Ensaio

The Adjustment of Portuguese Imports: Cyclical or Structural[1]?

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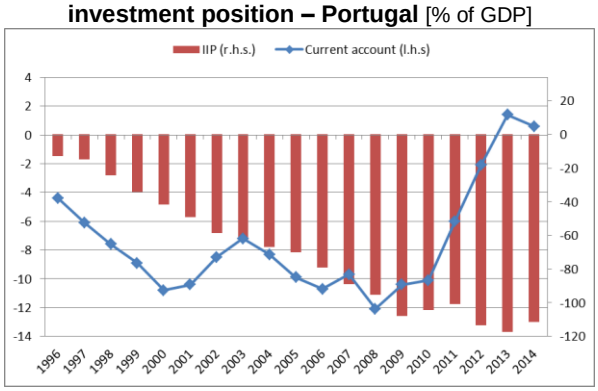
Abstract

Portugal achieved an impressive external adjustment in the recent years, with a boost in exports and a slowdown in imports. There has been some dispute on the nature of these adjustments, in particular for imports, as the gains were achieved in a period of strong demand contraction. Using quarterly data for the period 1989-2014 and focusing on non-energy imports, we estimate an import demand function following an Error Correction Model. This allows us to disentangle the short- and long-run elasticities of imports with respect to income and prices. We show that in the period 2011-2014 there was a substitution of imports (structural effect), reinforcing the large income effect (cyclical effect) observed during the period. Although modest, these structural effect contributed to the positive developments of the Portuguese current account and can be seen as preliminary evidence of a structural change in the Portuguese economy. This must be reinforced in the coming years and coupled with solid and sustained export dynamics.

1. Introduction

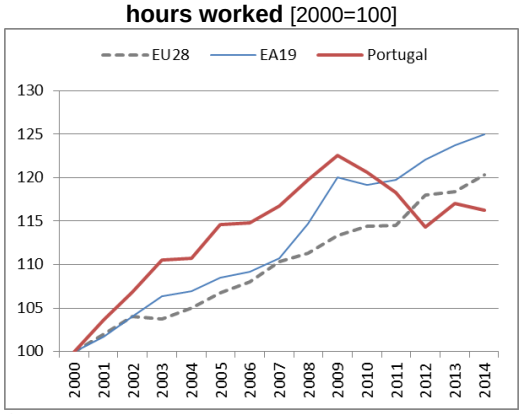
Portugal achieved impressive external adjustments in the past few years. In 2008, the country recorded a current account deficit of 12% of GDP (Chart 1), reflecting structural problems in the product and labor markets and significant losses in competitiveness (see, for instance, Chart 2 for the developments of Unit Labor Costs).

Chart 1 - Current account and net international investment position – Portugal [% of GDP]



Source: Eurostat

Chart 2 - Nominal unit labour cost based on hours worked [2000=100]



Source: Eurostat

With the outbreak of the crisis and the policy measures that followed, Portugal moved to a current account surplus of 1.4% and 0.6% in 2013 and 2014, respectively. The increase of almost 13 percentage points (p.p.) was one of the largest in the EU, only surpassed by four other EU countries (Chart 3). However, the many years of cumulated flow imbalances resulted in one of the worst net international investment positions (IIP) of the EU (Chart 4), where only 22% of the external liabilities relate to equity investments. The Portuguese net IIP shows some signs of stabilization but the correction of stock imbalances is only achievable with sustained flow external adjustments.

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[1] The views expressed are those of the authors and do not necessarily coincide with those of the institution. The authors would like to thank Guida Nogueira and Ricardo Pinheiro Alves for the useful comments.

