Is Fiscal Devaluation a Way Out?

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Vita

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Abstract

Most of the Euro Area members are currently facing one of the most economic and social crisis ever: they are struggling against slow growth and increasing unemployment rates while having their "hands tied" by the constraint of high government and external indebtedness and by the inability to use monetary policy of their own and to promote nominal exchange rate devaluations.

This work explores the ability of fiscal devaluation to replicate the effects of nominal exchange rate devaluation in boosting competitiveness, and thus output, in the Euro Area countries. Using a panel data regression for the Euro Area countries through the period of 1999-2010, we test the effects of alternative forms of fiscal devaluation on the current account.

The main results of our work are that fiscal devaluation can really improve the current account, especially when the reduction in the employers' social security contributions are financed either through an increase in workers' contributions or in consumption taxes. We also found robust evidence that the structural functioning of the labour market determines the degree of effectiveness of fiscal devaluation. In particular, the stricter employment protection is, the smaller are the effects of fiscal devaluation on the current account.

Keywords: Fiscal devaluation; Consumption taxes; Panel data; Europe.
JEL-codes: E62, F32, C23.

Resumo

A maioria dos países membros da Área Euro estão atualmente a enfrentar uma grave crise económica e social, lutando contra um lento crescimento e um aumento das taxas de desemprego, tendo as suas "mãos atadas" pelo elevado endividamento quer externo quer do governo e pela incapacidade usar a sua própria política monetária e de promover desvalorizações da taxa de cambio nominal.

Este trabalho explora a possibilidade de desvalorização fiscal para replicar os efeitos da desvalorização da taxa de câmbio nominal em aumentar a competitividade e, assim, produto, nos países da Área Euro. Usando uma regressão de dados em painel para os países da Área Euro ao longo do período de 1999-2010, testamos os efeitos das diferentes alternativas de desvalorização fiscal na balança corrente.

Os principais resultados do nosso trabalho são que a desvalorização fiscal pode realmente melhorar a balança corrente, especialmente quando a redução das contribuições dos empregadores para a segurança social são financiados pelo aumento das contribuições para a segurança social dos trabalhadores ou pelo aumento dos impostos sobre o consumo. Também encontramos evidências robustas de que o funcionamento estrutural do mercado de trabalho determina o grau de eficácia da desvalorização fiscal. Em particular, quanto mais rigorosa a proteção do emprego, menor são os efeitos da desvalorização fiscal na balança corrente.

Palavras-chave: Desvalorização fiscal; IVA; Dados em painel; Europa.
Códigos JEL: E62, F32, C23.

Table of Contents

List of Tables

List of Figures

Abbreviations

BoP	Bank of Portugal
CA	Current Account
CIT	Corporate Income Taxes
CT	Taxes on Consumption
EAGLE	Euro Area and Global Economy
EC	European Commission
ECB	European Central Bank
EMU	European and Monetary Union
ESSC	Employers' Social Security Contributions
EU	European Union
EUR	Euro
GDP	Gross Domestic Product
GMM	Generalized method of moments
HIPC	Harmonized Index of Consumer Prices
ITR	Implicit Tax Rate
ITR ESSC	Implicit Tax Rate on Employers' Social Security Contribution
ITRC	Implicit Tax Rate on Consumption
MAX	Maximum
MIN	Minimum
OECD	Organisation for Economic Co-operation and Development
p.p.	Percentage Points
PIT	Personal Income Taxes
SEP	Strictness of Employment Protection
USD	United States Dollar
VAT	Value Added Tax
WSSC	Employees' Social Security Contribution

1. Introduction

Most of the Euro Area members are currently facing one of the most economic and social crisis ever, struggling against slow growth and increasing unemployment rates, having their "hands tied" by the constraint of high government and external indebtedness and by the inability to promote nominal exchange rate devaluations.

Some authors argue that fiscal devaluation can be an answer to these problems because, to a certain extent, it can deliver the same real effects of nominal exchange rate devaluation, while keeping a balanced-budget path.[1] This idea is not new, being rooted in Keynes who, back in 1931, noted that the combination of an import tariff and an export subsidy has much the same effect of exchange rate devaluation, raising the domestic price of importable goods and services while reducing the foreign price of exportable goods (Farhi *et al.*, 2011).

In this context, the Portuguese government has recently proposed a fiscal devaluation policy measure through reducing the employers' social security contributions while increasing the employees' social security contributions.[2] The major argument in favor of this change was that such measure would be able to combat unemployment by reducing the labor costs and thus improving the demand for work. The proposal was withdrawn afterwards. The aim of our research is to assess the impacts of alternative fiscal devaluation procedures as an alternative to nominal exchange rate devaluation. In particular, how it affects primarily labor costs and external competitiveness.

According to most of the literature, fiscal devaluation can be generated by a uniform increase in import tariffs and exports subsidy or by a uniform increase in consumption taxes and a reduction in labor taxes. In the special case of the European Union (EU), the use of trade tariffs and subsidies is forbidden because of the impositions of the free trade agreement. Under the second strategy, fiscal devaluation usually works by decreasing the rate of employers' social security contribution (ESSC) that leads to a decrease in unit labor costs and thereby a decrease on producers prices (including export-prices), improving competitiveness and, therefore, output, while reducing unemployment. In turn, the deficit-balancing increase in value added tax (VAT) leads to a decrease in future consumption. The output is expected to increase

[1] See for example: Calmfors (1998), Farhi *et al.* (2011) or Langot *et al.* (2012).
[2] Portuguese Prime Minister Communication, at 7th September of 2012, on the 2013 government budget.

because the anticipated effects of the VAT increase will make households to increase present consumption and, thereby, increase output and employment because firms increase labor demand.

On the basis of this and other mechanisms, we aim to assess if fiscal devaluation can be a substitute of nominal exchange rate devaluation for the Economic and Monetary Union (EMU) countries, as they share a common currency since 1999. In order to accomplish our purpose we first provide a theoretical and empirical overview on the effects of fiscal devaluation. Secondly, we make an empirical application, motivated by the studies of Franco (2011), Aguiar-Conraria *et al.* (2012), Boscá *et al.* (2012) and de Mooij and Keen (2013). We apply a panel data regression to capture the effects of alternative forms of fiscal devaluation on the current account, using data for the Euro Area countries between 1999 and 2010. Finally, and relying on the estimation results, we make an exploratory attempt to draw conclusions on the relative efficiency of alternative forms of fiscal devaluation for Portugal.

This dissertation is structured as follows. Section 2 makes a review of the theoretical and empirical literature on the mechanisms and conditions that can make fiscal devaluation a substitute for nominal exchange rate flexibility. Section 3 shows some evidence on tax devaluation comparing the European Union countries back in 1999 (pre-Euro Area) and 2010 (after Euro Area). Moreover, in this section we describe the methodology, present the model and the analysis of results. In a tentative note, we compare the efficiency of fiscal devaluation in Portugal relative to average Euro Area countries. Finally, the conclusions of this work are presented in section 4.

2. From exchange rate depreciation/devaluation to fiscal devaluation - An overview

2.1. The exchange rate and the current account

When an economy, and in particular a small open economy, is confronted with a significant drop in the domestic demand, either in consumption or in investment, both private or public, the external demand may be the key component to prevent (or to lower the effects of) a recession. A real exchange rate depreciation (flexible exchange rates) or devaluation (fixed, but adjustable, exchange rates) may lead to an increase in the net foreign demand by creating the conditions for an increase in the value of exports and, simultaneously, for a reduction in the value of imports.

The key variable is the real exchange rate, which can be defined as the relative price of two products' baskets, one domestic and one foreign. This relative price depends both on their price level and on the nominal exchange rate, which is the relative price of two currencies,

$$q = EP^*/P, \tag{1.1}$$

where E is the price of the foreign currency in terms of the domestic currency (nominal exchange rate), P^* is the foreign price level and P is the domestic price level.

By assuming a short-term perspective, in which the price levels are assumed to be constant, a change in the real exchange rate is directly related with a change in the nominal exchange rate. So, a nominal depreciation/devaluation generates, in the short-run, a real depreciation/devaluation. Thus, in what follows, we only refer to *the* depreciation/devaluation.

As we said above, a depreciation/devaluation tends to increase the net foreign demand, defined as the difference between the value in domestic currency of, both, exports (EX) and imports (IM), which, by simplification, is the current account (CA):

$$CA = EX - IM \tag{1.2}$$

By making the domestic products relatively cheaper abroad, depreciation tends to generate a higher demand for domestic products in foreign countries, which tends to be

reflected in a higher value of exports, and hence in an improvement of the current account balance.

However, this is not so simple when we refer to the value of imports. The depreciation makes the foreign products more expensive in the domestic economy, which tends to be reflected in a decrease of domestic demand for those foreign products. This means that domestic economic agents are buying fewer (volume effect), but more expensive (price effect), products from abroad. So we have an ambiguous impact on the value of imports, and thus also on the current account. If the volume effect is higher than the price effect, we should expect that the depreciation generates a decrease in the value of imports, and hence an improvement of the current account balance. Yet, if the price effect is dominant, there is as increase in the value of imports, and therefore an indeterminate effect over the current account.

In order to clarify which effect is dominant we have to appeal to the *Marshall-Lerner condition*. This condition states that, everything else constant, a (real) depreciation tends to improve the current account balance if the quantity demanded of exports and imports is sufficiently elastic with respect to the (real) exchange rate.

Following Krugman *et al.* (2012), the current account can be expressed as:

$$CA = EX(q) - q \times EX^*(q) \tag{1.3}$$

where EX, as we have seen before, is the value in domestic currency of exports, EX^* is the value of domestic imports measured in terms of foreign output, and q is the real exchange rate, defined as in equation (1.1) above.

In order to analyze the changes in current account that results from changes in the real exchange rate, we can express the current account's response to changes in q as,

$$\Delta CA/\Delta q = EX_q - \left(q_1 \times EX_q^*\right) - EX_0^* \tag{1.4}$$

where EX_q stands for the effects on exports demand of a change in real exchange rate, EX_q^* stands for the effects on domestic imports demand (from the foreign countries point of view) of a change in the real exchange rate, q_1 is the value of the real exchange rate after the change and EX_0^* reflects the initial value of the domestic imports.

The first two terms of the right arm of the equation are related with the volume effect and they are always positive because $EX_q > 0$ and $EX_q^* < 0$. The last term is related with the price effect and tells us that when real exchange rate depreciates the current account worsens.

Lets define the price elasticity of exports demand (η) and the price elasticity of imports demand (η^*) with respect to real exchange rate, respectively, as

$$\eta = (q_0/EX_0)EX_q \tag{1.5}$$

and

$$\eta^* = -(q_0/EX_0^*)EX_q^* \tag{1.6}$$

Finally, if we substitute equations (1.5) and (1.6) into equation (1.4) and assume that changes in q are small, so that $q_0 \approx q_1$, we can conclude that a (real) depreciation tends to increase the current account balance when,

$$\eta + \eta^* > 1 \tag{1.7}$$

Equation (1.7) is the so called *Marshall-Lerner condition*[3] that states that if the current account is balanced, real exchange rate depreciation causes a current account surplus if the sum of the relative price elasticities of exports and imports demand exceeds 1. It is a sufficient condition (but not necessary) for the volume effect to be higher than the price effect.[4]

According to Krugman *et al.* (2012), empirical evidence shows that in the short run, due to a lag in the adjustment of the exports and imports demand, the sum of the relative price elasticities of exports and imports demand tends to be lower than 1, but, as the volume of exports and imports begins to react to the change in the relative prices, the value starts to rise, and after a few months is will be higher than 1 (typically, in developed economies, after 6 to 12 months).

This means that, in the short run, the price effect dominates the value effect, and hence a real depreciation/devaluation tends to deteriorate the current account. After some time, the volume effect begins to dominate the price effect and, therefore, the

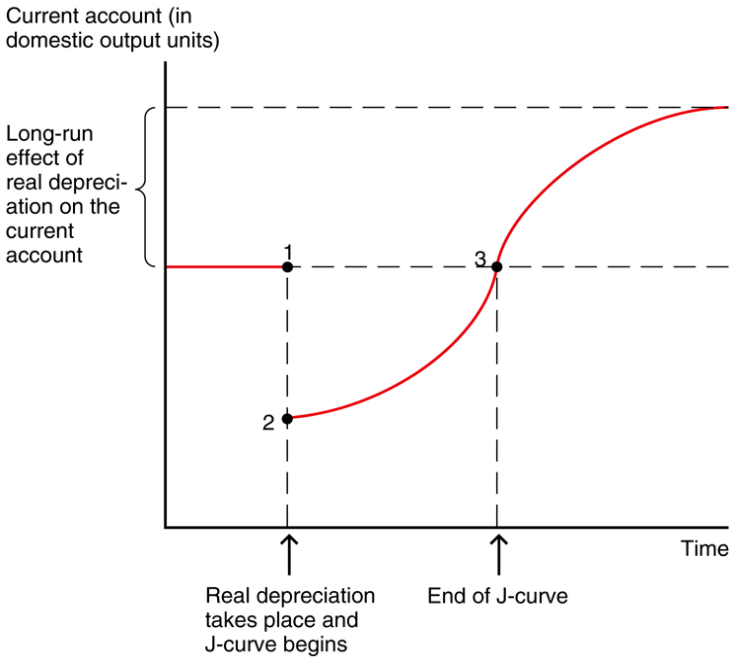
[3] For a detailed derivation of the *Marshall-Lerner Condition*, see, for instance, Krugman *et al.* (2012) pp. 490-492.

