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The Portuguese real exchange rate, 1995-2010: competitiveness or price effects?

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Abstract

We disentangle the extent to which the real exchange rate appreciation in Portugal during 1995-2010 reflected the emergence of wage-productivity misalignments or, instead, changes in the relative price of tradable and non-tradable goods. The available data suggests that the latter effect dominated at the aggregate level. The evidence is consistent with the view that the external imbalance that characterized the Portuguese economy during the 1990s and early 2000s was triggered by the liberalization of capital flows, and not by dysfunctional wage setting institutions. Using the Fundamental Equilibrium Exchange Rate approach, we find that recent oil price shocks played an important role in explaining the real exchange rate overvaluation in Portugal.

Keywords: real exchange rate; FERER; unit labor costs.

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1 Introduction

During the transition to the European Monetary Union (EMU), and in the years that followed, the Portuguese economy exhibited current account deficits reaching around 10% of GDP in some years. The rapid accumulation of external liabilities contributed significantly to the painful adjustment process to the global financial crisis in 2008: as the Portuguese economy was largely dependent on external financing, the sharp deterioration of international borrowing conditions during the Great Recession forced a dramatic contraction of domestic demand, which was only partially mitigated by official lending. As a consequence, unemployment soared and the country experienced one the most serious economic crises of the last century.

A notable feature of this episode of external imbalance is that it did not follow a period of substantial output growth. On the contrary, the external imbalance built up on a modest expansion of aggregate demand, and with a significant import bias. During 1995-2008, imports increased at an average of 5.3% per year, while domestic demand for domestic goods increased only by 1.2% [1]. This pattern points to an important role of expenditure switching in the emergence of the current account deficits. In fact, the real exchange rate appreciated around 15% during this period, when measured in terms of Unit Labour Costs (ULC).

The focus of this paper is on the behavior of the real exchange rate during the 1995-2010 period. Our aim is to shed some light on the question as to whether the real exchange rate appreciation was the result of price stickiness and wage productivity misalignments or if, instead, it reflected the change in the relative prices of home goods caused by an expansion of domestic absorption in excess of aggregate supply, without any major role played by wage-productivity misalignments.

Concerning the first view, Blanchard (2007) contends that the real exchange rate appreciation came along with a sizeable real wage gap [2]. According to the author, during the 1995-2000 expansion phase, unemployment declined below its natural rate, implying that "nominal wage growth was substantially higher than labor productivity growth, leading to growth in Unit Labor Costs higher than in the rest of the euro area" (p.4). In the 2000-2007 period - he added - the unemployment rate increased, but the deceleration of nominal wages was not enough to offset the deceleration of productivity growth. Thus labor costs kept increasing relative to Portugal's main trading partners. "Because Portugal is largely a price taker for its exports, export prices have not increased very much, if at all; the implication is that profitability in tradables has dramatically decreased" (p.6). The author concludes by arguing that, in the absence of an exchange rate policy, a decrease in nominal wages would be a way of avoiding a painful and long adjustment where competitiveness is regained through a higher unemployment level than the main

[1] Unless otherwise stated, all data used in this paper are from the AMECO European Commission database.

[2] The European Commission (2009) echoed this view, stating that "Cost competitiveness developments also reflect inadequate wage and price behavior, including also the weak response of wages to productivity and labour market developments." (p. 136).

trading partners [3].

Dysfunctional wage setting is not, however, the only possible cause of real exchange rate appreciation. As it is well known, in a small open economy, excess absorption over aggregate supply induces an increase in the relative price of non-tradable goods, thereby leading to a real exchange rate appreciation that is unrelated to wage-productivity misalignments. Interpretations of the Portuguese adjustment process along these lines include Campos e Cunha (2008) and Fagan and Gaspar (2007). [4]

Despite the contrasting views, none of the aforementioned authors employs data to disentangle whether the real exchange rate appreciation mostly reflected excessive wage growth or relative price effects. Campos e Cunha (2008) presents some figures that are suggestive of a constant share of labor on national income and of an increase in the relative price of services. The author does not, however, discuss these figures in detail. Blanchard (2007) provides evidence that ULC increased in Portugal at a faster rate than in the main EU trading partners but, as we argue in what follows, this does not constitute evidence that wages evolved ahead of productivity. [5]

In this paper we investigate the extent to which the real exchange rate appreciation along the period from 1995 until 2010 reflects the emergence of a real wage gap or, simply, relative price effects that alter the incentives to consume and produce tradable and non-tradable goods. The available data suggests that, despite some significant heterogeneity at the sector level, the latter effect is dominant. This evidence is consistent with the idea that capital inflows, rather than dysfunctional wage setting, are at the core of the external imbalance.

This paper proceeds as follows: in Section 2 we employ a simple analytical framework to introduce the main concepts. In Section 3 we interpret and describe the behavior of the real exchange rate during the 1995-2010 period in light of that framework. In Section 4 we investigate whether it can be said that the real exchange rate has been overvalued, using the methodology proposed by Williamson (1983). We find that oil prices play a significant role in explaining the observed real exchange rate overvaluation. In Section 5, we conclude.

[3]The author revisits an argument first put forward in Blanchard et al. (1993). Blanchard (2007) uses a narrow concept of competitiveness, defined as the inverse of the Unit Labor Cost in tradable goods relative to the corresponding world value. For comparative purposes, in this paper, we follow the same narrow definition of competitiveness.

[4]Campos e Cunha (2008) explicitly dismisses the idea of excessive wage growth: "...moral suasion aimed at wage negotiations is doomed to be a failure".

[5]In a footnote (p. 6), Blanchard (2007) claims that "another logical possibility is that wages have increased much less in the tradable sector than for the economy as a whole". However, an investigation using micro-data reveals that "wages have grown at the same rate in the textiles or clothing sectors for example as in the private sector as a whole". It should be noted, however, that observing similar dynamics for nominal wages in tradable and non-tradable goods sectors tells us nothing regarding the evolution of ULC: as we show, wage increases in the tradable goods sector were matched by productivity gains, so producer margins – or competitiveness – remained unchanged during this period.

2 Real Exchange Rates and Competitiveness

Real exchange rates (RER) are statistical indices that compare price levels or labor costs across different countries. Real exchange rate indices can be computed in various manners, depending on what the object of measurement is [6]. In this section we focus on two particular definitions of RER: one based on Gross Value Added (GVA) price deflators, and another based on ULC. That is,

$$\theta = \frac{P}{P^*} \tag{1}$$

$$\tilde{\theta} = \frac{ULC}{ULC^*} \tag{2}$$

where P and P^* refer to the domestic and foreign GVA deflators, respectively, and ULC and ULC^* refer to domestic and foreign unit labor costs, respectively. ULC measure wage costs per unit of output and are typically computed as

$$ULC = \frac{W}{a} \tag{3}$$

where W is the average compensation per employee ("nominal wage") and a is the GVA per worker ("average product of labor").

