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Macroeconomic imbalances in Europe: how to overcome the fallacy of unit labour costs

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Abstract

Policy recommendations based on Unit labour costs (ULC) indices can lead to undesirable and counterproductive policies, because they do not reveal possible distortions in the base year. In this paper we discuss the problems with the ULC-current account relation and provide an alternative measure for relative wage costs called Wage Competitive index (WCI) based on the assumption of convergence of the returns on capital. We show how to calculate it and that it is more efficient than traditional ULC and REER indicators. The implication is that policymakers should not focus on nominal wage setting only, but also more broadly on all factors which affect the return on capital. This implies that the well-known *Rehn-Meidner rule*, which underlies the Macroeconomic Dialogue should be modified.

JEL codes: C23, F15, F45, O52

1. Introduction

Before the global financial crisis, policy-makers devoted little attention to structural differences in macroeconomic fundamentals and competitive levels between Euro Area member states. European institutions mostly focused on the convergence of inflation rates and budget positions, primarily through monetary policy and the Stability and Growth Pact. The less well-known Macroeconomic Dialogue, which sought to reduce unemployment by defining a balanced macroeconomic policy mix, was part of the formal set of coordination procedures, but it made little substantive difference. Two conceptual issues contributed to this failure.

First of all, at the core of the Macroeconomic Dialogue stood the concept of aggregate unit labour costs (ULCs), which linked wage bargaining to monetary policy. The Dialogue's (non-binding) policy recommendation that ULCs in the Euro Area ought to grow at the rate of the ECB inflation target (Koll 2005) was inspired by the *Rehn-Meidner rule*, whereby wage settlements are distributionally neutral if nominal wages increase at the rate of labour productivity plus inflation. It was thought that following this rule would take stress off the central bank and would facilitate stability oriented fiscal policies and thereby support growth.¹ However, in reality only few countries complied. While aggregate ULCs roughly increased at the rate of the ECB-inflation target before 2007, many individual member states did not follow the rule; during the Euro crisis, even the aggregate ULC index remained behind the ECB target (see Figure 1), which makes it harder for the ECB to achieve its objective of price stability. The reason for this slow growth are multiple, but a recent study by the ECB concludes that the country dimension is crucial to understanding the drivers of Euro Area wage growth (Nickel, et al. 2019).

The second conceptual issue were current accounts. It is often not clear whether deficits were assumed to be the result of lack of competitiveness in the product market and cost disadvantages or of excessive capital inflows which would reflect comparative advantages. In the early phase of monetary union, current account divergences increased, but they were seen as the outcome of a real convergence process (Blanchard & Giavazzi, 2002). The inflow of foreign capital into catching up countries, especially in the form of FDI, would cause current account deficits, but over the long run that would increase competitiveness in these countries and eventually improve their net trade position. However, with the financial crisis and the sudden stop of capital flows, the problems with this model became evident. A growing body of research started to analyse these imbalances as a problem of competitiveness caused by wage cost distortions (European Commission, 2014; Collignon, 2014; Chen et al., 2013; Sinn 2014; Guerrieri & Esposito, 2012; Salvatore, 2015; Giannellis & Joukouritakis 2017). The deterioration of current account balances was interpreted as the consequence of competitive disadvantages caused by excessive nominal wages increases in the periphery. However, this causal link was soon put into question. New evidence indicated that capital flows from the core to the periphery had created bubbles in the construction and real estate sector, which supported the rapid wage increases above productivity, and this had fuelled consumption booms (Crocini-Angelini & Farina, 2011; Esposito, 2017). When the bubble burst, profits collapsed and these wages levels were unsustainable. In some countries, the banking sector required public bailouts, which generated massive increases in public debt. Spain and Ireland are the good examples, although similar dynamics were also at work in Greece, Italy and Portugal. Countries with high levels of public debt were economically most fragile and required structural reforms.