[4] Note this analysis assume that all other factors that affect the current account, namely the domestic disposable income, remain unchanged with changes in q.

current account starts to increase gradually. However, only after approximately 6 to 12 months the depreciation/devaluation really improves the current account balance.

This empirical evidence can be represented by making use of the usually called J-Curve. As we can see in Figure 1 below, the first impact of the real depreciation/devaluation is a decrease of the current account (move from point 1 to point 2). As the volume of exports and imports demand starts to react, the current account starts to improve gradually (move from point 2 to 3), but only after several months the current account balance is higher than the initial value (after point 3).

Figure 1: J-curve



Source: Krugman *et al.* (2012), p. 478.

As a conclusion, we can state that a real depreciation/devaluation increases the external (price) competitiveness of domestic products, but the positive impact on the current account only happens in the medium run. In the short run, the impact on the current account tends to be negative.

Thus, besides all we have seen before, to induce an exchange rate depreciation (flexible rates) or to make a domestic currency devaluation (fixed, but adjustable, rates) is a strategy that the policy maker can use in order to increase the external

competitiveness of domestic products. This operates on the demand side, by changing the relative price of imports and domestic production and, as a result, there is a switch on the demand from imported to domestic goods. By this way it is able to stimulate the economy.

However, when facing fixed, but not adjustable, exchange rates or within a single currency area (as in the case of a monetary union, as the Euro Area) it is not possible to use the exchange rate instrument in order to promote the external competitiveness and the output growth. In this context, Calmfors (1998) argues that the most direct substitute for a domestic currency depreciation/devaluation is an internal real exchange rate change, also known as fiscal devaluation.

Fiscal devaluation is a fiscal instrument that can, according to several authors, replicate the effects of a real exchange rate depreciation/devaluation (in terms of improved external competitiveness). It can be achieved by a tax-swap without affecting the amount of government revenues.

Referring to Calmfors (1993), he shows that in a short-run macro model with fixed capital stock, a cut in the payroll tax rate at an unchanged fiscal balance will have effects on output and on employment similar to those following a nominal exchange rate devaluation. The degree of substitutability between fiscal and exchange rate devaluation depends on several institutional and economic features that affect policy transmission mechanism (Calmfors, 1998). For instance, in terms of political economy, it will be harder for a government to obtain agreement on a fiscal devaluation measure than on an interest rate cut to achieve depreciation. Fiscal policy is usually characterized by a slower process by the policy maker than monetary policy; moreover, the reduction in labor taxes requires political agreements to be arranged to obtain accordance on which taxes and rate increases or on which government expenditures should be lowered, in order to keep a balanced budget.

Additionally, there is a difference between who controls the timing and the size of fiscal devaluation and those of exchange rate depreciation/devaluation. While the political system controls the first, the second usually depends on the functioning of the financial markets. Fiscal devaluation has the advantage of avoiding both unwarranted real exchange rate changes driven by market expectations and the overshooting phenomena. On the other hand, it bears the disadvantage that markets comprehend better the changes in nominal exchange rate than politicians do (Calmfors, 1998).

2.2. What is a fiscal devaluation and how does it works

Langot *et al.* (2012) points crucial mechanisms through which fiscal devaluation may operate. First, it can make exports cheaper and imports more expensive, bringing up the demand for domestic goods and reducing the external balance. Second, it may improve labor market performance: by lowering labor costs, it favors labor demand and employment. All of this is done while ensuring public finance sustainability.

According to most of the literature, fiscal devaluation can be implemented through a uniform increase in import tariffs and exports subsidy or by a uniform reduction in labor taxes and an increase in other taxes (see, among others, Farhi *et al.*, 2011, Pereira and Pereira, 2011, Langot *et al.*, 2012). This cut in labor taxes, can be accompanied by a rise in Employees' Social Security Contributions (WSSC), a rise in income taxes or a rise in the Value Added Tax (VAT). Additionally, it can also be done with a reduction in the government transfers to households (Calmfors, 1998).

Concerning income taxes we have two possibilities, increasing Personal Income Taxes (PIT) or increasing Corporate Income Taxes (CIT). According to Keen and Syed (2006), Ivanova (2012) and de Mooij and Keen (2013), the increase on CIT may lead to an increase on investment abroad, resulting, in the short run, in an increase/decrease in capital exports/imports, increasing trade balance or reducing the deficit. On long-run, the increase on capital exports, lead to a higher national income (due to inward flows of capital income), with negative impacts on the trade balance. Regarding the increase on PIT to accompanied the cut in labor taxes, Mooij and Keen (2013) argued that this increase have a small effect on net exports.

Additionally, there is no risk of an internal devaluation producing long-run inflationary spiral as in the case of exchange rate devaluation. In the short-run, a fiscal devaluation financed by reductions on government expenditures or the increase in other than value added taxes may even reduce the inflation because of the reduction on labor taxes that pressures down also the price of the domestically produced goods[5] (Calmfors, 1998).

Recent studies show that some conditions are necessary to ensure and enlarge the efficiency of fiscal devaluation.

[5] In fact, in the medium term, the unions may become more aggressive because they should bargain a wage increase as a result of the cut in payroll taxes.

Correia (2011) pointed some characteristics that are important to guarantee that a fiscal devaluation can replicate a nominal devaluation: first, external assets held by private and public sectors should be denominated in foreign currency as devaluation has no effect on its face value (according to Farhi *et al.* (2011), if external assets were denominated in domestic currency, a transfer between the domestic and foreign economies should be in place to make fiscal devaluation to match exchange rate devaluation effects); second, the pass-through of the exchange rate and that of the VAT should be identical in import and export prices, which implies a slow adjustment in prices of imported and exported goods after a large devaluation; and third, the pass-through to domestically produced goods' prices of social contributions by firms and the VAT should be the same; if such equality do not happen we will create a distortion on the relative price changes and lead to higher costs to economy. Another problem is when they are the same and equal to zero, as in this scenario we need to know exactly how the change in VAT need to be compensated by a change in Employers' Social Security Contributions (ESSC).

Rigidity in both nominal wage and exchange rate is also required for the effectiveness of fiscal devaluation, as argued by IMF (2011), Poterba (2013) and de Mooij and Keen (2013). If nominal wages are flexible, they adjust instantly to the changes in VAT: the wages will increase as a result of the increase on consumer's prices given the increase in VAT, thus reducing the impacts from lower payroll taxes on labor costs - fiscal devaluation may end up having any real effects. Similarly, under flexible nominal exchange rates, the increase on exports - resulting from lower labor costs for the firms - and the decrease on imports - resulting from an increase in the price of imported goods due to VAT increases - induces an appreciation of nominal exchange rate and, thus the increase on competitiveness will be undone.

Moreover, according to the existing literature, a fiscal devaluation has different, although ambiguous, effects according to the openness degree of an economy: while Langot *et al.* (2012) state that the more open a country is, the smaller will be the real effects of a fiscal devaluation, Lipińska and von Thadden (2012) claim that the smaller the country, and therefore the more open, the higher will be the effects on output and consumption of a fiscal devaluation.

According to Langot *et al*., 2012, in a closed economy, a fiscal devaluation increases worked hours, output and real wages; this pressures an increase on

consumption through a positive wealth effect. In an open economy, this effect is not as strong: the tax reform increases the price of imports, the purchasing power of real wages goes down and the consumption decreases due to a negative income effect.

For Lipińska and von Thadden (2012) the real effects of fiscal devaluation also depend on the market type - if the markets are complete or incomplete -, and further on the degree of financial integration and size of a country that belongs to a monetary union. In the case of a closed economy and the case of financial autarky (where the households do not have access to any international bonds) in order for a revenue-neutral shift from labor taxes to indirect taxes to be able to increase output and employment it is crucial that the shift does not fully eliminates the effectiveness of the decrease on the ESSC. Taking into consideration the case of a monetary union the real effects of a fiscal devaluation depend on the degree of financial integration and on the size of the countries that integrate the union.

Under complete markets (both home and foreign consumers own risky claims on home and foreign assets and the marginal rate of substitution between foreign and home consumption are steady) and equal-size countries the shift in the tax structure where the home country lowers the tax on home production, leads to an increase in home production and also in home labor supply, creating a negative wealth effect on home consumers. The foreign consumers experience a positive wealth effect that reflects on an increase in foreign consumption and a decrease in foreign output. Finally, the terms of trade depreciate meaning that exports have a lower value (decrease in the price of exports) while imports have a higher value (increase in the price of imports). When countries have different size, both home and foreign economies are less exposed to the terms of trade and the changes depend only on changes in labor taxes.

If we consider the case of incomplete markets (home consumers are the only owners of risky claims to their consumption) and equal-size countries, the tax shift is permanent and consumers do not have access to maintain a higher level of consumption through borrowing. The domestic consumption increases and we can see a small increase in the terms of trade as a result of the increase on foreign consumption and the decrease on foreign output. These results are similar to the case of a closed economy: the effects on output of the fiscal devaluation are smaller than when households have access to complete markets, but the effects on consumption and real wage are higher. In a monetary union, equal-size countries and symmetric bias in consumption with

complete markets, both economies are less exposed to the effects in the terms of trade. Lipińska and von Thadden (2012) conclude that when a country that belongs to a monetary union, and under complete markets, implements a fiscal devaluation, the real effects of the reforms are fully achieved.

IMF (2011) notes also that the larger is the number of countries implementing a fiscal devaluation the smaller will be its real effects, since devaluation works as a way to promote competitiveness across countries, the effects will be the same, but smaller. This effect is similar to that occurring under nominal devaluation retaliation: the real impact of an exchange rate policy in one country is reduced when partner' countries follow a similar policy.

de Mooij and Keen (2013) argue that when an increase on VAT rates is pre-announced, it can influence present consumption and the effect on aggregate demand will be small, reducing the effects of a fiscal devaluation.

Pereira and Pereira (2011) also notice some problems concerning the implementation of a fiscal devaluation. First, when making a reduction on ESSC, one assumes that the decrease occurs in all sectors, but this does not always happen. Fiscal devaluation can be implemented only in one sector: for example, the non-tradable sector does not beneficiate directly from the competitiveness gains, and reductions of ESSC only increase the revenue of non-tradable firms. Such tax reform should apply a reduction of ESSC in the sector that beneficiate more – the tradables. Another problem is that one tends to assume that the changes in VAT only impinges on aggregate private consumption while current and investment public spending grows at an exogenous rate. For instance, government expenditure may also decrease/increase, reducing/amplifying the real effects of the fiscal devaluation.

Van Reenen (2012) also argues that a fiscal devaluation can deliver different effects on output or on employment, depending on the phase of the business cycle during which fiscal devaluation is implemented. Fiscal multipliers are not the same in booms or in recessions; according to several authors (*e.g.*, Ratto *et al,*, 2009, Barsky and Sims, 2012, Auerbach and Gorodnichenko, 2012, Silva *et al.*,2013, and Castro *et al.*, 2013) multipliers are larger during recessions and, thus, a fiscal devaluation during a recession period is expected to lead to a stronger negative effect in domestic demand. Moreover, according to Van Reenen (2012), if such measures are to be implemented too early in the business cycle, the country has to engage on higher cost in terms of output.

The author also draws attention to the hysteresis effect of a fiscal devaluation, an effect that most macroeconomists do not account for. This effect implies that when unemployment increases, during recessions, people who lose their jobs will also lose their skills, motivation and networks.

Additionally, IMF (2011) notices that fiscal devaluation tends to favor a production switch towards the non-tradable goods, because such goods are generally taxed at a lower VAT rate than tradables are; a higher standard tax rate on tradable goods is expected to reduce the relative consumer's price of the non-tradable goods and this encourage the substitution of tradable goods by non-tradable goods. Because the latter usually exhibit smaller productivity gains, this policy option may limit long run growth rates. Another incentive for production shift towards non-tradable goods is the fact that non-tradable goods usually are more labor-intensive when compared to tradable goods; thus, a reduction in ESSC affects proportionately more the labor costs of the non-tradables.

de Mooij and Keen (2012) have expressed their worries relative to VAT increases in Europe. According to the authors, between the European Union (EU) countries, the standard rates are too high and the EU has already an informal general agreement not to increase standard VAT rates beyond the maximum of 25 percent. Higher standard VAT rates can make households reduce their consumption and, hence, reduce the effects of fiscal devaluation. The increase on reduced VAT rates can also be made but with some caution because of the risks of distributional consequences. According to the authors, this measure affects essentially the poorer and beneficiates the richer. Pereira and Pereira (2011), on a related topic, also notes that the impact of the reduction of the ESSC on social security accounts should not be ignored in terms of distributional effects.

Cavallo and Cottani (2010) point two advantages of using VAT as an instrument of fiscal devaluation: it promotes formal job creation and stimulates private saving. It is able to "kill" tree birds with one stone: reduce unemployment, informality in the labor market and current account deficits. They conclude that in countries like Portugal, Greece and Spain it is possible to substitute a general tax on consumption for a tax on labor utilization without sacrificing tax revenue. Another advantage is the fact that VAT do not impose against savings and help to promote capital formation and economic formation (Feldstein and Krugman, 1990). They present also some disadvantages such

as higher administrative costs and "greater difficulty in providing an acceptable degree of progressivity to the overall tax-and-transfer structure as well as the possible political costs (or benefits, depending on one's point of view) of a tax that is relatively invisible and thus easy to raise." (Feldstein and Krugman (1990), p. 263). The businessman's thinks that VAT is a tax to help to gain international competitiveness, since it is levied on imports and rebated on exports. They think that countries with VAT have an international competition advantage face the countries that only have income taxation. Feldstein and Krugman (1990), defend that VAT is not anything like a tariff-cum-export subsidy and that "VAT is no more an inherently procompetitive trade policy than a universal sales tax, to which an 'idealized' VAT, levied equally on all consumption, is in fact equivalent." (Feldstein and Krugman (1990), p. 263).

