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05

Internal devaluation in a wage-led economy. The case of Spain

Ignacio Álvarez
Jorge Uxó
Eladio Febrero

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Abstract

The aim of this paper is to use the theoretical distinction between wage-led and profit-led economies to consider the impact of internal devaluation policy on GDP growth for the case of Spain. We assess to what extent wage devaluation in Spain has proven useful vis-à-vis triggering an export-led strategy, boosting aggregate demand and overcoming the crisis.

For said purpose, we estimate a Bhaduri-Marglin model drawing on quarterly data from Eurostat, and we expand the traditional model to take into account the effect of private debt on consumption and investment.

Our main conclusion is that the Spanish economy can be characterized as a wage-led economy, and that therefore a wage share decrease proves counterproductive to growth. According to our calculations, internal devaluation policy detracted an average of 0.3 percentage points of annual economic growth during the period 2010-2016.

JEL codes: E24, E25, E64

Keywords: distribution; demand; wage share; Bhaduri-Marglin model; debt;

Instituto Complutense de Estudios Internacionales, Universidad Complutense de Madrid. Campus de Somosaguas, Finca Mas Ferré. 28223, Pozuelo de Alarcón, Madrid, Spain.

Ignacio Álvarez, Instituto Complutense de Estudios Internacionales (ICEI) Departamento de Estructura Económica y Economía del Desarrollo,, Universidad Autónoma de Madrid. nacho.alvarez@icei.ucm.es

Jorge Uxó, Departamento de Análisis Económico y Finanzas, Universidad de Castilla – La Mancha, Jorge.Uxo@uclm.es

Eladio Febrero, Departamento de Análisis Económico y Finanzas, Universidad de Castilla – La Mancha Eladio.Febrero@uclm.es

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1. - Introduction

One of the main economic measures promoted by the governments of peripheral eurozone countries in an effort to overcome the Great Recession of 2008 was the policy of internal devaluation. In Spain, this policy was applied between 2010 and 2016, as a result of pressure from the European authorities, and has been justified using two arguments.

Firstly, internal devaluation is prescribed to correct external imbalances. After the establishment of European Monetary Union, peripheral countries accumulated important external deficits with the core economies of the eurozone. Since nominal devaluation of the exchange rate is no longer possible, internal devaluation (understood as a reduction in unit labor costs) is posited by EU institutions as the only way to rebalance price competitiveness among monetary union members.

Secondly, the European authorities also argue that, in a context characterized by domestic demand shortfall and fiscal austerity measures, internal devaluation helps to restore economic growth. The impulse of external demand as a result of improved price-competitiveness should offset the decline in domestic demand caused by both fiscal austerity measures and by a general reduction in wages. Thus, if internal devaluation actually works, it should therefore trigger an export-led growth recovery.

Has internal devaluation policy proved successful in Spain? Many voices proclaim that it has (Domenech *et al*., 2015; Bank of Spain, 2015; European Commission, 2016), given that Spain corrected its external imbalances and grew at an annual rate of 3.2% in 2015-2016.

The present paper aims to use the theoretical distinction between wage-led and profit-led economies to consider the impact of internal devaluation policy on GDP growth for the case of Spain. We assess to what extent wage devaluation in Spain has proved useful in triggering an export-led strategy, boosting aggregate demand and overcoming the crisis.

The distinction between wage-led and profit-led economies is presented by the Bhaduri-Marglin model, a post-Kaleckian model that describes the causal links between functional income distribution and economic growth (Bhaduri and Marglin, 1990). We adopt this theoretical approach in our research.

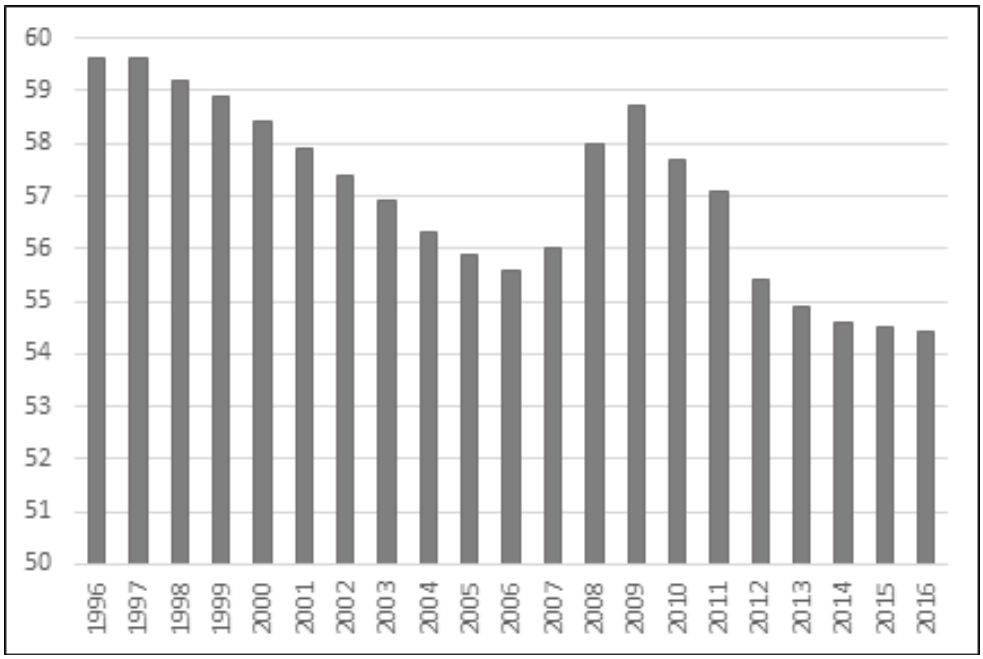
According to this model, lower consumption expenditure and a higher volume of net exports, as well as simultaneous opposite effects on the demand for investment should be expected after a reduction in the wage share. The final effect of a change in functional income distribution on aggregate demand is undetermined, and depends on the specific characteristics of each economy. Specifically, it depends on the elasticity of consumption, investment and net exports to a change in wages, profits, labor costs and prices. In other words, it is an empirical issue. Of course, each regime –whether wage-led or profit-led– leads to different policy implications that should be taken into account when authorities seek to support a sufficient level of aggregate demand.

Since internal devaluation policy has led to a change in functional income distribution in the Spanish economy, furthering the downward trend of the wage share ratio of the last few decades (Figure 1)[1], we can use the Bhaduri-Marglin model as a tool to gauge the impact of wage devaluation on economic growth.

Following this theoretical approach, we estimate a Bhaduri-Marglin model for the period 1995-2016, focusing particular attention on the years of internal devaluation (2010-2016). We expand the model so as to consider the effect of private debt on consumption and investment, which is of major importance in the case of Spain. In addition, we use quarterly data in order to obtain a greater number of observations, and thus be able to use the model for analyzing a short period of time.

[1] The increase in wage share observed in Spain during the early years of the Great Recession is due to the so-called "composition effect": temporary jobs, the lowest paid, are the first to be destroyed with the onset of the crisis, leading to a spurious increase in the average salary of employees.

Figure 1. Adjusted wage share, Spain, 1995-2016 (% GDP)



*Note. Adjusted wage share is used: compensation per employee as percentage of GDP at market prices per person employed. Source: AMECO

In recent years, there have been several empirical studies based on this model aimed at determining the macroeconomic consequences of redistribution towards profits or wages. Briefly, two general conclusions can be drawn from this research: 1) many studies find major OECD economies to be wage-led demand regimes. Therefore, policies that depress wages cause net contractionary effects; 2) when the decrease in the wage share takes place simultaneously in a group of countries (for example, the eurozone), even those economies that initially appeared to be profit-led, become wage-led when considering macroeconomic effects as a whole. In this context, the current policy of internal devaluation proves counterproductive, since it produces a recessive bias.

Our research contributes to this literature through three elements. First, we put the Bhaduri-Marglin model at the service of a short term economic policy analysis in order to explore the appropriateness of the internal devaluation policy applied during the crisis. Said model is normally used to characterize the structural nature of an economy rather than to assess a specific policy implemented in an economy during a given period.

Second, the empirical literature which uses this approach has been confined almost exclusively to major OECD economies or, on some occasions, to certain emerging countries. Eurozone peripheral countries have rarely been included in the analyses and there is no in-depth study of the Spanish economy in the literature that draws on the Bhaduri-Marglin model.

Third, few articles expand the Bhaduri-Marglin model to include financial variables, although there are some notable exceptions as will be seen in section 3. We feel that it is essential to do this since financialization has significantly altered the main macroeconomic drivers over the past two decades. Ignoring such a phenomenon might lead to possible bias in the empirical estimates.

The structure of our research is as follows. After this introduction, in the second section we analyze the strategy of internal devaluation in Spain, and its supposed rationale. In section three, we examine whether the Spanish economy is wage-led or profit-led, and in the fourth section we evaluate the effects of internal devaluation on economic growth. Finally, in the fifth section we present our conclusions and draw some economic policy implications.

2. Internal devaluation policy in the Spanish economy

2.1 What is it and how does internal devaluation policy theoretically work?

Internal devaluation can be defined as a set of economic policy measures designed to achieve a reduction in wages and unit labor costs (ULC) so as to secure lower inflation than is present in international competitors. The ultimate goals of this policy are to improve external competitiveness, correct external imbalances and restore economic growth.

Since 2010, wage moderation in Spain has not only been the result of the crisis itself –weakening the bargaining power of workers– but also the product of successive labor market reform laws (2010, 2011 and 2012). These reforms, particularly the one implemented in 2012, decentralized collective bargaining, reduced the regulatory scope and duration of collective agreements, facilitated opt-out clauses and alleviated dismissal costs and procedures (OECD, 2013; Cruces *et al*., 2015).

According to the rationale of internal devaluation, a decrease in nominal wage growth, and lower ULC growth, are required to achieve enhanced price competitiveness aimed at increasing net exports. A reduction in ULC should result in a lower rate of inflation of domestically produced goods and services. Nevertheless, fulfilling such a condition depends on profit margin performance and the degree to which changes in labor costs are passed on to prices.

Furthermore, as competitiveness is a relative concept, what is needed is not only a decrease in domestic inflation but also lower price increases compared to those of other countries. The problem is, of course, that other counties might well be applying a similar strategy at the same time. If higher price-competitiveness is actually achieved, the final effect on current account will depend on the price elasticity of exports and imports.