To see how these measures are related to competitiveness, we assume that the economy's underlying production technology is such that the elasticity of substitution between labor and other inputs is unitary. When this is so, the textbook profit maximization rule implies that wages and the demand for labor evolve in such a way that the labour share on factor income is constant and equal to the labor-output elasticity. [7] In a world with frictions, however, firms may optimally deviate from that rule. To capture this, let β be the labor-output elasticity and Z be a mark-up term in the demand for labor [8], such that

$$Z = \frac{a\beta}{W/P} \tag{4}$$

Assume first that there are no frictions, so that real wages W/P are equal to the marginal product of labor $a\beta$ at each point in time. In this case, $Z = 1$, and the share of labor on income is equal to $W/Pa = \beta$ (recall that a is value added, divided by employment). Whenever the wage rate increases, everything else constant, the demand for labor

[6] See, for instance, Economist (2007)

[7] The analysis of ULC implicitly postulates a unit elasticity of substitution between inputs. This assumption is supported by the evidence that the shares of labor and capital on national incomes tend to be stationary over long periods of time. Under shorter horizons, however, the elasticity of factor substitution is expected to be less than one, implying that real wage increases come along with increases in the labor share on national income. Recent cross-country estimates for the Euro area (for the 1980-2008 time period) point towards an elasticity of factor substitution equal to 0.7 as shown by Lebrun and Perez Ruiz (2011). For our analysis, an elasticity of substitution less than unity only reinforces our main conclusions.

[8] This specification follows Blanchard (2007). The author relates Z to the bargaining power of workers, which in turn depends on labor market conditions. Hence, whenever the unemployment rate falls below the "natural rate", real wages increase in excess of productivity (lower Z).

contracts: employment falls, causing the marginal product of labor to increase, until the higher nominal wage is exactly matched by a higher marginal product of labor. This is what happens when firms face no adjustment costs in optimizing the size of the labor force they hire. In a world with frictions, however, firms may opt to maintain a level of employment different from that implied by the simple wage-productivity rule. In this case, a wage rate push (increase) may cause producer margins to shrink ($Z < 1$) and the labor share in income to increase to $\beta/Z > \beta$.

The measure $1/Z$ is often labeled the *real wage gap*, since it is computed as the ratio between the actual labor share and the "reference" one, β. When $1/Z$ is expressed in terms of a base year, the constant parameter β cancels and the index is renamed *Real Unit Labour Cost* (RULC). Such index can be computed at the industry level or at the economy-wide level.

Using the above concepts, it becomes possible to relate the RER index based on nominal unit labor costs (RER-ULC) to the RER index based on GVA through the following relation

$$\tilde{\theta} = \frac{ULC}{ULC^*} = \left(\frac{P}{P^*}\right)\left(\frac{Z^*}{Z}\right) = \theta\left(\frac{Z^*}{Z}\right) \tag{5}$$

The above expression means that the RER index based on unit labor costs captures two main effects:

1. Wage-productivity misalignments, represented by the second term Z^*/Z;
2. Relative price effects (the first term): changes in domestic prices relative to those in the rest of the world.

With this machinery in mind, one can revisit the argument of Blanchard (2007). In his model, the author distinguishes tradable (T) and a non-tradable(N) goods sectors. The author argues that while firms in the non-tradable good sector are able to completely pass through wage costs to final consumers, firms in the tradable good sector cannot do so, because they are subject to international competition ($P_T = P_T^*$). Hence, while in the non-tradable sector prices are always equal to ULC, they may differ in the tradable goods sector. A wage rate push in the tradable good sector, therefore, causes producer margins to shrink and competitiveness, as measured by Z, to decline. [9] Economy-wide real wage gaps are then mainly driven by the tradable goods sector.

Changes in Z are not, however, the only factor influencing the real exchange rate. As shown in equation (5), changes in price deflators may also cause the real exchange rate

[9]Blanchard (2007) assumes that nominal wages evolve according to price expectations, the economy-wide average productivity and deviations from full employment. Thus, a decline of the unemployment rate below full employment causes nominal wages to increase faster than average productivity in the economy. Producers of non-tradables are able to pass through the higher wage costs, so that they always find themselves on their own labour demand curves. Tradable good producers, however, cannot deviate from the law of one price, so they must face a fall in their profit margins, or a competitiveness loss (a fall of Z), and requiring a period of rising unemployment to restore competitiveness .

to swing irrespectively of producer margins. To further explore this argument, assume that there are no labor market frictions or "competitiveness" problems, so that $Z = 1$ in both sectors at each moment in time. That is, following a wage rate push, firms reduce employment so as to remain aligned with their own neoclassical labor demand curve. Let γ be the share of tradable goods in production (which we assume to be equal domestically and abroad). The GDP deflator P is given by

$$P = P_T^{\gamma} P_N^{1-\gamma} \tag{6}$$

where P_N and P_T refer to the prices of non-tradable and tradable goods, respectively. By the same token, aggregate ULC are

$$ULC = (W/a_T)^{\gamma}(W/a_N)^{1-\gamma} \tag{7}$$

where a_N and a_T are the average products of labor in each of the two sectors. When prices in both sectors are equal to ULC (that is, $Z = 1$) and the Law of One Price holds for tradable goods ($P_T = P_T^*$), the RER index based on ULC simplifies to

$$\tilde{\theta} = \frac{ULC}{ULC^*} = \left(\frac{P_N}{P_N^*}\right)^{1-\gamma} \tag{8}$$

Thus, in a version of the model where there is no such thing as wage-productivity misalignments (or losses of competitiveness), the RER may still appreciate or depreciate, depending on the relative prices of non-tradable goods. These, in turn, may vary according to the relative levels of aggregate demand and supply (the capital inflow problem), or due to productivity changes in the tradable goods sector (the Balassa-Samuelson effect).

The main point of this discussion is that the traditional measures of the RER are not good indicators of competitiveness, as defined by the producer margin in the tradable goods sector. A more precise measure of the change in a country's competitiveness is the ratio between the two measures of the RER, (2) and (1). From (5), it follows that such ratio captures precisely the competitiveness component of the RER, disentangling it from changes in the relative prices of non-tradable goods.

With these concepts in mind, we now turn to the data.

3 What do we learn from the data?

Table 1 shows the evolution of the RER based on GDP deflators (RER-P) and ULC (RER-ULC) through the 1995-2010 period. The base year is 1995, a period during which the current account was close to balance. Row (c) in Table 1 measures the ratio of the two indices, which according to our discussion should capture wage-productivity misalignments in the domestic economy and abroad (relative RULC). As shown in Table 1, both RER-P and RER-ULC appreciated significantly between 1995 and 2010. The RER-ULC appreciated 15% while the RER-P appreciated 12%. As we have just shown (equation 5), the ratio between these two indices captures the real wage gap in Portugal relative to the real wage gap abroad (relative RULC , line c in Table 1). As shown in

the table, most of the RER-ULC appreciation between 1995 and 2010 was accounted for the relative price effect, that is, by movements in RER-P. The distance between RER-ULC and RER-P peaked at 6% in 2005, then declining to 3% in 2010. This gap seems to be too little a gap to support the narrative that Portugal faced a wage-productivity misalignment.