In the special case of the EU, the use of trade tariffs and subsidies is forbidden because of the impositions of the free trade agreement. So the EU uses the uniform reduction in labor taxes and an increase in other taxes strategy[6] and fiscal devaluation usually works by decreasing the rate of ESSC that leads to a decrease in unit labor costs and thereby a decrease on producers prices (including export-prices), improving competitiveness and, therefore, output, while reducing unemployment. The exports will increase due to the lower labor costs associated, implying that exports will be cheaper abroad. In turn, the deficit-balancing increase in VAT leads to a decrease in future consumption. The output is expected to increase because the anticipated effects of the VAT increase will make households to increase present consumption and, thereby, increase output and employment because firms increase labor demand. The VAT increase will apply to both imported goods and goods consumed domestically. As a result, consumers will face a tighter budget constraint as they lose purchasing power in terms of imported and domestically produced goods; moreover, imported goods will become more expensive at home and thereby imports will decrease. It is clear now that, a fiscal devaluation improve net exports.

Referring to the strategies available for the less-competitive members of the European and Monetary Union (EMU), Cavallo and Cottani (2010) recall some lessons retained from the financial crisis that occurred in the beginning of the 21st century in Argentine. First, exchange rate devaluation (which implies exiting the Euro Area) is not

[6] This strategy is known as the classical form of fiscal devaluation and is among the most preferred form adopted by EU countries (de Mooij and Keen, 2013).

the answer: adopting the old currency and make them lose value relatively to the euro will deteriorate government and private sector balances. Second, a sovereign debt restructuring must be planned and executed in an orderly manner and take in account creditors and debtors while maintaining an active support from the international financial organizations. Third, there must be fiscal consolidation, but not limited to cutting spending and raising taxes, this must include fiscal measures to improve competitiveness. And finally, fiscal consolidation, debt restructuring and the enhancement of competitiveness have to take place in simultaneous. Fiscal devaluation as a means of gaining competitiveness without bruising government accounts, clearly matches in such strategy advocated for the EMU countries.

European Commission (2006) address some problems concerned with the redistributional implications and the induced price increases of implementing a fiscal devaluation. Regarding to redistributional implications, the decrease in ESSC accompanied with an increase in VAT tends to increase taxation in the poor or middle-income households (which are the majority of the population) and reduce the taxation on higher incomes households and because they have a very low propensity to consume, they will not be affected by the increase in indirect taxes. Another problem is because fiscal devaluation tends to stimulate savings, but, in short-run, this may implicate a negative effect on GDP. Now, regarding to the induced price increases, one problem is the one-time increase in the price level, which may lead to a negative impact on consumption and GDP, on short-run, because consumers tend to save their income to worse days. This can be aggravated if consumers anticipate an increase in the VAT and delay the consuming of durable goods. Another problem is the danger that a wage spiral can occur if the trade unions demand an increase in wages as a result of the negative consumer sentiment, which can lead to an increase in inflation rate that can last for a few years. Finally, the increase in general price level lead to a decrease on the real value of the debt, which beneficiates the debtors. This will also reduce the value of the non-indexed bonds, held by pensioners and older workers, and as a result they present incentives to oppose any increase in VAT.

The Portuguese government has recently proposed (September 2012) a fiscal devaluation-type measure through reducing the employers' while increasing the employees' social security contributions. This strategy is a "particular" form of fiscal devaluation and by reducing the ESSC while increasing the WSSC the government

budget would remain the same. The proposal of the Portuguese government would involve an estimated increase in the rate of WSSC of 7 p.p. and a decrease in the rate of ESSC of 5.75 p.p., which would result in an increase 1.25 p.p. in total contribution to social security. This "particular" form of fiscal devaluation is a very interesting question, both from the academic and the empirical point of view, given its novelty relative to existing literature. Aguiar-Conraria *et al.* (2012) use a theoretical approach based on a small open economy with two periods of analysis and three alternative scenarios to assess what would change according to the proposal of the Portuguese government. The first period represents short-run, when the economy is not on equilibrium; and the second period represents the long-run, when the economy is in equilibrium. In the first scenario they assume that the gross wage is fixed - firms do not change the nominal wage paid to workers. Labor costs will decrease due to the decrease on the ESSC and firms tend to increase employment. The short-run effects are: a decrease in unemployment and net wages and an increase of government revenue due to the increase of workers and of ESSC. On second scenario they assume, instead, a fixed net wage. Since the increase in WSSC is larger than the decrease in ESSC, labor costs will increase and the firms will reduce employment. On the short-run the unemployment, gross wages and government revenue (but this do not mean an increase on government total revenue) will increase. The last scenario takes fixed labor costs. This reflects no change on employment; gross wage increases because of the reduction on ESSC; net wages decrease because of the increase of WSSC; and government revenue increases. Concluding, the results of such reform have ambiguous effects.

Table 1 makes a summary of the mechanisms that may amplify/reduce the effectiveness of a fiscal devaluation.

Table 1: Effectiveness of fiscal devaluation

Mechanism	*Magnifying/Reducing Effect*	*Authors*
Nominal wage rigidity	Larger effects	IMF (2011), Poterba (2013) and de Mooij and Keen (2013)
Exchange rate rigidity	Larger effects	IMF (2011), Poterba (2013) and de Mooij and Keen (2013)
Trade Openness /Open Economy	Smaller effects/ Larger effects	Langot *et al.* (2012) /Lipińska and von Thadden (2012)
Size of the country	Smaller effects	Lipińska and von Thadden (2012)
Number of countries implementing a fiscal devaluation	Smaller effects	IMF (2011)
Pre-announced VAT Increase and Higher VAT taxes	Smaller effects	de Mooij and Keen (2012, 2013)
Government Expenditure	Undefined	Pereira and Pereira (2011)
Complete Markets	Larger effects	Lipińska and von Thadden (2012)
Monetary Union and Complete Markets	Fully achieved	Lipińska and von Thadden (2012)

2.3. Empirical evidence on the effects of fiscal devaluations

In order to assess the impacts of fiscal devaluations, some empirical applications and model simulations are provided in the literature. In what follows we review the most recent empirical literature on this topic, which is applied to some Euro Area and other developed countries.

de Mooij and Keen (2012, 2013), using a GMM procedure for 30 OECD countries between 1965 and 2009, report that the results of a fiscal devaluation differ across European Union countries, belonging or not to the Euro Area: for example, for the Euro Area, a reduction of 2.6 p.p. on social security contributions and an increase of 2.7 p.p.

on VAT rate generate an immediate impact between 0.9 percent and 4 percent of GDP. For the non-Euro Area the impact is smaller and less significant. On the long-run the effects on net exports become insignificant after 10 years, for Euro Area countries.

Boscá *et al.* (2012), perform a simulation based on a small open economy general equilibrium model calibrated to Spain, considering a permanent decrease of 3.5 pp in the ESSC rate and, to satisfy the condition of ex-ante revenue neutrality, an increase of 2 pp on the effective tax on consumption. The results show an increase of employment in average by 1.3 percent in the first two years (this represents more than 200 000 jobs), the GDP increases by 0.74 percent, exports increase by 0.9 percent and imports decrease by 0.4 percent.

The Ministry of Economy, Finance and Industry of France, in 2007, finds that a 1.5 point increase in the VAT rate used to finance a general cut in social contributions raises employment by 30 000 in France (IMF, 2011). Langot *et al*. (2012), using a model of optimal fiscal devaluation with labor market frictions, evaluate the optimal tax scheme in quantitative terms to study the impacts of a reduction from 34 percent to 24 percent in the payroll tax in France. The optimal tax policy is reached when the payroll tax is 0.44 and a VAT rate of 0.14, when the open-search economy features a low unemployment benefit ratio. Where the firm's bargaining power differs from its contribution to the matching process the optimal tax rate is reached with a payroll tax rate of 0.14 and a VAT rate of 0.37. They also notice that fiscal devaluation can be also achieved by a reduction in the employee's tax rate and an increase on the indirect tax rate. In this perspective and keeping the welfare program the optimal tax reform will be when the employee's tax rate is of 0.06 and the VAT rate is 0.28.

As for Portugal, Franco (2011) argues that the country needs to improve competitiveness and savings in order to improve the current account. However, he also refers some problems in order to achieve this: Portugal has no autonomous monetary policy, no own currency to devaluate and is constrained by a very limited role for the fiscal policy. Thus, Franco (2011) tests for the case of a budget-neutral tax swap between ESSC and VAT, using two Structural Vector of Autoregression model. He concludes that a reduction by 16 p.p. in the ESSC rate leads to a reduction of 16 percent in unit labor costs, but would require an increase in the VAT rate approximately by 10 p.p. as to keep public finances balanced. A temporary increase in VAT by two or three

years generates sufficient revenues to finance the decrease in ESSC, reduces consumption and promotes competitiveness and employment.

Also Pereira and Pereira (2011), using a numerical dynamic general equilibrium model for the Portuguese economy, simulate a decrease in the rate of ESSC of 4 p.p. and an increase in VAT rate on private consumption by 2 p.p. The results are an increase in GDP growth of 0.27 p.p., and that employment will increase permanently by 0.38 percent, tax revenues will permanently increase by 0.44 p.p. while public deficit decreases by 0.59 p.p.

IMF (2011) presents alternative simulation results for Portugal relying on models form the Banco of Portugal (BoP), the European Commission (EC) and the European Central Bank (EBC). They simulate a shift from ESSC to VAT. According to the BoP, relying on a general equilibrium model, a shift from the rate of ESSC to VAT rate, equivalent to 1 percent of the GDP, improves, in the first year, total exports by 0.5 percent, and the trade balance by 0.6 percent. After three years, the effects on trade balance have disappeared. The EC uses the QUEST model and simulate a shift equivalent to 1 percent of GDP: in the short-run, the net exports rise by 0.11 percent of GDP; however, this effect disappears in the long run. In a five-year horizon, the reform boosts employment and GDP by almost 1 percent. The EBC uses the EAGLE model to predict an improvement in the trade balance of almost 0.2 percent of GDP for a tax shift of 1 percent of GDP. This effect will disappear in four-year time.

Aguiar-Conraria *et al.* (2012), using the GMM procedure to estimate a system of equations, assess the impacts of substituting a decrease in ESSC (from 23.5% to 18%) by an increase in WSSC (from 11% to 18%). They conclude that the changes in the ESSC in Portugal have no statistically significant impact on employment and employment tax both in short and long run. In the short-run, the increase on WSSC has a negative impact on employment, being this result statistically significant at 7.5%. In the long-run, the impact of changing WSSC is insignificant. They predict, considering a confidence interval of 95%, that the impact of the tax-swap reform ranges from an increase of 1000, and in the worst case, to a decrease of 68000 jobs. The impact on unemployment rate is statistically insignificant. The increase of WSSC has a negative impact on labor force. Finally, there is no impact in long term unemployment and, in the long-run, the increase in WSSC increases weight of long-term unemployment – an evidence for the hysteresis effect from fiscal devaluation.

In the next section we explore the evidence on the relation between current account balance and fiscal devaluation. In this regard, we first compare data for the EMU countries and the EU non-EMU countries. Second, we use an econometric model to assess the impact of alternative fiscal devaluation strategies on the current account, using data for the EMU countries from 1999 to 2010. Finally, relying on the estimation results we tentatively compare the effectiveness of fiscal devaluation as a demand-side instrument for Portugal as compared with the average of Euro Area countries.

3. Tax devaluation in the EMU – an empirical assessment

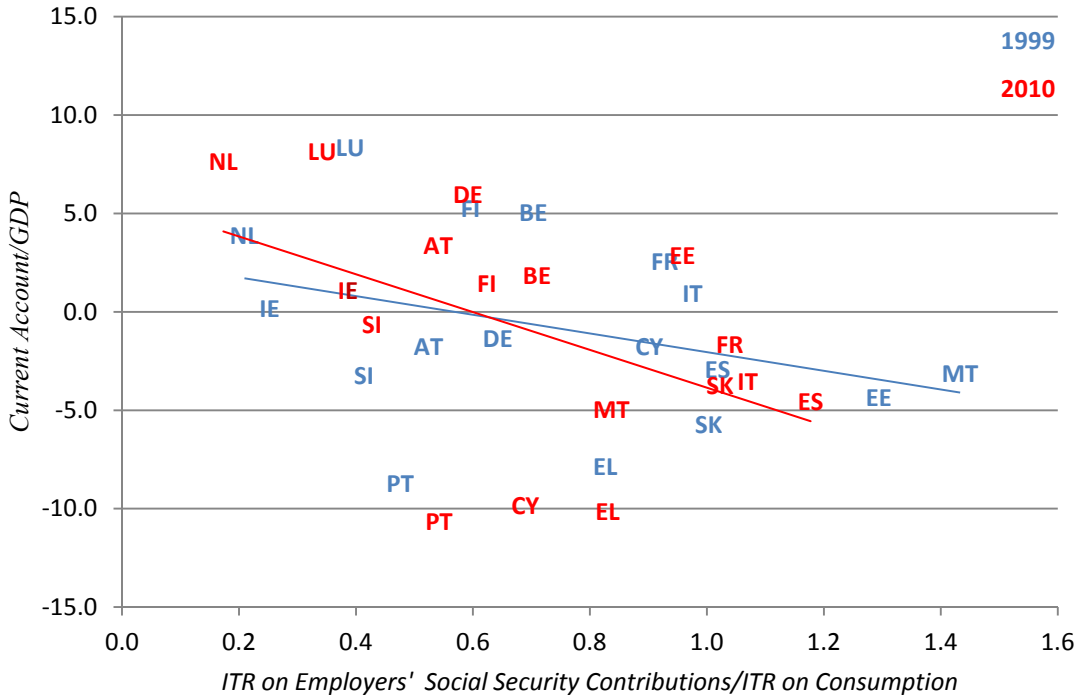
3.1. A new set of evidence

Figure 2 and Figure 3 report the relationship between Current Account/GDP and the ratio of implicit tax rate on Employers' Social Security Contributions over implicit tax rate on Consumption Taxes (ITR ESSC/ITRC)[7], respectively for the countries belonging to the EMU and for those belonging to the EU but non-members of the EMU. A negative relation gives preliminary insights on enhanced competition through the substitution of social security contributions for indirect taxes.