The policy consensus focused on current accounts and labour market rigidities, which prevented the required economic adjustments. Member states with low wage growth, above all Germany and the Netherlands, were increasing their surpluses; those with rapid wage increases, mainly in the southern periphery, witnessed growing deficits. Divergences in ULC indices and ULC-based Real Effective Exchange Rates (REER) seemed to match this explanation, although curiously the new member states

¹See Koll (2005), European Commission (2005), Flassbeck & Lapavitsas (2013).

in Central and Eastern Europe seemed to live on a different planet. Consequently, policy makers recommended that deficit countries (i.e. the periphery) should improve their cost competitiveness by the “internal depreciation” of their REER. Wage cost and labour market institutions were seen as key variables behind the Euro crisis.

Following this logic, the European Commission created two new institutions: the Euro Plus and the Macroeconomic Imbalances Procedure (MIP). The Euro Plus included a broad set of provisions ranging from productivity-enhancing structural reforms to measures aimed at improving the sustainability of public finances. The MIP monitored developments in internal and external imbalances through a vast scoreboard of indicators where ULCs, REERs, current account balances and market shares played a prominent role. The policy generated asymmetric adjustment, because it treated excessive surpluses as less detrimental to the stability of the EMU than excessive deficits – a logical conundrum that only makes sense if the Euro Area as a whole is supposed to run a current account surplus. Competitiveness, however, now focused on national ULC developments and REERs between member states. Wage moderation was to be achieved by reforming national wage setting and indexation schemes, especially in the public sector.

The focus on ULCs has justified excessive austerity and caused deep welfare losses. Not surprisingly, some economists started to praise monetary sovereignism again, calling either a return to the previous EMS fixed-but-adjustable exchange rate regime of the 1980s and ‘90s (Flassbeck & Lapavistas, 2013) or claiming that losing control over their currency prevents euro-members from monetizing their sovereign debt. De Grauwe (2012) wrote that “there is an important, potentially destructive dynamic in a monetary union”, although Mabbett & Schelkle (2015) subsequently found that the evidence does not support this claim.

The analysis of competitiveness based on ULCs and NEER is misleading, because ULCs do not provide information on competitiveness *levels*. Indices ignore possible disequilibria in the base year. Nor do they explain what determines such equilibrium level.² To address this issue, we propose an alternative measure based on the simple assumption of convergence of the returns on capital in a single market with Monetary Union. By using the functional distribution of income into capital and wage shares and comparing it to the Euro average, we derive regional wage levels and develop a Wage Competitiveness Index (WCI) as the difference (ratio) between actual and equilibrium wages.

The policy focus is, therefore, not only on wage setting, but also more broadly on all factors, which affect the return on capital. Current account disequilibria are useful indicators for monitoring the evolution of financial flows, especially when they lead to asset bubbles. However, neither current account deficits nor rising ULCs signal necessarily competitive deteriorations as they might be the result of a catching up process in prices or in consumption levels (Blanchard & Giavazzi, 2002). This is very clear in the case of new member states in Central and Eastern Europe, which had huge wage cost advantages, despite rising ULCs, and still ran current account deficits. Furthermore, the current accounts focus treats Euro member states as if they had adopted a fixed exchange rate regime rather than formed a monetary union (Collignon 2014). However, it was the experience with fixed-but-adjustable exchange rates in the 1980s that made policy makers realise that national currencies were not compatible with Europe’s single market (Padoa-Schioppa & Emerson, 1987; Collignon & Schwarzer, 2003).

The story told by our WCI is different from that of the ULC-current account approach. First, it shows that the divergent dynamics of relative labour cost competitiveness was less marked in the years

² The closest theoretical answer to this problem is the calculation of Fundamental Equilibrium Exchange Rates (FEER), which is a normative concept taking aggregate demand into account. Our model of equilibrium wages in this paper focusses only on price-wage competitiveness.

before the crisis than often thought. Second, the divergent dynamics are the result of convergence toward the equilibrium in some southern members as well as in Germany. Third, we show that in the new CEECs member states a major distortion has occurred due to the low nominal wage growth relative to total productivity. These countries experienced high growth of equilibrium wages while restraining nominal wage growth. Third, our WCI explains competitiveness better in terms of market shares and attractiveness of FDI. After controlling for reverse causality, our results show a real causal relation.