When changes in nominal wages are passed on to prices in full, and profit margins remain constant, real wages and wage share should also remain unaltered. However, if the decrease in price inflation is less sharp than the decrease in wage inflation, as has been the case in Spain, internal devaluation will have distributional consequences and spark a reduction in wage share (as seen in Figure 1).

Internal devaluation might also affect net exports through a second channel: its negative impact on domestic demand, given that private consumption depends positively on wages. Only if private investment offsets this restrictive effect will domestic demand grow slowly, which would slow down imports and improve the balance of goods and services.

Furthermore, internal devaluation is not only prescribed as a tool to correct external imbalances but also as an instrument to boost economic growth. Positive effects of this economic policy would, theoretically, be the outcome of two combined forces:

- Price competitiveness recovery would lead to an increase in net exports, offsetting the restrictive effect of wage cuts on internal demand and boosting aggregate demand.
- Improved profit margins would be used by companies to restore investment, therefore boosting new production and new labor demand.

2.2 Implementing internal devaluation in Spain and its consequences

In this section, we see how the causal chains explained in the previous section have not actually occurred in Spain[2]. We examine how the reduction in ULC has only partially translated into lower inflation and improved external competitiveness, whilst internal devaluation has in fact depressed domestic demand.

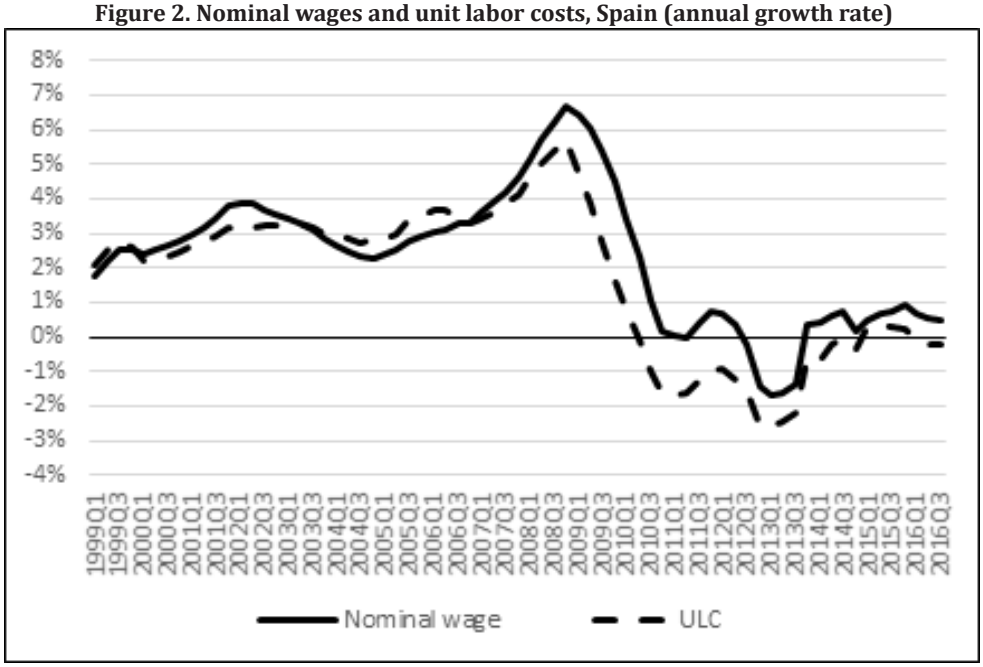
Nominal employee compensation clearly fell after 2010 (Figure 2), reaching negative annual growth rates during five quarters (2012-2013). As apparent labor productivity was simultaneously growing faster because of labor adjustments, ULC evidenced an even sharper

[2] For a more in-depth analysis, see Uxó *et al.* (2016)

contraction.

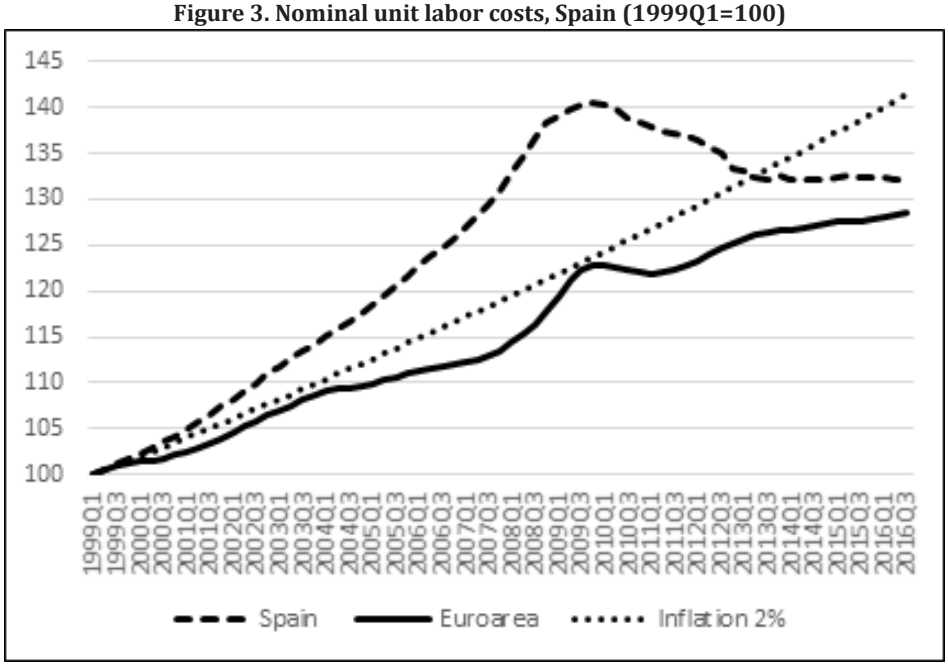
This has led to almost eliminating the deviation between Spanish and eurozone ULC that occurred between 1999 and 2008 (Figure 3). In the third semester of 2016, the accumulated increase in ULC since EMU began is only 3.6% higher in Spain than in the eurozone. This remaining difference is due to the fact that wage restraint has been applied simultaneously in other eurozone countries, not only in Spain, such that the average ULC growth rate in the monetary union has also decreased. Indeed, had the average ULC grown at a pace compatible with the 2% inflation target set by the ECB, the gap would be negative. Thus, the first step of the above-described internal devaluation policy has been fulfilled: the decrease in nominal wages has led to a decrease in ULC relative to competitors.

Figure 2. Nominal wages and unit labor costs, Spain (annual growth rate)



Source: Eurostat and author's calculations

Figure 3. Nominal unit labor costs, Spain (1999Q1=100)

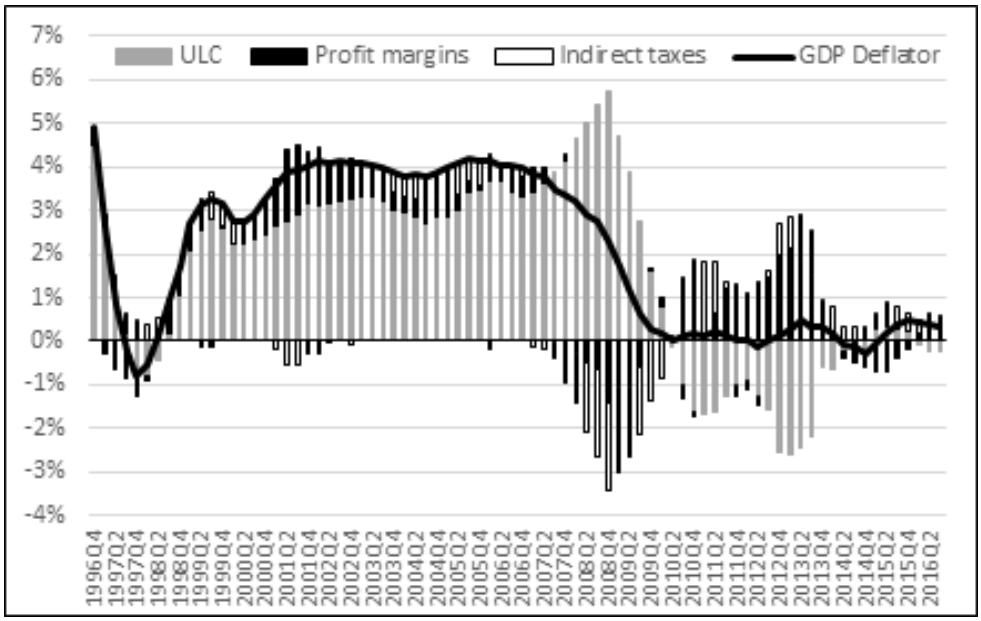


Source: Eurostat and author's calculations

The inflation rate in Spain has also decreased since 2010. The average growth rate of the GDP deflator was 3.9% between 1999 and 2007, and only 0.2% between 2010 and 2016. However, the reduction in ULC has not fully translated into a lower rate of inflation. While the accumulated decrease in ULC between 2009Q4 and 2016Q3 was -6%, the GDP deflator registered an accumulated increase of 1%. As can be seen in Figure 4, this is explained because profit margins have been increasing at an average annual growth rate of 0.5%, while wages and ULC have been falling. That is, changes in labor costs have only been partially passed on to prices, which has had distributive effects[3].

As the decrease in price inflation has been less sharp than the decrease in wage inflation, the real wage fell between 2010 and 2013 (Figure 5). This is true if we use the GDP deflator (real wages from the employers' standpoint), but is particularly acute if we take the HCPI as an indicator of the cost of living (real wage from the workers' perspective). Finally, lower real wages and accelerating labor productivity stemming from mass dismissals have meant a decrease in real ULC (Figure 6), or wage share.

