

The costs of rebalancing the Euro area

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Abstract: This paper investigates the economic costs of Euro area rebalancing. Based on an old Keynesian model we estimate a current account equation, a wage-Phillips curve and an Okun's Law equation. All estimations are carried out for a panel of eleven Euro area members (excluding Luxembourg). From the estimation results we calculate the output costs of reducing current account deficits. Greece, Ireland, Italy, Portugal and Spain (GIIPS) had, on average, current account deficits of 8.4% of GDP in 2007. To eliminate these current account deficits, it would necessitate a reduction of GDP by some 47%. These are staggering amounts and, indeed we think that such a reduction of GDP should not be imposed in the GIIPS group. Moreover, we doubt whether it would be politically feasible. In principle there are two ways that trade imbalances could be resolved: deflationary adjustment in the deficit countries or inflationary adjustment in the surplus countries. Presently, the burden of adjustment is exclusively on the deficit countries. Our results indicate that the economic costs of this adjustment to those countries are equivalent to the output loss of the Great Depression. An adjustment of the surplus countries would increase growth and it would come with higher inflation, but it would allow rebalancing without a Great Depression in parts of Europe.

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1. Introduction

The Euro area is suffering from substantial internal trade imbalances.¹ These are widely recognised as important contributing factors to the crisis of the Euro system. The present economic policy regime essentially aims at rebalancing the Euro area by means of internal devaluation and/or by fiscal contraction in the deficit countries; in short, there would be a deflationary adjustment.

The paper aims at estimating the costs of deflationary rebalancing. We calculate how much output loss is necessary in order to eliminate the current account deficit for the GIIPS countries (Greece, Ireland, Italy, Portugal and Spain). To identify these effects quantitatively the paper takes an old Keynesian approach. First, we estimate a current account equation as a function of domestic demand and of unit labour costs (ULC). Second, we estimate a traditional wage Phillips curve, where ULCs are explained by unemployment, import prices and lagged ULCs. Third, we estimate an Okun's Law relation, where changes in unemployment are explained by changes in growth. The model uses annual data for the panel of Euro area member states (excluding Luxembourg) for the Euro period (1999-2011).

Combining the effects of these equations allows us to identify direct as well as indirect effects of demand on the current account balance. The direct effect is that a decrease in demand will reduce imports and thereby improve the current account. The indirect effect is that the decrease in demand will lead to an increase in unemployment, which reduces wage inflation and thus price inflation. Our results indicate that the economic costs of this adjustment to the GIIPS countries, which are those that ran current account deficits before the outbreak of the crisis, are equivalent to the output loss of the Great Depression. An

¹ The Euro area overall has in the past decade had close to balanced current account, that is it rarely exceed +/- 1% pg GDP. However, individual Euro member states have had substantial deficits or surpluses. In this sense the Euro area has on aggregate had *internal* imbalances. Of course, member states have had substantial surpluses or deficits with the rest of the world.

adjustment of the surplus countries would increase growth and it would come with higher inflation, but it would allow rebalancing without a Great Depression in parts of Europe.

The paper is structured as follows. Section 2 discusses the imbalances and the economic policy regime of the Euro area. Section 3 outlines the old Keynesian model on which our estimations are based. Section 4, 5 and 6 present the literature review and our results on the current account equation, the Phillips curve and the Okun's law relation respectively. Section 7 calculates the total costs of rebalancing implied in these estimates. Finally, Section 8 concludes by indicating policy implications.

2. Imbalances, the EU economic policy regime and growth models²

Economic performance of the Euro area is characterized by a (cumulative) divergence of the development across countries, in particular between Germany (and some related countries) and the GIIPS countries. Table 1 documents the current account positions in 2007 and the growth of unit labour costs from 1999 to 2007. This section will discuss these divergences and the EU economic policy regime that allowed for these imbalances to emerge.

Table 1 about here

The economic policy mix in the Euro area has been outlined in the Maastricht Treaty and thereafter updated in the Stability and Growth Pact (SGP) and the Fiscal Compact. It consists of the following elements. First, fiscal policy is national³ and it is restricted in the short term as the budget deficit must not exceed 3% of GDP (except in severe recessions); member

² This sections builds on Stockhammer (2011a; 2012a).

³ The EU budget is restricted in size (to 2% of GDP) and too small (and too inflexible) to serve a macroeconomic function such as providing an expansionary stimulus in the face of (symmetric) adverse shocks.

states must aim at a balanced budget in the medium term. Second, monetary policy is centralized and is effectively inflation targeting. Third, financial markets are liberalized, internally as well externally. Thus the EU foregoes any instruments of controlling credit growth or allocating credit. Fourth, there is a no bailout clause, stating that neither other national governments nor the ECB will support individual countries which are facing problems in financing themselves.⁴ This is the only policy area where there has been substantial move since the crisis. Fifth, labour markets are supposed to be flexible. This is an essential part of the arrangement as the EU's policy regime essentially hinges on labour markets to respond flexibly, efficiently and quickly to symmetric as well as to asymmetric shocks because much of the traditional national means of dampening shocks such as exchange rate policy, (national) monetary policy or fiscal policy have been entirely given up or severely restricted.

The EU policy package is characterized by a strong believe in the efficiency and self-stabilising properties of the market system and a strong distrust against state activity. From the very beginning Keynesian economists criticized its design (Arestis et al, 2001; Arestis and Sawyer, 2004; Huffschiemied, 2005; Euromemo Group, 2010; Flassbeck and Spiecker, 2005; Hein and Truger, 2004, 2005; Bibow, 2007; Stockhammer and Onaran 2012). First, there is an excessive reliance on labour market flexibility in the adjustment to symmetric as well as to asymmetric shocks. Keynesians have long been sceptical of the beneficial effects of wage flexibility. In chapter 19 of the *General Theory* Keynes (1973) pointed out that labour markets are complex social institutions and wages have social norm aspects that make them unlikely to react flexibly in the face of unemployment. And even if they did, the effect of falling wages is not necessarily beneficial because they reduce consumption expenditures and may give rise to a debt-deflation spiral (see Stockhammer, 2011b as a modern

⁴ Buiter and Rahbari (2010) offer an interesting discussion on what the bail out clause precisely states.