The structure of the paper is as follows. Section 2 discusses the problems with the use of indices and introduces the intuition behind the WCI. Section 3 explains the methodology to calculate equilibrium wages and the WCI. Section 4 provides some descriptive evidence on the convergence of returns on capital in the Euro Area and compares our measure with the standard indicators of international competitiveness. Section 5 concludes and raises additional policy questions.

2. ULCs and competitiveness: literature and alternative proposal

According to standard macroeconomic models, competitive positions cause capital flows through trade and FDI. However, Gross (2016) has argued that ULC developments are poor predictors of trade performances. Gabrish and Staehr (2015) explored this hypothesis and found that current account development cause ULC divergences and not the other way round. This leads to the conclusion that measures aimed at restraining ULC by wage moderation have little impact on external imbalances. Other studies showed that financial flows from core to the periphery led to the accumulation of imbalances independently of the evolution of macroeconomic fundamentals (Schmidt and Von Hagen, 2011; Holinski et al., 2012; Croci-Angelini and Farina, 2011; Gossè and Serranito, 2014; Esposito, 2017). Following these works, Esposito and Messori (2019) analysed the relation between REERs and trade balances before and after the global financial crisis and found that most of the rebalancing was due to the recessionary effect of austerity, which reduced inflation, GDP growth and imports. They concluded that the (partial) rebalancing of net trade positions in the periphery was not due to improvements in ULC or in structural productivity.

While ULC and REER developments are certainly useful to assess the *dynamics* of economic adjustment, these indices suffer from the arbitrary assumption of a base year at which all countries start at equal conditions. In the Euro Area, 1999 is taken as base year and ULC dynamics up to 2007 show the typical core-periphery dualism in the Euro Area (see Figure 1), which led to the Macroeconomic Imbalances Procedure (MIP). During the post-crisis rebalancing period, ULC increased faster in the core than in the periphery. However, the data do not confirm a connection between these measures and current accounts. In Central and Eastern Europe, ULC indices rose rapidly far above the ECB target, and yet, these countries did not seem to suffer from lack of competitiveness or slow growth.

ULC and REER measures ignore that substantial disequilibria may have prevailed in the base year, so that the evolution of the index might not correctly reflect the convergence or divergence of actual wage levels to equilibrium. Nor do they explain what determines such equilibrium level. The use of these indicators introduces, therefore, a strong element of arbitrariness, which hampers the capacity to prevent imbalances. This is problematic for measuring comparative advantages, since how much things cost is a matter of price and cost *levels* and not of *changes*. Hence, the standard indices of competitiveness are not satisfactory.

This is particularly true for the understanding of the convergence process within the EMU (Groll and van Roye, 2011; Gross and Alcidi, 2011). Some scholars have divided the ULC index by a long run average of four decades (Wyplosz, 2013; de Grauwe, 2016). While this approach dampens the

distortions, it remains an *ad hoc* and a-theoretical assumption. We deviate from such practices by calculating a theory-based equilibrium wage level and measure competitiveness as the deviation from this equilibrium.

We derive our measure of equilibrium wages and ULC *levels* from the assumption that in a Monetary Union the return on capital should be equalized in the long run. More generally, in equilibrium the specific return on capital of a sector or country should be equal to the average return for the Euro Area as a whole (Collignon & Esposito 2014, 2017). The implied wage level is the benchmark used to compare competitive positions of member states. When a country or economic sector operates with wages higher than the equilibrium level, we say it is overvalued and suffering comparative disadvantages due to the lower than average return on capital; by contrast, when wages are lower than equilibrium, the sector has a competitive advantage and returns on capital are above average.