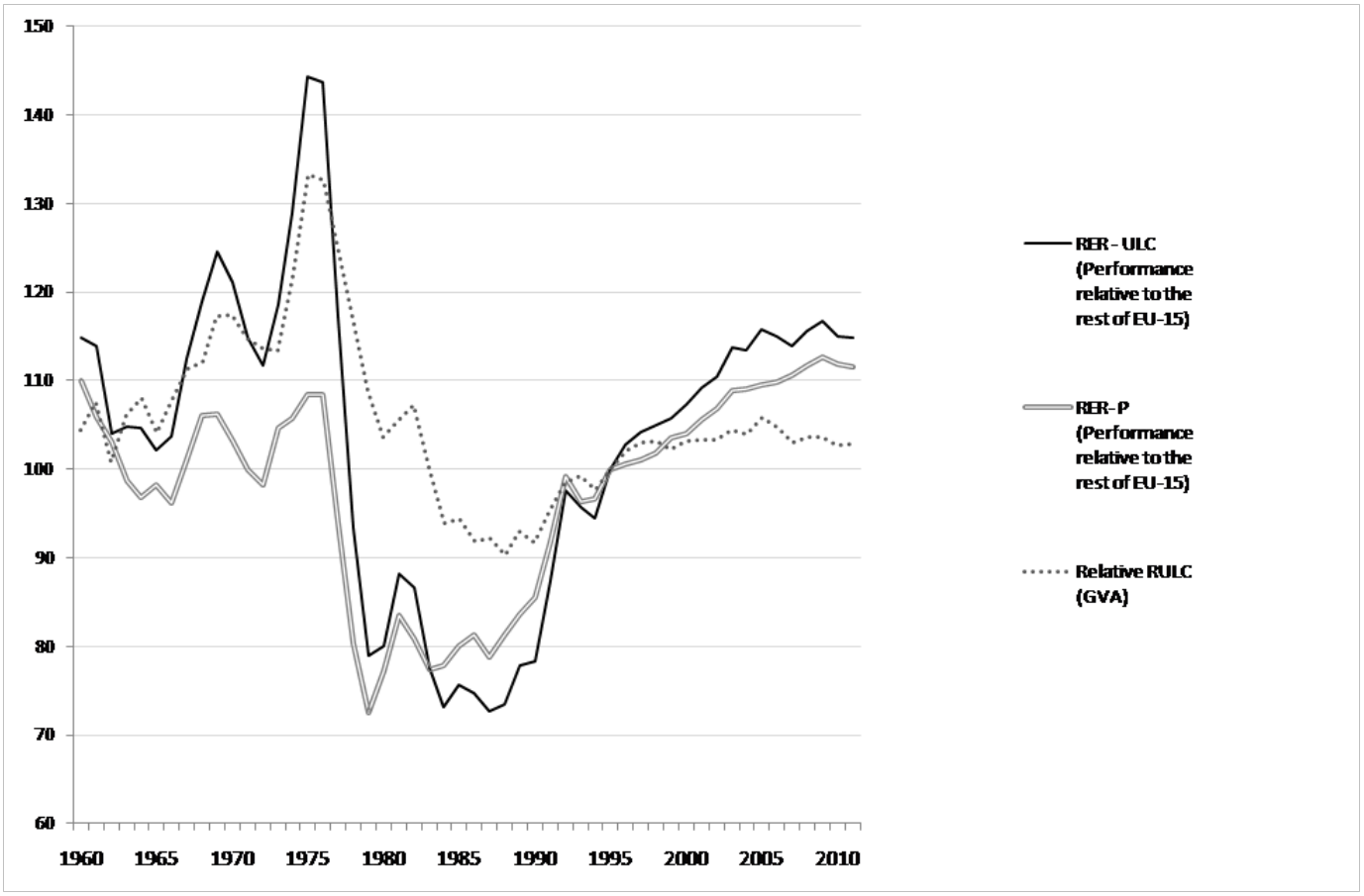
Table 1: Real exchange rate indices and adjusted wage share

		1995	2000	2005	2010
(a)	RER-ULC	100	107	116	115
(b)	RER-P	100	104	109	112
(c)	Relative RULC	100	103	106	103
(d)	Labor Share (PT)	66.0	67.2	68.2	66.3
(e)	Labor Share (EU15)	66.9	66.8	65.5	66.0

Source: Own calculations using the AMECO database. (a), (b): real exchange rates, performance relative to the remaining EU15; (c) = (a)/(b); (d), (e): the adjusted wage share is computed as the ratio between compensation per employee, while the average productivity is obtained as the ratio between gross value added and total employment. The procedure assumes that self-employed workers earn a wage that is similar to wage earners.

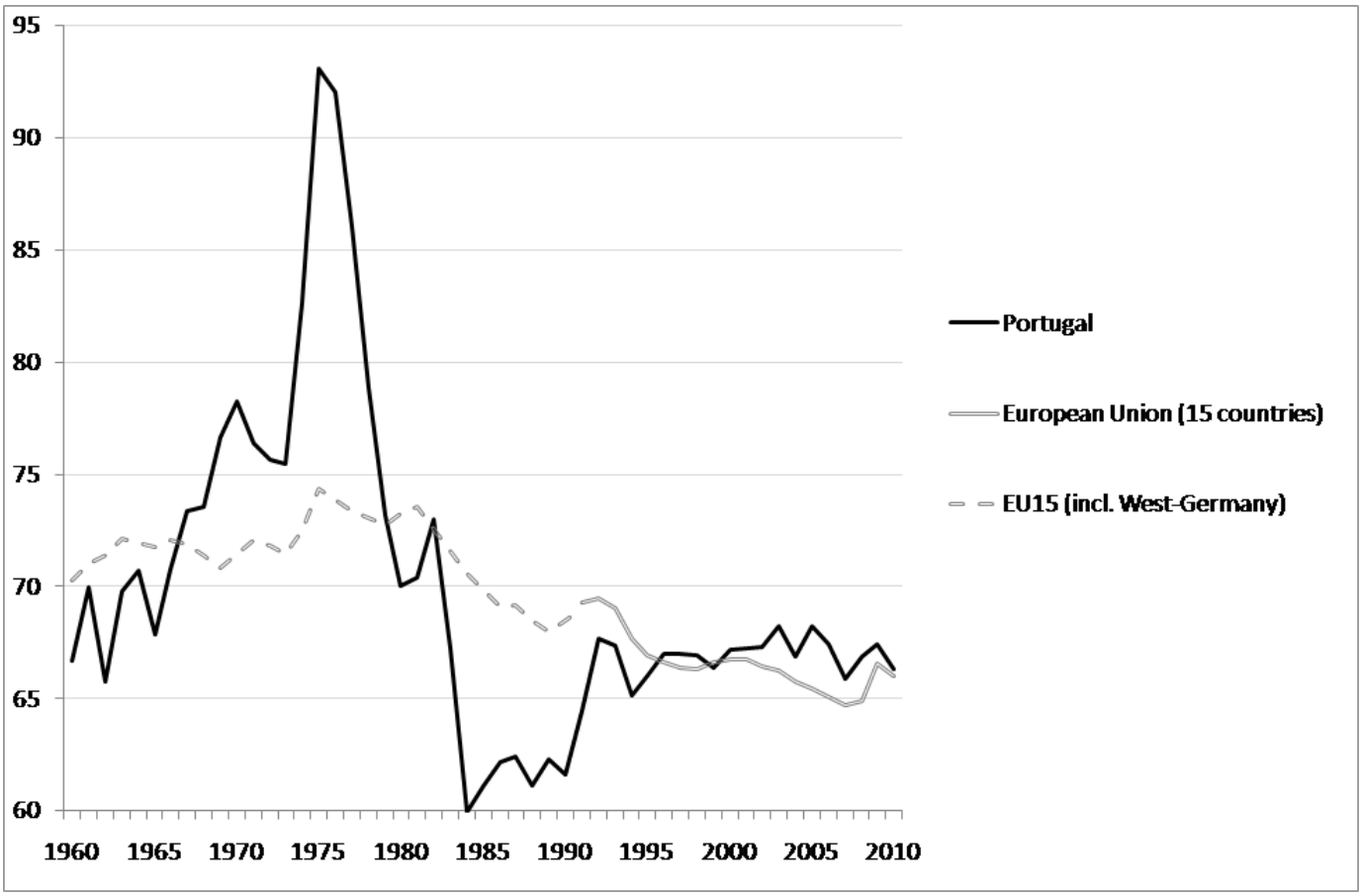
Figure 1 plots the evolution of the real exchange rate based on GDP deflators (RER-P) and ULC (RER-ULC) for the last four decades (1960-2010). Figure 2 plots the evolution of the income labor shares in Portugal (β/Z) and in the EU15 (β^*/Z^*) for the same time period. Note that the ratio between the latter two corresponds to the RULC.