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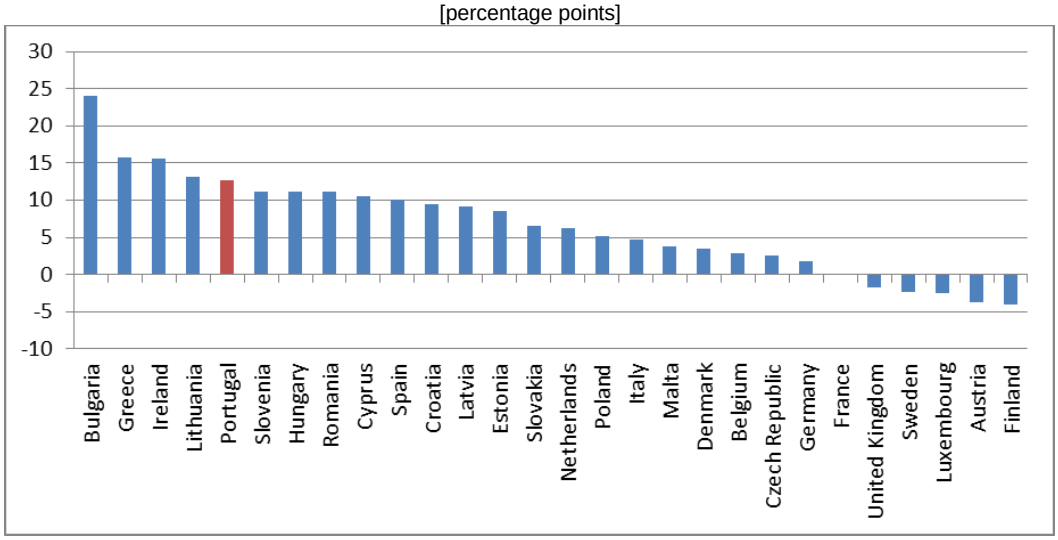
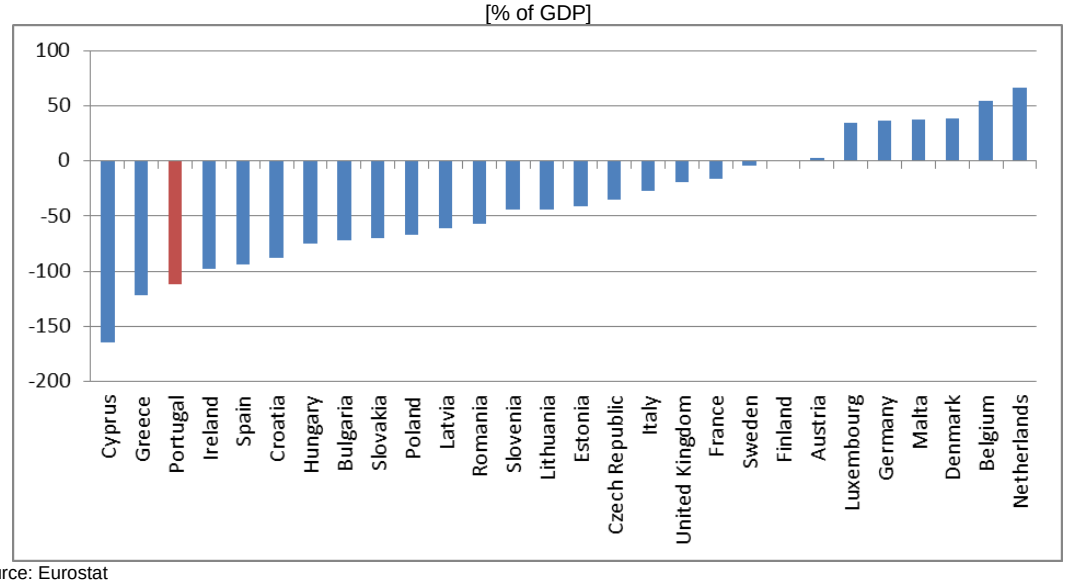
Chart 3 - Change in current account balance as a % of GDP – 2008-2014 – EU Countries
[percentage points]



Source: Eurostat
Notes: Data for Luxembourg refers to 2008-2013.

Chart 4 - Net international investment position – 2014 – EU Countries
[% of GDP]



Source: Eurostat
Notes: Data for Croatia, Denmark and Luxembourg refers to 2013.