This idea goes all the way back to Adam Smith. It is, of course, only a theoretical benchmark and not a description of facts, but it allows measuring comparative advantages or the handicap of attracting investment to particular sectors or countries (Chou et al. 2016). With free flows in the European market, capital ought to be invested where it yields the highest return, while diminishing returns will erase this advantage over time. This allows overcoming the problems with ULC indices as it takes into account that sectoral wages and productivity might differ due to labour market segmentation and specific technological requirement, but the return on capital should converge due to full capital mobility. This assumption allows us to focus on the level of nominal wages without having to depend on price and cost *indices*. More specifically, we define wage competitiveness as the ratio of actual to equilibrium wages and call this variable Wage Competitiveness Index (WCI). We slightly modify the formulation of Collignon and Esposito (2017) by taking into account the consumption of fixed capital and net production taxes. Our aim is to show that the WCI is better suited at explaining the dynamics of intra-EMU competitive positions than traditional indicators and, hence, should be systematically used by European institutions to manage the growth process in the EMU.

The policy implications of our approach go beyond the classical demands for structural labour market reforms and restraint in wage bargaining. Because the equilibrium wage is determined by productive capacities in a broad sense, the WCI depends on the factors contributing to capital accumulation. It includes elements of non-price competitiveness, such as technological progress, productivity developments and shifting tastes, through the definition of the equilibrium wages. However, as Blanchard et al. (2013) pointed out, the accumulation of capital, skills and knowledge, innovation, R&D, and the broad conditions of the legal and political environment take time to adjust. Our definition of competitiveness therefore implies persisting differences in returns of capital. A full theory of competitiveness would have to consider this endogeneity, but this would transcend the limited purpose of this paper, which focuses on the methodology of measuring – not explaining – competitiveness.

3. Calculating equilibrium wages and the WCI

To calculate equilibrium wages, we begin by using the functional distribution of income, which defines GDP as the sum of labour income, capital income (gross operating surplus) and net production taxes:

$$(1) \quad PY = \Pi_G + T + WL$$

Where PY is nominal GDP, W is the average wage, L is the employment level, Π_G is the gross operating surplus, and T is taxes on production and imports less subsidies on production. The gross return on capital is defined as the ratio of gross operating surplus relative to the historic value of the aggregate

capital stock of a country or sector. It also includes the part of value added that is used to substitute the consumed capital. By subtracting the consumption of fixed capital cfc from the gross operating surplus we obtain net (before taxes) profits Π_N , which is the key variables from the point of view of investors. The net return on capital is defined, accordingly, as:

$$(2) \quad RoC = \frac{PY - cfc - T - WL}{P_k K}$$

P_k is the capital stock deflator, K is the capital stock in constant prices. By multiplying and dividing by nominal output PY , we get:

$$(3) \quad RoC = \frac{1 - \tau - \rho - \sigma_w}{P_k K} PY = (1 - \tau - \rho - \sigma_w) ACE$$

Where:

$$(4) \quad ACE = \frac{PY}{P_k K} \text{ is the average capital efficiency or nominal capital productivity;}$$

$$(5) \quad \tau = \frac{t\Pi}{PY} = t\sigma_\pi \text{ is total taxes on profits in \% of GDP given by the product of the tax rate and the profit share;}$$

$$(6) \quad \rho = \frac{cfc}{PY} \text{ is the depreciation cost of capital in \% of GDP;}$$

$$(7) \quad \sigma_w = \frac{WL}{PY} \text{ is the wage share;}$$

We also define nominal labour productivity as nominal output per person employed:

$$(8) \quad P\lambda = \frac{PY}{L}$$

Our equilibrium condition is that a country's or sector's net return on capital is equal to the average level in the Euro Area:

$$(9) \quad (1 - \tau - \rho - \sigma_w) ACE = (1 - \tau_e - \rho_e - \sigma_{w_e}) ACE_e$$