As we can see in Figure 2, in 1999, the higher the ratio between implicit tax rate on employers' social security contributions and consumer taxes, the smaller is the current account as percentage of GDP. By 2010, this relationship is even stronger. Before the inception of the EMU, in 1999, these countries were able to use the exchange rate as an instrument to improve competitiveness. In 2010, the tax advantages across countries are clear: since they are no longer able to depreciate the exchange rate in other to improve their competitiveness, fiscal devaluation became, on average, more correlated with the external balance. Clearly most of the countries kept ITR ESSC/ITRC at the 1999 levels: but while those above EMU-average have clearly seen their current accounts deteriorating (for instance, Greece and Belgium) the reverse occurred for those with rather stable ITR ESSC/ITRC below average (for instance, Austria, Slovenia, Netherlands and Germany). Moreover most of those in which ITR ESSC/ITRC increased have clearly seen their current account deteriorating (Portugal, Spain, Italy and France). However, even reducing ITR ESSC/ITRC, Cyprus and Malta have seen their current accounts deteriorating: they have recently joined the EMU and, apparently, the reduction in ITR ESSC/ITRC was not enough to improve competitiveness relative to their major trading partners (namely Germany); second, major partners are still out of the Euro Area (UK, Singapore or the US, especially for Malta).

[7] Eurostat defines the implicit tax rates on consumption (ITRC) as the ratio between all consumption taxes and the final consumption expenditure of private households on the economic territory. The implicit tax rate on ESSC (ITR ESSC) is the ratio between the employers' actual social security contributions on wages (ESSC) and the wages paid to the employees.

Figure 2: ESSC and external balance – Euro Area, 1999 and 2010 compared



Source: Eurostat, accessed in January 2013 at

http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

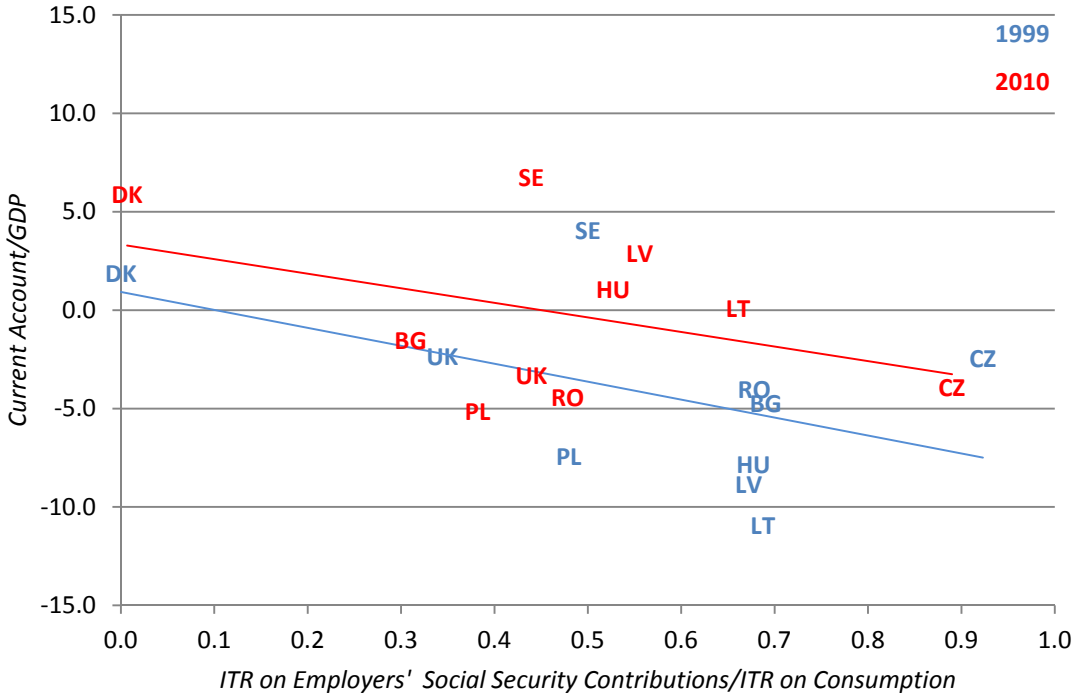
Notes: 1) AT – Austria, BE – Belgium, CY – Cyprus, DE – Germany, EE – Estonia, EL – Greece, ES – Spain, FI – Finland, FR – France, IE – Ireland, IT – Italy, LU – Luxembourg, MT – Malta, NL – Netherlands, PT – Portugal, SI – Slovenia, SK – Slovakia.

2) The data for Greece reported for 1999 refers, in fact, to 2000.

From Figure 3 it is clear that the relationship has suffered a shift while keeping the slope rather stable in-between 1999 and 2010. On average, for this group of countries, changes in ITR ESSC/ITRC have not became more important for competitiveness reinforcement as it happened with the EMU countries. Instead, apparently, the EU non-EMU countries have experienced a recover in competitiveness, namely relatively to the EMU countries against which a flexible nominal exchange rate prevails. Even for a group of countries under currency board (i.e., Bulgaria) or under other relative rigid regimes (Latvia, Lithuania or Romania) against the euro, fiscal devaluation was enforced during this period and competitiveness towards EMU countries was clearly enhanced. Actually, most of the countries in this group have

reduced ITR ESSC/ITRC, improving, alongside exchange rate developments, the external balance. Actually, most of the countries in this group have reduced ITR ESSC/ITRC, improving, alongside exchange rate developments, the external balance. We notice that the tendency to the improvement of the current account may result, mostly, from the fact these countries have their own currency and are able to improve their competitiveness through exchange rate adjustments.

Figure 3: ESSC and external balance – EU non-EMU, 1999 and 2010 compared



Source: Eurostat, accessed in January 2013 at
http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

Note: BG – Bulgaria, CZ – Czech Republic, DK – Denmark, HU – Hungary, LT – Latvia, LV – Lithuania, PL – Poland, RO – Romania, UK – United Kingdom.

3.2. Data and methodology

In this section, we estimate the impacts of fiscal devaluation on the current account, through using a panel data regression for a sample of Euro Area countries.

Our approach was inspired in several works drawn from the literature. Boscá *et al.* (2012) follow a cross-section analysis for the samples of the EU15 and the EU27 and

find that the ratio of social security contributions over consumption taxes has a statistically significant positive impact on the current account. de Mooij and Keen (2013), using a panel regression for a sample of 30 OECD countries in the period 1965 to 2009, also test for the short and long-run effects of fiscal devaluation on net exports. Franco (2011), instead, uses a two Structural Vector Autoregression model for Portugal to access the effects of fiscal devaluation on government revenue and in trade balance. Finally, the study of Aguiar-Conraria *et al.* (2012) use as dependent variable a set of employment-related variables as to capture the indirect effects of competition on output. Moreover, they explore theoretically the effects of the structure of the labor markets in shaping the effectiveness of fiscal devaluation.

Our empirical framework relies on the estimation of a panel growth regression using data for the Euro Area countries[8] from 1999 to 2010, following the standard panel-data specification in the literature:

$$Current\ Account_{\ it} = \boldsymbol{C}_{it} + \boldsymbol{\beta X}_{it} + \boldsymbol{u}_{it}, \qquad (3.1)$$
$$for\ i = 1, \dots, 17\ and\ t = 1999, \dots, 2010$$

The dependent variable is the current account in percentage of GDP; we use this variable because the final effect of fiscal devaluation is on competitiveness which impacts on the level of current account. By using the current account we can also infer, although not linearly, the effect on output and on unemployment, because if a reduction of ESSC rate leads to a decrease in unit labor costs and thereby a decrease on producers prices (including export-prices), it improves competitiveness (current account) and, therefore, output, while reducing unemployment, as we explained in section 2.

$\boldsymbol{C}$ is the matrix of constant terms (including potential cross-section and time effects); $\boldsymbol{\beta}$ is the matrix of parameters to be estimated; and $\boldsymbol{u}$ is the vector of error terms. $\boldsymbol{X}$ is the matrix of independent variables that are commonly used to explain the current account dynamics. In the first group of variables we include the control regressors:

[8] The Euro Area is composed by 17 countries: Belgium, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Luxembourg, Malta, Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland.

- ***Current Account*** in the previous period, as the dynamics of the current account usually exhibits inertia and thus, most of the studies include this variable as a regressor (*e.g.* Calderón *et al.*, 2002).

- ***Output Gap*** (in percentage of the potential GDP). The Output Gap is measured by the difference between the current and the natural real GDP. It captures the cycle effects on current account as, through the Okun relationship, a positive output gap relates with a negative unemployment gap (current unemployment rate below natural unemployment rate). In expansions, income is rising and imports follow; thus we expect a negative impact of expansionary phases on the current account. Among others, Calderón *et al.* (2002) include this variable as a determinant of the current account.

- ***Partner's growth***[9] is a constructed index capturing a weighted average growth rate of the main trading partners of each Euro Area country. The index is defined as:

$$Partners'\ growth_{\ i} = \sum_{j}^{N} w_j . real\ per\ capita\ GDP\ growth_j \qquad (3.2)$$
$$for\ i, j = 1, \dots, N.$$

Where N stands for the number of representative partners (those receiving more than 5% of total exports from the origin country) and w_j refers to the weight of each trading partner on total exports for the N representative partners). We include this index as a proxy of the growth rate of the main trading partners, as to capture pressures from external demand on the current account. When external income increases, the current account is expected to improve as a result of an increase in total exports to the representative partners.

- ***Exchange Rate*** as measured by the nominal exchange rate between the euro (EUR) and the United States Dollar (USD)[10] - set as the indirect quotation for the EUR (1EUR = Units of USD). This variable is one of the most important in capturing price competition, as used by Calderón *et al.* (2002). An appreciation of the Euro increases export prices for out-of-EMU countries while it reduces the value of imports for EMU countries expressed in Euro. This deteriorates the current account for the Euro Area countries.

[9] Index constructed and computed by Santos *et al.* (2013).
[10] We consider that most of the external transactions of the EMU countries with non-EMU countries are valued in USD or in EUR.

- ***Inflation Differential***, measured by the difference between the rate of change of Harmonized Index of Consumer Prices (HICP)[11] between a country - π - and the average rate of change of the HICP in main trading partners (external inflation rate). We computed the external inflation rate through a weighted average of inflation rates using the share of each main trading partner on total exports.

$$Inflation\ Differential = \pi - \sum_{j=1}^{N} \pi_j \times w_j \tag{3.3}$$

- ***Tax Wedge***, as used by Boscá *et al.* (2012) and is defined as:

$$Tax\ Wedge = \frac{(1+\tau^c)}{(1-\tau^l)} \tag{3.4}$$

where τ^c is the consumption tax rate and τ^l is the tax rate on labor income, including direct taxes on wage income and social contributions paid by employees and employers.

We collect data from Social Security Contributions (% GDP), Taxes on labor (in percentage of GDP) and Taxes on Consumption (% GDP) to calculate the variable. Tax labor income (τ^l) is the sum of Security Contributions and Taxes on labor (both in percentage of GDP).

This variable captures the gap between real consumption wage and the real product wage.[12] A decrease in tax wedge as a result, *e.g.*, of a reduction in tax income means that real consumption wage increases and, thus, for the same gross wages workers are willing to work more as they benefit for a positive increase in the wage rate. Home production, disposable income and consumption increase, pushing up imports and deteriorating current account.