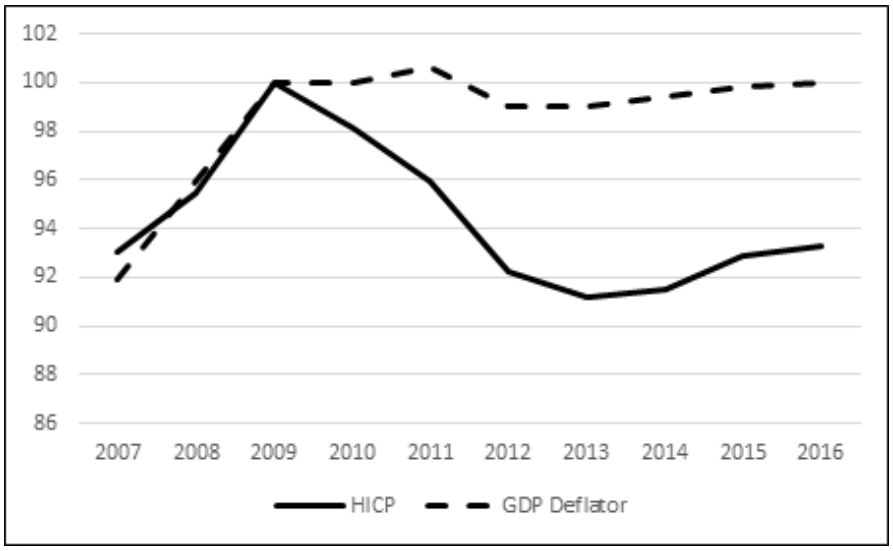
Figure 4. Contributions to the growth rate of GDP deflator, Spain



Source: Eurostat and author's calculations

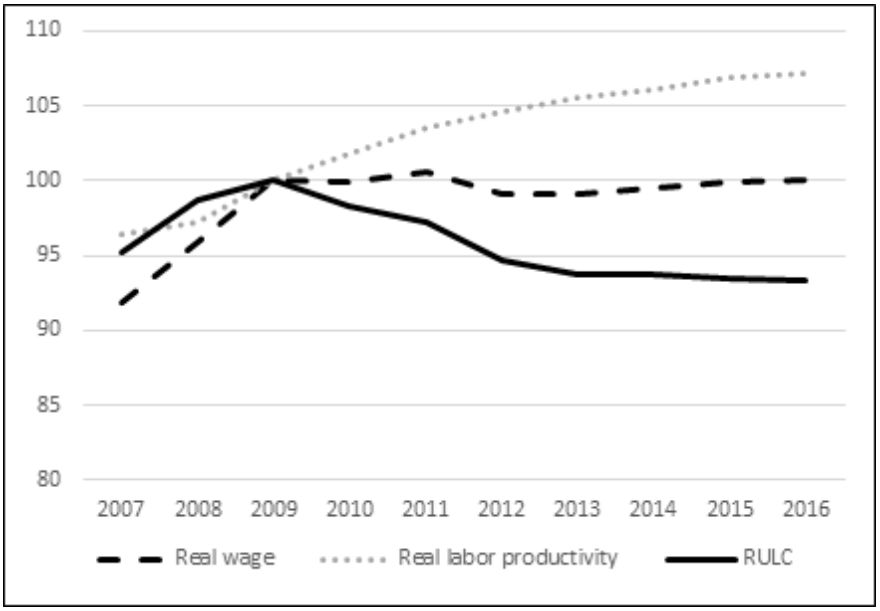
[3] Indeed, the fact that internal devaluation strategy was based on this change in income distribution is what allows us to use the Bhaduri-Marglin model to test the suitability of the strategy to support economic growth.

Figure 5. Real wage (2009 = 100), Spain



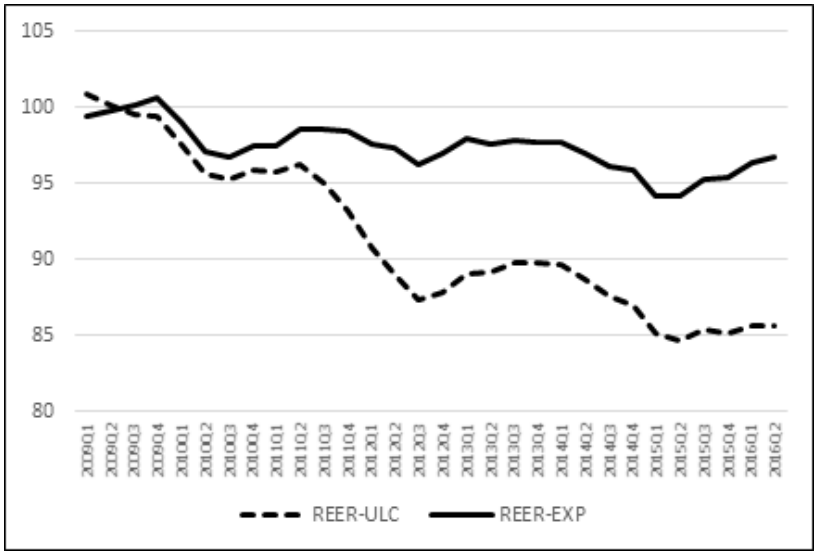
Source: Eurostat and author's calculations

Figure 6. Real ULC (2009=100), Spain



Source: Eurostat and author's calculations

Figure 7. Real Effective Exchange Rate (37 main partners, 2009=100), Spain



Source: Eurostat and author's calculations

To what extent have these developments in ULC and prices meant an improvement in price competitiveness? To gauge this, we use the real effective exchange rate for 37 major trading partners, obtained using unit labor costs (REER-ULC) and the price deflator of exports (REER-EXP). Considering 2009 as the base year, Spain recorded a 14% real depreciation in terms of ULC. Nevertheless, this depreciation is seen to be much lower when measured in terms of export prices (the REER-EXP has only decreased by 3%, as can be seen in Figure 7).

This is explained by the fact that the decline in ULC is mainly captured by profit margins, as stated earlier, and because the rest of the eurozone has also registered inflation rates well below 2%.

As can be seen in Table 1, actual export growth during the period 2010-2016 as well as its contribution to GDP growth, is only slightly higher than was experienced by the Spanish economy during the years prior to the economic crisis. Hence, the rapid adjustment of the Spanish external sector (going from a borrowing position of over 10% in 2008 to a lending one of 2% in 2015), and its net contribution to economic growth in recent years, has not been so much the result of the rapid growth in exports but rather the consequence of the collapse of imports.

Table 1. Spanish external sector.

	Spain	2001-2007	2010-2013	2014-2016
Contribution to GDP growth	Domestic Demand	4.4%	-2.9%	2.8%
	External Demand	-0.9%	1.5%	0.0%
	Exports	1.0%	1.4%	1.4%
	Imports	-1.9%	0.1%	-1.5%
	Total GDP	3.6%	-1.5%	2.8%
Real growth rate	Exports	4.1%	4.4%	4.5%
	Imports	6.7%	-1.6%	5.2%
Export market share*		2.3	1.9	1.9

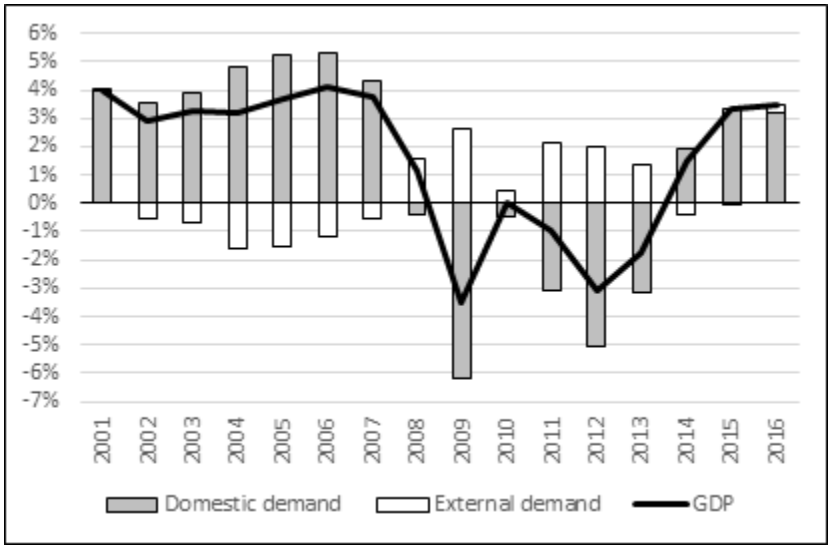
*Goods and services, % of world total, the last period corresponds to years 2014-15.

Source: Eurostat and author's calculations.

The recent adjustment of the external sector and the evolution of economic growth in Spain are mainly explained by the progress of domestic demand (Figure 8), and not by an export-led expansion triggered by the latest labor market reforms.

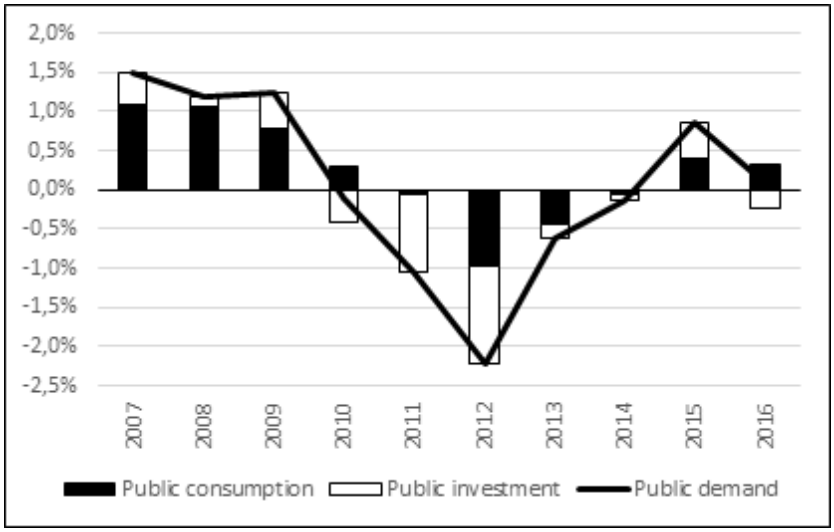
The upturn in domestic demand in Spain is due not only to key external factors (depreciation of the euro, falling energy prices[4], the ECB's quantitative easing policy[5]), but also to having abandoned fiscal austerity in 2015-2016. As can be seen in Figure 9, in 2015 Spain implemented a noticeable expansionary fiscal policy, with a 1% positive contribution of public demand to GDP growth.

Figure 8. Contributions to GDP growth, domestic and external demand, Spain



Source: Eurostat and author's calculations

Figure 9. Direct contribution to GDP growth of public demand, Spain



Source: Eurostat and author's calculations

[4] Spain is highly dependent on fossil fuel imports. Around one third of the total import bill corresponds to this category.

[5] The impact of this measure is particularly relevant in an economy where millions of households link their mortgages to variable interest rates.