The equilibrium wage share of a country or sector is then:

$$(10) \quad \sigma_w^* = 1 - \tau - \rho - (1 - \tau_e - \rho_e - \sigma_{w_e}) \frac{ACE_e}{ACE}$$

The wage share is identical with real unit labour costs, so that equation (10) also represents a country's equilibrium real unit labour costs. This equation shows that the diversified performance of wage shares in the Euro Area, observed by the European Commission (2008), may reflect not only wage bargaining but also taxation, depreciation and the relative productivity of capital. By replacing equation (8) into equation (10) we obtain the equilibrium wage, that is the *wage level* at which the return on capital of a country equals the Euro Area average:

$$(11) \quad W^* = P\lambda \left[1 - \tau - \rho - (1 - \tau_\epsilon - \rho_\epsilon - \sigma_{w\epsilon}) \frac{ACE_\epsilon}{ACE} \right]$$

Which can be rewritten as:

$$(12) \quad W^* = P\lambda \left(1 - \tau - \rho - \sigma_{\pi\epsilon} \frac{ACE_\epsilon}{ACE} \right)$$

Where $\sigma_{\pi\epsilon}$ is the profit share in the Euro Area. The ratio of Euro to national ACE can be decomposed into the product of relative capital productivities and relative prices, so that the definition of equilibrium wages becomes:

$$(13) \quad W^* = P\lambda \left(1 - \tau - \rho - \sigma_{\pi\epsilon} \frac{\kappa_\epsilon \varphi_\epsilon}{\kappa \varphi} \right)$$

where $\kappa=Y/K$ is capital productivity and $\varphi=P/P_k$ is the capital price ratio. Thus, equilibrium wages depend on labour productivity, prices, and the shares of net production taxes and capital consumption. In addition, they depend positively on relative capital efficiency, given by the product of relative capital productivities and relative capital price ratios. These two terms are weighted by the average profit share of the Euro Area. If a country's capital efficiency is equal to the average, then the profit share will be also equal to the Euro average, but *the equilibrium wage share will differ from it as long as differences in taxation and cost of capital exist*. In addition, differences in GDP deflators are further causes of divergences between a country's equilibrium wage and its average wage, although in monetary union they should converge in the long run. In fact, Euro Area average wages are defined as:

$$(14) \quad W_\epsilon^* = P_\epsilon \lambda_\epsilon (1 - \tau_\epsilon - \rho_\epsilon - \sigma_{\pi\epsilon})$$

Notice however, that – given that we define competitiveness as the deviation of actual from equilibrium wages - the dynamics of local labour productivity, net production taxes and capital consumption do not matter for the assessment of the competitiveness level, although they determine the living standards in a country. Important is the relative ACE, as it determines the difference between a country's and the average Euro Area profit share. If a country's capital efficiency is higher than the European average, so that $ACE_\epsilon/ACE_x < 1$, its equilibrium profit share (and therefore in equilibrium a country's real unit labour costs) will be above the Euro Area's. This means that a larger share of value added can be used to remunerate labour because capital is more productive. On the other hand, if in some countries the labour share has fallen more than the European average, this may simply reflect the slow-down of

capital productivity. However, assuming equilibrium as a starting position, voluntarist increases in wages, as suggested by wage-led growth theorists (Stockhammer, 2015), would only generate deviations from equilibrium and harm competitiveness. Higher wages require improvements in labour and capital productivity.

We measure wage competitiveness as the absolute and relative differences between actual and equilibrium wages. *Absolute* wage competitiveness (WC) is the gap between nominal actual and equilibrium wages measured in euros:

$$(15) \quad WC = W - W^* = P\lambda \left(\sigma_\pi - \sigma_{\pi\epsilon} \frac{\kappa_\epsilon \varphi_\epsilon}{\kappa \varphi} \right)$$

Where the last term is derived directly from equations (1) and (13). The *relative* wage competitiveness index (WCI) is defined as the ratio of actual to equilibrium wages:

$$(16) \quad WCI = \frac{W}{W^*}$$

A WCI value above 1 indicates that a country's RoC is lower than the Euro Area average; in the opposite case, the index will be below 1.

