of prices and shares

$$\Delta p = \sum_i \alpha_i \Delta p_i + \sum_i \Delta \alpha_i p_i + \sum_i \Delta \alpha_i \Delta p_i$$

Remembering that shares are expressed in quantities, the second term usually accounts for a composition effect. If the structure of exports is moving towards more (less) expensive products, this would imply an increase (decline) in the aggregate export price.

Using the available export micro data in both nominal and volume terms (in Kg) covering around 420 different products, Chart 7 considers this type of decomposition

Chart 7 – Export prices in the clothing sector
(contributions to annual growth, in p.p.)



for the evolution of export prices in the clothing sector.⁴ The results show a regular

⁴ Products not available for two consecutive years are excluded. Moreover, the products with prices growing outside the range (-25%,+25%) or with quantities rising outside (-50%,+50%) were also excluded. It should be mentioned that the same type of exercise was attempted for the textiles and footwear sectors. However, the micro data did not allow reproducing reasonably the evolution of the respective export prices. This may be related to some important quality adjustments when computing the official figures for export prices. In general, these adjustments are not possible to be reproduced, and should be particularly important in sectors with less homogeneity of products.

positive share effect, pointing to an annual average contribution of 1.2 percentage points to the evolution of export prices in the clothing sector. This suggests some recomposition in this sector, translated into an increase in the relative weight of more expensive products, by a decline in production and exports of lower-end products and/or by a redirection of exports to high-range markets. The results presented do not allow concluding which of the two composition effects was the most important.

4. Conclusions

This article analyses the recent evolution of Portuguese terms of trade. The fluctuations of oil prices are clearly the major factor explaining their evolution. When the energy component is excluded, and the focus is on manufactured goods, the results suggest two main reasons behind the increase in terms of trade.

i) The first one is the increasing competition of low-cost countries in international markets. Terms of trade gains were common across OECD countries and started to occur in the beginning of the 90s, when the increasing international competition seemed to gain momentum. Moreover, the role of globalization is suggested by the fact that, both in Portugal and in the other OECD countries, the increase in terms of trade was connected with a very contained evolution of import prices, in particular since the end of the 90s. Several empirical studies point out the increasing competition from low-cost countries as having contributed to this evolution [see, for instance, Kamin et al. (2004) and ECB (2006)]. In the Portuguese case, this negative effect of increasing competition on manufacturing import prices was particularly strong in the so-called traditional sectors (textiles, clothing and footwear), i.e. the sectors where imports from low-cost countries recorded the highest shares [see Cardoso and Esteves (2008)] and where the import prices made the most important contribution to the rising path of terms of trade.

ii) The second factor explaining the rise in terms of trade is more specific of the Portuguese economy, being related to a significant increase in export prices (as compared with import prices) in the traditional sectors. In line with recent results for the textiles sector concerning the evolution of labour and wages [see Banco de Portugal (2007)], there is evidence that a composition change within the clothing sector contributed to the positive evolution of export prices, which may also be related to the increasing international competition. Such integration translated into a progressive change in global comparative advantages, implying not only the redirecting of some national production to high-range markets, but also a decline in the weight of exports of lower-end manufactured goods.

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