The stylized facts seen in the Spanish economy do not exactly match the orthodox assumptions reviewed in section 2.1. Wage devaluation has only partially translated into improved price competitiveness. Another part has gone towards increasing corporations' profit margins, thus reinforcing the downward trend in the wage share. Finally, although there has been some improvement in external competitiveness, it has not triggered the desired export-led recovery, since it is domestic demand that has proven to be the main driver of growth.

3. Functional income distribution and aggregate demand in Spain.

In this section, we estimate the effect of a change in functional income distribution on aggregate demand. We use these estimates to gauge whether the internal devaluation policy implemented in the 2010-2016 period is suited or otherwise to stimulating economic growth.

3.1 Theoretical framework: an extended Bhaduri-Marglin model

Bhaduri and Marglin (1990) analyzed the effects of changes in functional income distribution on consumption, investment and economic growth. The starting point for their model is a basic fact: salary has a twin dimension in our economy, being at the same time both a cost to business and the main determinant of private household consumption. Said authors study the contradictory impact of a distributive change on the components of aggregate demand.

Given an increase in wage share, consumption will rise as the propensity to consume out of wages is higher than the propensity to consume out of profits. In addition, an increase in wage share will have the opposite effect on the demand for investment (being negative, due to increased costs, and positive due to the accelerator effect[6]). Finally, net exports might fall should the increase in wage share come with a loss of price competitiveness.

Therefore, the net effect of an increase in the wage share will depend on whether the elasticity of investment vis-à-vis profits, and net exports elasticity vis-à-vis changes in relative prices, are large enough to offset the expansionary effect on consumption. In this section, we obtain an empirical estimation of these elasticities for the case of the Spanish economy.

Real aggregate demand (Y) consists of consumption spending (C), investment (I), net exports (NX) and government spending (G). The demand exerted by the public sector is considered an exogenous factor and thus we write aggregate demand as follows (where Ω is the wage share, and Z other control variables):

$$Y = C(Y, \Omega, Z_C) + I(Y, \Omega, Z_I) + NX(Y, \Omega, Z_{NX}) + G \quad (1)$$

Our goal is to analyze how total demand changes when the wage share rises or falls. The final impact on aggregate demand of an increase in the wage share is the result of two types of effects: first, the direct influence of this change on each component of aggregate demand, assuming that total income remains constant, and second, the multiplier effect; consumption, investment and net exports alter as a consequence of second round effects. This can be written as follows:

$$\frac{\partial Y}{\partial \Omega} = \frac{1}{1-\left(\frac{\partial C}{\partial Y}+\frac{\partial I}{\partial Y}+\frac{\partial NX}{\partial Y}\right)}\left(\frac{\partial C/Y}{\partial \Omega}+\frac{\partial I/Y}{\partial \Omega}+\frac{\partial NX/Y}{\partial \Omega}\right) = \mu\left(\frac{\partial C/Y}{\partial \Omega}+\frac{\partial I/Y}{\partial \Omega}+\frac{\partial NX/Y}{\partial \Omega}\right) \quad (2)$$

The second term of this expression is the sum of the partial effects of income distribution on each of the components of demand, while the first term (μ) is the multiplier effect. Having estimated this equation, the results will allow us to ascertain whether the Spanish economy behaves as wage-led or profit-led, as well as the consequences of the wage policy applied during the period of internal devaluation.

We estimate separate equations for consumption, investment, prices, imports and exports. The wage share is, either directly or indirectly,

[6] According to the accelerator effect, an increase in aggregate demand results in a proportionately larger rise in capital investment.

an explanatory variable in all these functions, together with other variables. We incorporate financial variables in the consumption and investment functions, in line with some previous research (Onaran *et al*, 2011; Nishi, 2012; Stockhammer and Wildauer, 2016). The coefficients estimated in each equation reflect the marginal effect of aggregate demand on each component, of a one percentage point increase in the wage share[7], assuming that total income initially remains constant.

The consumption function is:

$$C = c_0 + c_W W + c_R R + c_{Dh}\Delta Dh + c_{DhY} DhY \quad (3)$$

where the determinants are wages (W), profits (R), household debt growth (ΔDh) and the household debt-to-GDP ratio (DhY), and $c_W, c_R, c_{\Delta Dh} > 0, c_{DhY} < 0.$

We consider consumption to be induced by the level of income, distinguishing between income from wages and income from profits. Specifically, we expect both W and R to have a positive effect on consumption, but since the propensity to consume from wages is likely to be higher than from profits, consumption will increase if total income does likewise or if we have a distributive change that is favorable to wages.

The influence of debt on the consumption function is contradictory, as noted by different authors (Hein, 2012; Vasudevan, 2016; Palley, 1994; Stockhammer and Wildauer, 2016). Household debt provides a source of finance for consumption, increasing disposable income, although its accumulation also leads to a growth in stock liabilities for households, with a debt service that can be a constraint for consumption (especially when over-leverage occurs). As Palley (1994) points out, increases in the level of borrowing are expansionary if the direct demand effect induced by new credit flow exceeds lost consumption spending arising from the amount of additional interest needed to service the extra debt. Therefore, we expect household debt growth (ΔDh) to affect consumption positively, and we expect the stock of household debt (DhY) to have a negative impact on consumption.

Household debt affects consumption in two ways. First, consumer debt directly boosts household consumption. Second, mortgage debt in Spain during the real estate bubble frequently covered 100% of the property value or even more, as it was often used to finance other durable consumptions (such as cars, domestic appliances or furniture). The investment function is:

$$I = i_0 + i_Y Y + i_\pi \pi + i_r r + i_{Dh}\Delta Dh + i_{Dc}\Delta Dc + i_{DpY} DpY \quad (4)$$

where the determining factors are income (Y), profit share (π), long term interest rates (r), household debt growth (ΔDh), corporate debt growth (ΔDc) and private debt-to-GDP ratio (DpY). We expect all these factors to influence investment positively, except for interest rates and the stock of debt (private debt-to-GDP ratio). That is to say, we expect $I_Y, I_\pi, I_{\Delta Dh}, I_{\Delta Dc} > 0$ and $I_r, I_{DpY} < 0.$

Income is used as a proxy for expected demand, in line with the accelerator effect. In addition, we use profit share as an indicator of profitability.

Private debt is the sum of household and corporate debt. In a country like Spain which has experienced a housing bubble, investment will be strongly determined not only by corporate debt but also by household debt (much of the investment made by the country before the crisis was residential investment). In this case, the effect linked to the stock debt is given by the total private debt-to-GDP ratio (DpY).

Net exports are:

$$\mathrm{NX} = \mathrm{NX}(\mathrm{Y}, \mathrm{Y}^f, \mathrm{Pm}, \mathrm{Px}); \quad \text{with } NX_{\mathrm{Y}f}, NX_{Pm} > 0;\ NX_Y, NX_{Px} < 0 \quad (5)$$

Net exports will depend positively on the income of the rest of the world (Y^f), as this increases exports, and will depend negatively on national income (Y), since it sparks an increase in imports without affecting exports.

[7] In fact, the estimated coefficients are elasticities, and marginal effects are obtained after some transformation, as will be seen.

The relationship between export and import prices also proves decisive. Export prices are inversely related to net exports, since a fall in these prices will mean higher exports. Moreover, we expect import prices to be directly related to net exports, given that an increase in import prices will cut imports. In addition, export prices will depend, as will domestic prices, on ULC. Thus, the wage share will affect external competitiveness, such that an increase in ULC will reduce net exports.

3.2 Related empirical literature

The Bhaduri-Marglin model has become widely used, resulting in abundant empirical literature aimed at determining the macroeconomic consequences of redistribution towards profits or wages.

Notable surveys of the empirical studies carried out in the literature can be found in Hein and Vogel (2008), Onaran *et al.* (2011), Onaran and Galanis (2012), Lavoie and Stockhammer (2013), Stockhammer and Onaran (2012), Stockhammer (2015) and Blecker (2016).

This empirical literature has adopted a range of approaches. We seek to identify three essential aspects in this literature in order to better situate our work: the case studies analyzed, the estimation methods used and the different specification of the models.

First, most empirical studies to date have focused on OECD developed countries (Stockhammer *et al*., 2009; Onaran *et al*., 2011; Stockhammer *et al.*, 2011; Stockhammer and Stehrer, 2011; Hein and Vogel, 2008; Naastepad and Storm, 2006; Ederer and Stockhammer, 2007; Bowles and Boyer, 1995). Peripheral eurozone countries have rarely been included in the analyses. Some notable exceptions are Stockhammer and Wildauer (2016), as well as Onaran and Obst (2016). This latter study analyzes the EU15 member-states. Together with Naastepad and Storm (2006), these are the only two papers in the literature to consider the case of Spain in the context of a country-group study.

Most of this literature, both for individual and for country-group studies, concludes that aggregate demand is mainly wage-led: Naastepad and Storm (2006) for Germany, France, Italy, the UK, the Netherlands and Spain; Hein and Vogel (2008) for Germany, France, the UK, the US; Stockhammer *et al.* (2011) for Germany; Ederer and Stockhammer (2007) for France; Stockhammer and Stehrer (2011) for Germany, France, the US, Japan, Canada, Australia; Stockhammer *et al.* (2009) for the eurozone; Onaran and Galanis (2012) for the main OECD economies. Moreover, even small open economies that may be profit-led in a single country analysis become wage-led when considered in external interaction with other trading partners, since OECD countries have strong trade links with one another (Onaran and Galanis 2012; Onaran and Obst, 2016; Onaran and Stockhammer, 2016). The latter would be particularly noticeable in the case of the eurozone.

Second, and relative to the estimation methods, the empirical literature can be grouped into two estimation strategies. The first group of works (Onaran and Stockhammer, 2005; Barbosa-Filho and Taylor, 2006; Nishi, 2012; Kiefer and Rada, 2014; Carvalho and Rezai, 2014) uses structural vector autoregression (VAR) models of simultaneous equations, in order to estimate a full economic model.

Our work, however, belongs to a second group (Onaran *et al.*, 2011; Stockhammer *et al.*, 2009; Stockhammer *et al.*, 2011; Hein and Vogel, 2008; Naastepad and Storm, 2006): those that only examine the goods market by estimating single equations for consumption, investment, exports and imports (functional income distribution is assumed to be exogenous in these studies). This approach better reflects how the effects of changes in the wage share affect economic growth.