Figure 1: ULC and P-based real exchange rates (1995 = 100)



Source: AMECO.

Figure 2: Adjusted wage share: total economy (compensation per employee as percentage of GDP at factor cost per person employed)



Source: AMECO. The adjusted wage share is computed as the ratio between compensation per employee and gross value added per worker. The computation implicitly assumes that self-employed workers earn a wage that is similar to that of wage earners.

These figures allow us to identify four main episodes in Portugal. The first, from the mid-1960s to 1976, is characterized by a progressive real exchange rate appreciation, as measured by the RER-ULC; the RER-P, in contrast, appears to be trendless. During this period the working force in Portugal was shrinking due to the Colonial War in Africa and emigration, while a rising demand for labor was pressuring wages upwards and compressing producer margins. This trend was magnified during the revolutionary period of 1974-1975, a time during which wages suffered administrative raises in a context of falling productivity. As shown in Figure 1, it is during this period that the RER-ULC departs from RER-P series, reflecting a competitiveness loss á la Blanchard. The same can be assessed in Figure 2, by observing that the labor income share in Portugal increased significantly during this period.

The second episode (1977-1979) corresponds to the implementation of the first stabilization package negotiated with the IMF. [10] This package largely relied on significant

[10]Krugman and Braga de Macedo (1979) provide an interesting discussion of this episode.

nominal exchange rate devaluations, translating into a depreciation of the RER-P. At the same time, a policy of nominal wage moderation in a context of high inflation allowed unit labor costs to decline significantly. The improvement in competitiveness is captured by the fact that the paths RER-ULC and the RER-P seemed to converge. The differential, as captured by the RULC, may be decomposed in a domestic labor share and in a foreign labor share components. As shown in Figure 2, by 1979 the share of labor on domestic income was already as low as in the mid-1960s.

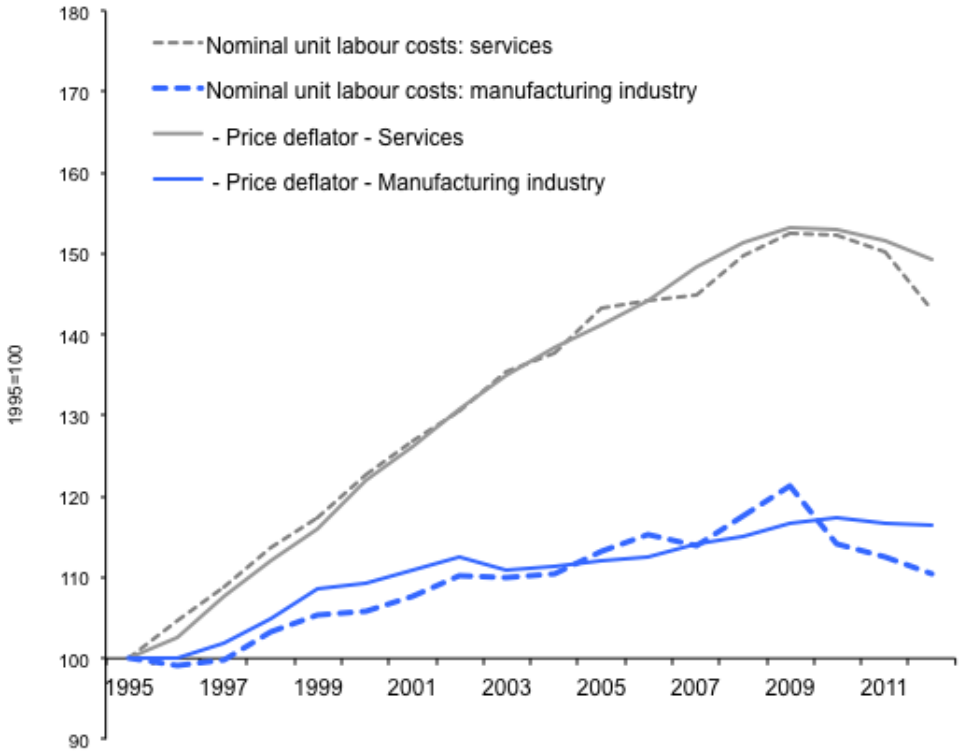
The third episode (1989-1990) is characterized by a trendless RER-P, while the RER-ULC keeps declining. This means that competitiveness was still improving. By 1990, the share of labor on domestic income was well below the sample average, meaning that the income distribution was already biased against labor (this fact was previously documented by Braga de Macedo (1990)).

Finally, during the last episode (1990-2010), both real exchange rate indices increased significantly. The RER-ULC index, however, increased faster than the RER-P. Although this may be suggestive of a new phase of loss of competitiveness, it may also have another interpretation: in 1990, the share of labor on national income was below the trend (that is, $Z > 1$) so the adjustment that followed was basically a return to the "equilibrium" labor share. The fact that between 1993 and 2010 the labor share was roughly constant (Figure 2) is consistent with this interpretation. It is true that during this period the labor share abroad declined slightly and this explains the loss of "competitiveness" identified in line (c) of Table 1. However, as we already observed, such "competitiveness" effect seems to have been small.

It could be argued that wages were too high in 1995 and were too high in 2005 as well. However, in 1995 the net borrowing requirements of the economy were close to zero. Moreover, it should be noted that the average share of labor income on gross value added in the 1995-2008 period was 0.676, which compares to average shares of 0.718 for 1960-2010 and 0.662 for 1986-2010. This is not suggestive of large deviations from historical levels.

As complementary pieces of evidence, we introduce Figure 3 and Table 2. In Figure 3, we compare the indices of Unit Labor Costs and of Prices in manufactures and services, using 1995 as the base year. The first noticeable fact in Figure 3 is that ULC in each sector remained close to price movements. This is not suggestive of significant wage-productivity misalignments.

Figure 3: Price deflators and Unit Labor Costs (1995=100)



Source: AMECO, own calculations.

The second evident fact in the figure is that, until 2008, prices increased much faster in Services than in Manufactures. This suggests that relative price effects, rather than competitiveness problems, underlie the real exchange rate appreciation in the period.

In summary, the increase in economy-wide unit labor costs in Portugal relative to other countries appears to have little to do with dysfunctional wage setting: unit labor costs increased wherever prices increased. In this particular episode, the real exchange rate measured with unit labor costs captures basically the increase in the relative price of non tradable goods, not wage productivity gaps.

Due to the fact that the data on services above accounts for many sectors, including the government, we look at each sector in greater detail in Table 2. This table displays the observed labor shares on gross value added, or – equivalently – the ratio between real wages and productivity (β/Z). Without frictions, the labor share should be constant and equal to the elasticity of labor in the production function, β. The table presents the shares of labor in gross value added at the sectoral level (agriculture is excluded because the adjustment employment/employees produces odd results). The first column displays the shares on employment, as of 2010. The last column shows the average labor shares during the 1995-2010 period. As shown in the table, the share of labor on domestic income remained pretty stable around 67.3 during the 1995-2010 period, reaching a max-

imum of 68.6 in 2005. This seems to be too little to support the claim that wages have in general evolved ahead of productivity. In the case of manufactures in particular, the maximum observed labor share was 64.9 in 2009, which compares to the 61.9 average. In 2010, the gap in manufactures was already negative.