reformulation). Relying on wage flexibility, the EU would be subject to prolonged unemployment. Second, the EU policy system would create a deflationary bias. In the case of divergences within the EU, with some countries running trade deficits and others running trade surpluses, the burden of adjustment effectively falls to the country with trade deficits. The adjustment of the surplus countries is inflationary (to stimulate their demand and imports and to increase their unit costs), whereas the adjustment of the deficit countries is deflationary as they have to dampen demand (to decrease imports) and lower their prices and wages (to restore competitiveness). As the ECB is committed to a low inflation target an inflationary adjustment is unlikely and would be counteracted by monetary policy. Third, the exclusive reliance on wages as the adjusting variable will create a downward pressure on them. With macroeconomic policy having a deflationary bias and most of the traditional economic policy instruments constrained the relatively open EU member states would be prone to pursue wage restraint as a means of competitive (real) devaluation. Fourth, there was no Plan B in case of a serious crisis. The effectiveness of monetary policy is limited in the case of severe crisis, but fiscal policy is limited by design in the EU. Moreover, the no bailout clause would hamper fiscal policy in times of severe crisis exactly at the time when countries would be unable to use either monetary or exchange rate policies. The EU policy package simply assumed that such a crisis would not occur. With hindsight all these criticisms have been vindicated.⁵

The economic performance of Euro member states was characterized by a divergence. Stockhammer (2011a) argues that two growth regimes have emerged: in the first group of

⁵ A theoretical attempt to present in a Marxian fashion all these points as necessary moments within a specific organization of capitalist power can be found in Milios and Sotiropoulos (2010). They argue that the strategy of the euro corresponds to a mechanism for continuously exerting pressure for reorganization of labour in the various member countries. In this sense, it is not just an income issue. Working people are being systematically attacked both at the 'centre' and at the 'periphery' of the Euro area in their conditions of production and reproduction. This can be approached as an ideal diagram for the organization of capitalist power; the practical application of which proved far from being perfect. The plan for the single currency very obviously generates strategic benefits for the collective capitalists of all the countries that participate in it.

countries growth has been driven by increasing debt; this usually came with asset and/or property price bubbles. Typically these countries had current account deficits and capital inflows. In a second group of countries, net exports have provided the main driving force for demand. The extreme case of this is Germany, where from 1999 to 2007 around three quarters of GDP growth had been driven by net exports (not counting indirect effects via induced-export investment). Roughly half of the net export surpluses are to Euro area members (Statistisches Bundesamt, 2012). Germany pursued this neo-mercantilist strategy particularly aggressively with average real wages stagnating in the decade prior to the crisis and the sharpest increase in wage inequality, i.e. the creation of a low wage sector (OECD, 2007). Stockhammer (2011a, 2012b) documents the differences between countries with predominantly export-led and credit-led growth models. Germany and Austria had substantial current account surpluses, whereas Greece, Ireland, Portugal and Spain have substantial deficits. Private household debt, on the other hand increased much faster in the Mediterranean countries than in the Euro core. From 2000 to 2008 household debt increased by 61.7, 21.3, and 32.5 % points in Ireland, Portugal and Spain respectively, but it shrank in Germany by 11.3 % points and it grew by 7.2% points in Austria.

The debt-led growth model was made possible to a significant extent through European financial integration. The EC's policy (namely the Financial Services Action Plan) aimed at creating a single financial market for Europe (Grahl 2011). In theory this means uniform interest rates across the Euro area and in practise it translated into massive capital flows from Germany, France and the UK to the fast growing Southern European countries. This initially fostered non-residential investment, but also turned into a property boom and/or boost of non-tradable sector which is supported by domestic demand.⁶

⁶ There is a certain economic logic to this. The real interest rates that businesses face are the nominal interest minus the inflation rate. But the inflation in producer prices (at which a firm can sell its output) depends on its sector. A Spanish automobile producer's prices are set by the world market (and not by Spanish inflation), whereas the real estate market has a regional dynamic (the real interest is negative if nominal interests are, say,

The two growth models, in Stockhammer's analysis mutually reinforce each other, at least during the formation of a bubble in debt-led economies. Simply put, fast growing Southern European economies ran current account deficits that allowed for German export surpluses. These surpluses were 'recycled' as private credit flows back to the Southern European countries, where they financed property bubbles and rising household debt.⁷ In fact the situation differed by country, but a massive increase in *private* household debt (in Southern European countries) is the hallmark of the growth (de Grauwe, 2010). With the exception of Greece and Italy, public debt was declining.

European Monetary and Economic Unification has not only resulted in disappointing overall performance, but it also led to increasing divergence within the Euro area member states. While there has been a convergence in inflation rates, in the sense that inflation rates came down in all countries, the countries that had low inflation prior to the Euro also had lower inflation rates afterwards. This has led to the increasing divergence of unit labour costs (see Table 1) and resulted in sizable current account imbalances across the Euro area. These imbalances are mostly due to economic imbalances *within* the Euro area. Roughly speaking two thirds of the external trade of Euro member states is within the Euro area (according to the OECD's STAN Bilateral Trade Data).

Current account deficits have to correspond to capital inflows. This means that the Mediterranean countries have experienced massive capital inflows for more than a decade. Indeed, the European Commission has encouraged the integration of capital markets within the Euro area and thereby also encouraged capital flows. Consequently external financial

3% and house prices rise by 10%). The same nominal interest meant quite different real interest rates for different sectors; given a regime that encouraged capital flows, this meant that finance would be channelled to real estate (or, more broadly, non-tradable) sectors.

⁷ The term 'recycled surpluses' is used to highlight the relationship between (German) export surplus and (Southern European) financial liabilities. However, the term is potentially misleading as there is no one-to-one correspondence between export surpluses (of one country) and financial assets of that country. German banks could invest their surpluses in American government papers (or subprime derivatives) and loan it to French bank. And French banks may borrow from German banks and lend to Spanish households. Borio and Disyatat (2011) warn against confusing current account imbalances (a flow concept) and financial liabilities (a stock concept).

assets have been built up in the trade surplus countries, most of all Germany, and external liabilities were have been accumulated in the trade deficit countries. The sectors that accumulated debt have differed by country. In Greece it was mostly the government sector, in Ireland, Portugal, and Spain it was rather the private sector, and in particular the household sector (Lapavitsas et al, 2010a, 2010b).

Since the outbreak of the crisis European economic policy has, by and large, reinforced its orthodox orientation. A recent European Council document ‘endorsed priorities for fiscal consolidation and structural reform’ (European Council 2012, p. 2); in other words: no active demand policy. Fiscal policy has tightened its straightjacket. The Fiscal Compact will bring more surveillance of the deficit limits and balanced budget requirements are to be written into national law. Monetary policy has maintained its anti-inflation focus, but it was forced to give more attention to financial stability, which it treats synonymous with survival of the big banks. The ECB did engage in a form of quantitative easing, i.e. massive expansion of its balance sheet, but different from the US and the UK case, it has been more directed towards saving banks rather than supporting governments. This is also clearly reflected in the different compositions of the balance sheets of the FED, the BoE and the ECB (Piasani-Ferry and Wolff 2012). As regards wage policy, which is discussed under the heading of improving competitiveness, the downward pressure on wages in increased with explicit calls for decentralization of collective bargaining, reducing minimum wages (which was part of all ‘rescue packages’) and recommendations to reduce public sector pay (‘bearing in mind the important signalling effect of public sector wages’ European Council 2012, p. 16).