4. Descriptive evidence

4.1 Trends in returns on capital

As first step to assess the empirical relevance of the WCI we look at the evolution of the RoCs in the Euro Area to understand whether a convergence process took place. To this aim, we group countries according to a cluster analysis based on mean levels and changes in the RoC. We use data from the European Commission's Ameco.³ The results show (see Table A1 in the appendix) that ten out of the twelve original members of the EMU are grouped in the same cluster due to low and relatively stable RoCs. The two outliers are Ireland and Luxembourg, which are, instead, grouped together with Cyprus, Malta and Estonia, the smallest member states in the European Union. This second groups includes mostly countries that are either financial centres or attractors of MNC headquarters due to low taxation on corporate profits. The third cluster includes the remaining new members of the EMU which all show large profitability. The exception is Slovenia, which is grouped together with the old EMU members due to low profitability.

In Figure 2, we show the coefficients of variation (i.e. standard deviation divided by average) of the RoC in the EMU. Taking the area as a whole we observe on average a slight but constant divergence, which is mostly due to the dynamics across clusters, with new member states in Eastern Europe experiencing large increases in their RoC. This is in line with the observation made by Chou et al. (2016) whereby transition economies in general have shown rapid RoC increases. For the purpose of our analysis, this result is interesting as large differences in profitability are the type of distortions that

³ We are aware of other measures for calculating the value of capital. See for example Piketty (2014) and Friedman (1956). However, these approaches require the exogenous determination of the rate of return in order to determine the value of capital endogenously. We think that the rate of return is endogenous and investment is exogenous, because investment depends on expected profitability.

we wish to trace with the WCI. The high returns on capital in the transition countries attracted foreign investment and caused delocalization from old to new member states.

Within clusters, we observe a convergence pattern coherent with the entry of countries in the Monetary Union. In fact, among old members (Cluster 1), there has been a continuous convergence in the RoCs between 1995 and 2007, which resumed after 2013 following the divergence caused by the two crises. Countries in Cluster 2 followed a similar pattern until the early 2000s, but since the Global Financial Crisis their RoCs started to diverge again. For countries belonging to Cluster 3, the convergence started in 2012, consistently with their path toward EMU membership. Summing up, data seem to confirm that the euro introduction fostered a convergence process in the RoCs in line with the main assumption behind the construction of the WCI.

4.2 WCI versus ULC and REER

The second step of the descriptive analysis is to compare the WCI with the standard indices for REER and ULC. The latter are normalized to the Euro Area average. The comparison is shown in Figure 3 for the period 1999-2007 and in Figure 4 for the period 2010-2016. We observe important differences between the evolution of the WCI and the other two indicators before and after the Global Financial Crisis.

The first difference concerns the behaviour of the new member states of the Euro Area, in particular the Baltic States and Slovakia. For this group, both ULCs and REERs indicate an increase in relative prices between 30% and 15% with respect to the average which would imply a deterioration of competitiveness, while the WCI indicates improvements in their relative positions (i.e. reductions in the WCI) ranging from 3% in Estonia to 22% in Latvia. This appreciation of the REER and the increase of ULCs was due to the convergence to western price standards. However, this represented the logic of catching up in transition economies, which generated substantial gains in capital productivity and shows up as an increase in the equilibrium wage in our WCI. On the other hand, WCI dynamics in the pre-crisis decade indicate that Cyprus, Ireland, Italy, Spain, Portugal and France accumulated the highest competitiveness losses by all accounts.