Hartwig (2014), Rada and Kiefer (2015) and Stockhammer and Wildauer (2016) are among the few studies to use panel data methodology for estimating collective equations for a group of OECD countries. These studies also confirm that demand regimes are likely to be wage-led in OECD economies.

Thirdly, we turn our attention to the specification of the models. Bhaduri-Marglin literature mainly uses traditional determinants to explain consumption, investment and net export functions (including wages, profit, income, interest rates, ULC and prices). Nevertheless, post-Keynesian literature has paid little attention to other factors (such as personal income distribution, asset prices, wealth effects or private debt). The implications of not considering these effects when describing an economy as wage-led or profit-led may be important, since the reported results may suffer from omitted variable bias[8].

Onaran *et al.* (2011) and Stockhammer and Wildauer (2016) extend the Bhaduri-Marglin model to include financial variables, and find strong effects of debt in the aggregate demand of major OECD countries. These economies still remain mainly wage-led after including financial control variables. Nishi (2012) finds that Japan is a profit-led and debt-burdened economy for the 1990s and 2000s.

3.3 Data and estimation strategy

We estimate our model with quarterly data obtained from Eurostat, for the period 1995-2016. The main objective of using quarterly data is to increase the size of our sample in order to better evaluate the internal devaluation policy followed during the period 2010-2016[9]. Other authors have also used quarterly data in order to explicitly focus on a short term analysis (Stockhammer and Stehrer, 2011).

We use the following variables for the econometric estimations: real GDP (Y), household consumption (C), private gross fixed capital formation (I), adjusted employee compensation (W)[10], adjusted operating surplus (R), profit share (π), long term interest rates (r), nominal unit labor costs (ULC), exports (X), imports (M), price of exports (Px), import prices (Pm), total GDP of OECD countries (YW), household debt (Dh), corporate debt (Dc), household debt-to-GDP ratio (DhY) and private debt-to-GDP ratio (DpY). Definitions and statistical sources are provided in Table A1 in Annex 1. Whenever possible, we use seasonally adjusted statistical series, and all the variables in our estimates are deflated by the GDP deflator (or by its corresponding deflator in the case of exports and imports). Income of OECD countries is deflated by their own GDP deflators.

We apply a single-equation approach, estimating a different function for each component of aggregate demand and assuming functional income distribution to be exogenous. This single-equation approach allows us to isolate the partial effects on each component of aggregate demand.

In order to avoid the risk of spurious correlations, time series econometric models require variables to be stationary. For this purpose, it is usual in the literature to take the first difference transformation of log variables. We use a logarithmic transformation of the series, but since we are working with quarterly data we do not take the first difference with the previous quarter, but with the equivalent quarter of the previous year. That is, we take the fourth difference of the series[11].

For those variables with no presence of unit roots in the Dickey-Fuller test (profit share, household debt-to-GDP ratio and private debt-to-GDP ratio), the fourth difference need not be taken, and only the logarithmic transformation is used[12].

To check for the possible existence of autocorrelation, we apply the Breusch-Godfrey test. When autocorrelation is detected, we add an

[8] For an interesting discussion on the importance of considering financial variables in the theoretical and empirical debate on wage-led or profit-led regimes, see Hein (2016).

[9] The early years of the crisis, 2008-2009, are not included in the analysis since during that period an internal devaluation policy was not followed. Moreover, an expansionary policy was implemented at the fiscal level.

[10] Adjusted wages are calculated as real compensation per employee multiplied by total employment. The unadjusted share of labor compensation in GDP underestimates the labor share, since part of the mixed income is remuneration of the self-employed.

[11] For a more detailed analysis on this issue, when using quarterly data, see Stockhammer and Stehrer (2011).

[12] We also applied the Engle-Granger cointegration test to verify the possibility of estimating error-correction models (ECM). However, this test failed to provide evidence of cointegration.

autoregressive term AR (1) to the equation, and use the coefficients resulting from the Cochrane-Orcutt estimate in the equation which is finally estimated. We use robust estimators of the standard errors when heteroskedasticity is detected.

Having expressed all variables as the fourth difference of logarithms, the estimated coefficients are elasticities. Since we are interested in the marginal effects of a change in wage share, we transform these elasticities using the actual values of the sample. The variables estimated are kept in the reported specifications even when they are not statistically significant (although they are computed, in these cases, as null variables when calculating the marginal effects).

3.4 Results

The results of our estimates are presented below. We divide our analysis into two periods: first, we analyze the sample as a whole (1995-2016). Second, we focus on estimating our equations exclusively for the period of internal devaluation (2010-2016). Table 2 presents the coefficients corresponding to the estimated equations for both periods.

Consumption function:

$$dlogC_t = \beta_0 + \beta_W dlogW_t + \beta_R dlogR_t + \beta_{Dh} dlogDh_t + \beta_{DhY} logDhY_t + u_t \quad (6)$$

As can be seen in the coefficients reported in Table 2, the elasticity of consumption with respect to an increase in wage income is positive and statistically significant. In contrast, the effect of profit income on consumption is not statistically significant. This happens for the whole sample, and also occurs for the period 2010-2016.

Thus, a rise in the wage share positively affects consumption, as noted in other studies for other OECD countries (Naastepad and Storm, 2006; Hein and Vogel, 2008; Stockhammer *et al*. 2009 and 2011; Onaran and Galanis, 2012), although in these cases the elasticity out of profits was statistically significant. Similar results to ours are also obtained by Onaran and Obst (2016) and Naastepad and Storm (2006) for the case of Spain.

The effect of debt is as expected. On the one hand, the evolution of household credit flow (dlogDh) has a positive impact on consumption, with an elasticity of around 0.36, similar to wage income. Household debt-to-GDP ratio (logDhY), which represents the stock of debt, is negatively related to the level of consumption. This result is even more evident for the period 2010-2016, with higher elasticities for both coefficients, showing the expected effect of over-leverage of households during a balance sheet recession. These results are also consistent with the outcomes reported in similar studies (Stockhammer and Wildauer, 2016).

Investment function

$$dlogI_t = \propto_0 + \propto_Y dlogY_t + \propto_\pi log(\pi)_{t-1} + \propto_r d(r)_t + \propto_{Dh} dlogDh_t + \propto_{Dc} dlogDc_t + \propto_{DpY} logDpY_t + u_t \quad (7)$$

The positive relationship predicted theoretically between income (Y, as a proxy of expected demand) and private investment is clearly significant in the two periods analyzed. These results are similar to those obtained by other studies: changes in aggregate demand appear to be the main driver of gross fixed capital formation for OECD and eurozone countries (Stockhammer *et al.*, 2009 and 2011; Onaran and Galanis, 2012), and for the case of Spain (Onaran and Obst; 2016; Naastepad and Storm, 2006)[13].

To estimate the effect of a pro-capital distribution on investment, we use the first lag of the profit share ratio (π), as is often done in the literature. This indicator is the one that works best among the different proxies tried. Nevertheless, the relationship between profit share and investment is less clear. For the sample

[13] It should be noted that although the coefficient of income (3.54) is greater than the profit share coefficient (0.27), we must take into account not only the value of these coefficients but also the variability of these variables over a period of time in order to understand which exerts a greater influence on investment (i.e., if income is relatively constant over a period, changes in profitability will explain changes in investment).

as a whole, we obtain a positive coefficient (0.27), although it is necessary to increase the significance threshold to 10% in order to consider this effect. Naastepad and Storm (2006) already reported a similar result a decade ago when examining the case of Spain for the 1960-2000 period[14].

When analyzing the sub-period of internal devaluation, this coefficient is not significant even at the 10% statistical level. This is due to the fact that during these years, we observe a relative disconnection between the two variables, as shall be seen later in more detail. A similar breakdown of the profit-investment nexus since the start of the Great Recession is noted by Onaran and Obst (2016) for EU15 Member States.

Interest rates lack explanatory capacity in our estimates (whether we take real or nominal, long or short term). Similar results are obtained in other studies in the literature (Onaran and Galanis, 2012). This is probably due to the particularity of the sample period analyzed: during the crisis, in the context of a liquidity trap, Spanish investment remained at very low levels although interest rates were much lower than during the years of the housing bubble. Nevertheless, including the interest rate in the investment function seeks to reflect an economic effect that is in fact already contained in the evolution of household and corporate debt.

Testing with the specification and with the lag structure of both profit share and interest rates failed to improve the results obtained for the estimates.

With regard to the effect of private debt on investment, some, but not all, of our initial hypotheses are confirmed. Neither corporate debt growth (dlogDc) nor the stock effect of private debt (logDpY) show significant coefficients for either of the two periods analyzed. However, household debt growth (dlogDh) – mainly, mortgage debt– is again confirmed as a major determinant of private investment. As is well known, a large part of private investment in Spain was residential investment for the period 1995-2007, also making corporate investment dependent on real estate construction.

[14] These authors explain the low intensity of the profit–investment nexus as a typical pattern of "coordinated market economies" (according to the classification developed by the Variety of Capitalism approach). In such economies, profitability is less important for investment than in "liberal market economies", since they rely on bank-based financial systems.

Domestic/export prices:

Changes in domestic and export prices will partially depend on changes in nominal ULC (i.e., changes in income distribution). Said changes in prices prove decisive for estimating the net export function, since net exports depend on the relation between domestic and export prices.

We first seek to find a relationship between changes in distribution and changes in prices and, second, between these changes in prices and the behavior of net exports. Thus, we can measure the change in net exports by each percentage point of change in the wage share.

We estimate a similar function for domestic and export prices:

$$dlogP_t = a + b_1\, dlogULC + b_2\, dlogPM + u_t \quad (8a)$$

$$dlogPX_t = a + b_1\, dlogULC + b_2\, dlogPM + u_t \quad (8b)$$

Companies set their prices by charging a mark-up on their production costs. These production costs can be decomposed at an aggregate level into ULC and unit costs associated with imported intermediate goods (PM).

In Table 2, we can see how ULC are clearly significant and positive in the case of the domestic price function for the two periods studied. A coefficient of 0.13 (clearly below 1) for the period 2010-2016 is consistent with the outcomes of section 2.2 (see Figure 4): the reduction in ULC is only partially reflected in a reduction of the GDP deflator.