3. A basic old Keynesian model

To evaluate the potential costs of rebalancing we will estimate a simple old Keynesian model consisting of a current account equation, a traditional wage Phillips curve and an Okun's Law relation. These three equations will allow us to discuss the *direct* effects of demand on the current account as well as the *indirect* effects of demand via employment and wage costs on the current account. The model is old Keynesian in the sense that it is not based on any particular microfoundation, but rather posits plausible macroeconomic relations. Its time horizon is short to medium run. All of the following equations can be found in standard intermediate macroeconomics textbooks.

The current account (or net exports) is (in a simplified macroeconomic model) equal to exports minus imports. Exports will depend on foreign demand and the domestic price level relative to the foreign price level. Imports depend on domestic demand and the relative price level. To keep things simple we will focus on the domestic component and we regard unit wage costs as the prime determinant of relative prices. The current account equation then is:

$$CA = a_1 \cdot Y + a_2 \cdot ULC$$

where CA is the current account (as % of GDP), Y the real income and ULC the (nominal) unit labour costs.

The Phillips curve is a standard ingredient of macro economic models. While there is agreement on a Phillips curve in the short run across different schools of thought, the views differ on the long-run properties of the Phillips curve. Monetarists and New Keynesian assume a vertical long-run Phillips curve, post-Keynesians argue that due to hysteresis effects, the Phillips curve will be endogenous or downward-sloping in the long run (e.g.

Setterfield and Leblond 2003, Kriesler and Lavoie 2007; Palley 2003; Stockhammer 2008). However, the focus of our analysis is the short to medium run; thus long-run properties are not given further attention here. The wage Phillips curve has the form:

$$ULC = b_1 \cdot U + b_2 \cdot PM + b_3 \cdot ULC_{t-1}$$

where U is the rate of unemployment and PM the import prices.

Okun's Law relates the level (or growth) of output to the rate of unemployment. As a behavioural function it is not contested (indeed it follows from standard production function). In the short run it is usually interpreted as the level of output determining unemployment. As we are focussing in short to medium run phenomena, this is the interpretation that we will use. Okun's Law relation takes the following form:

$$U = c_0 + c_1 \cdot Y$$

The model is Keynesian in that aggregate demand plays the active role. We ignore (or assume constant) a whole host of other factors, including demand from the rest of the world and productivity. A change in demand has direct effect a_1 on the current account, but it also has an indirect effect ($Y \rightarrow U \rightarrow ULC \rightarrow CA$). The following sections will discuss the econometric estimation of these three equations and then calculate the direct and indirect effects of demand on the current account.

We will estimate all three equations as a panel of eleven Euro area countries with annual data. We exclude Luxembourg because with a population of just over half a million and a large financial sector it is not comparable to the other countries in our sample. We

choose panel data because we are more worried about heterogeneity over time than about heterogeneity across countries. Due to European integration (and globalisation more broadly) some of the macroeconomic relations, namely the price elasticities of exports and imports, may have changed substantially. Therefore we want to be able to estimate our equations for time periods that are too short to be estimated in a single-country context. The use of panel data may lead to some bias as we are pooling countries that may not be identical with respect to the relevant coefficients. However, by making use of the panel dimension it allows us to reduce the variance of the coefficient estimate. Simply put, with the panel estimation we may get the exact number wrong, but we are more likely to be the order of magnitude right. The decision to work with annual data is closely linked to our decision to employ panel estimation. While we would not necessarily expect countries to have the exact same lag structure (with quarterly data), we do expect them to have similar effects over longer time periods, thus the use of annual data.

We estimate all equations for three samples. First, the Euro period 1999-2011. We regard this as the most interesting sample for our question. Second, we report results for the longer period 1990-2011. Third, we restrict the latter sample to recession years. This is because there has been an extensive discussion about possible non-linearities in the Phillips curve. We will thus report all equations for the recession years only. This reduces the sample size substantially (to 35 observations); thus results are less reliable and are reported only as a robustness check to investigate whether effects are very different in recession years.

We use a standard fixed effect estimator with sectoral fixed effects. Results are very similar if the fixed effects are dropped (which is to be expected given that our dependent variable is in difference form). Results are very similar if heteroscedasticity-consistent standard errors are used and if autocorrelation (which is not a major problem in most specifications) is corrected-for.

Our data are from AMECO database. Y stands for the (real) GDP at 2005 prices; ULC is the nominal unit labour cost for total economy (calculated as the ratio of compensation per employee to real GDP per person employed); PM is the price deflator for imports of goods and services; CA is the balance on current transactions with the rest of the world (based on national accounts) as percentage of GDP; and, finally, U is unemployed persons as a share of the total active labour force.

4. Current account equation

The empirical research on current account imbalances in the case of Euro Area has undergone two phases. Before the crisis, Blanchard and Giavazzi (2002) set the groundwork for the discussion. Using panel data for several groupings of OECD and EU countries since 1975 they show that current account positions have become increasingly related to the level of output per capita of the country both within OECD as a whole and EU (this tendency is stronger within the Euro area). They argue: “the channel appears to be primarily through a decrease in saving (typically private saving) rather than through an increase in investment” (Blanchard and Giavazzi 2002, p. 148). Eichengreen (2010) recently described their view as the “good imbalance” argument: the rise of persistent current account imbalances reallocated the capital flows in a way that accommodated the catching-up process between countries with different GDP per capital levels. Blanchard and Giavazzi argue that in the context of EMU there is a gradual decline in the correlation between national savings and investments. The fast growing economies in the periphery can rely on external savings to undertake additional domestic investment projects while they can increase their own consumption (reducing national savings). This was not perceived as a big problem since the resulting deterioration in

the current account positions would be gradually offset by higher future income levels (outcome of the catching-up process).

Insert Table 2 about here

In this line of reasoning several papers approached current account imbalances from the saving-investment point of view. Typically they econometrically explain current account positions with economic variables that affect saving and investment decisions (according to neoclassical theory), such as: income per capita, demographic variables, government balance, old age dependency ratios, real interest rates, net foreign asset position and variables that capture the institutional structure of the society (for a summary see Barnes et al, 2010). Ahearne et al (2008) using panel specifications (with annual data for the period before the crisis: 1981-2005) agree with the above perspective of ‘good imbalances’ pointing out that the EMU by eliminating exchange rate risk has boosted intra-European (but not extra-European) financial flows from high-income to low-income countries of the Euro area. Similar results are provided by Lane (2010) and Schmitz and von Hagen (2009). Current account imbalances are interpreted as signs of efficient capital allocation within Euro area that promotes economic convergence.