After the global financial crisis (Figure 4), we observe a generalized fall of both ULC and REER in many countries. Exceptions to this pattern are the Baltic States, Germany and Austria. The former show a loss of competitiveness in all three indicators but stronger for the WCI. In Germany nominal wages increased more rapidly and in Austria the REER fell while both ULC and WCI increased because productivity deteriorated. The WCI confirms that Portugal, Ireland and Spain have improved their competitive position, but in Greece, it indicates a deterioration despite improvements in the traditional indices. Finally, in Germany the slight increase in relative ULC is not matched by the WCI, which shows no change between 2010 and 2016.

To sum up, the picture of the *competitive dynamics* in the Euro Area based on WCI is not the same as that painted by the standard measures of competitiveness, because the REER and ULC indices do not define an equilibrium position.

4.3 The WCI and its components

To deepen our analysis, we show the absolute and relative levels of the index as well as that of equilibrium wages and the absolute wage gap in Table 1. Countries are ordered according to the WCI

level in 2016. In addition to the Euro Area, we also provide this information for other EU countries and for the main non-EU advanced economies.⁴ In the Euro Area, the *new member states are the most competitive countries*. In most cases, their wage levels are significantly below the equilibrium level - by more than 10% with peaks above 25% in Lithuania and Slovakia. Among the old members, Luxembourg and Ireland are now the most competitive. German wages in 2016 were below equilibrium by 1,400€ *per annum* whereas in 1999 they were 900 € *above* equilibrium. Italian wages in 1999 were 7.9% below equilibrium but this advantage has been almost entirely lost by 2016.

These dynamics suggest that the claim that Germany has become super competitive due to labour market reforms and excessive wage restraint holds only partially as roughly 50% of the improvement in the WCI is due to the rapid increases in equilibrium wages, which are higher than for France and nearly double compared to Italy. Competitiveness advantages may also explain why Ireland and Portugal came out of the crisis earlier than Greece and Italy. However, our data reveal, too, that Central and Eastern European economies are an important source of disequilibria. All together, they represent nearly 10 percent of the Euro Area's GDP.

The evolution over the period 1999-2007 is consistent with the logic of convergence in RoCs in a monetary union. Most countries that were overvalued in 1999 experienced a reduction of the WCI whereas most undervalued countries experience an opposite pattern. Exception were Slovakia, Lithuania and Malta, which further increased their undervaluation, and France and Portugal, which were overvalued in 1999 and subsequently deteriorated their position further. The Spanish case is in between as the country started from a position of moderate undervaluation and ended up by being slightly overvalued. These results indicate that the standard core-periphery dualism explanation for competitive divergences within the EMU is misleading when we take countries' initial position into account.

Looking at post crisis dynamics, Table 1 shows a substantial stabilization of cross-country differences, and in some cases a reduction of previously accumulated competitiveness gaps. This evidence might suggest that the problem of competitive imbalances is now under control; however, the WCI indicates that there are some elements of concern as new divergences are emerging. More specifically, countries at the top of the ranking are further consolidating their position. This is true in particular for financial centres and small countries with low corporate tax rates (Ireland, Luxembourg, Malta and Cyprus). At the same time, France, Slovenia and Austria increased their overvaluation. The adjustment program after the debt crisis did not improve but strongly deteriorated competitiveness in Greece. As for the other peripheral countries, Spain and Portugal corrected their competitive gap while Italy remained stable.

Figure 5 shows the dynamics of actual and equilibrium wage levels in selected countries belonging to the first group of EMU members until 2018.⁵ To begin with, competitiveness improvements in Germany up to the global financial crisis were the result of moderate wage dynamics and steady

⁴ The main purpose of the WCI is to assess the comparative advantages or disadvantages for regions in unified currency areas, which makes the WCI particularly well suited to the Euro Area. Between different currency areas, a variation of nominal exchange rates will affect relative prices and output and to the extent that the relative prices shift the trade balance, they will affect GDP and therefore the wage share and capital productivity. The WCI will capture these effects only indirectly, because both the actual and the equilibrium wages are denominated in the same currency. It will provide insight as to how attractive investment will be across countries or regions or even sectors.