The matrix $\boldsymbol{X}$ also crucially includes variables capturing fiscal devaluation, the central regressor for our analysis. Relying on the studies of Boscá *et al.* (2012) and of de Mooij and Keen (2013), we have selected four alternative ways to proxy fiscal

[11] *Eurostat* defines HIPC as an economic harmonized indicator that measures the change over time of the prices of consumer goods and services acquired by households.
[12] Real product wage refers to the ratio between the full cost of labor to firms (nominal gross wages) and the price firms set for their products (excluding indirect taxes). In turn, real consumption wage is the ratio between post-tax money wage paid to the employee and the consumer price index (Carlin and Soskice, 2006).

devaluation. To capture the "traditional" form of fiscal devaluation, the substitution of ESSC for VAT, we use the following variables:

- The ratio between ***Implicit Tax Rate (ITR) on ESSC (ITR ESSC)*** and ***ITR on Consumption (ITRC)***, as in Boscá *et al.* (2012). *ITR ESSC* is the ratio between the employers' actual social security contributions on wages (ESSC) and the wages paid to the employees:

$$\boldsymbol{ITR\ ESSC} = \frac{EASSC}{Wages} \tag{3.5}$$

We computed this measure using data on GDP (at market prices), taxes on labor (in percentage of GDP), the ITR on labor (total) and the employers' actual social security contributions (in percentage of GDP). We then re-defined the previous equation as:

$$\boldsymbol{ITR\ ESSC} = \frac{ESSC * ITR\ on\ labor}{Taxes\ on\ labor}$$

where

$$ITR\ on\ labor = \frac{Taxes\ on\ Labor}{Wages}$$

$$Taxes\ on\ labor = Taxes\ on\ labor\ (\%\ GDP) \times GDP$$

and

$$ESSC = ESSC\ (\%\ GDP) \times GDP$$

The ITR on Consumption is defined by *Eurostat* as the ratio between all consumption taxes and the final consumption expenditure of private households on the economic territory (European Commission, 2010). Thus, if *ITR ESSC/ITRC* impacts negatively and statistically significantly on the current account, we can conclude for the effectiveness of fiscal devaluation.

- The ratio between ***ESSC as percentage of GDP and the Taxes on Consumption as percentage of GDP (ESSC/TC)***: is a similar proxy as alternative for

the former and has the property of enabling the comparison with alternative forms of fiscal devaluation.

Indeed, and following de Mooij and Keen (2013) and Aguiar-Conraria *et al.* (2012), alternative financing sources to compensate for ESSC reduction have been put forward in the literature. For instance, the recent proposal of the Portuguese government (September 2012) was designed as a reduction in employers' contributions compensated with a rise in workers' contributions. Other alternatives include the substitution of ESSC for income taxes, namely corporate or personal taxes. In this context, we have also used as a proxy to fiscal devaluation instruments, the following variables:

- The ratio between ESSC (% GDP) and workers' contributions (% GDP), ***ESSC/WSSC***;
- The ratio between ESSC (% GDP) and corporate taxes (% GDP), ***ESSC/CIT***;

and

- The ratio between ESSC (% GDP) and personal income taxes (% GDP), ***ESSC/PIT***.

Moreover, and in order to explore structural features that may impact on the effectiveness of fiscal devaluation, as explored, above, in section 2, we also include additional variables to be used in a cross-product with the fiscal devaluation ones:

- ***Strictness of Employment Protection (SEP)***, as a proxy to upward nominal wage flexibility (labor market flexibility). Employment protection is usually used in models (see, e.g., Addisson and Teixeira, 2003) as a proxy for workers' bargaining power in wage negotiations. Thus, if an increase in consumption taxes occurs, the large the workers' bargaining power, the more they will try to recover through nominal wage increase to avoid large losses in the purchasing power. According to Poterba (2013), de Mooij and Keen (2013) and IMF (2011), the more flexible the wage is, the smaller will be the effects of a fiscal devaluation on the current account (see section 2). We expect that stricter employment protection (larger ***SEP***) reduces the effectiveness of a fiscal devaluation for validation of the theoretical mechanism.

- ***Trade Openness*** as measured by the sum of exports and imports (of all products and services) in percentage of GDP.

According to Langot *et al.* (2012), the more open the economy is, the smaller will be the effects of implementing a fiscal devaluation, leading to smaller positive impacts on the current account. However, conclusions are opposite in Lipińska and von Thadden (2012).

All the data used in the estimations was taken from *Eurostat* (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes) – folders Balance of Payments, Harmonized Indices of Consumer Prices, Government Finance Statistics, Exchange rates and National accounts – with the exception of:

- ***Output Gap***, taken from *IMF* at
http://www.imf.org/external/pubs/ft/weo/2012/02/weodata/index.aspx;
- ***SEP***, taken from *OECD* – folder Labor – at
http://stats.oecd.org/Index.aspx?DataSetCode=MON20123_2;
- ***Partner's Growth***, data collected from Santos *et al.* (2013).

Main descriptive statistics for the data are presented in Annex A and the correlation matrix is provided in Annex B.

3.3. Estimation Results

Since our cross-section units are not random drawings from a larger sample (our sample covers 17 out of the 27 members of the EU), the fixed effects model seems more adequate than the random effects model (Gujarati, 2004). We use the software *Eviews* in order to estimate the model; this software provides built-in tools for testing fixed effects against random effects, and also for testing the joint significance of fixed effects, cross-section or/and time series. We consider two types of specifications. In specification A, we use the lagged variables to capture the effects of the previous period on the current account. In specification B, we use the lagged current account and thus we had to avoid lagged variables and contemporary variables in the same estimation. Moreover, we allowed for the presence of the bilateral nominal exchange rate in specification A as a control variable, whether, in specification B, we did not include it, as explained below.

We estimate the "traditional" type of fiscal devaluation by including the **ITR ESSC/ITRC** on estimation I and, by using a similar proxy in order to enabling the

comparison with alternative forms of fiscal devaluation, the **ESSC/TC** on estimation II. We also estimate the other alternatives to mimic fiscal devaluation using as proxies the following variables: in estimation III we use **ESSC/WSSC**, in estimation IV we use **ESSC/CIT** and finally, in estimation V we use **ESSC/PIT.**

Table 2 shows the results of the "Hausman Test" for estimation I. The results strongly reject the null hypothesis that individual effects are uncorrelated with the other explanatory variables. Thus, the test points to the option for a fixed-effects model.

Table 2: Tests on cross-section random effects

Hausman Test	**Estimation I**	
	Specification A	*Specification B*
Chi-Sq. Statistic	24.23449	36.417462
Chi-Sq. d.f.	9	8
Prob.	0.0039	0.0000

The *Eviews* provides a test on the nature of the fixed effects (cross-section, period or both) by running the model under fixed-effects. Test results for estimation I are presented in Table 3.

The first set of statistics consists of two tests ("Cross-section F" and "Cross-section Chi-square") that evaluate the joint significance of the cross-section effects using sums-of-squares (F-test) and the likelihood function (Chi-square test). The corresponding restricted specification is one in which there are period effects only. The two statistic values (7.39 and 89.22 for specification (A) and 4.92 and 69.53 for specification (B)) and the associated *p-values* strongly reject the null that the cross-section effects are redundant.

Table 3: Tests on cross-section and period fixed effects

Redundant Fixed Effects Tests	Estimation I					
	Specification A			Specification B		
	Statistic	*d.f.*	*Prob.*	*Statistic*	*d.f.*	*Prob.*
Cross-section F	7.385031	(14,116)	0.0000	4.917174	(14,108)	0.0000
Cross-section Chi-square	89.216782	14	0.0000	69.529440	14	0.0000
Period F				2.191016	(10,108)	0.0235
Period Chi-square				26.044376	10	0.0037
Cross-Section/Period F				4.022441	(24,108)	0.0000
Cross-Section/Period Chi-square				90.046174	24	0.0000

Notes: For specification A, we do not have period-fixed effects because variable bilateral exchange rate (EUR/USD) varies in the same way in all periods for all countries; this delivers multicollinearity with the period dummies. For this reason, the specification A considers only cross-section fixed effects.

The next two tests evaluate the significance of the period dummies in the unrestricted model against a restricted specification in which there are cross-section effects only. For the specification (A) we have included as a regressor the bilateral nominal exchange rate EUR/USD and, thus, period dummies are not allowed. For specification (B), without the bilateral exchange rate, *F* and *Chi-square* statistics reject the null hypothesis of no period effects. The remaining results evaluate the joint significance of all of the effects. For both specifications, the test statistics reject the restricted model in which there is only a single intercept.[13]

For the remaining estimations, II, III, IV and V, the tests from Table 2 and Table 4 remain valid. [14]

[13] We have also tested for specification B with the bilateral nominal exchange rate as independent and no period-fixed effects. Estimation results were slightly worse than the reported here (Table 4, below) and thus we opt by the period fixed-effect model.

[14] See annexes C and D, respectively for the Hausman Test and for the Redundant Fixed Effects Tests for the remaining estimations.

Table 4 shows the results for estimation I using the *Eviews* software.

Table 4: Results from Estimation I

	Estimation I	
	(A)	*(B)*
Lagged Current Account		**0.732939***
		(9.582983)
ITR ESSC/ITRC	**-20.88611****	**-17.17261*****
	(-2.120523)	*(-1.906519)*
Lagged ITR ESSC/ITRC	**-8.404614**	
	(-1.481885)	
ITR ESSC/ITRC *SEP	**1.476967**	**5.203159****
	(0.589061)	*(2.384535)*
ITR ESSC/ITRC *Trade Openness		**-8.773726****
		(-1.999872)
Lagged ITR ESSC/ITRC *Trade Openness	**8.335660**	
	(1.554953)	
Lagged Partner's Growth		**0.487716*****
		(1.887287)
Output Gap	**-0.305844***	**-0.213685****
	(-2.881609)	*(-2.326689)*
Lagged Output Gap	**-0.271643****	
	(-2.239611)	
Tax Wedge	**7.457342*****	**8.094898****
	(1.670343)	*(2.189109)*
Lagged Inflation Differential	**-0.216183**	**-0.334435***
	(-1.171106)	*(-2.780821)*
Lagged Exchange Rate	**-3.565426***	
	(-3.183985)	
No. Observations	*140*	*141*
Adjusted R Squared	*0.870392*	*0.951424*
F-Statistic	*41.58556*	*66.10370*
Prob. (redundant cross-section fixed effects)	*0*	*0*
Prob. (redundant cross-section/period fixed effects)	*-*	*0*

Notes: (1) Significant at 1% (*), 5% (**) and 10% (***); *t-statistics* in parenthesis.

(2) Estimations made under white-diagonal standard error correction for valid statistic inference.

From the results we conclude that the estimated models provide a good fit, with a adjusted R-Square of 87% and 95.1% for specifications A and B, respectively, and a high overall significance of the independents variables (F-statistic of 42 for

specification A and 66 for specification B). By observing the outcomes in Table 4, we can also see that, with exception of the ***ITR ESSC/ITRC*SEP***, the (lagged) ***Trade Openness,*** the (lagged) ratio between ***ITR ESSC*** and ***ITRC*** and the (lagged) ***Inflation Differential*** – specification A -, all the variables are significant. Moreover, including the lagged current account – specification B – all the variables become statistically significant.

For specification B, we cannot use ***Exchange Rate*** as an independent variable, because the values that compose the variable are the same across the countries, yielding a linear dependent vector of that capturing the period-fixed effects. We assume that the effects of this variable are partially captured by the lagged current account.

In addition, the signs of all the coefficients associated with independent variables, for Estimation I, are in line with those expected from the literature. Focusing on the better specification, B, we now compare the results with those in the related literature. To analyze the impact of a fiscal devaluation in the current account we use the ratio between ***ITR ESSC*** and ***ITRC,*** we conclude that as the implicit tax rate on employers' social security decreases relative to that in consumption taxes, the current account improves, a result in line with Boscá *et al.* (2012). This confirms fiscal devaluation as an effective device to substitute for nominal exchange rate devaluation for the EMU countries.

In order to inspect whether different economic structure environments shape the effects of a fiscal devaluation on the current account, we use as regressors the cross products of ***Trade Openness*** and ***SEP*** with the ratio ***ITR ESSC/ITRC***. According to the literature, the effects of the degree of openness (***Trade Openness***) are mixed, as they are expected to amplify (e.g., Lipinska and von Thaden, 2012) or to moderate (e.g., Langot *et al.*, 2012) the effects of a fiscal devaluation. Our estimation tends to favor the first hypothesis. Regarding ***SEP***, our estimation shows that the sign is positive, as expected from the literature; this means that the more strict the employment protection is, the harder is to negotiate more flexible policies for the labor market, and the larger is the bargaining power for workers to update wages in accordance to the ITRC depletion. Thus wages may partially crowd-out the effects of a reduction in the employer's social contributions rate. More flexible labor markets are expected to improve the effectiveness of fiscal devaluation (see, among, others, Poterba, 2012, de Mooij and Keen, 2013 and IMF, 2011).

Regarding ***Tax Wedge***, the sign is positive as in Boscá *et al.* (2012). We can see that when the taxes on consumption and/or income taxes increase, the disposable income of the households decreases, leading to a fall on the demand for foreign goods and services.

Partner's Growth and ***Output Gap*** also have the expected sign according to the literature (see, Calderón *et al.,* 2002), influencing, respectively, positively and negatively the current account. ***Partner's Growth*** captures foreign demand pressures for domestic goods. Our results are in line with those in Santos *et al.* (2013) for a similar sample of countries, and according to the literature therein: the larger the real growth rate of the representative partner, the more the country exports for them, increasing the current account.[15]

Concerning with ***Inflation Differential*** the sign is also as expected (negative). This means that a high ***Inflation Differential*** is associated with low levels of current account due to small price competitiveness of the economy once countries share a single currency.

Table 5 resumes the results for estimation II and II (specification B)[16] from estimation model using the *Eviews* software.