The positive developments of the current account reflected both an increase in exports and a contraction of imports. From 2008 to 2014, the weight of exports on GDP grew 9 p.p., from 31% to 40%, almost double the growth of exports in the EU28 and the euro area and also the double of what the country experienced in the period 2002-2008 (Chart 5). Concerning imports, from 2008 to 2014 Portugal experienced a reduction of 1,4 p.p. of GDP, putting a break on the growth registered in the precedent years (+6 p.p. from 2002 to 2008, Chart 6). This was at odds with the imports developments in the EU28 and the euro area in the same period, which registered increases of 1.3 p.p. and 1.9 p.p., respectively.

Some have casted doubt on the sustainability of the adjustments in the Portuguese exports and imports (see, for instance, IMF, 2015, pp. 107-108). As discussed in Banco de Portugal (2015), 86% of exports in 2013 are due to firms with stable relations with foreign markets, suggesting that the positive developments of the recent years will not be overturned. Concerning imports, the contraction of consumption and investment from 2008-2014 (-5% and -39%, respectively), played a key role, given the high import content of these aggregates[4]. On the contrary, the positive developments of exports, of which 42% is imported content[5], have put some upward pressure on imports. Adding to these demand factors, the Portuguese econ-

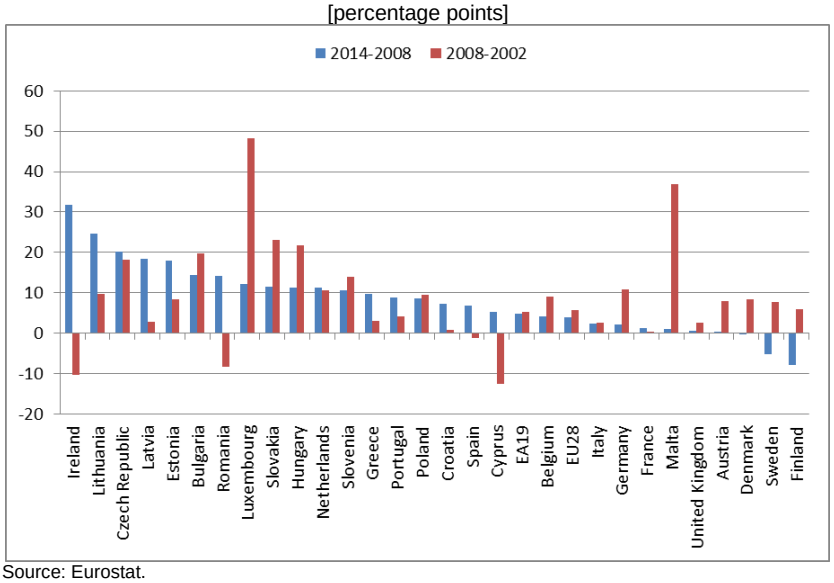
[4] According to Cardoso, Esteves, Rua (2013) the import content of investment and consumption is 39% and 26%, respectively, in 2008. Consumption of durable goods (which declined 39% between 2008 and 2013) has an import content of 90%.

[5] 2008 data as presented in Cardoso, Esteves, Rua (2013).

omy went through an important structural change during the period, making it possible for some import substitution during the period. In a context where import growth is again accelerating (1,9% in 2013 and 4,1% in 2014), we assess the nature of Portuguese imports adjustments by estimating import demand functions. This allows us to disentangle temporary and permanent factors and, of those, demand- and competitiveness-driven developments.