If labor costs are only partly transferred to domestic prices, the reflection is even weaker in export prices: ULC are not statistically significant in the export price function. This is con-

sistent with what was seen in Section 2 (Figure 7): a reduction in ULC does not necessarily imply improved price competitiveness. As can be seen in Table 2, the main determinant of export prices is import prices[15].

These results of domestic and export price functions are again quite similar to those reported in the literature for other countries similar to Spain (Stockhammer *et al.*, 2009 and 2011; Onaran and Galanis, 2012; Onaran and Obst; 2016). Although in many of these cases, ULC are statistically significant in the export price function (since longer annual series are used for the estimations), this variable is rarely a strong determinant of export prices compared to import prices.

Export / import functions:

As explanatory variables, the export and import functions include, respectively, the income of the remaining OECD countries (YW), national income (Y), as well as the ratio between export prices (PX) and import prices (PM). As Stockhammer *et al.* (2011) did for the German case, in the import equation we take the first lag of the PX/PM ratio, since the expected behavior of this variable is thus reinforced.

$$dlogX_t = x_0 + x_1\, dlogYW + x_2\, dlog\,(PX/PM) + u_t \quad (9)$$

$$dlogM_t = m_0 + m_1\, dlogY + m_2\, dlog(PX/PM)_{t-1} + u_t \quad (10)$$

The coefficients of these functions have the expected signs. Exports depend positively and intensely on the rest of the world's income, and negatively on relative prices. However, the coefficient of prices is not statistically significant in either of the two periods. Income elasticity of exports is much greater than price elasticity. This is consistent with previous research on the wage-led and profit-led approach (Stockhammer *et al.*, 2011; Onaran and Galanis, 2012; Onaran and Obst; 2016), and for the case of Spain (Naastepad and Storm, 2006). It is also consistent with specific research on the Spanish external sector (Uxó *et al.* 2014; Uxó *et al.* 2016). Even mainstream authors and institutions who are enthusiastic about internal devaluation (Bank of Spain, 2012a and 2015) obtain similar results: price competitiveness only partly explains the evolution of exports.

The behavior of the import function is similar, and the sign of the coefficients is as expected. Domestic income has a significant effect and is the main driver of imports. The elasticity of prices is significant for both periods, although it is much lower.

[15] It should be noted here that the amount of intermediate goods imported by the Spanish economy is relatively high. The import content of Spanish exports is 39% according to the Bank of Spain (2012b: pp. 89)

Table 2. Regression results

	1995-2016						2010-2016					
	CONSUM	**INVEST**	**NAC PRICE**	**EXPORT PRICE**	**XPORT**	**IMPORT**	**CONSUM**	**INVEST**	**NAC PRICE**	**EXPORT PRICE**	**XPORT**	**IMPORT**
dlogW	**0.3122*** **						**0.3551*** **					
	-0.0945						*-0.1194*					
dlogR	**0.0414**						**-0.1141**					
	-0.0501						*-0.084*					
logDhY	**-0.103** **						**-0.2121*** **					
	-0.0671						*-0.0675*					
dlogDh	**0.3581*** **	**1.1453*** **					**0.7273** **	**0.5151**				
	-0.1208	*-0.4331*					*-0.2614*	*-1.1981*				
dlogY		**3.5400**** **				**3.8868**** **		**3.3409** **				**1.9823**** **
		-0.7159				*-0.7674*		*-1.7128*				*-0.3914*
dr		**0.0014**						**0.0016**				
		-0.0048						*-0.0108*				
logπ(t-1)		**0.2662***						**1.6972**				
		-0.1451						*-1.0828*				
dlogDc		**-0.0252**						**0.0069**				
		-0.2248						*-0.2612*				
logDpY		**-0.0205**						**0.3159**				
		-0.1928						*-0.396*				
dlogULC			**0.1483**** **	**0.0997**					**0.1300** **	**-0.0444**		
			-0.0398	*-0.0794*					*-0.0467*	*-0.1259*		
dlogPM			**-0.0043**	**0.4269**** **					**-0.0329**	**0.2784** **		
			-0.0179	*-0.0376*					*-0.0272*	*-0.1053*		
dlogYW					**2.6549**** **						**1.2129**	
					-0.23						*-0.7541*	
dlogPXPM					**-0.2125**						**-0.0036**	
					-0.1383						*-0.2405*	
dlogPXPM (t-1)						**0.5193** **						**0,4853***
						-0.2541						*-0.3036*
N	64	64	80	80	80	79	24	25	24	24	24	24
r2	0.3207	0.5583	0.1866	0.6266	0.5551	0.4346	0.8181	0.7691	0.3001	0.2531	0.0524	0.5478
F	6.9634	8.967	6.9438	64.6178	112.8054	15.7967	30.91	14.5355	6.096	3.558	1.5125	15.0688
pvalue	0.0349	0.0053	0.1339	0.0154	0.0088	0.0613	0.0022	0.0016	0.1502	0.2422	0.4733	0.064
ll	220.3885	144.4759	340.5613	271.8076	193.0109	167.4863	87.0945	55.7885	104.4543	79.2862	60.1158	61.8491
rho	0.969	0.9736	0.976	0.6823	0.6656	0.8862	0.5451		0.6319	0.8174	0.6373	0.6731

Standard errors in italics: * p<0.1,** p<0.05, *** p<0.01, **** p<0.001 Source: own calculations, based on Eurostat quarterly data

4. Effects of internal devaluation policy on economic growth

To estimate the effects of internal devaluation policy on economic growth, we calculate the marginal effects of a change in functional income distribution. Elasticities are converted into marginal effects at the mean of our sample by multiplying the estimated coefficients by the actual values of consumption, investment, wages, profits, exports and imports. We compute the global marginal effect as noted in equation 2:

$$\frac{\partial Y}{\partial \Omega} = \frac{1}{1-\left(\frac{\partial C}{\partial Y}+\frac{\partial I}{\partial Y}+\frac{\partial NX}{\partial Y}\right)}\left(\frac{\partial C/Y}{\partial \Omega}+\frac{\partial I/Y}{\partial \Omega}+\frac{\partial NX/Y}{\partial \Omega}\right) = \mu\left(\frac{\partial C/Y}{\partial \Omega}+\frac{\partial I/Y}{\partial \Omega}+\frac{\partial NX/Y}{\partial \Omega}\right) \quad (2)$$

The specific calculation of the estimated elasticity of consumption, investment and net exports with respect to wage share can be found in Annex 2.

From these calculations, we obtain that the difference in marginal consumption propensities (between wage and profit incomes) determines the effect on consumption of a change in income distribution (equation 18 of Annex 2). Table 3 shows the difference in these marginal consumption propensities (c_W - c_R).

Estimated elasticity of investment with respect to wage share is given by equation 22 in Annex 2, and its empirical value for our sample is shown in Table 4.

Finally, estimated elasticity of exports and imports with respect to wage share is given by a long chain of linked elasticities. This chain of elasticities goes from real ULC to imports and exports, with prices being the variable that allow such a connection, as can be seen in Annex 2. Estimated elasticity of exports and imports (equations 34 and 35 of Annex 2) are shown in Table 5. Its value is null because the respective coefficients have not proven significant in the previous estimations.

Table 3. Marginal effect on C/Y of a 1% increase in the W/Y ratio

	C	W	R	β_W	β_R	c_W	c_R	c_W - c_R
1995-2016	138.4446	137.3436	80.95312	0.312	0.000	0.315	0.000	0.315
2010-2016	147.3102	147.033	92.32808	0.355	0.000	0.356	0.000	0.356

Source: own calculations, based on Eurostat quarterly data

Table 4. Marginal effect on I/Y of a 1% increase in the W/Y ratio

	I	π	Y	α_π	$-\alpha_\pi(I/\pi)\,(1/Y)$
1995-2016	54.248	0.3387217	253.2701	0.266	-0.168
2010-2016	46.716	0.3497415	264.0674	0.000	0.000

Source: own calculations, based on Eurostat quarterly data

Table 5. Marginal effect on XN/Y of a 1% increase in the W/Y ratio

	Elasticity of P with respect to ULC	Elasticity of ULC with respect toΩ	Elasticity of PX with respect to ULC	Elasticity of X with respect to PX	Elasticity of X with respect toΩ	Elasticity of M with respect to PX	Elasticity of M with respect toΩ	Imports associated with each unit exported	Inverse of wage share on a given date (2016q1)	Weight of exports, on the same date (2016q1)	Weight of imports, on the same date (2016q1)	Partial effect of a 1% increase in wage share on X/Y	Partial effect of a 1% increase in wage share on M/Y	Partial effect of a 1% increase in wage share on XN/Y
	e P - CLU	e CLU-Ω	e PX-CLU	e X-PX	e X-W	e M-PX	e M-W	Content M of X	1/W	X/Y	M/Y	(dX/Y) / dW	(δM/Y) / dW	(dXN/Y) / dW
1995-2016	0.148	1.174	0.000	0.000	0.000	0.519	0.000	0.390	1.553	0.321	0.288	0.000	0.000	0.000
2010-2016	0.130	1.149	0.000	0.000	0.000	0.000	0.000	0.390	1.553	0.321	0.288	0.000	0.000	0.000

Note: The import content of Spanish exports is 39% according to the Bank of Spain (2012: page 54) Source: own calculations, based on Eurostat quarterly data

Adding the marginal effects of consumption, investment and net exports, we can measure the total effect of a percentage point increase in the wage share on private demand. However, as income is also an explanatory variable in these equations, we also obtain an estimate of the implicit multiplier (μ, in equation 2)[16]. The ultimate effect on the economy will be the product of this multiplier for the above effect. If positive, the economy is wage-led, and if negative, the economy is profit-led.

Table 6 shows the marginal effects on C/Y, I/Y and XN/Y of an increase of one percentage point in wage share. We give a value equal to zero to the coefficients that are not statistically significant in the estimates.

The effect of a 1%-point increase in wage share in Spain entails an expansionary effect of 0.50 points in aggregate demand for the period 2010-2016. Therefore, the Spanish economy is a wage-led economy, according to the typology of economies established by Bhaduri and Marglin (1990). Between 2010 and 2016, wage share in Spain fell by 4.3 percentage points (see Figure 1), that is, by 0.6 points each year. This means that every year the economy lost 0.3 percentage points of potential growth as a consequence of the internal devaluation policy[17].