Other approaches use a similar econometric framework but offer a different interpretation and, to some extent, reject the idea of ‘good imbalances.’ Eichengreen (2010) using panel annual data for EU countries for the period 1999-2009 provides evidence that the level of corruption is more significant for the explanation of intra-European imbalances than the growth differentials. He argues that current account imbalances finally proved to be ‘bad.’ In his reasoning, convergence is conditional not only on the gap in per capital incomes but also on the quality of domestic institutions. He argues that imbalances were driven mostly by

“domestic distortions” such as irrational asset booms and lack of fiscal discipline. Jaumotte and Sodsriwiboon (2009) working with panel data for 49 advanced and emerging countries (period 1973-2008) provide evidence that the introduction of the common currency helped countries with lower per capita incomes to maintain high investment despite low national savings ratios. They emphasize that the resulting current account imbalances does not necessarily imply optimal and sustainable foreign borrowing. They come to the latter conclusion using ‘Macro_Balance’ and ‘External Sustainability’ methodologies to determine an equilibrium current account. They compare this price with the actual current account positions arguing that for ‘peripheral’ European economies current account deficits in 2008 exceeded their long-run fundamental ‘norms’. Barnes et al. (2010) relying on econometric panel techniques of a sample of OECD countries find that imbalances over the past decade cannot be fully explained by growth differentials and institutional environment (the so-called ‘fundamental economic factors’); the contribution of housing investment (non-tradables) also appears to be significant. Decressin and Stavrev (2009) referring to a sample of both Euro area and thirteen other advanced economies (panel and time series techniques) find that while current account divergence have widened a trend that was existent even before the onset of EMU. This is not different from what is observed for a broader sample of advanced economies; what has changed with EMU is that the speed of adjustment of the current account has become significantly lower.

The literature discussed above explains the current account by means of a reduced form savings-minus-investment equation. As behavioural functions exports and imports -- and consequently the current account -- are associated with differences in relative price levels, i.e. differences in competitiveness, and with different levels of demand. Notably, competitiveness, played little role in the abovementioned literature. Arghyrou and Chortareas (2008) highlight the channel of competitiveness. The use VAR techniques (based on

quarterly data from 1975 to 2005) and to identify long run and short run effects. They find that the relation between imbalances and real exchange rates appears to be substantial with the speed of adjustment subject to non-linear effects. Berger and Nitsch (2010) focusing on bilateral trade balances argued that trade imbalances among Euro area members widened considerably reflecting both growth differentials and divergent real exchange rates. The competitiveness channel is also emphasized by Belke and Dreger (2011; they use panel annual data for the period 1981-2008): imbalances cannot be traced back to catching-up process but the increase of unit labour costs.

Our current account equation is closer to the latter group in the literature. We do not analyze current account imbalances as the outcome of neoclassical saving and investment decisions but as the outcome of macroeconomic export and import function that depend on relative demand and relative costs. Essentially we explain the current account by changes in domestic demand, on the one hand, and of competitiveness, on the other hand. More technically, the (change in the) current account is a function of the (growth of) real GDP and of (the rate of growth of) nominal ULC. The current account equation thus takes the following form:

$$\Delta CA_{j,t} = a_1 \cdot \Delta \log(Y_{j,t}) + a_2 \cdot \Delta \log(ULC_{j,t-1}) + a_3 \cdot F_j + \varepsilon_{j,t}$$

Where subscripts j and t denote country and time respectively; F_j stands for country fixed effects. In what follows we shall focus on the period 1999-2011. This period amounts to the longest Euro area period for which annual data are available. In relation to most the above mentioned papers, our sample includes years in recession after the crisis of 2008. The results should be read as the effects in an hypothetical average European country.

Table 3 summarises the results for the current account equation. We get consistently statistically significant results. For the period covered by our sample (1999-2011): one percentage increase in real GDP growth leads to -0.14 percentage points decline of the current account (as ratio of GDP). One percentage point increase in the growth of ULC leads to a -0.25 percentage point decline of the current account. For the longer sample (1990-2011) we get a similar effect for growth, but a substantially smaller effect of ULC inflation (-0.1).

Table 3 about here

If we restrict the sample to recession years, the effect of GDP growth becomes statistically insignificant (and the coefficient very small), whereas the effect of ULC inflation remains statistically significant and of comparable magnitude. This may be interpreted as inflation effects being stronger in recession years. Most of our recession observations, however, lie in the Euro period, which may explain why results are similar to the Euro sample.

Results are very similar if net exports (over GDP) are used instead of the current account as the dependent variable. Indeed, the current account and net exports are highly correlated over time and for most country they are also very close numerically. The major exception to this is Ireland, which has had consistently high net exports, but has in the run up to the crisis had substantial current account deficits. The main reason for the discrepancy is the unusually high level of repatriated profits.

5. Wage Phillips curve

There is a rich literature on Phillips curves. Table 4 gives an indicative (but not exhaustive) summary of the literature with regard to the Euro area. Phillips (1958) had estimated the link

between money wage growth and the rate of unemployment (for the UK from 1861 to 1957).⁸ Phelps (1967) and Friedman (1968) argued that his model did not properly account for inflation expectations (but implicitly had assumed adaptive expectations) and paved the way for the rational expectations revolution. Much of the recent literature is dominated by New Keynesian and New Consensus Models which rely on purely forward looking inflation expectations.

Insert Table 4 about here

In contrast, Gordon's (1998) triangular model continues a more pragmatic, Keynesian tradition. It is called triangular as it includes demand factors, supply shocks and past inflation. Typically inflation is explained by unemployment (or the output gap), import prices (as proxy for supply shocks) and lagged values of inflation. Aguiar and Martins (2005) use this type of model to check the non-linearity of Phillips curve in the case of Euro area providing evidence against this hypothesis. Beccarini and Gros (2008) rely on a similar specification to show that the impact of oil prices is more persistent in the Euro area than in the US. Fabiani and Morgan (2003) adopt a Gordon-type model and investigate aggregating national Phillips curves into one Euro area Phillips curve. They see advantages in the country specific approach, but do find that 'differences do not prove to be statistically significant and it is possible to impose a common unemployment gap effect' (Fabiani and Morgan (2003, p. 19). Finally, Musso et al (2007) use an expectations-augmented Gordon-type Phillips curve rejecting the case of non-linearity in the case of Euro area as a whole.