Chart 5 - Change in exports as a % of GDP – 2008-2014 & 2002-2008 – EU Countries

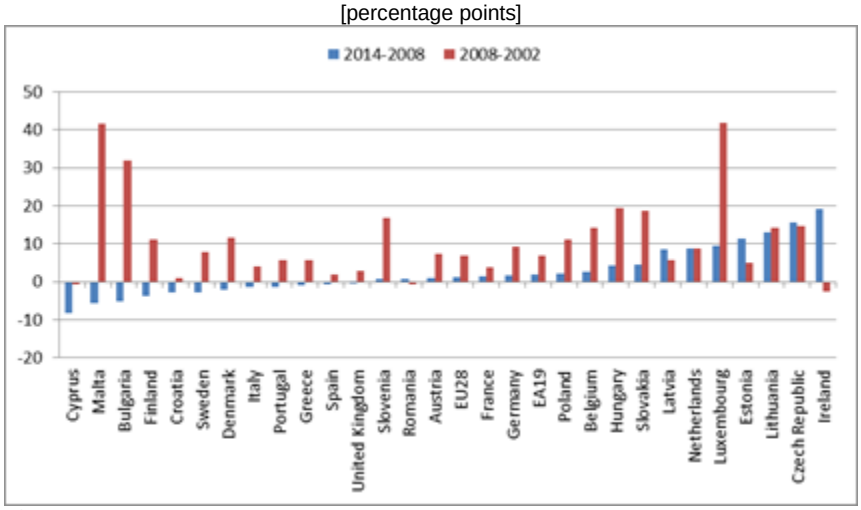
[percentage points]



Source: Eurostat.

Chart 6 - Change in imports as a % of GDP – 2008-2014 & 2002-2008 – EU Countries

[percentage points]



Source: Eurostat.

2. Econometric framework

To assess the cyclical and structural components of the adjustment of Portuguese imports, we estimate an import demand function which relates the volume of imports to the volume of demand and relative prices.

This type of import demand equations have been commonly used in empirical trade literature, using the so-called Error Correction Model (ECM). One common approach is to estimate the model in two-steps, as proposed by Engle and Granger (1986). Two recent examples are Orsini (2015) or BBVA (2013).[6] Both studies focus on the adjustment of non-energy imports in Spain and estimate both income and price elasticities (using final demand and relative prices developments). Orsini (2015) uses quarterly data for the period 1981 - 2014 while BBVA (2013) focuses on the period 1986 - 2013.

Cardoso, Esteves and Rua (2013) estimate a similar model for the Portuguese economy, but considering overall imports (and not only non-energy imports). Using quarterly data for the period between 1980 and 2012, the authors rely on a different measure of total demand, namely by disentangling the different ele-

[6] Orsini (2015) also performs one-step estimation.

ments (private consumption, public consumption, investment and exports) and weighting them by their import content.

Constantinescu, Matto and Ruta (2015) and Escaith et al (2010) assess the nature of the recent slowdown in international trade, relating imports and GDP via one-step ECMs. Both studies focus solely on elasticities of income and, in particular, possible structural changes in those elasticities. The first study relies on IMF (annual and) quarterly data for the period 1970-2013 while the second uses OECD quarterly data between 1971 and 2009.

In this paper, we use an Error Correction Model (ECM) as proposed by Engle and Granger (1986), allowing us to estimate the short- and long-run elasticities of imports with respect to income and prices and, also, the speed of convergence to the steady state when a deviation occurs.

Our econometric specification is as follows:

$$\Delta M_t = c + \beta_s \Delta Y_t + \alpha_s \Delta P_t + EC(M_{t-1} - \beta_l Y_{t-1} + \alpha_l P_{t-1}) + \varepsilon_t$$

where M_t , Y_t and P_t denote respectively aggregate non-energy imports[7], aggregate income and relative prices. The symbol Δ denotes the first order differences. The part of the equation in parentheses is the error correction mechanism; it is equal to zero in steady-state. β_s and α_s are estimates of the short-term effect of an increase in *Y* and *P*, respectively, on *M*. EC represents the speed of return to equilibrium after a deviation. β_l and α_l are the long-run multipliers. As argued in BBVA (2013), the coefficients of Y_t and P_t can be interpreted as the marginal propensity to import and the elasticity of substitution of imports, respectively.

As discussed above, this equation can be estimated in one step (see Escaith et al, 2010 or Constantinescu et al, 2015 for a similar econometric approach) or in two steps (as done by BBVA, 2013 or Orsini, 2015). The estimation in two steps entails a regression in levels of imports on income and prices. The lagged residuals are then plugged in an equation with the variables in first differences. We follow the two-steps approach.