As already stated, this result is similar to those obtained by many of the studies conducted for large OECD economies using the Bhaduri-Marglin approach (Hein and Vogel, 2008; Stockhammer *et al.*, 2011; Stockhammer and Stehrer, 2011; Onaran and Galanis, 2012). Nastepaad and Storm (2006) also find the Spanish economy to be wage-led for the period 1960-2000, and Onaran and Obst (2016) present very similar figures for the Spanish case (in their study, the effect of a 1%-point increase in the profit share in Spain entails a reduction of -0.54 points in aggregate demand).

Furthermore, the results of our estimates show that this wage-led character is reinforced during the period 2010-2016. One initial explanation for this concerns a stronger effect of the implicit multiplier, which becomes greater[18] in periods of crisis, as the literature on fiscal multipliers tends to point out (Auerbach and Gorodnichenko, 2012a and 2012b; Gerchert and Rannenberg, 2014; Martinez and Zubiri, 2014).

Second, the fall in wages not only affects consumption but also (by means of a reversed accelerator effect) the demand for investment, which falls.

Thirdly, the wage-led character is reinforced due to a partial disconnection between profits and private investment during the period 2010-2016. This partial disconnection can be observed in Figure 10, which correlates the evolution of the gross operating rate and gross fixed capital formation for the main NACE branches of the Spanish economy. A similar breakdown of the profit-investment link is presented by Onaran and Obst (2016) for

Table 6. Total effect on demand of a 1% increase in the W/Y ratio

	Partial effect of a 1% increase in wage share on C/Y	Partial effect of a 1% increase in wage share on I/Y	Partial effect of a 1% increase in the wage share on XN/Y	μ	TOTAL EFFECT
	A	B	C	D	D(A+B+C)
1995-2016	0.315	-0.168	0.000	1.030	0,151
2010-2016	0.356	0.000	0.000	1.420	0,505

Source: own calculations, based on Eurostat quarterly data

[16] For further details on calculating the implicit multiplier, see Annex 3.

[17] For an interesting analysis of the costs of internal devaluation in the eurozone, see Stockhammer and Sotiropoulos (2014).

[18] See Annex 3.

EU15 Member States for the period after the Great Recession of 2007. In an economy such as Spain's, where the private sector maintains high debt ratios, wage devaluation policies serve to increase profit margins and deleverage but fail to foster investment in equal measure.

Finally, and according to our estimates, it cannot be said that the internal devaluation of the Spanish economy triggered a sustainable export-led growth recovery during the period 2010-2016. For this period, we find no relevant effects of ULC on export prices. Nor do the latter show significant coefficients in the export equation. This is consistent with the stylized facts discussed in section 2, where we saw that the factors driving the Spanish recovery stem mainly from domestic demand.

5.- Main conclusions and policy implications

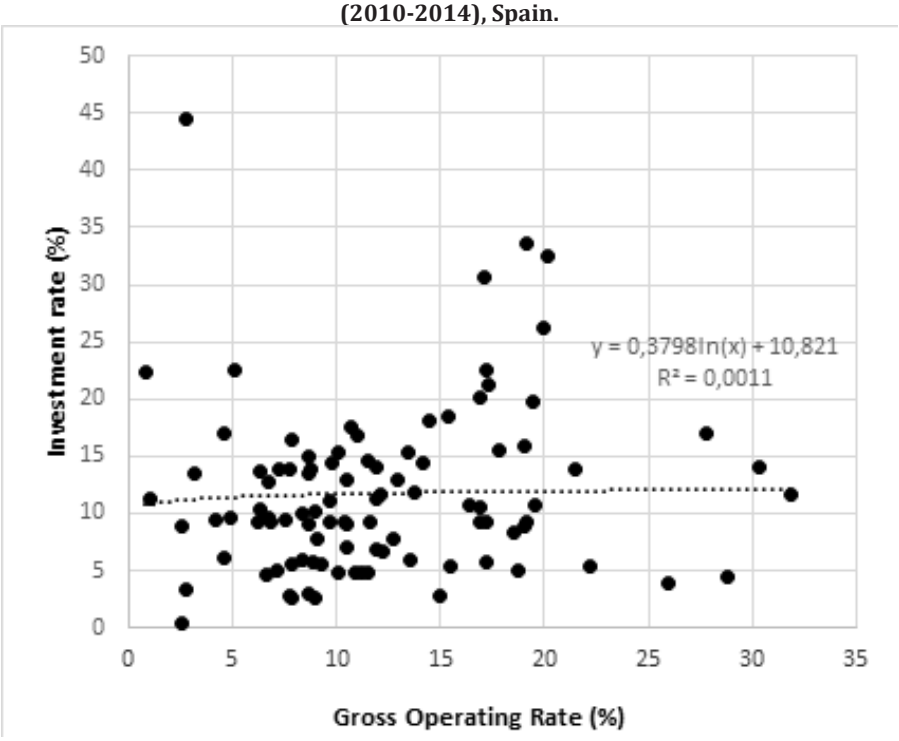
Our estimates confirm that the Spanish economy is a wage-led economy. This result is analogous to those obtained by many other studies that follow the Bhaduri-Marglin approach to analyzing large eurozone economies.

The labor market reforms of 2010, 2011 and 2012 imposed wage devaluation in Spain but did not transform the wage-led character of the economy. According to our calculations, Spain lost an average of 0.3 percentage points of GDP growth per year between 2010 and 2016 as a result of this internal devaluation policy.

These outcomes are due to three important factors. First, the marginal propensity to consume out of wage income is invariably greater than the marginal propensity to consume out of capital income. Thus, a pro-capital income distribution reduces aggregate consumption.

Second, although profit share has a significant statistical impact when explaining capital formation in the long term, private investment is more influenced by the evolution of income and the subsequent accelerating effect. As internal devaluation reduces domestic demand, the net effect also proved detrimental to private investment during 2010-2016.

Figure 10. Gross Operating Rate (%) vs. Investment Rate (%). NACE aggregates of activities (2010-2014), Spain.



*Note: Gross Operating Rate, in the X axis, is defined as Gross operating surplus/turnover. Investment rate, in the Y axis, is defined as gross fixed capital formation /value added at factors cost. In both cases, we take the average value for the period 2010-2014. Source: Eurostat and author's calculations

Third, ULC are a strong determinant of domestic prices, although the translation of ULC into prices was extremely limited during this period. Moreover, the impact of this variable on export prices seems even more restricted. The economic growth of major trading partners is far more relevant vis-à-vis explaining exports than the change in relative prices. It thus proves crucial to bring an end to austerity and to support demand at the EU level, and not to extend the policies of internal devaluation to other member countries.

One contribution of this paper lies in its having extended the Bhaduri-Marglin model to include financial variables. Including these variables allows for a comparison between the robust and positive effects of private credit flow on investment and consumption. When the economic cycle changes and the Spanish economy enters into a balance sheet recession, excessive private indebtedness helps to explain the partial disconnection between profits and investment, since the former must be used by companies to deleverage (Goretti and Souto, 2013). This fact partially explains the reinforcement of the wage-led character of the Spanish economy in 2010-2016.

Some relevant variables in our study were not significant for the period of internal devaluation (propensity to consume out of capital income, profit share as a determinant of investment, or ULC as drivers of exports). These variables would probably be significant for a longer period of analysis, as many studies have shown. In any case, and as discussed in section 2, this points to the weak capacity of these factors to explain Spain's recovery since 2015. This recovery is not the result of a supposed export-led strategy due to internal devaluation, but rather to the effect of other factors (depreciation of the euro, falling energy prices, the ECB's quantitative easing policy, and a certain abandonment of fiscal austerity).

For all this, it is time to re-examine the rationality of pro-capital distributional policies, and to develop an alternative policy mix based on pro-labor distributional policies in order to follow a wage-led growth strategy (Lavoie and Stockhammer; 2013; Onaran and Stockhammer; 2016). In addition, this might be accompanied by measures favoring the restructuring of certain corporate debt so as to facilitate the re-establishment of the profit-investment nexus.

As pointed out by Felipe and Kumar (2011), a higher wage share does not necessarily lead to a less competitive economy (the well-known *Kaldor's paradox*), since competitiveness also depends on unit capital costs (the ratio of the nominal profit rate to capital productivity) as well as on non-price factors.

Pro-labor distributional policies might help to consolidate the current fragile growth of the Spanish economy, strengthening those factors that are currently driving domestic demand.

Annex 1. Table A1- Variables, data definitions and sources

Abbreviation	Full variable name	Units and description	Type	Source	Eurostat code
Y	Gross domestic product at market prices	Chain linked volumes (2010), million euros	Seasonally and calendar adjusted data	Eurostat	namq_10_gdp
P	Gross domestic product at market prices	Price index (implicit deflator), 2010=100, national currency	Seasonally and calendar adjusted data	Eurostat	namq_10_gdp
C	Household and NPISH final consumption expenditure	Chain linked volumes (2010), million euros	Seasonally and calendar adjusted data	Eurostat	namq_10_gdp
I	Private gross fixed capital formation	Private sector, Current prices, million euros; deflated by GDP deflator	Unadjusted data (i.e. neither seasonally adjusted nor calendar adjusted data)	Eurostat	nasq_10_nf_tr
W*	Employee compensation	Current prices, million units of national currency; deflated by GDP deflator	Seasonally and calendar adjusted data	Eurostat	namq_10_gdp
W	Adjusted employee compensation	Current prices, million units of national currency; deflated by GDP deflator	Seasonally and calendar adjusted data	Calculated as W *(Employment/employees, domestic)	
R*	Operating surplus and mixed income, gross	Current prices, million units of national currency; deflated by GDP deflator	Seasonally and calendar adjusted data	Eurostat	namq_10_gdp
R	Adjusted operating surplus and mixed income, gross	Current prices, million units of national currency; deflated by GDP deflator	Seasonally and calendar adjusted data	Calculated from W	
Ω	Adjusted Wage Share	%		Calculated as W/Y	
π	Adjusted Profit Share	%		Calculated as R/Y	
r	EMU convergence criterion bond yields	Nominal, deflated by GDP deflator	Unadjusted	Eurostat	irt_lt_mcby_q
ULC	Nominal unit labor cost based on persons	Index, 2010=100	Unadjusted data (i.e. neither seasonally adjusted nor calendar adjusted data)	Eurostat	namq_10_lp_ulc
X	Exports of goods and services	Chain linked volumes (2010), million euros	Seasonally and calendar adjusted data	Eurostat	namq_10_gdp
M	Imports of goods and services	Chain linked volumes (2010), million euros	Seasonally and calendar adjusted data	Eurostat	namq_10_gdp
PX	Price of exports of goods and services	Price index (implicit deflator), 2010=100, national currency	Seasonally and calendar adjusted data	Eurostat	namq_10_gdp
PM	Price of imports of goods and services	Price index (implicit deflator), 2010=100, national currency	Seasonally and calendar adjusted data	Eurostat	namq_10_gdp
YW	GDP, volumes, OECD total	Index, 2010=100	Seasonally and calendar adjusted data	OECD Economic Outlook, 99, June 2016	
Dh	Household debt, stock	Liabilities (loans), households, million euros, deflated by GDP deflator	Unadjusted data (i.e. neither seasonally adjusted nor calendar adjusted data)	Eurostat	[nasq_10_f_bs]
Dc	Corporate debt, stock	Liabilities (loans and debt securities), non-financial and financial corporations, million euros, deflated by GDP deflator	Unadjusted data (i.e. neither seasonally adjusted nor calendar adjusted data)	Eurostat	[nasq_10_f_bs]
DhY	Household debt-to-GDP ratio	%		Calculated as Dh/Y	
DpY	Private debt-to-GDP ratio	%		Calculated as (Dh+Dc)/Y	