Most recent empirical research on Phillips curves for the Euro area follow the new Keynesian approach. New Keynesian models rely on purely forward looking inflation

⁸ For useful brief presentations of the history of Phillips curve regression models see Galí et al. (2001), Montoya and Döhring (2011), Goodhart and Hofmann (2005).

expectations. The so-called hybrid version also takes into consideration some backward looking behaviour thus bridging between the new Keynesian model and the backward looking specifications. Goodhart and Hofmann (2005, p. 759) highlight the performance of the pure New Keynesian Phillips curves as follows: “hybrid specifications [...] allowing for both forward-looking and backward-looking expectations, or even fully backward-looking specifications, are typically preferred by the data.” Our assessment is that the majority of the authors who include both inflation expectations and past inflation in their models find strong evidence for an independent role of past inflation. They interpret this as evidence in favour of the hybrid version of New Keynesian Phillips curve. For instance, Buchmann (2009) using parametric and non-parametric versions of hybrid New Keynesian Phillips curve challenges the validity of the pure New Keynesian specification and provides evidence for important non linearity of the curve in the case of Euro area. Galí et al (2001) also argues for the superiority of the hybrid specification. A similar point of view can be found in Paloviita (2008). Montoya and Döhring (2001) also offer evidence for the hybrid model. They use quarterly data from 1990 until the end of 2010 covering in this sense some of the recession period. Their point is that “although the heterogeneity of Phillips curve relationships across Member States is not large, the exceptionally large output gap caused by the crisis is one driver (among others) of the recently observed inflation differentials in the euro area” (ibid.: 1). However, some authors find support for the pure forward-looking model. Chortareas et al. (2011) present evidence that is consistent with the pure New Keynesian model. Sheufele (2010) argues that data in the case of Germany favours pure forward-looking model (his sample comprises quarterly data and covers the period 1973-2004).

An important issue that runs through the above debates is questions of the functional form of the Phillips curve. Several studies have investigated whether the Phillips curve is non-linear. However, the literature does yield an ambiguous picture. For instance, Aguiar and

Martins (2005) and Musso et al (2007) do not find significant evidence of non-linearity, while Buchmann (2009) argues for important non-linearity in the sense that demand pressure in price inflation depends heavily on the state of the economy.

Our model is empirically close to the triangular model. New Keynesian and hybrid specifications rely on the data about inflation expectations. In theory, inflation expectations are ‘rational’, i.e. model endogenous; in practise available inflation forecast data is used. These forecasts themselves, however, are often based on past data, e.g. when they are the outcome of macroeconomic modelling. We use unit labour costs as proxies of the price levels. We estimate the growth of unit labour costs as function of (the change in) the rate of unemployment the growth of (lagged) import prices and lagged growth of unit labour costs. This is a version Gordon’s (1998) triangular Phillips Curve:

$$\Delta \log(ULC_{j,t}) = b_1 \cdot \Delta U_{j,t} + b_2 \cdot \Delta \log(PM_{j,t-1}) + b_3 \cdot \Delta \log(ULC_{j,t-1}) + b_4 \cdot F_j + \varepsilon_{j,t}$$

Table 5 summarises the results for the wage Phillips curve. We find statistically significant results (at the 1% level) for all variables. Strictly speaking our findings are biased because we use a lagged dependent variable and fixed effects. However, results are essentially the same if we drop the fixed effects and we prefer to have a uniform specification across all three behavioural equations.

Table 5 about here

For our Euro period sample (1999-2011), we find that one percentage point decline in the rate of unemployment reduces ULC growth by 0.39% in the short run. For the period 1990-2011,

the reduction in ULC growth is 0.54% while during recessions it almost triples to 1.5%. Short-run and long-run effects of unemployment differ because lagged wage inflation plays a role in determining wage growth. For 1999-2011 long run effect is -0.68%, for 1990-2011 the value is -1.42%, whereas for recession years it reaches -5.69%.⁹

6. Okun's Law

Finally we estimate a relation of Okun's law that links changes in unemployment to GDP shifts. Our regression equation takes the following form:

$$\Delta U_{j,t} = c_0 + c_1 \cdot \Delta \log(Y_{j,t}) + c_2 \cdot F_j + \varepsilon_{j,t}$$

This equation is essentially identical to Okun's (1962) first equation.¹⁰ We estimate it with annual data for a panel of countries, whereas Okun estimated it for a single country using quarterly data. Much of the literature since uses the output gap instead of GDP growth. However, the output gap measures involved assumptions about the production function and about the existence and empirical identification of a natural rate of unemployment (NAIRU or NAWRU). As we do not wish to invoke the assumption of a NAIRU, we use Okun's original version (see also Knotek 2007).

Table 6 about here

⁹ One could argue that the Phillips curve should be homogenous of degree one with respect to import prices and past wages. If this condition is imposed the long-run effects are -1.42 and -2.19 for the 1999-2011 and the 1990-2011 sample respectively (see Table A.1 in the Appendix).

¹⁰ Okun (1962) presents several versions, all estimated with quarterly data. The first version estimates the difference in unemployment as function of difference in (the logarithm of) GDP and is identical to our specification. The second version first calculates a potential GDP and an output gap. The unemployment rate is then related to the output gap.

Table 6 summarises the results for the Okun's law relation. Coefficients are statistically significant at the 1% level in all specifications. The Okun's law coefficient is just below -0.26 and very similar for all three alternative sample periods. This number indeed very close to -0.3 which Okun himself had found.

7. Total effects

The total effect is the direct effect of demand on the current account plus the indirect of demand on unemployment, of unemployment on wages and of wages on the current account.

$$\frac{dCA}{dY} = \frac{\partial CA}{\partial Y} + \frac{\partial CA}{\partial ULC} \frac{\partial ULC}{\partial u} \frac{\partial u}{\partial Y}$$

Table 7 summarises the effects of a change in aggregate demand on the current account based on the results reported in Tables 3, 5 and 6. Based on the Euro area period (1999-2011), a one percentage point increase in demand will lead to a 0.18 percentage point reduction in the current account deficit. Of this -0.14 percentage points are due to the direct effect. The decrease in demand also leads to an increase in unemployment, which dampens wage growth. However the total effect of this effect is rather moderate.

Table 7 about here

The effects are very similar for different time periods. Extending the sample to include 1990 to 2011 gives a total effect of -0.18. If we impose a constant profit mark up on the wage Phillips curve, the values are -0.23 and -0.2 for the 1999-2011 and 1990-2007 samples respectively (see Table A.2). If we restrict the sample to recession years (between 1990 and

2011), we get a total effect of -0.35, i.e. the effect seems to be large during recession years, which is mainly driven by a much steeper slope of the Phillips curve in this sample. If the estimations are performed for a panel of the GIIPS countries only, we get value of -0.34 and -0.29 for the 1999-2011 and 1990-2011 samples respectively (see Table A.3).