3. The data

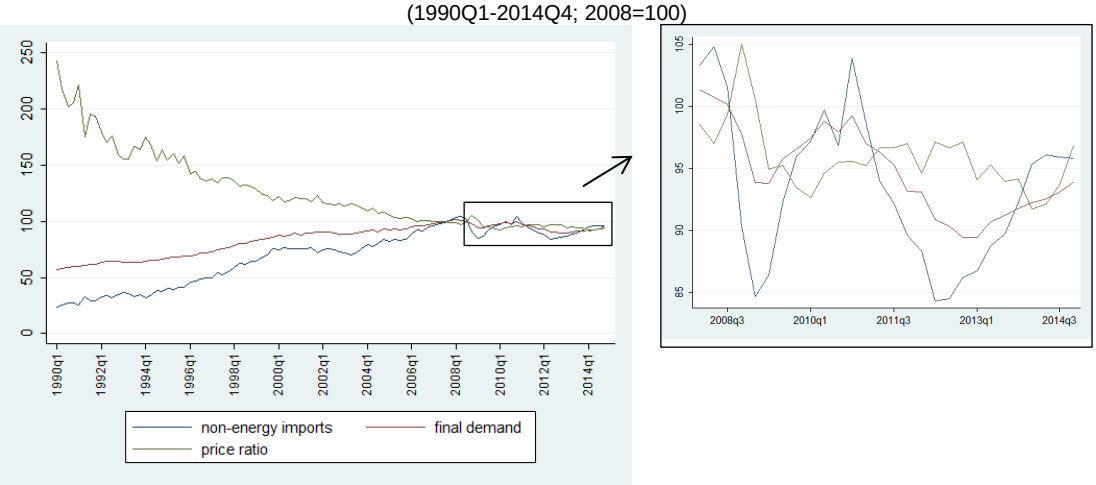
In the econometric analysis we use quarterly data from Statistics Portugal (INE) for the period 1995Q1 to 2014Q4, complemented with Banco de Portugal´s historical series for the period 1989Q1 to 1994Q4. Final demand, i.e. GDP plus total imports, is our proxy for the income aggregate; the ratio of the implicit non-energy imports deflator to the implicit final demand deflator is the measure of price competitiveness. To obtain the proxy for the series of non-energy imports we use the series of the Brent spot price (sourced from the European Central Bank) to deflate energy imports at current prices, which is in turn subtracted from the volume of total imports.[8] All the variables are expressed in logarithms.

The series used in the regressions are presented in Chart 7. Non-energy imports have been growing steadily until the outbreak of the crisis, although at a slower pace from 2000 onwards. Recently, they stabilized around 2008 values. This overall pattern follows closely the pattern of the final demand. Concerning relative prices, Portugal lost competitiveness in particular in the early 1990s. Focusing on the most recent years, there was some modest gains after 2010, but the overall pattern does not show clear signs of improvement.

[7] We limit the analysis to the imports of non-energy goods and services, given the rigidities associated with energy imports. The developments of energy imports will of course be crucial for the final outcome. Portugal has been decreasing its dependency on energy from abroad: in 1990, Portugal recorded 84% of energy dependence, improving in 2013 to 74%. There were important investments on renewable energy allowing the country to achieve one of the highest shares of renewables among EU countries. Concerning installed capacity of wind power per capita, Portugal is now fourth at European level and sixth worldwide. Looking ahead, Portugal aims to further increase the share of renewable energy by 2020 (National Renewable Action Plan).

[8] An alternative specification was also applied, namely by subtracting nominal energy imports from total imports and then deflating the result by the total imports deflator.

Chart 7 – Non-energy imports, relative prices and final demand – volumes
(1990Q1-2014Q4; 2008=100)



Source: Statistics Portugal, Banco de Portugal, European Central Bank and author's own calculations

4. Estimation results

We estimate our model in two-steps (Table 1)[9]. The estimates of the long-run marginal propensity to import suggest that when demand increases by 1 percentage point, imports increase by 1,58 percentage points. Concerning the long-term price elasticity, our estimate is -0,65, implying lower responsiveness to prices than to demand. Short-term parameters translate an overshooting in the short-term, with imports being more responsive to both demand and prices: the marginal propensity to import is 1,87 and the relative price effect -0,96. This overresponse of imports is only corrected after 5-6 quarters.