In general, labor shares at the sectoral level do not seem to display an obvious trend. There are however, some exceptions: for those sectors where this trend is positive, "information and communication" stands out ("Building and construction" as well, but we have reasons to suspect that the data for this sector, as well as for agriculture, is plagued by changes in the proportion of temporary labor or by changes in the level of informality); on the other hand, sectors where the wage shares have been declining include "Transportation and storage", "Arts and entertainment" and – not surprisingly – energy supply. The financial services industry also exhibited a declining labor share until 2008, but the productivity fall in the years that followed partially reversed the situation.

Table 2: Wage shares per industry

Industry	Share of Total Employment	1995	2000	2005	2010	1995-2010 Average
2 - Industry, energy, water supply and sewerage	16%	57.0	56.3	57.6	52.7	56.2
2.C - Manufactures	15%	62.5	60.5	63.1	60.7	61.9
2.D - Electricity, gas, steam and air conditioning supply	0%	23.4	27.0	23.7	18.1	22.5
3 - Construction	9%	60.8	69.1	71.7	75.0	69.4
4 - Wholesale and retail trade	25%	59.0	59.2	61.6	61.2	60.3
4.G - Repair of motor vehicles and motorcycles	16%	57.9	58.6	62.4	63.0	60.6
4.H - Transportation and storage	4%	65.0	65.5	64.6	60.6	63.4
4.I - Accommodation and food service activities	6%	55.0	53.5	55.2	56.1	55.3
5 - Information and communication	2%	42.7	43.6	42.0	50.1	44.7
6 - Financial and insurance activities	2%	67.0	61.6	57.3	52.1	57.0
7 - Real Estate activities	1%	4.7	5.9	4.9	5.1	5.2
8 - Professional, scientific and technical activities	8%	62.1	63.7	64.9	64.7	65.0
9 - Public administration and defence; education; health	20%	88.8	89.9	89.0	87.7	88.9
10 - Arts, entertainment, other services	6%	98.2	90.5	87.2	85.4	90.0
Total	100%	66.4	67.6	68.6	66.6	67.3

Source: Bank of Portugal.

In summary, the claim that real wages have gone significantly above productivity does not match the national accounts data. In the case of manufactures, the maximum observed real wage gap amounted to 4.6% during the 2009 collapse of international trade, only to recover one year later. In general, the data seems to support the narrative that aggregate demand effects, rather than nominal wage stickiness, explain the pre-2008 external imbalance: during the capital inflow episode, prices of non-tradable goods increased, pressuring nominal wages up. This forced average productivity in manufactures to increase, in some cases with technological change, but mostly through the shutting down of low productivity firms, while labor was reallocated to low-productivity-growth non-tradable good sectors.

4 The Real Exchange Rate gap

Descriptive analyses of real exchange rate indices face a major drawback: there is no benchmark or reference value to which the data should compare, so as to assess whether

the real exchange rate is over or under-appreciated. Moreover, to the extent that real shocks impact on the level of the real exchange rate that is consistent with internal and external balance, any reference value cannot possibly be constant over time - there is no time-invariant benchmark that reflects the equilibrium real exchange rate of an economy.

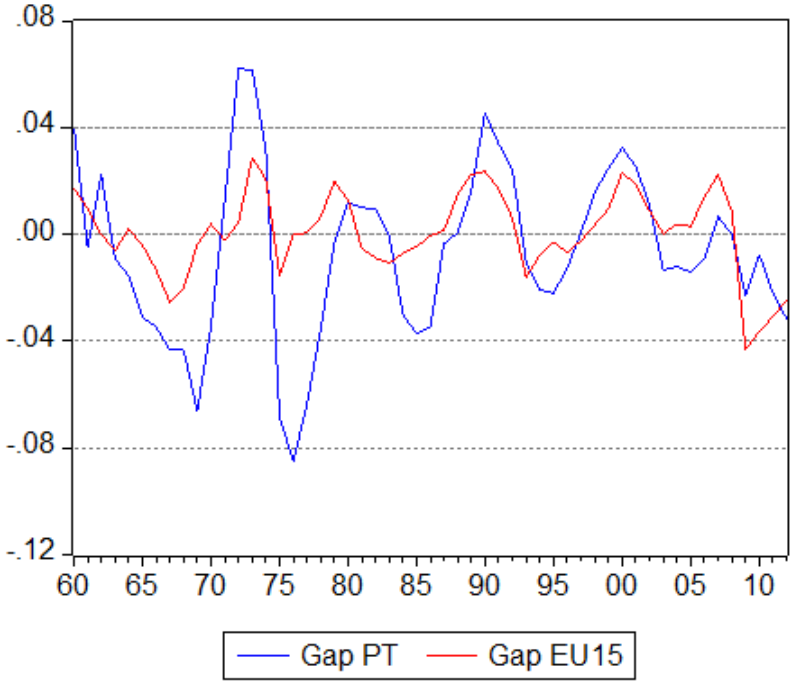
A typical approach to assess the extent of a country's real exchange rate gap is to compute the Fundamental Equilibrium Real Exchange Rate (or FEER) based on the methodology put forward by Williamson (1983). This approach consists of estimating an equation that describes the behavior of a country's Fundamental Balance over time. Once such equation is estimated, one can then compute the value of the real exchange rate that would be consistent with internal and external balance.

External balance is defined as a situation in which an economy's primary current account deficit is totally financed by inflows of foreign direct investment. In other words, a country is said to be in external balance when its Fundamental Balance - defined as the sum of the primary current account with net foreign investment - equals zero. The rationale underlying the inclusion of foreign direct investment in the concept of external balance follows the idea that these capital flows are mainly driven by structural factors and, hence, less likely to be reverted in the face of financial crises. [11] By internal balance, one refers to a situation in which the economy is at full employment, and the output gap (with respect to potential output) is equal to zero. Despite the obvious limitations, especially when too little factors are taken into account in the equation that describes the fundamental balance, this methodology still has a great appeal, as it provides a reference value that would otherwise not exist. [12]

[11] Note that this concept of external balance has nothing to do with that of country solvency: a country may engage in external deficits as long as debt holders perceive the country as capable of generating future surpluses. The concept of external balance, as used in the current context, should be interpreted as a benchmark that occurs if the country does not borrow nor it accumulates assets at each moment in time.

[12] Other studies that estimate FEER for Portugal using this procedure include Lebre de Freitas (1992), Costa (1998) and Costa (2000) .

Figure 4: Output gaps

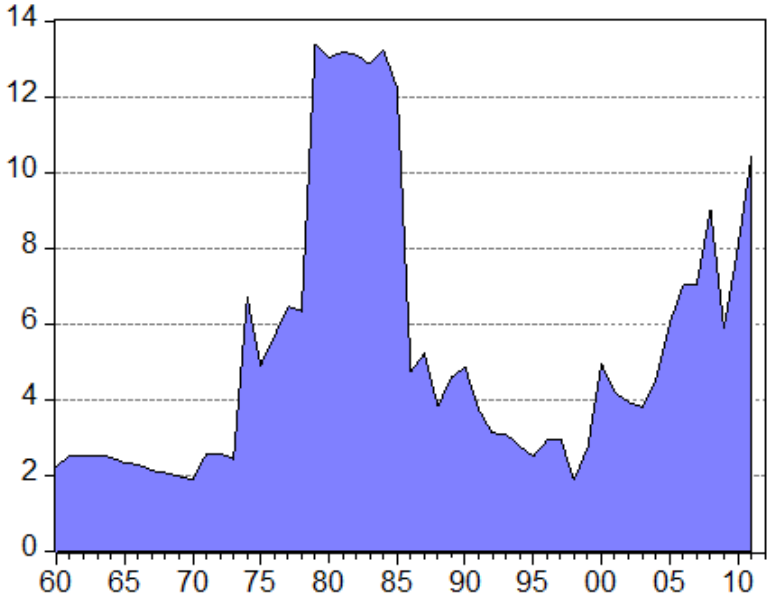


Source: AMECO, own calculations. The output gap is obtained by taking the percentage deviation of real output from its potential value. Data for the EU15 includes West Germany prior to 1992 and Germany from 1992 onwards.