Given that Greece, Ireland, Portugal, Spain and Italy in 2007 had an average current account deficit of 8.4% of GDP, how much is the average GDP cost of eliminating the current account deficit? Our estimates are 47.2% and 47.0% respectively, based on the results for the 1999-2011 and the 1990-2011 samples. These figures are rather similar despite the fact that their composition differs. The calculations based on the results for the recession years only gives a much lower number of 23.7%, i.e. only about half size of the results for the more balanced samples. As the sample of recession-only years is small ($n=35$), one should be careful with its interpretation. We mainly report it as a reminder that macroeconomic relations may change during a downturn. The results for the GIIPS panel imply GDP costs of 24.3% (with the 1999-2011 period) and 29.4% (with the 1990-2011 period) for rebalancing. Smaller, but still very high.

Our results may indicate very high costs of adjustment. However, these high costs are not unique to our results. Indeed, the research on Phillips curves by the OECD or ECB would all imply similarly high costs of adjustment. As an illustration consider the results by Turner and Seghazza (1999), an OECD working paper. They estimate Phillips curves and find that coefficients for sixteen out of twenty OECD countries can be pooled. The common sacrifice ratio, that is output loss per percent of inflation, is 3.75. The GIIPS ULC inflation has been cumulatively, on average, 26.1% from 1999 to 2007; the Euro area's inflation was 12.9%. To reduce the price levels back to Euro area average, the GIIPS would have to reduce the price level by 13.2%. With Turner and Seghazza's sacrifice ratio this gives a GDP reduction of 49.5%, similar to the value we find. Finally, to illustrate how devastating the orders of

magnitudes involved are, consider the case where the GIIPS had to reduce their price level to match the German one. They would have (in 2007) to reduce prices by 27.8%. With Turner and Seghazza's sacrifice ratio would require a reduction in GDP by 104%.

8. Conclusion

The paper has estimated the effects of rebalancing for Euro area countries. Based on an old Keynesian model we have estimated a current account equation, a wage (ULC) Phillips curve and an Okun's Law relation for a panel of Euro member countries (excluding Luxembourg). We find that in order to eliminate the average current account deficit of the GIIPS group, a GDP reduction of 47% is needed. We also report alternative results that are somewhat lower, but of similar order of magnitude. These are staggering amounts and, indeed we think that such a reduction of GDP should not be imposed in the GIIPS group. Moreover, we doubt whether it would be politically feasible.

These results should not be considered as forecasts, but as 'what if' excises. Our estimations answer the following question: how big an output loss is required to eliminate the GIIPS' current account deficits *if* the basic macroeconomic behavioural equations were to hold, on average, as in the recent past? In 2007 the average current account deficit of GIIPS was 8.4% of GDP. Our results suggest that these economies would have to undergo a GDP reduction of 47%. There are several reasons why things may not be as bad as our results imply. First, economic relations may differ during recessions from those of normal times. Based on a sample of recession years only, we get an estimate of a required 23% reduction in GDP to balance current accounts. This is still an enormous number. Second, there may not be a need to eliminate current account imbalances completely. If current account deficits had to be halved, then our required GDP reduction would also be halved. Third, there are many ifs

in our scenario and many factors that have not explicitly entered our analysis: ‘structural reforms’ may work and dramatically improve productivity (and thus competitiveness) of the GIIPS; but there are several factors that may make things worse: the effects of economic uncertainty, debt overhang and deflation may turn out to be more important factors than the export and Phillips curve effects which have been the focus of this paper. In short, we believe that there are good reasons to think that we overestimate adjustment costs as well as good reasons to think that we underestimate them.

Our results thus have to be taken with more than one grain of salt and they have to be interpreted with care. But they do indicate the high cost of reducing a 8.4% current account deficit as implied in the parameters based on the Euro area. They do give plausible order of magnitude of the costs involved in rebalancing Europe. And these costs are plainly enormous. These numbers are larger than the output losses occurred in the Great Depression.

In brief, while we have little confidence in the details of our results, we do hold that they indicate a plausible order of magnitude of the adjustment costs. And these costs are so large that there is only one conclusion: deflationary adjustment in the deficit countries will have devastating economic and social effects. If the Euro area is to survive it has to rebalance. If this is to be done without strangulating the deficit countries, the surplus countries will have to do a much larger part of the adjustment. There are two ways of rebalancing: a deflationary and an inflationary one. Inflationary adjustment involves higher wage growth and expansionary policies in the surplus countries. An adjustment of the surplus countries would increase growth and it would come with higher inflation, but it would allow rebalancing without a Great Depression in parts of Europe. Europe desperately needs inflationary adjustment.¹¹

¹¹ These inflationary policies will have to have a corresponding monetary policy and interventions in the workings of financial sector. The fact that we do not discuss them here does not reflect on their importance, but merely on the scope of this paper.

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Table 1. Current account positions and Unit Labour Costs in the Euro area

	Current account (% of GDP)	Unit Labour Costs
	2007	1999-2007
Germany	7.5	-1.68
Netherlands	6.7	19.08
Finland	4.1	9.10
Austria	3.5	4.53
Belgium	1.7	13.42
France	-1.0	15.91
Italy	-2.4	20.73
Ireland	-5.3	35.85
Portugal	-9.9	24.08
Spain	-10.0	28.26
Greece	-14.3	21.54
GIIPS (unweighted average)	-8.4	26.1