Table 1 – Results of the estimation

Long-term		
Marginal propensity to import	1,58	**
Replacement elasticity	-0,65	**
Short-term		
Error correction	-0,17	**
Constant	0,00	*
Marginal propensity to import	1,87	**
Replacement elasticity	-0,96	**
Adjusted r-squared	0,87	
Breusch-Godfrey	0,22	*0,63*
Sum squared residuals	0,019	
Joint significance F statistic	217	
Stationary residuals	I(0)	

Notes: Two-steps estimation by OLS. ** Statistically significant at 5%; * Statistically significant at 10%.

Compared to the results found for Spain[10], our long-term marginal propensity to import is smaller than the results found by Orsini, 2015 (1,87) and BBVA, 2013 (1,69), suggesting lower import dependence in Portugal.[11] The authors find some evidence of lower elasticities after the introduction of the single currency (around 1,4 in both studies). In the Portuguese case, an estimation with structural breaks also suggest a somewhat lower elasticity (1,82 before the introduction of the euro; 1,63 after) but the difference is not statistically significant.

The long-term response to relative prices is in line with that found for Spain in BBVA, 2013 (-0,68), but is lower than the results in Orsini, 2015 (-0,84).[12] The authors of both studies also find evidence of lower price elasticities after 1998 (around -0,4). In Portugal, the estimation with structural breaks also points to a reduction after the euro introduction (to values similar to those of Spain) but this is reversed with the outbreak of the crisis, where imports became again more responsive to prices. However, as for the demand elasticities, we do not find evidence that these changes are statistically significant.

[9] For alternative specifications, please refer to Annex I. The model presented was selected based on econometric criteria and to allow comparison with the results found in other studies for Spain.

[10] Our results cannot be compared with those found in Cardoso, Esteves, Rua (2013) as the authors assess total imports while we focus on non-energy imports, as done, for instance by Orsini (2015). They find a short-run price elasticity of -0.15 and of -0.65 in the long-run. Concerning income, the short-run elasticity is 1.5 while it is 1 in the long-run.

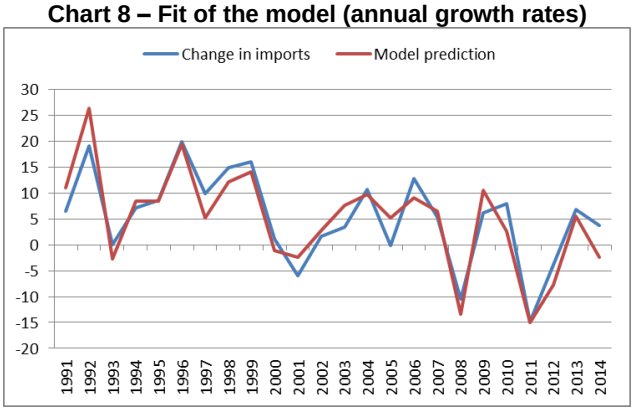
[11] It should also be noted that the demand elasticity for Spain has been decreasing over time. Thus, the fact that Orsini (2015) uses a sample that starts in 1981Q1 whereas we start in 1990Q1 also influences the results.

[12] Again, the longer time series used in Orsini (2015) may influence the results.

Our short-term demand elasticity is much lower than what is found for Spain (BBVA, 2013: 2,60; and Orsini, 2015: 3,32), pointing to a lower overshooting in the short-run. The opposite happens to prices, with Portuguese imports being more responsive to price changes than in Spain (BBVA, 2013: -0,40; and Orsini, 2015: -0,70). Overall, in Spain the imports take 8-9 quarters to return to the long-run equilibrium, longer than what we estimate for Portugal, reflecting higher adjustment capacity.

The fit of our model is presented in Chart 8. Based on the results of the model, we compute the long-term change of non-energy imports, disentangling income and substitution effects (Table 2). We present aggregate results for four periods: 1991-1998, before the euro adoption; 1999-2007, until the outbreak of the global financial crisis; 2008-2010, before the Portuguese Economic and Financial Assistance Programme; and, finally, the period 2011-2014.