In the exercise that follows, we present two estimates for the FEER, each using a different measurement of the Portuguese real effective exchange rate: the first uses the RER-P while the second employs the RER-ULC. Our estimates account for the business cycle in Portugal and abroad (as measured by the output gaps displayed in Figure 4), and a terms-of-trade effect, captured by the price of a barrel of Brent oil in units of domestic GDP (Figure 5). The latter accounts for the idea that changes in oil prices play a significant role in the Portuguese macroeconomic adjustment. [13]

[13]To get a sense of the direct impact of oil prices on the current account, the external deficit in energy products increased from 2.9% of GDP to 4.9% of GDP between 2011 and 2008. This excludes indirect effects.

Figure 5: Relative price of oil



Source: INE, IFS, own calculations. The relative price of oil is computed as the price of a barrel of Brent oil in the domestic currency, divided by the GDP deflator.

We estimate an equation for the Fundamental Balance as a percentage of potential GDP over the 1966-2010 period. The covariates are the real exchange rate (either as P or ULC), the output gaps in Portugal and the EU15, and the relative price of oil. The basic specification follows

$$bf_t = \beta_0 + \beta_1 gap\_pt_t + \beta_2 gap\_eu_t + \beta_3 \theta_t^j + \beta_4 oil_t + u_t, \tag{9}$$

where bf_t is the Fundamental Account, gap_pt_t, gap_eu_t are the output gaps in Portugal and the EU15, respectively, θ_t^j is the (log) RER, for $j \in \{P, ULC\}$,oil_t is the relative price of oil, and u_t is the error term. Dummy variables accounting for the entry of China in the WTO or for the 2005 trade liberalization event, initially included as controls, proved to be non-significant. Also, no time trend or segmented trends accounting for periods of fast productivity growth in the tradable goods sector (capturing a Balassa-Samuelson effect) were found to be statistically significant.

All of the variables were tested for unit-roots, and Table 3 presents the output of such tests. Standard tests fail to reject the hypothesis that the employed time series have a unit root, except for both output gaps. Furthermore, preliminary estimations of the structural form of the equation we seek to estimate display high levels of serial correlation. These two facts motivate the inclusion of a lagged term of the dependent variable,bf_{t-1}, in a partial adjustment model

$$bf_t = \beta_0 + \alpha_1 bf_{t-1} + \beta_1 gap\_pt_t + \beta_2 gap\_eu_t + \beta_3 \theta_t^j + \beta_4 oil_t + u_t, \tag{10}$$

Table 3: Augmented Dickey-Fuller Tests (Unit root tests)

Variable	ADF (None)	ADF (intercept)	ADF (trend + intercept)
bf	3.17%	14.36%	38.14 %
gap_pt	0.00%	0.00%	0.01 %
gap_eu	0.01%	0.22%	1.27 %
θ^{P}	57.00%	64.98%	80.52 %
θ^{ULC}	51.96%	62.40%	88.46 %
oil	53.44%	44.00%	71.81 %

This table reports the p-values for different specifications of the Augmented Dickey-Fuller test. The null hypothesis of the ADF test is that the variable has a unit root.

The regression results of the model that provides the best fit for each RER are presented in Table 4. The same table presents several robustness checks, to ensure that the residuals are well-behaved. The residuals pass all standard tests, given that no heteroskedasticity nor serial correlation are detected. Furthermore, there is no statistical evidence to reject the hypotheses that residual series are stationary and normally distributed.

Figures 6 and 7 plot the time path of the Fundamental Balance in Portugal, as well as the fit of each of our estimated models. Table 4 presents the estimates for the Fundamental Balance equation using both measures of the RER. The relevant variables, namely the real exchange rate and the oil price, are significant and display the signs that we expect from economic theory: a real exchange rate depreciation (that is, an increase of this variable), improves the Fundamental Balance, while rising oil prices deteriorate it. It is important to note that our estimation points towards an important role for oil prices. The reason is that the Portuguese economy is largely dependent on energy imports. Given that the demand for energy is rather inelastic in the short run, changes in the relative price of oil impact the economy as a transfer from abroad: whenever terms of trade improve, this becomes equivalent to a positive transfer (the mechanism being similar to that of the Dutch disease), so that the real exchange rate consistent with the external balance appreciates. When, on the contrary, the terms of trade deteriorate, this becomes equivalent to a negative transfer: in this case, a surplus in the non-energy component of the current account is required to keep the external balance, so that the real exchange rate has to depreciate.

Table 4: Fundamental Balance estimation with RER-P and RER-ULC

Dependent Variable: bf_t	θ^P	θ^{ULC}
Constant	-7.400^{**}	-4.998^{**}
bf_{t-1}	0.515^{***}	0.502^{***}
gap_pt_t	4.347	-3.154
gap_eu_t	-18.336	-11.119
θ_t	0.094^{**}	0.070^{***}
oil_t	-0.688^{***}	-0.665^{***}
R^2	68.91%	70.51%
White Test (p-val)	0.614 (86.41%)	0.928 (56.34%)
LM Test (p-val)	0.528 (59.41%)	0.621 (54.29%)
ADF Residuals (p-val)	-5.856 (0.00%)	-6.154 (0.00%)
Jarque-Bera Residuals (p-val)	0.654 (72.12%)	0.559 (75.61%)

The upper part of the table reports regressions results. Sample: 1966-2010 (45 observations). $*, **, ***$ represent significant at the 10%, 5%, and 1% levels, respectively. The bottom part of the table reports robustness test statistics and p-values in parentheses. The null hypothesis of the White test is no heteroskedasticity present; the null hypothesis of the LM test is that no serial correlation is present; the null hypothesis of the ADF test is that residuals have a unit root; and the null hypothesis of the Jarque-Bera test is that residuals are normally distributed.

From the estimated parameters we compute the structural equation coefficients. These then allow us to compute the Fundamental Equilibrium Exchange Rate. This is defined as the value of the real exchange rate that is simultaneously consistent with external balance (Fundamental Balance and foreign output gap equal to zero) and internal balance (national output gap equal to zero). Figure 8 plots the evolution of the actual RER and the FEER. Interestingly enough, the two estimated FEER do not differ significantly: The reason is that, in equilibrium, ULC and prices should be equal (there should be no real wage gaps).

Before the EMU, two large swings in the real exchange rate gap were observed. The first was one of overvaluation in the early seventies, until the first IMF stabilization package. This period was marked by the first oil shock (that required a depreciation) while real wages moved in the opposite direction, exacerbating the real exchange rate gap. This phenomenon is better captured by the ULC-measure, which accounts for shrinking producer margins. After the nominal exchange rate started depreciating in 1977, the real exchange rate gap decreased. The exchange rate depreciation along this period was basically an adjustment to the deterioration in the terms of trade that took place with the oil shocks of 1973 and 1979 (see Lebre de Freitas (1992) and Krugman and Braga de Macedo (1979)).