Annex 2. Estimated elasticity of consumption, investment and net exports with respect to wage share

Consumption function:

We calculate the estimated elasticity of consumption with respect to wage share, based on the consumption function used:

$$C = c_0 + c_W W + c_R R + c_{Dh}\Delta Dh + c_{DhY} DhY \quad (3)$$

$$C = c_0 + c_W \Omega Y + c_R (1-\Omega) Y + c_{Dh}\Delta Dh + c_{DhY} DhY \quad (11)$$

$$C = c_0 + Y[c_W \Omega + c_R (1-\Omega)] + c_{Dh}\Delta Dh + c_{DhY} DhY \quad (12)$$

$$\frac{C}{Y} = \frac{c_0}{Y} + \Omega(c_W - c_R) + c_{Dh}\frac{\Delta Dh}{Y} + c_{DhY}\frac{DhY}{Y} \quad (13)$$

$$\frac{C}{Y} = \frac{c_0}{Y} + \Omega(c_W - c_R) + c_{Dh}\frac{\Delta Dh}{Y} + c_{DhY}\frac{DhY}{Y} \quad (14)$$

$$\frac{\partial {}^{C}/_{Y}}{\partial \Omega} = c_W - c_R \quad (15)$$

Taking into account the following:

$$\beta_W = \frac{{}^{\Delta C}/_{C}}{{}^{\Delta W}/_{W}} = \frac{\Delta C}{\Delta W} * \frac{W}{C} \quad ; \quad c_W = \beta_W \frac{C}{W} \quad (16)$$

$$\beta_R = \frac{{}^{\Delta C}/_{C}}{{}^{\Delta R}/_{R}} = \frac{\Delta C}{\Delta R} * \frac{R}{C} \quad ; \quad c_R = \beta_R \frac{C}{R} \quad (17)$$

we can replace these expressions in equation (17), and obtain the effect on consumption of a change in the distribution of income (equation 20). This effect is given by the difference in marginal consumption propensities of wage income and profit income:

$$\frac{\partial {}^{C}/_{Y}}{\partial \Omega} = c_W - c_R = \beta_W \frac{C}{W} - \beta_R \frac{C}{R} \quad (18)$$

Investment function:

We compute estimated elasticity of investment with respect to wage share in a similar way, through the following transformation:

$$I = i_0 + i_Y Y + i_\pi \pi + i_r r + i_{Dh}\Delta Dh + i_{Dc}\Delta Dc + i_{DhY} DhY \quad (4)$$

$$\frac{I}{Y} = \frac{i_0}{Y} + i_Y + i_\pi \frac{(1-\Omega)}{Y} + i_r \frac{r}{Y} + i_{Dh}\frac{\Delta Dh}{Y} + i_{Dc}\frac{\Delta Dc}{Y} + i_{DhY}\frac{DhY}{Y} \quad (19)$$

$$\frac{\partial {}^{I}/_{Y}}{\partial \Omega} = -\frac{i_\pi}{Y} \quad (20)$$

Taking into account the following,

$$\propto_\pi = \frac{{}^{\Delta I}/_{I}}{{}^{\Delta \pi}/_{\pi}} = \frac{\Delta I}{\Delta \pi} * \frac{\pi}{I} \quad ; \quad i_\pi = \alpha_\pi \frac{I}{\pi} \quad (21)$$

then, estimated elasticity of investment with respect to the wage share results gives equation (25):

$$\frac{\partial {}^{I}/_{Y}}{\partial \Omega} = -\alpha_\pi \frac{I}{\pi} * \frac{1}{Y} \quad (22)$$

Functions of domestic prices and export prices:

The rate of inflation is affected by increases in unit labor costs (as they are partly translated into prices), and by increases in import prices:

$$P = a + b_1\, ULC + b_2\, PM \quad (23)$$

Moreover, wage share is equal to real unit labor costs:

$$\Omega = RULC = \frac{ULC}{P} \quad (24)$$

From these two equations, and in order to calculate the elasticity of domestic and export prices with respect to wage share, we develop the following transformation. In growth rates:

$$dlog\Omega = dlogULC - dlogP \quad (25)$$

$$dlog\Omega = dlogULC - a - b_1 dlogULC - b_2 dlogPM \quad (26)$$

$$dlog\Omega = (1 - b_1) dlogULC - a - b_2 dlogPM \quad (27)$$

Clearing the ULC growth rate and replacing it in the equation of the inflation rate:

$$dlogULC = \frac{a + b_2 dlogPM}{1 - b_1} + \frac{dlog\Omega}{1 - b_1} \quad (28)$$

$$dlogP = \frac{a + b_2 dlogPM}{1 - b_1} + \frac{b_1}{1 - b_1} dlog\Omega \quad (29)$$

$$\frac{\partial dlogP}{\partial dlogRULC} = \frac{b_1}{1 - b_1} \quad (30)$$

That is, keeping everything else constant, when ULC grow, both the rate of inflation and the wage share are modified. This expression reflects the relationship between these two latter variables.

As we are interested in external competitiveness, we can also write the above equations in terms of export prices, and not in terms of the GDP deflator, which includes tradable and non-tradable goods:

$$dlogPX = a + b_1^x dlogULC + b_2^x dlogPM \quad (8b)$$

$$dlogPX = \frac{a + b_2^x dlogPM}{1 - b_1^x} + \frac{b_1^x}{1 - b_1^x} dlog\Omega \quad (31)$$

$$\frac{\partial dlogPX}{\partial dlog\Omega} = \frac{b_1^x}{1 - b_1^x} \quad (32)$$

Export and import functions:

The export and import functions were as follows:

$$dlogX = x_0 + x_1\, dlogYW + x_2\, dlog\,(PX/PM) \quad (9)$$

$$dlogM = m_0 + m_1\, dlogY + m_2\, dlog(PX/PM) \quad (33)$$

These equations are expressed in terms of differences of logarithms. Thus, the estimated coefficients are elasticities. If we join these two expressions with the previous ones, the change in Ω is associated with a change in export prices, said change affecting both exports and imports. We can write this as follows:

$$\frac{\partial X/Y}{\partial \Omega} = e_{XPx} e_{PxCLU} e_{CLU\Omega} \frac{X}{Y} \frac{1}{\Omega} \quad (34)$$

$$\frac{\partial M/Y}{\partial \Omega} = e_{MPm} e_{PmCLU} e_{CLU\Omega} \frac{M}{Y} \frac{1}{\Omega} \quad (35)$$

Annex 3. Calculating the multiplier

The marginal effects on consumption, investment, and net exports resulting from an increase in wage share do not take place with a constant level of income. It is obvious that by increasing these components of aggregate demand, equilibrium income will not remain constant. This increase in income will lead to second round effects, resulting in the well-known multiplier effect.

To incorporate this effect into our analysis, we must begin by estimating the marginal effect of an increase in income on consumption, investment and net exports. For the latter two variables, it can be obtained almost directly, since in the estimated equations the income level was an explanatory variable. We can therefore transform these elasticities into marginal effects following the usual procedure:

$$\frac{\partial I}{\partial Y} = \alpha_Y \frac{I}{Y} \quad (36)$$

$$\frac{\partial XN}{\partial Y} = -m_1 \frac{M}{Y} \quad (37)$$

In the case of consumption, however, the effect of an increase in income, assuming that the functional distribution remains constant, must be calculated from the consumption function:

$$C = c_0 + c_W W + c_R R + c_{Dh} \Delta Dh + c_{DhY} DhY \quad (3)$$

$$C = c_0 + Y[c_W \Omega + c_R (1 - \Omega)] + c_{Dh} \Delta Dh + c_{DhY} DhY \quad (12)$$

$$\frac{\partial C}{\partial Y} = c_W \Omega + c_R (1 - \Omega) \quad (38)$$

The multiplier (μ) is an expression in which these three effects are taken into account, and which depends on coefficients we have already estimated:

$$\mu = \frac{1}{1 - \left(\frac{\partial C}{\partial Y} + \frac{\partial I}{\partial Y} + \frac{\partial XN}{\partial Y}\right)} = \frac{1}{1 - \left(c_W \Omega + c_R (1 - \Omega) + \alpha_Y \frac{I}{Y} - m_1 \frac{M}{Y}\right)} \quad (39)$$

In Table A2, we present the calculation of the multiplier. For this calculation, we use the mean values of the sample for the corresponding period.

Table A2. Calculation of the multiplier, Spain

	W	cW	cR	αY	m1	I/Y	M/Y	cW*W	cR * (1-W)	βY * I/Y	m1 * M/Y	μ
1995-2016	0.57	0.32	0.00	3.54	3.89	0.23	0.25	0.18	0.00	0.82	0.97	1.03
2010-2016	0.56	0.36	0.00	3.34	1.98	0.19	0.26	0.20	0.00	0.62	0.52	1.42

Source: own calculations, based on Eurostat quarterly data

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