Source: AMECO

Table 2. Overview of empirical literature on current account imbalances

Study	Dep. variable	Explanatory. Variables	Estimation Method	Sample	Notes
Arghyrou and Chortareas (2008)	CA, REER, Y, Y* (foreign income)		VAR	EA countries, quarterly data: 1975-2005	important differences across EMU countries regarding the significance of each variable in the determination of CA equilibrium.
Belke and Dreger (2011)	CA	Ypc, REER	panel	Annual data, 11 EA, 1982-2008	competitiveness channel is more robust and shows the expected sign
Berger and Nitsch (2010)	Bilateral trade balance	G differentials and volatility, REER, GGB, institutional variables	Panel	EU15 + 3 countries, Annual data: 1948-2008	with the introduction of the euro, trade imbalances among euro area members widened considerably and became more persistent
Blanchard and Giavazzi (2002)	CA	Ypc in relation to an average level of Ypc	Panel	Annual data: 1975-2001, different groups of OECD and EU countries	It is with saving rather than investment as the main channel through which integration affects current account balances
Ahearne, Schmitz, and Hagen (2008)	NX (as proxy of CA)	Ypc, GGB Poil, dummy for EMU	Panel	EU-15, Annual data (1981-2005),	By eliminating exchange rate risk the Euro has boosted financial flows from high-income to low-income countries in the euro area (not outside).
Jaumotte and Sodsriwiboon (2010)	CA, S, I	GGB, population growth, future old-age dependency ratio, oil balance, financial liberalization, dummies	Panel	49 advanced and emerging economies	The Euro helped southern EA countries to maintain investment despite lower saving rates by improving their access to international saving. That does not necessarily imply optimal or sustainable process.
Eichengreen (2010)	NX (as proxy of net capital flows)	Ypc, corruption index, GGB, private credit, RIR, elderly dependency ratio	Panel	EU countries, Annual data (1999-2009), F	Convergence is conditional not just on the gap in per capita incomes but also on the quality of policies and institutions. "bad imbalances" driven by domestic distortions: bubble-driven asset booms, excessive budget deficits, and unrealistic expectations of future growth.
Barnes, Lawson, and Radziwill (2010)	CA	demographic variables, G, Ypc, initial NFA, Poil prices, RIR, GGB, structural rigidities, trade openness, institutional quality, financial depending	Panel	Sample of OECD countries, averages of 5 years period	'Fundamental' economic factors play an important role but do not fully explain the extent of imbalances over the past decade.
Decressin and Stavrev (2009)	CA	F, NFA, GGB, NXoil, REER, demographic variables	Panel and time series	Annual data, EA-11 and 13 other advanced countries	differences between EMU countries' current accounts, are not unusual by historical standards, not different from a broad sample of advanced economies outside the EA. What different is the current account dynamics.

Notes: CA is the current account, NX net exports, S saving, I investment, Y real GDP, Ypc real per capita GDP, R real GDP growth, REER real exchange rate, GGB general government balance, NFA net foreign assets, EA Euro area, Poil oil prices, RIR real interest rate

Table 3. Results for the current account equation

dep var	d(CA/Y)		d(CA/Y)		d(CA/Y)	
sample	1999 2011		1990 2011		recessions 1990 2011	
Periods	13		22		8	
Cross-sections	12		12		12	
obs	156		264		35	
	coeff	t-stat	coeff	t-stat	coeff	t-stat
C	0.637	3.070	0.524	3.290	0.013	2.491
DLOG(Y_R_)	-0.136	-2.778	-0.142	-3.763	-0.051	-0.354
DLOG(ULC_)	-0.248	-4.248	-0.097	-2.896	-0.193	-2.446
Mean dep var	-0.104		-0.036		0.008	
S.D. dep var	1.721		1.587		0.018	
R-squared	0.166		0.090		0.453	
F-statistic	2.171		1.904		1.336	
DW	2.289		2.169		3.379	

Table 4. Overview of empirical literature on Phillips curves.

Study	Sample	Estimation	Notes
Aguiar and Martins (2005)	Quarterly data (1970:1-2002:3), EA	Gordon-type PC (GDP deflator, imports deflator)	PC turns out to be linear and its trade-off statistically significant. Non-linearity shows up in the Okun relation.
Beccarini and Gros (2008)	EA, US, Quarterly data (1996:1-2008:1). <i>Inflation</i> : Headline HCPI, core inflation, Output gap, HP filtered GDP	PC (Gordon-type) with oil prices for headline, PC (Gordon) with oil prices for core	The mean and the volatility of inflation appear to be higher in the past decade. The impact of oil prices is more persistent in the EA, and the slope coefficient is higher in the EA than in the US.
Buchmann (2009)	Monthly data (1990-2008), EA	Nonparametric and parametric estimation of hybrid-NKPC	Doubts on the validity of the New Keynesian Phillips curve. Estimates reveal an important nonlinearity in the sense that demand pressure on price inflation is not invariant to the state of the economy as it increases considerably at times of high economic activity.
Chortareas et al (2011)	Quarterly data (1970:1-2007:4), EA	Hybrid-NKPC (GDP deflator, real unit labor cost)	Estimations are consistent with the pure NKPC but also with the central banks' perseverance to anchor inflation expectations when inflation is high.
Fabiani and Morgan (2003)	Quarterly data (1982:1-2000:4), national and aggregate level for DE, FR, IT, NL, ES	Gordon-type PC (ulc, consumers' expenditure deflator, import deflator, gap between unemployment and time-varying NAIRU)	Major advantages arise from the ability to develop country-specific structures for PC and not from aggregation biases that emerge when a common structure is used.
Gali et al (2001)	Quarterly data (1970:1-1998:2), EA and US	Traditional PC, pure and hybrid NKPC (GDP deflator, real unit labor costs)	Hybrid-NKPC fits Euro area data very well (better than US data). Inflation dynamics in the EA appear to have a stronger forward-looking component than in the US. Labour market frictions appear to have played a key role in shaping the behavior of marginal costs and inflation in EA.
Gorter (2005)	Quarterly data (1991:3-2004:4); countries: FR, DE, IT	NKPC with different specifications for marginal costs (output gap, real unit labour costs, open economy measures)	For France and Germany plausible estimations are received only when taking into account open economy factors affecting real marginal costs and subsequently the inflation process. For Germany and Italy (but not France) lagged inflation is a significant determinant of current inflation.
McAdam and Willman (2004)	Quarterly data (1970:1-1997:4), EA	NKPC, hybrid-NKPC (GDP deflator, marginal costs captured by sector based estimation using a production function)	Underlying determinants of NKPCs has general applicability to a wide set of countries as well as of use for sectoral studies.
Montoya and Döhring (2011)	Quarterly data (1990:1-2010:4), EA-11 (panel and time series)	Hybrid-NKPC (output gap, HICP core inflation, unit labor costs)	Evidence for both backward and forward looking inflation. The impact of the output gap on core inflation is significant but not large.