Chart 8 – Fit of the model (annual growth rates)



Source: Author's own calculations

Before the crisis, the non-energy imports growth was triggered by demand developments, coupled with losses in competitiveness. With the outbreak of the crisis, income effects become, as expected, negative, but they were counterbalanced by substitution effects. The period after 2011 registered, for the first time, competitiveness gains which, coupled with negative income effects, allowed for the decline of non-energy imports.

Table 2 – Non-energy imports growth – long-term (average quarterly growth rates)

	Observed change	LT change (estimated) (1)+(2)	Income effect (1)	Substitution effect (2)
1991-1998	2,69%	2,48%	1,56%	0,92%
1999-2007	1,24%	1,40%	0,89%	0,52%
2008-2010	0,30%	0,03%	-0,16%	0,19%
2011-2014	-0,51%	-0,60%	-0,54%	-0,06%

Source: Author's own calculations

5. Conclusions

Our results suggest a smaller import dependency in Portugal as compared to Spain, with lower long-term marginal propensity to import. Concerning short-term developments, Portugal displays lower rigidities vis-à-vis demand developments and a faster adjustment capacity.

Using the results of our model to assess the nature of the recent adjustment of imports in Portugal, we conclude that the conjecture that the results are fully driven by demand effects does not hold. While it is true that the bulk of the correction in the period 2011-2014 was driven by income, there was a substitution of imports, explaining 10% of the recent adjustment. This is an encouraging sign and reflects a change in the structure of the economy. But it also supports the idea that the transformation of the Portuguese economy needs to continue. Developments on the exporting sector will also be crucial. In an economy with 40% of import content of exports, the focus must be on the sectors with lower import content (such as services, where the percentage is, as expected, much lower than in goods[13]) and on the maximization of domestic value-added, namely with a repositioning on global value chains (see Amador and Stehrer, 2014).

Our analysis can be extended in a number of ways. A longer time series would allow an estimation of endogenous structural breaks as done, for instance, in Orsini, 2015 (although the author concludes that, for the case of Spain and after adjusting the model, there is no evidence of structural breaks in the esti-

[13] Cardoso, Esteves, Rua (2013).

mated parameters). As a longer time series for the post-crisis period becomes available, it would also be interesting to assess possible changes in the marginal propensity to import. We could also conduct the estimation disentangling the demand components, as done in Herzberg et al (2002). For the UK, the authors do not find evidence that one model outerperforms the other. Finally, we ould weigh the demand by its import content, as done in Cardoso, Esteves e Rua (2013). This should not have a significant impact in the results, given that the share of imports on demand has remained fairly stable. One may argue that the crisis possibly had impact on this share but, for the time being, data are only available for the pre-crisis period.

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Annex I
Estimation results

	Model I		Model II		Model III		Model IV	
Long-term								
Marginal propensity to import	1,41	**	1,78	**	1,58	**	1,76	**
Replacement elasticity	-0,56	**	-0,57	**	-0,65	**	-0,76	**
Short-term								
Error correction	-0,16	**	-0,12	**	-0,17	**	-0,15	**
Constant	0,00		0,00		0,00	*	0,00	
Marginal propensity to import	1,85	**	1,49	**	1,87	**	1,61	**
Replacement elasticity	-0,54	**	-0,37	**	-0,96	**	-0,91	**
Adjusted r-squared	0,62		0,25		0,87		0,72	
Breusch-Godfrey	4,79	*0,03*	0,56	*0,46*	0,22	*0,63*	0,08	*0,78*
Sum squared residuals	0,02		0,02		0,02		0,03	
Joint significance F statistic	54		12		217		86	
Stationarity residuals	I(0)		I(0)		I(0)		I(0)	

**Statistically significant at 5%; *Statistically significant at 10%. All models are estimated in two steps. Model II and IV use GDP as the proxy for demand while models I and III rely on final demand. Models I and II use an alternative proxy of non-energy volume imports (as described in footnote 8), while Models III and IV use our standard estimate.