In the mid-eighties, however, the RER gap became negative: this episode was associated to a decline in oil prices, so that the equilibrium real exchange rate appreciated relative to the previous episode. Given that the actual RER did not appreciate, it re-

mained undervalued relative to the benchmark. During this period, the fundamental balance exhibited a surplus. Our results suggest that the real exchange rate appreciation that occurred between 1986 and 1992 was mostly an equilibrium phenomenon, reflecting the adjustment to lower oil prices .

Along the 1990s, the progressive stabilization of the nominal exchange rate allowed the real exchange rate to appreciate again. In the mid-nineties the real exchange rate gap was basically nil. Interestingly enough, these estimates give support to our procedure above, of taking 1995 as a reference year: between 1995 and 2000, the actual RER and the fitted FEER evolved in the exact same manner, suggesting that the demand expansion that occurred in the second half of the nineties was not the main source of real exchange rate overvaluation. Apparently, the reason is that the output gap observed in that period was small (in historical terms). Oil prices, in contrast, increased sharply around 2000 and this coincides with the emergence of a sizeable real exchange rate gap: the increasing price of oil would call for a decline in the relative price of non-tradable goods, while the opposite occurred.

Figure 9 plots the real exchange rate gaps computed using both measures of the FEER. By the time of EMU accession, the real exchange rate was close to equilibrium. In the years that followed, however, the continuous real exchange rate appreciation implied the emergence of a positive real exchange rate gap, that reached 35% in 2010 when measured using the RER-P, and 36% as per the RER-ULC. It is important to note that the rising real exchange rate gap was largely accounted for the steep increase in oil prices. Should the real price of oil imports in 2010 be at the same level as in 1995, the exchange rate gap would be equal to 19% when measured with the RER-P and 16% for the RER-ULC.

A final, but certainly no less interesting exercise is to account for the negative income balance, due to a high external debt, in the computation of the real exchange rate gap. In particular, it is possible to compute, at each moment in time, what would be the value of the FEER that would allow the fundamental balance to have a surplus equal to net interest payments, as a percentage of GDP. This can be seen as a rough measure of the weight of external debt on the exchange rate misalignment. The gap between the original FEER and the one adjusted for income balance is close to zero until 2006, after which it rapidly rises to the 6% range. The most recent estimate was of 6.98% in 2011. The evolution of this FEER adjusted for income balance is compared to that of the regular FEER and the RER-ULC in Figure 10, for the period 1996-2011.