			Although the heterogeneity of Phillips curve relationships across EA economies is not large, the exceptionally large output gap caused by the crisis is one driver (among others) of the recently observed inflation differentials in the euro area.
Musso et al. (2007)	EA, quarterly data (AWM database: 1970:1-2005:4); <i>Inflation</i> : GDP deflator, HICP; Several alternative specifications of output gap	Linear PC (Gordon-type), PC (Gordon) with time-varying slope and intercept	No significant evidence of non-linearity. The Phillips curve became flatter around a lower mean of inflation.
Paloviita (2008)	Annual data (1981-2006; 1990-2006 for pooled estimates)	NKPC, hybrid NKPC	Hybrid specification of the New Keynesian Phillips curve is needed in order to capture the euro area inflation process properly. In recent years of low and stable inflation, EA inflation dynamics have become more forward-looking and the link between inflation and domestic demand has weakened.
Pyyhtiä (1999)	Annual data (1976-1997), EA and country specific (AT, DE, FI, FR, IT, NL, ES)	NKPC with quadratic output gap (GDP deflator, output gap).	The Phillips curve has been especially asymmetric in Germany, Finland, Italy, the Netherlands and Spain. Strong negative influence of inflation uncertainty on GDP in the euro countries during the estimation period, 1976– 1997.
Rumler (2007)	Quarterly data (1980-2004), EA, AT, BE, DE, ES, FR, EL, IT, NL	Open-economy versions of hybrid-NKPC (GDP deflator, labour share, domestic and imported intermediate goods prices)	The estimates of the structural parameters of the model suggest strong heterogeneity in the degree of price rigidity across euro area counties. Price rigidity is systematically lower in the open economy specification than in the closed economy specification.
Scheufele (2010)	Quarterly data (1973:1-2004:4), DE	Hybrid-NKPC (GDP deflator, labour income share as marginal cost)	Evidence for a purely NKPC for Germany.
Tillmann (2009)	Quarterly data (1970:1-2005:4), EA	NKPC, hybrid-NKPC (GDP deflator, labor share), VAR methodology	Purely forward-looking as well as for the hybrid model cannot be interpreted as it is done in the literature due to the immensely wide confidence intervals.
Turner and Seghezza (1999)	Semi-annual data (1970-1997)	Gordon-type PC (output gap, output deflator of business sector, imports deflator)	Most countries accept a common sacrifice ratio of about 3¾.

Table 5. Results for the ULC-Phillips curve

Dep Var:	DLOG(ULC_)		DLOG(ULC_)		DLOG(ULC_)	
	1999 2011		1990 2011		recessions 1990 2011	
periods	13		22		8	
sections	12		12		12	
obs	156		264		35	
	Coeff	t-stat	coeff	t-stat	coeff	t-stat
C	0.009	3.334	0.005	2.607	0.023	2.398
D(U_/100)	-0.391	-2.617	-0.536	-4.492	-1.497	-4.141
DLOG(ULC_(-1))	0.405	4.960	0.624	12.966	0.737	5.383
DLOG(PM_(-1))	0.207	4.309	0.199	5.119	0.319	2.280
Mean dep var	0.019		0.025		0.030	
S.D. dep var	0.024		0.031		0.041	
R-squared	0.267		0.526		0.756	
F-statistic	3.666		19.718		4.415	
DW	2.203		2.285		2.602	
LR effect	-0.657		-1.424		-5.687	

Table 6. Results for the Okun's law relation

Dep Var:	D(U_/100)		D(U_/100)		D(U_/100)	
Sample	1999 2011		1990 2011		recessions 1990 2011	
periods	13		22		8	
sections	12		12		12	
obs	156		264		35	
	coeff	t-stat	coeff	t-stat	coeff	t-stat
C	0.006	5.323	0.007	7.146	0.011	2.781
DLOG(Y_R_)	-0.259	-10.154	-0.262	-12.295	-0.277	-2.299
Mean dep var	0.001		0.001		0.018	
S.D. dep var	0.012		0.012		0.018	
R-squared	0.6163		0.5947		0.6024	
F-statistic	17.546		28.218		2.777	
DW	2.051		1.867		1.994	

Table 7. Total effects of a change in aggregate demand on the current account

	1999 2011	1990 2011	recessions (1990 2011)
dir dCA/dY	-0.14	-0.14	-0.05
indir $dCA/dULC \cdot dULC/dU \cdot dU/dY$			
$dCA/dULC$	-0.25	-0.10	-0.19
$dULC/dU$	-0.66	-1.42	-5.69
dU/dY	-0.26	-0.26	-0.28
sum	-0.04	-0.04	-0.30
total dCA/dY	-0.18	-0.18	-0.35
how much less growth for -1%pt dCA			
	-5.62	-5.60	-2.82
to reduce all imbalances of 2007			
GIIPS	-47.20	-47.04	-23.72

Appendix [for working paper version only]

Table A.1 Summary results restricted wage Phillips curve

Estimation equation: $DLOG(ULC_t) = C(3) + C(1) * D(U_t/100) + C(2) * DLOG(ULC_{t-1}) + (1-C(2)) * DLOG(PM_{t-1})$

	coeff	t-stat	coeff	t-stat	coeff	t-stat
C(3)	0.002	0.874	0.001	0.848	0.001	0.631
C(1)	-0.455	-3.131	-0.576	-4.902	-0.245	-1.329
C(2)	0.679	18.892	0.737	25.864	0.713	23.544
Mean dep						
var	0.019		0.025		0.024	
S.D. Dep						
var	0.024		0.031		0.030	
R-squared	0.186		0.505		0.490	
F-statistic	17.456		132.890		108.561	
DW	2.533		2.426		2.488	
LR effect	-1.418		-2.190		-0.853	

Note the equation restricts the equation to be homogenous of degree one with respect to lagged wage inflation and import price inflation. In other words, it imposes a constant profit mark up.

Table A.2 Summary total effects with restricted Phillips curve results with restricted ULC equation

	1999 2011	1990 2011	recessions 2011	1990
dir				
dCA/dY	-0.14	-0.14	-0.05	
indir				
dCA/dULC.dULC/dU.dU/dY				
dCA/dULC	-0.25	-0.10	-0.19	
dULC/dU	-1.42	-2.19	-0.85	
dU/dY	-0.26	-0.26	-0.28	
sum	-0.09	-0.06	-0.05	
total				
dCA/dY	-0.23	-0.20	-0.10	
how much less growth for -1%pt				
dCA				
	-4.41	-5.05	-10.39	
to reduce all imbalances of 2007				
GIIPS	-37.02	-42.40	-87.25	

Table A.3 Summary results for a panel of the GIIPS countries

	recessions		
	1999	1990	1990
	2011	2011	2011
dir			
dCA/dY	-0.30	-0.28	-0.29
indir dCA/dULC.dULC/dU.dU/dY			
dCA/dULC	-0.11	-0.02	-0.11
dULC/dU	-0.92	-1.71	-9.11
dU/dY	-0.43	-0.40	-0.64
sum	-0.04	-0.01	-0.63
total			
dCA/dY	-0.34	-0.29	-0.91
how much less growth for -1%pt dCA			
	-2.94	-3.50	-1.10
to reduce all imbalances of 2007			
GIIPS	-24.73	-29.38	-9.20