Estimation II also captures the effects of the "traditional" type of fiscal devaluation, now measured by the ratio between ESSC (in percentage of GDP) and TC (in percentage of GDP). From the results, we conclude that the estimated model gives a good fit, with an adjusted R-Square of 93.18% and a high overall significance of the independents variables (F-statistic of 60.8). By observing Table 5 we can also see that, with exception of ***Trade Openness, Partner's Growth*** and ***Tax Wedge***, all variables are statistically significant.

We conclude that as employers' social security contributions decrease, relative to consumption taxes, the current account improves a result in line with Boscá et al. (2012). This confirms the same results of estimation I, in support of fiscal devaluation as a good substitute for nominal exchange rate devaluation in the EMU countries. For the remaining significant variables (***ESSC/TC*SEP,*** (lagged) ***Inflation Differential*** and

[15] Considering that *Marshall-Lerner condition* prevails.
[16] For specification A results, please see Annex E.

Output Gap) we also have the expected sign in line with the literature and with the previous results in estimation I.

Table 5: Estimation Results from Estimations II and III

	Specification B	
	II	*III*
Current Account (-1)	**0.672801***	**0.682687***
	(8.849706)	*(9.311170)*
ESSC/TC	**-22.77223****	
	(-2.480734)	
ESSC/TC * SEP	**7.133455***	
	(3.607535)	
ESSC/TC * Trade Openness	**-3.979461**	
	(-0.719141)	
ESSC/WSSC		**-5.369859****
		(-2.254701)
ESSC/WSSC * SEP		**1.286733***
		(2.990485)
ESSC/WSSC * Trade Openness		**1.002664**
		(1.322675)
Partner's Growth	**-0.031305**	
	(-0.089200)	
Partner's Growth (-1)		**0.487516**
		(1.396711)
Output Gap	**-0.177608*****	**-0.117134**
	(-1.909816)	*(-1.302622)*
Tax Wedge	**5.948333**	**2.599626**
	(1.180498)	*(0.920204)*
Inflation Differential (-1)	**-0.317822***	**-0.290407*****
	(-2.231057)	*(-1.784956)*
No. Observations	*141*	*141*
Adjusted R Squared	*0.931847*	*0.938170*
F-Statistic	*60.81881*	*67.38361*
Prob. (redundant cross-section random effects)	*0*	*0*
Prob. (redundant cross-section/period fixed effects)	*0*	*0*

Notes: (1) Significant at 1% (*), 5% (**) and 10% (***); *t-statistics* in parenthesis.

(2) Estimations made under white-diagonal standard error correction for valid statistic inference.

Estimation III assesses the type of fiscal devaluation underlying the Portuguese government proposal in 2012. By observing Table 5 we can see that the variables that

capture the impacts of fiscal devaluation, and with the exception of ***Trade Openness***, are statistically significant. For the remaining significant variables (***ESSC/WSSC*SEP*** and (lagged) ***Inflation Differential***) we also have the expected sign in line with the literature and with the previous results in estimation I.

We conclude that the fiscal devaluation that Portuguese government tried implements back in September of 2012 would have produced positive effects on the current account.

Table 6 summarizes the estimation results for regressions IV and V (specification B).[17]

In estimation IV fiscal devaluation is characterized by a substitution of ESSC for CIT. From the results we conclude that the estimation model provides a good overall adjustment (adjusted R-Square of 93.7%,). In this estimation, the coefficient of the ***ESSC/CIT*** has the expected sign and is highly significant (2.89%). As we see in section 2 (*e.g.*, Keen and Syed, 2006, Ivanova, 2012, and de Mooij and Keen, 2013), in short run, the increases in CIT may induce a net outflow of investment abroad, leading to increases in current account, due to an increase/decrease on capital exports/imports. In long run, however, the increase on capital exports leads to a higher national income (due to inward flows of capital income), with negative impacts on the trade balance. For the remaining variables (***ESSC/CIT*SEP,*** (lagged) ***Inflation Differential*** and ***Output Gap***) we also have the expected sign in line with the literature and with the results previously reported.

In estimation V we assess a final alternative for fiscal devaluation: the one that substitutes nominal exchange rate devaluation by a decrease in ESSC and an increase in PIT. From the results we conclude that the estimation model yields a good fit, with an adjusted R-Square of 93.3%, a high overall significance of the independent variables (F-statistic of 61.8) but with few statistical significant individual variables. In this estimation, the coefficient of ***ESSC/PIT*** has the expected sign; however it is not statistically significant (significance level of 14.09%). We achieved the same results as de Mooij and Keen (2013) as they also conclude that an increase on PIT to substitute for a cut in ESSC is not statistically significant in improving the current account in the short

[17] For specification A results, please see Annex F.

run. As previously, the variables ***ESSC/PIT*SEP***, (lagged) ***Inflation Differential*** and ***Output Gap*** are significant and with the expected sign.

Table 6: Estimation Results from Estimations IV and V

	Specification B	
	IV	*V*
Current Account (-1)	**0.676111***	**0.693065***
	(9.173439)	*(9.236056)*
ESSC/CIT	**-2.217653****	
	(-2.215109)	
ESSC/CIT * SEP	**0.753685****	
	(2.356323)	
ESSC/CIT * Trade Openness	**-0.464107**	
	(-0.704799)	
ESSC/PIT		**-6.032288**
		(-1.483489)
ESSC/PIT * SEP		**3.212692****
		(2.582749)
ESSC/PIT * Trade Openness		**-0.791401**
		(-0.334529)
Partner's Growth	**0.087883**	
	(0.293565)	
Partner's Growth (-1)		**0.325116**
		(1.095575)
Output Gap	**-0.185601****	**-0.167905*****
	(-2.111486)	*(-1.813290)*
Tax Wedge		**-0.442099**
		(-0.143545)
Tax Wedge (-1)	**3.417703**	
	(1.169040)	
Inflation Differential (-1)	**-0.283973****	**-0.421871***
	(-2.186428)	*(-3.090399)*
No. Observations	*141*	*141*
Adjusted R Squared	*0.936637*	*0.932856*
F-Statistic	*65.67179*	*61.78356*
Prob. (redundant cross-section random effects)	*0*	*0*
Prob. (redundant cross-section/period fixed effects)	*0*	*0*

Notes: (1) Significant at 1% (*), 5% (**) and 10% (***); *t-statistics* in parenthesis.

(2) Estimations made under white-diagonal standard error correction for valid statistic inference.

In line with the literature, fiscal devaluation appears to be efficient in affecting the current account in the short run. Moreover, the effects of a more flexible upward wage adjustment (as measured by a higher employment protection index) in reducing the effects of the fiscal devaluation are robust across all, but one, the estimations under specification B and specification A (see Annex E and F). In contrast, trade openness evidence is rather mixed: in most of the estimations, the coefficient on ***ESSC/Other taxes*Trade Openness*** is not statistically significant, but some yield a statistically significant amplifying effect (*e.g.*, estimation IB or VA), while others deliver the opposite result (*e.g.*, estimation IIA). This diverse evidence is in line with the literature (*cfr.* Table 1, above).

The main motivation for estimating equations II to V is to allow a comparative analysis of the coefficients on the alternative fiscal devaluation variables, concluding on the best form of implementing a fiscal devaluation. Indeed, for the same change in the ratios involving ESSC and other taxes, the "traditional" form of fiscal devaluation yields better results (larger statistically significant coefficient).

However, a more refined analysis brings us a less clear-cut interpretation. Suppose that there is a reduction in ESSC by 1% of GDP and that, simultaneously, there is a rise in the same proportion (1% of GDP) in any other taxes; this way we fully mimic a tax devaluation that preserves, as required, the value of government revenues on the GDP. To analyze the effects of such substitution, the impacts on the ratios ESSC/Other taxes are different for different tax structures.

Table 7 depicts the average, maximum and minimum ratios ESSC/Other taxes for our sample.

Table 8 presents the change in the ratios when an ESSC-cut of 1% GDP is fully financed by an increase of 1% GDP in Other taxes. Finally, Table 9 shows the estimated impacts from the alternative devaluation strategies on the current account.[18]

[18] For this analysis we have excluded Estonia from our sample as it exhibits very low WSSC values (as percentage of GDP) that strongly bias our results.

Table 7: Ratio ESSC/Other taxes

	Average	*MAX*		*MIN*	
ESSC/TC	0.553	1.192	Spain 2009	0.185	Malta 2007
ESSC/WSSC	1.620	4.684	Spain 2007	0.563	Netherlands 2009
ESSC/CIT	1.891	8.769	France 2009	0.382	Malta 2007
ESSC/PIT	0.841	3	Slovakia 2010	0.277	Ireland 1999

Note: Average, maximum (MAX) and minimum (MIN) values of the sample.

Table 8: Changes in the ratio ESSC/Other taxes considering a simultaneous reduction of ESSC and an increase in other taxes by 1% of GDP

	Average	*MAX*		*MIN*		*Coefficients*
ESSC/TC	-0.128	-0.264	Spain 2009	-0.079	Malta 2007	-22.772*
ESSC/WSSC	-0.527	-1.960	Spain 2007	-0.174	Netherlands 2009	-5.3699*
ESSC/CIT	-0.656	-4.247	France 2009	-0.177	Malta 2007	-2.218*
ESSC/PIT	-0.213	-1.212	Slovakia 2010	-0.127	Ireland 1999	-6.032

Notes: 1) Average, maximum (Max) and minimum (MIN) values of the sample; coefficients refer to the corresponding coefficients of *ESSC/Other taxes* of specification B (see Tables 5 and 6).

2) The coefficient on ESSC/PIT is not, though, statistically significant in specification B.

Table 9: Changes (percentage points) in CA considering a simultaneous reduction of ESSC and an increase in Other taxes by 1% of GDP

	Average	*MAX*		*MIN*	
ESSC/TC	2.796	6.013	Spain 2009	1.800	Malta 2007
ESSC/WSSC	2.830	10.525	Spain 2007	0.932	Netherlands 2009
ESSC/CIT	1.456	9.419	France 2009	0.393	Malta 2007
ESSC/PIT	1.284	7.312	Slovakia 2010	0.740	Ireland 1999

Notes: 1) The values were computed by multiplying each of the first 3 columns by the coefficient column in Table 8.

2) Darker shadows represent the best outcomes for average values.

From Table 9, we can see that, on average, ESSC/WSSC delivers slightly better effects on the current account than the traditional ESSC/TC. However, in countries where ESSC represent a smaller (larger) fraction of Other taxes, the smaller (larger) are the impacts on the current account. We have performed the exercise in Table 9 considering per country averages of ESSC, WSSC, CIT and PIT, 1999-2010. Results are shown in Table 10.

Table 10: Fiscal devaluation strategies across countries – an assessment

	ESSC/TC	***ESSC/WSSC***	***ESSC/CIT***	***ESSC/PIT***
Belgium	3.3629*	2.9413	1.9964	0.7245
Germany	3.2988*	1.4962	2.6573	1.1253
Ireland	2.3850	5.1699*	0.9231	0.8699
Greece	2.5364*	2.2422	1.4908	2.2203
Spain	4.2790	10.2621*	1.9517	1.7042
France	3.7092	3.9657*	3.5132	1.6243
Italy	3.7693	7.7588*	2.5585	0.8887
Cyprus	2.2468	6.1631*	0.6190	2.5123
Luxembourg	2.8627*	1.8581	0.5361	1.2119
Malta	1.9606	2.8389*	0.6061	1.2696
Netherlands	2.4267*	1.1713	1.1447	1.2635
Austria	2.7333*	1.6335	2.6120	0.9154
Portugal	2.4223	3.0769*	1.3300	1.8015
Slovenia	2.1710	1.0856	2.7560*	1.7866
Slovakia	3.1153	4.9502	2.2483	5.4690*
Finland	2.6433	7.6316*	1.6382	0.6945
EMU average	2.7963	2.8298*	1.4557	1.2839

Notes: 1) (*) represent the best outcomes for average values.

2) EMU average excludes Estonia.

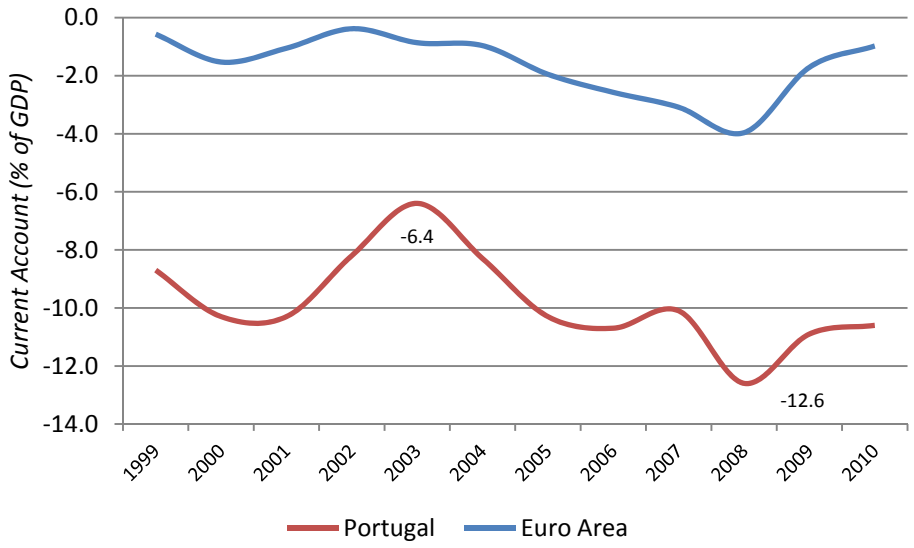
As a tentative example, Table 10 shows that the impact on the CA is larger either through ESSC/WSSC or ESSC/TC; results are thus conditional on the particular tax structure of each country.