Figure 6: Fundamental balance (% of GDP): actual and fitted, RER-P

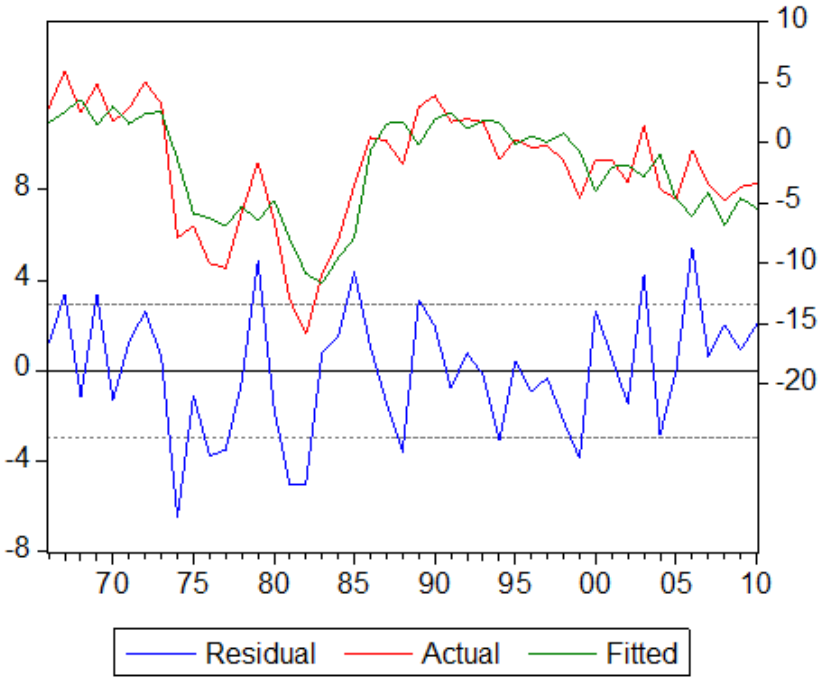


Figure 7: Fundamental balance (% of GDP): actual and fitted, RER-ULC

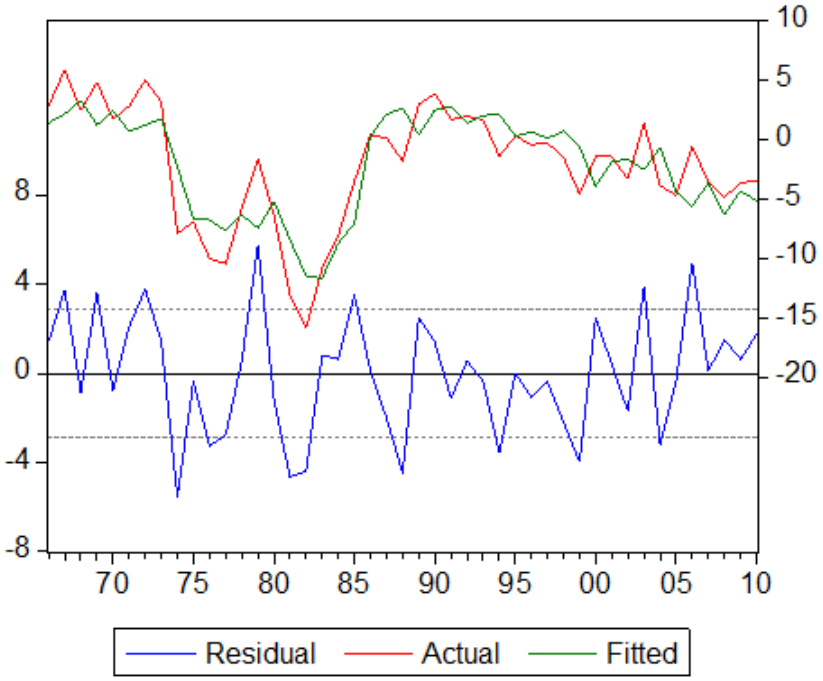


Figure 8: Actual and equilibrium real exchange rates

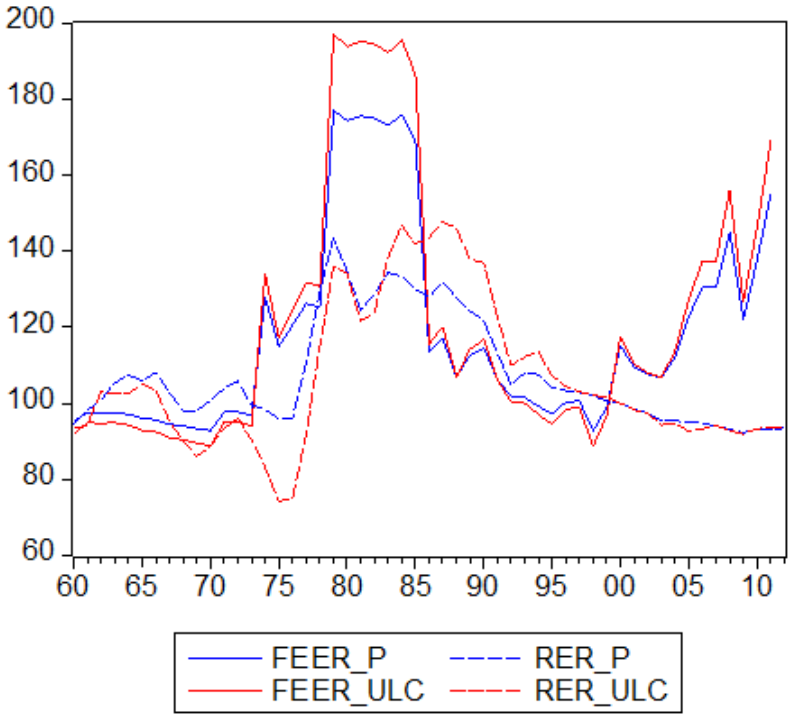
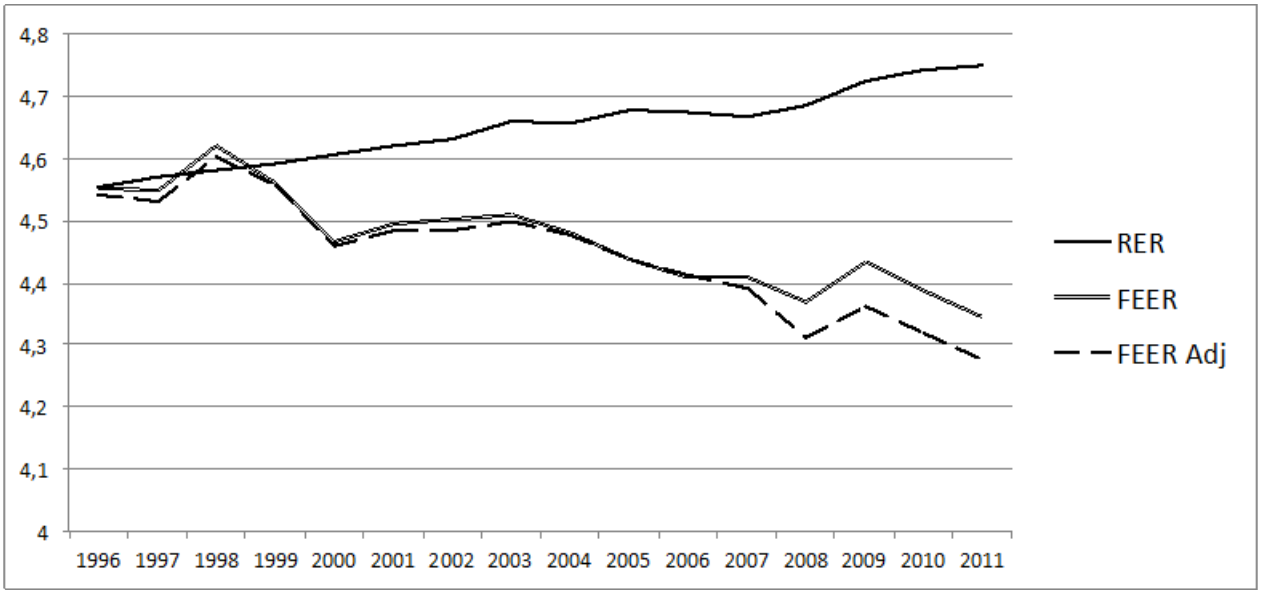


Figure 9: Real exchange rate gap

Figure 10: RER-ULC vs. FEER-ULC vs. FEER adjusted for income balance



This figure plots the RER-ULC, FEER-ULC and the FEER-ULC adjusted for income balance. That is, we compute the FEER that would prevail should the fundamental balance feature a surplus that exactly offsets net interest payments on public debt.

5 Conclusions

The analysis in this paper suggests that the real exchange rate appreciation that preceded entry in the EMU and the Financial Crises was mostly driven by changes in the relative prices of non-tradable goods, rather than by dysfunctional wage setting. This is in line with the view that the underlying cause of the external imbalance was the capital inflow surge that followed the liberalization of capital flows and EMU accession in the 1990s.

Prior to the 1990s, monetary policy in Portugal was reliant on heterodox instruments, such as capital controls, credit ceilings, and administratively set interest rates. Banking credit was primary allocated to the public sector at below market interest rates, while the credit to the private sector was restricted. The process of financial liberalization that culminated in 1992 implied the progressive elimination of these borrowing constraints, while the government turned progressively to market financing (see Reis (2013) for an account). [14] On the other hand, EU membership is likely to have generated a sense of security against bad policies and prospects of faster economic convergence, boosting private expenditures for each level of the interest rate (Blanchard and Giavazzi (2002)). These factors implied a significant fall in private savings, boosting domestic demand ahead of production. Finally, by eliminating the perception of exchange rate risk, accession to the EMU further triggered foreign capital inflows, thus postponing the unavoidable macroeconomic adjustment.

[14]Data from Banco de Portugal reveals that the fraction of banking credit allocated to households increased from 14% in 1985 to more than 40% in 2000. At the same time, the banking credit to the general government declined from 34% in 1985 to less than 2% in 2000.

Some may argue that the discussion in this paper is irrelevant: after all, a real exchange rate appreciation impacts negatively in the current account, irrespectively as to whether it comes through an increase in the relative price of non-tradable goods or through wage-productivity misalignments. For policy purposes, however, the distinction is very important. Indeed, if the real exchange rate appreciation was a consequence of dysfunctional wage setting, one would be tempted to question whether Portugal would be able to sustain its membership in a low inflation club without reforming drastically its labor market institutions. If, instead, the real exchange rate appreciation had materialized without significant wage-productivity misalignments, then the question of how to deal with large cross-border capital flows in a monetary union eventually becomes the main matter of concern.

This does not mean that average wages in the economy will not decline during the adjustment process to full employment. In general, a "white collar" to "blue collar" transition entails the acceptance of lower wages. Not only because wages are on average lower in manufactures than in services, but also because recycled workers lose the value of whatever specific knowledge they accumulated in the job they had before. Hence, we shall expect workers to resist the move until it becomes a matter of personal urgency. In this context, a policy of reducing wages in existing contracts (for instance, by extending the number of working hours per day) will hardly encourage workers to move from non-tradable good sectors to tradable goods sectors. Yet easing the social security contributions and offsetting this with an increase in VAT rates fits perfectly this diagnostic: to the extent that such policy leads to a fall in labor costs, it will stimulate investment in the tradable goods sectors and – most importantly – it will speed up the fall in prices of non-tradable goods, thereby promoting the required expenditure switch. The latter effect will only hold, of course, if there is enough competition in non-tradable goods sectors, so that the lower costs are passed through to consumers; it also presumes that any increase in VAT rates to ensure budget neutrality will apply mostly to tradable goods . [15]

We conclude by emphasizing the pervasive role of non-price barriers to factor mobility. We refer to those barriers lying on the path of entrepreneurs and job-seekers that impair investment and delay the reallocation of labor from the nontradable to the tradable sectors. These include macroeconomic uncertainty, skill mismatch frictions, imperfect competition, and legal frictions. On the policy dimension, it is urgent to anchor investors' expectations on a scenario of fiscal and monetary stability. Without this, investment and employment will not recover and the Portuguese economy will face a long and painful adjustment process. For what is left, the current macroeconomic strategy is correctly addressing the main issues: more competition, lower firing costs, less incentives for workers to remain unemployed while searching for better matches, a more effective justice system, etc. In a single word: more competitiveness, in its broadest sense.

[15] Franco (2013) provides a detailed theoretical analysis of this class of policies, as well as empirical counterfactuals for the Portuguese case.

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