3.4. Fiscal devaluation and current account in Portugal – a tentative note

Relying on results from the previous section, we propose now to make a brief note by making a descriptive analysis for Portugal. Comparing with the average for the Euro Area countries, we will study the recent trends on the current account, relating it with the trend observed for a proxy measure of fiscal devaluation (ITRC ESSC/ITRC), given some structural differences regarding employment protection and the degree of trade openness.

Back in 1990-1993, Portugal presented the current account near to balance (Kang and Shambaugh, 2013). In turn, the last decade was characterized by high deficits of the current account in Portugal, as we can see in Figure 4.

Figure 4: The evolution of Current Account 1999 to 2010 - Portugal *versus* Euro Area



Source: *Eurostat*, accessed in January 2013 at
http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

Notes: 1) The data for current account is in percentage of GDP.
2) The data for Euro Area is a simple average of Euro Area country members.

The current account of Portugal moves similarly as to that of average Euro Area. However, from Figure 4, we conclude that the current account deficit compares to an

almost balanced position for the Euro Area, and its dynamics is much more volatile. Since 2003 onwards, the current account deteriorated constantly, having reached the lowest value in 2008 (-12.6% GDP) and the highest value in 2003 (-6.4% GDP).[19] However, from 2008 onwards, the current account shows a recovery. The main reasons appointed by Kang and Shambaugh (2013) are the increase in exports, investment and the decrease on domestic consumption.

Apparently, given the poor competitiveness performance of Portugal relative to Euro Area average, there is a case for implementing fiscal devaluation. Moreover, on the basis of the results obtained in the previous sub-section, we concluded that a reduction in ESSC relative to other form of taxes (namely consumption, corporate or personal income taxes) is expected to improve a country's current account (see Table 4 to Table 6).

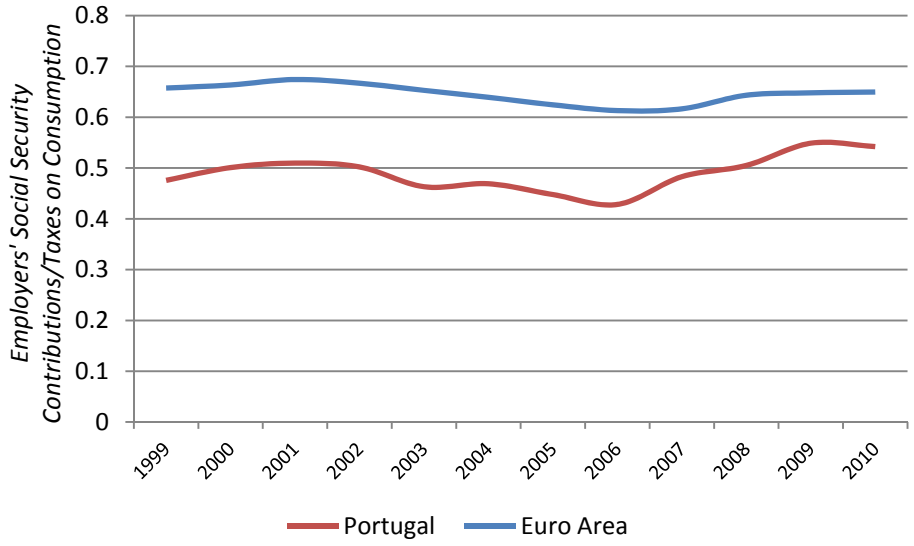
Figure 5 and Figure 6 show the ITR ESSC/ITRC ratio and the ITR ESSC for Portugal and Euro Area compared.

Our estimation results show that when the ratio between ITR ESSC and ITRC decreases (for instance an increase in ITR ESSC and a decrease in ITRC), current account increases in the same period and/or in the next periods (see Table 4).

From Figure 5, we see that ratio between ITR ESSC and ITRC is higher for the average of Euro Area countries than in Portugal. In fact that is, at least partially due to a lower ITR ESSC value (see Figure 6). Still, with a lower ESSC, Portuguese competitiveness falls behind Europe's. Moreover, we observe a fall in ITR ESSC in 2003 and back to close the initial values from 2007 onwards. This may have contributed slight to the improvement in the deficit in 2003 (albeit most of is explained by the recession period) and the worsening of the deficit in 2008; but, in spite of a slightly better performance, it apparently did not alter permanently the behavior of the current account in-between.

[19] The World Economic Outlook Database from the IMF shows that in 1981 Portugal had the highest value for current account deficit, -14.65%. Source: http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx (accessed in September 2013).

Figure 5: ITR ESSC/ITRC, 1999 - 2010, Portugal versus Euro Area

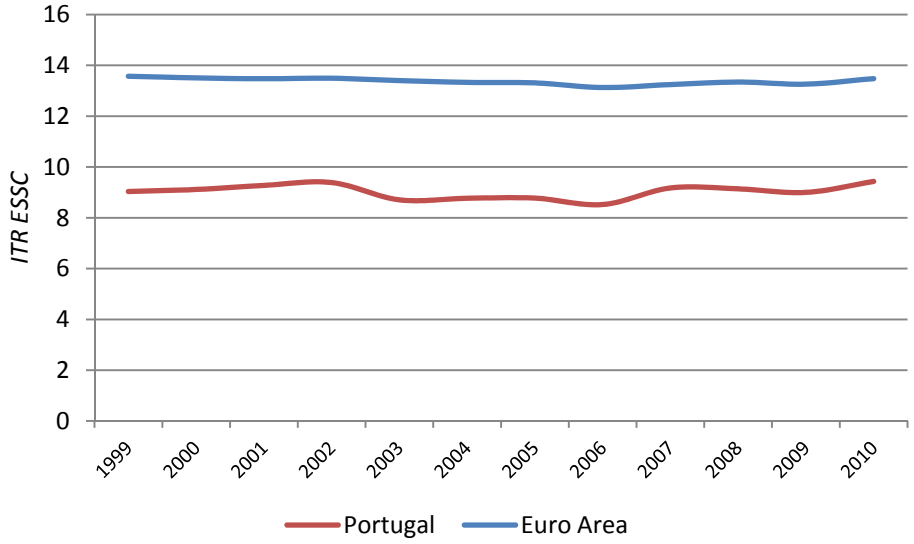


Source: *Eurostat*, accessed in January 2013 at

http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

Notes: The data for Euro Area is a simple average of Euro Area country members.

Figure 6: ITR ESSC, 1999 - 2010, Portugal versus Euro Area



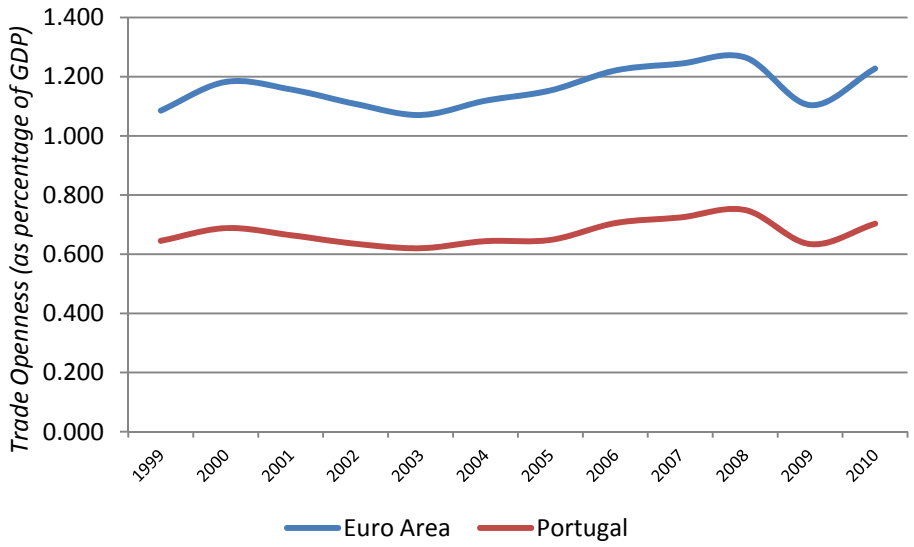
Source: *Eurostat*, accessed in January 2013 at

http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

Notes: The data for Euro Area is a simple average of Euro Area country members.

To complement our analysis Figure 7 and Figure 8 show, respectively the evolution of trade openness degree and the indicator on strictness employment protection for Portugal and the Euro Area.

Figure 7: The evolution of trade openness through 1999 to 2010 - Portugal *versus* Euro Area

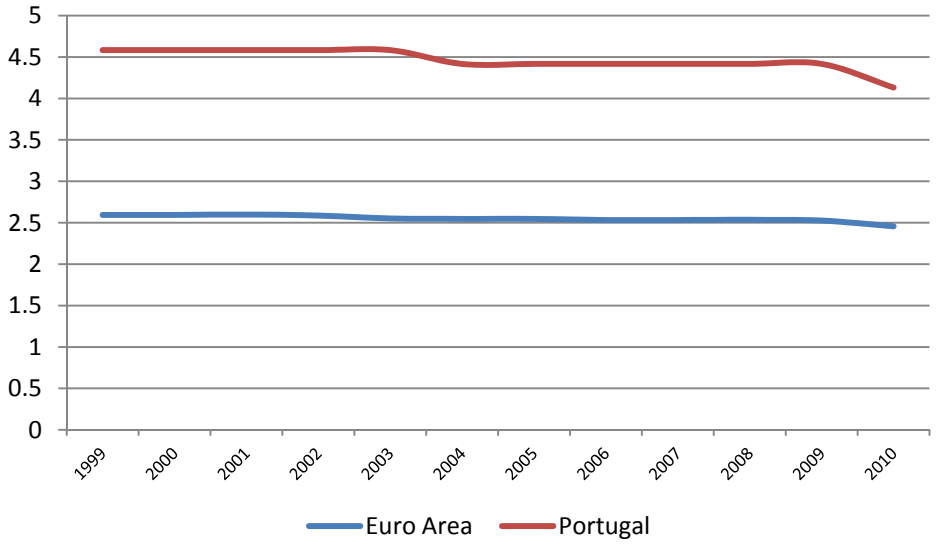


Source: *Eurostat*, accessed in January 2013 at
http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

Notes: The data for Euro Area is a simple average of Euro Area country members.

We see that Portugal is a more closed economy than Euro Area countries are, on average. Recently, both Portugal and the Euro area became more open, with a stronger evolution for the Euro Area. As we have already mentioned, literature is ambiguous on the effects of openness for the efficiency of fiscal devaluation. Our results also show that openness appears to be non-significant or that, at most, it has a mixed influence.

Figure 8: The SEP evolution through 1999 to 2010 – Portugal *versus* Euro Area



Source: *OECD*, accessed in July 2013 at

http://stats.oecd.org/Index.aspx?DataSetCode=MON20123_2

Notes: The data for Eurozone is a simple average of Euro Area country members.

Figure 8 shows, as expected, small volatility in the SEP indicator. This, as many other institutional dimensions, is rather stable for small time horizons. Moreover, employment protection is substantially stricter for Portugal but, from 2008 onwards, there is a clear downward trend. However, it is clear. Thus we can conclude, both from literature and from our, rather robust, previous results, that a fiscal devaluation would be apparently a less effective instrument in affecting the current account for Portugal than for its main trading partners. Employment protection is substantially stricter for Portugal but, from 2008 onwards, there is a clear downward trend.

We conclude that, for Portugal, albeit results in Table 10, above, show that a devaluation through ESSC/WSSC would be more efficient for Portugal than for the Euro Area countries, on average, this would come substantially reduced if we consider the effects of high SEP levels when compared to those for the Euro Area. Thus, we conjecture that fiscal devaluation is expected to have a very short-run and smaller impact on the current account for Portugal, when compared with Euro Area average, because of the important crowding-out effect from the wage mechanism.

4. Conclusions

The purpose of this work was to test the effectiveness of fiscal devaluation in the Euro Area countries as a substitute of nominal exchange rate devaluation. There are several theoretical arguments on that fiscal devaluation can be a good substitute of nominal exchange rate devaluation. Recently, this subject re-gained academic and policy interest given the recent crisis that has hit the Euro Area member countries.

Relying on both empirical and theoretical pieces of the relevant literature, most of the authors conclude that fiscal devaluation can actually improve external competitiveness and that the results are similar to the ones of a nominal devaluation, while keeping a balanced-budget path. We have also found that there are some mechanisms that affect the efficiency of fiscal devaluation. While larger nominal wage and exchange rate rigidity and complete markets produce magnifying effects, the larger the number of countries implementing fiscal devaluation and the previous announcement of an increase in a compensating tax rate reduce the impacts of a fiscal devaluation.

Using a panel data regression for the Euro Area countries, and covering for the period 1999-2010, we made an attempt to study the effects of a fiscal devaluation on the current account. We have also tested for alternative forms of fiscal devaluation and for two mechanisms potentially determining the effectiveness of such policy. We conclude for the effectiveness of a fiscal devaluation through a tax-shift between employer's social security contributions and consumption taxes, workers' social security contributions or corporate taxes. In contrast, a tax-shift between employers' social security contributions and personal taxes is statistically insignificant. We also concluded that a cut in the employer's social security contributions of 1% of GDP financed by an increase by 1% of GDP on consumption taxes or on workers' social security contributions deliver the best outcomes for most of the countries: while the first is prescribed for Belgium, Germany, Netherlands, Austria, Luxembourg and Greece, the latter prevails for the remainder of EMU members, except for Slovenia and Slovakia.

Moreover, we have also found robust evidence that labor market functioning (captured by an index on strict employment protection) is an important mechanism on the transmission of fiscal devaluation. In particular, a more strict employment protection, delivering a larger wage bargaining power to the workers, produces smaller effects of a fiscal devaluation on the current account. In turn, we did not find clear evidence on the effects of trade openness on the effectiveness of fiscal devaluation. Drawing on these results, we conclude that the type of fiscal devaluation that delivers larger effects on the Portuguese current account is the substitution of employers' contributions by workers' contributions; however, given the high employment protection compared with the average of the Euro Area, we conjecture that fiscal devaluation is expected to have a very short-run and smaller impact on the current account for Portugal, when compared with its main trading partners, because of the important crowding-out effect from the wage mechanism.

Among several problems, we came across with a rather sparse empirical and theoretical literature on the subject, most of which is too recent as it rose in the context of the actual Euro Area crisis. Another limitation is that we were unable to find an indicator to properly address the degree of financial integration. Moreover, due to cross-data restrictions we were unable to implement a more adequate, but also more complex and time-consuming, estimation method that preserves consistent estimators when lagged dependent variables are used – the dynamic GMM. Finally, an alternative approach could be to compute different tax multipliers using a VAR approach as to individually assess the impacts of tax changes on output, instead of the current account

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Annexes

Annex A - General descriptive statistics

	Average across countries	*Std. Dev. across countries*	*Min.*	*Max.*	*Obs.*
Corporate Income Tax	3.288725	1.411082	0.7	8	204
Current Account	-1.63628	6.160925	-15.9	13.2	204
Differential Inflation	0.440686	1.897175	-7.6	8.7	204
ESSC	6.686765	2.496731	2.6	12.5	204
Exchange Rate	1.188933	0.187132	0.8956	1.4708	204
Exports	33.32051	58.88522	19.3	181.8	203
Imports	27.52846	57.28177	22.4	151.8	203
ITR ESSC	13.37801	4.898407	5.225	24.53261	203
ITR Labor	7.036144	34.01232	20.2	44.1	203
ITRC	20.7335	3.736422	11.1	29.3	203
Output Gap	0.345611	2.725367	-9.797	10.868	203
Partner's growth	1.415518	2.267688	-8.86213	5.68116	204
Personal Income Tax	7.566176	2.894463	2.3	14.5	204
SEP	2.547956	0.703337	1.269841	4.583333	153
Tax on Consumption	11.68578	1.388923	7.3	15.2	204
Tax Wedge	-0.59051	0.194233	-1.08725	-0.34298	204
Taxes on Labor	4.925652	17.38529	9.6	24.8	204
Trade Openness	1.16167	0.604747	0.467	3.336	203
WSSC	3.753431	1.984432	0	8	204

Annex B: Correlation Matrix between the variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	*CA*	1.00																					
2	*CA(-1)*	0.93	1.00																				
3	*ITR ESSC/ITRC*	-0.36	-0.35	1.00																			
4	*ITR ESSC/ITRC *SEP*	-0.51	-0.51	0.88	1.00																		
5	*ITR ESSC/ITRC *Trade Openness*	-0.07	-0.10	0.37	0.13	1.00																	
6	*ESSC/TC*	0.06	0.04	0.83	0.65	0.29	1.00																
7	*ESSC/TC*SEP*	-0.13	-0.16	0.78	0.85	0.05	0.85	1.00															
8	*ESSC/TC*Trade Openness*	0.26	0.22	0.15	-0.13	0.87	0.31	0.01	1.00														
9	*ESSC/WSSC*	-0.10	-0.24	0.28	0.25	0.30	0.32	0.31	0.30	1.00													
10	*ESSC/WSSC*SEP*	-0.13	-0.27	0.27	0.28	0.26	0.30	0.34	0.25	0.99	1.00												
11	*ESSC/WSSC *Trade Openness*	-0.07	-0.21	0.16	0.12	0.37	0.20	0.17	0.38	0.98	0.97	1.00											
12	*ESSC/PIT*	-0.39	-0.43	0.62	0.54	0.70	0.37	0.35	0.36	0.26	0.25	0.26	1.00										
13	*ESSC/PIT*SEP*	-0.53	-0.58	0.54	0.65	0.50	0.25	0.43	0.15	0.24	0.27	0.23	0.92	1.00									
14	*ESSC/PIT*Trade Openness*	-0.17	-0.21	0.26	0.12	0.89	0.08	-0.03	0.64	0.22	0.19	0.30	0.85	0.71	1.00								
15	*ESSC/CIT*	0.08	0.00	0.57	0.45	0.24	0.74	0.66	0.26	0.48	0.45	0.41	0.40	0.31	0.17	1.00							
16	*ESSC/CIT*SEP*	-0.04	-0.14	0.54	0.59	0.08	0.66	0.77	0.06	0.48	0.49	0.40	0.38	0.43	0.08	0.93	1.00						
17	*ESSC/CIT*Trade Openness*	0.17	0.06	0.20	0.00	0.71	0.34	0.13	0.75	0.57	0.51	0.63	0.47	0.30	0.60	0.66	0.50	1.00					
18	*Partners' Growth*	0.00	0.14	-0.03	-0.05	0.02	-0.09	-0.12	-0.05	-0.12	-0.14	-0.10	0.00	-0.03	0.02	-0.24	-0.28	-0.16	1.00				
19	*Inflation Differential*	-0.24	-0.33	0.23	0.21	0.46	0.08	0.07	0.32	0.57	0.54	0.59	0.50	0.47	0.49	0.30	0.28	0.56	-0.06	1.00			
20	*Tax Wedge*	0.61	0.58	0.28	0.13	0.01	0.67	0.52	0.28	0.04	0.03	-0.02	-0.17	-0.27	-0.24	0.50	0.42	0.23	-0.11	-0.27	1.00		
21	*Output Gap*	-0.33	-0.22	-0.06	0.00	-0.11	-0.22	-0.17	-0.18	-0.07	-0.04	-0.05	-0.15	-0.11	-0.14	-0.41	-0.36	-0.35	0.38	-0.10	-0.18	1.00	
22	*Exchange Rate*	-0.06	-0.08	-0.02	-0.04	0.10	0.02	0.00	0.15	0.12	0.12	0.14	0.03	0.00	0.09	0.11	0.09	0.18	-0.36	-0.07	0.03	0.02	1.00

Annex C: Tests on cross-section random effects

Table C1: Tests on cross-section random effects - Estimation II

Hausman Test	Estimation II	
	Specification A	*Specification B*
Chi-Sq. Statistic	40.884617	56.046262
Chi-Sq. d.f.	9	8
Prob.	0.0000	0.0000

Table C2: Tests on cross-section random effects - Estimation III

Hausman Test	Estimation III	
	Specification A	*Specification B*
Chi-Sq. Statistic	26.935631	49.855469
Chi-Sq. d.f.	9	8
Prob.	0.0014	0.0000

Table C3: Tests on cross-section random effects - Estimation IV

Hausman Test	Estimation IV	
	Specification A	*Specification B*
Chi-Sq. Statistic	15.290101	40.961152
Chi-Sq. d.f.	9	8
Prob.	0.0833	0.0000

Table C4: Tests on cross-section random effects - Estimation V

Hausman Test	Estimation V	
	Specification A	*Specification B*
Chi-Sq. Statistic	14.856419	34.044787
Chi-Sq. d.f.	9	8
Prob.	0.0950	0.0000

Annex D: Tests on cross-section and period fixed effects

Table D1: Tests on cross-section and period fixed effects - Estimation II

Redundant Fixed Effects Tests	Estimation II					
	A			B		
	Statistic	*d.f.*	*Prob.*	*Statistic*	*d.f.*	*Prob.*
Cross-section F	10.784587	(14,114)	0.0000	4.960884	(14,108)	0.0000
Cross-section Chi-square	116.399113	14	0.0000	70.016513	14	0.0000
Period F				1.737497	(10,108)	0.0814
Period Chi-square				21.034068	10	0.0209
Cross-Section/Period F				3.750275	(24,108)	0.0000
Cross-Section/Period Chi-square				85.469851	24	0.0000

Table D2: Tests on cross-section and period fixed effects - Estimation III

Redundant Fixed Effects Tests	Estimation III					
	A			B		
	Statistic	*d.f.*	*Prob.*	*Statistic*	*d.f.*	*Prob.*
Cross-section F	15.464019	(14,113)	0.0000	5.304855	(14,108)	0.0000
Cross-section Chi-square	146.614278	14	0.0000	73.791888	14	0.0000
Period F				2.933830	(10,108)	0.0027
Period Chi-square				33.884558	10	0.0002
Cross-Section/Period F				4.494520	(24,108)	0.0000
Cross-Section/Period Chi-square				97.647869	24	0.0000

Table D3: Tests on cross-section and period fixed effects - Estimation IV

Redundant Fixed Effects Tests	Estimation IV					
	A			B		
	Statistic	*d.f.*	*Prob.*	*Statistic*	*d.f.*	*Prob.*
Cross-section F	18.154448	(14,116)	0.0000	5.133761	(14,108)	0.0000
Cross-section Chi-square	162.449183	14	0.0000	71.926627	14	0.0000
Period F				2.174384	(10,108)	0.0246
Period Chi-square				25.863748	10	0.0039
Cross-Section/Period F				4.108905	(24,108)	0.0000
Cross-Section/Period Chi-square				91.469482	24	0.0000

Table D4: Tests on cross-section and period fixed effects - Estimation V

Redundant Fixed Effects Tests	Estimation V					
	A			B		
	Statistic	*d.f.*	*Prob.*	*Statistic*	*d.f.*	*Prob.*
Cross-section F	10.171628	(14,114)	0.0000	5.367051	(14,108)	0.0000
Cross-section Chi-square	111.856063	14	0.0000	74.463879	14	0.0000
Period F				2.166580	(10,108)	0.0252
Period Chi-square				25.778904	10	0.0040
Cross-Section/Period F				4.288188	(24,108)	0.0000
Cross-Section/Period Chi-square				94.375694	24	0.0000

Annex E: Estimation results for Estimation II and III

	Specification A	
	II	*III*
ESSC/TC	**-32.82424***	
	(-2.736314)	
ESSC/TC * SEP	**5.877539***	
	(2.641765)	
Lagged ESSC/TC * SEP	**-3.039342**	
	(-1.517982)	
ESSC/TC * Trade Openness	**10.29727*****	
	(1.938228)	
Lagged ESSC/WSSC		**-8.040059****
		(-2.232913)
Lagged ESSC/WSSC * SEP		**2.177158****
		(1.978539)
Lagged ESSC/WSSC * Trade Openness		**1.369858**
		(1.281093)
Lagged Tax Wedge	**7.498277****	**-1.997408**
	(2.099392)	*(-0.729678)*
Output Gap	**-0.430899***	**-0.196983****
	(-5.047474)	*(-1.974589)*
Lagged Output Gap		**-0.200894****
		(-1.974610)
Lagged Inflation Differential	**-0.307609****	**-0.278878*****
	(-1.948307)	*(-1.681472)*
Exchange Rate	**2.163168**	**1.100610**
	(1.023150)	*(0.466703)*
Lagged Exchange Rate	**-5.611831***	**-3.924119*****
	(-2.746365)	*(-1.805656)*
No. Observations	*138*	*137*
Adjusted R Squared	*0.880643*	*0.868805*
F-Statistic	*44.94871*	*40.15758*
Prob. (redundant cross-section random effects)	*0*	*0*

Notes: (1) Significant at 1% (*), 5% (**) and 10% (***); *t-statistics* in parenthesis.

(2) Estimations made under white-diagonal standard error correction for valid statistic inference.

Annex F: Estimation results for Estimation IV and V

	Specification A	
	IV	*V*
Lagged ESSC/CIT	**-1.109852***** *(-1.930615)*	
ESSC/CIT * SEP	**-0.414904*** *(-2.885272)*	
Lagged ESSC/CIT * Trade Openness	**0.999032** *(1.025994)*	
Lagged ESSC/PIT		**-11.69667***** *(-1.879355)*
ESSC/PIT * SEP		**0.729628** *(0.930511)*
Lagged ESSC/PIT * SEP		**1.634289** *(0.756014)*
ESSC/PIT * Trade Openness		**4.748770**** *(2.132267)*
Lagged Tax Wedge	**1.606993** *(0.473223)*	**-2.294971** *(-0.775955)*
Output Gap	**-0.369737*** *(-3.701646)*	**-0.323916*** *(-3.539156)*
Lagged Output Gap	**-0.204937**** *(-2.291283)*	
Inflation Differential	**-0.155201** *(-0.894784)*	
Lagged Inflation Differential		**-0.348160**** *(-2.354653)*
Exchange Rate	**-0.646656** *(-0.298004)*	**1.750974** *(0.776469)*
Lagged Exchange Rate	**-2.027260** *(-1.014891)*	**-5.400337*** *(-2.694206)*
No. Observations	*140*	*138*
Adjusted R Squared	*0.874372*	*0.871339*
F-Statistic	*43.06253*	*41.33974*
Prob. (redundant cross-section random effects)	*0*	*0*

Notes: (1) Significant at 1% (*), 5% (**) and 10% (***); *t-statistics* in parenthesis.

(2) Estimations made under white-diagonal standard error correction for valid statistic inference.