⁵ The full set of data and graphics is available on request from the authors.

improvements in the equilibrium wages. After the crisis, nominal wages increased at the same pace as equilibrium wages and competitiveness remained stable. By contrast, in France, equilibrium wages grew less than nominal wages up to the crisis and experienced a further slowdown in the following years. Nominal wages however, increased faster and did not slowdown after the crisis. A similar argument holds for Italy where equilibrium wages started to slow-down in 2004, but after the crisis the dynamics of the two component was similar and WCI remained stable. In Spain, the competitive deterioration is concentrated in the years 2003- 2007 due to the housing bubble, which boosted nominal wage growth while slowing down the increase in equilibrium wages. The country regained competitiveness in the years 2012-2018 due to stable increases in equilibrium wages. In Greece, the problems started with the implementation of the austerity attached to the rescue programs. While implementing nominal wage cuts, the country experienced a massive reduction in equilibrium wages in the years 2010-2015 that drove up the WCI. This is because excessive austerity imposed by the creditors had reduced aggregate spending at a faster rate than could be written off from the capital stock, so that the productivity of the Greek capital stock has fallen. This is a good example for the superiority of our WCI as an analytic tool, for ULC indices only take into account labour productivity and not capital productivity. Since 2015, Greece seems to have recovered because equilibrium wages are now increasing more rapidly than actual wages. Finally, in Ireland we observe a significant leap in equilibrium wages, which is explained by increases in productivity, fostered, in particular over the last years, by the relocation of firms with aircraft leasing and substantial IP assets (NCC, 2017).

To sum up, the WCI provides a different picture of the evolution of competitiveness compared to the standard ULC or REER indices. The difference is due to the introduction of an equilibrium wage level benchmark. Hence, nominal wage setting, which may cause deviations from equilibrium, is only one of the factors determining competitiveness, and wage competitiveness in a broader context, which includes labour and capital productivity, taxation, and all the factors that determine potential output.

4.4 Testing the performance of the WCI

The final step of our empirical analysis consists in comparing the performance of the WCI against that of relative ULC and REERs in explaining revealed measures of international competitiveness. Due to the theoretical and empirical problems when using current accounts and trade balances as measures of competitiveness, we seek alternative measures. One of the most important measures for the revealed international competitiveness is the dynamics of export market shares, given by the ratio of national exports to world trade. Market shares are the result of structural factors relating to both demand and supply sides. Competitiveness is typically considered a supply side factor whereas demand side factors relate to the interaction between the sectoral and geographical composition of exports. By using a classic Constant Market Share analysis (CMS) the effect of market and product specialization can be separated from supply side competitiveness changes. We follow the ECB (2005) approach and decompose market share growth as follows:

$$(17) \Delta mkt_sh_{i,t} = me_{j,t} + pe_{k,t} + comp_{i,t} + mix_{i,j,k,t}$$

Where Δmkt_sh is the change in export market share, me is the market effect, i.e. the growth effect generated by export markets, pe is the product effect, i.e. the effect that exports are specialized on products for which there is high or low demand; $comp$ is the supply side competitiveness effect, which indicates the change in market share due to all factors other than demand, and mix is a residual term.

The variables *mkt_sh* and *comp* will be regressed alternatively on the three measures of competitiveness as in the following equations:

$$(18) \quad mkt_sh_{i,t} = \alpha + \beta_1 X_t + \gamma \Theta_t + \varepsilon_{i,t}$$

$$(19) \quad comp_{i,t} = \alpha + \beta_1 X_t + \gamma \Theta_t + \varepsilon_{i,t}$$

Another important indicator of external competitiveness is the ability to attract FDI, which is related to production costs, exchange rate expectations, size of the host market and non-price competitiveness factors. ULC typically measure production costs while REER also takes into account the effect of exchange rates movements. Non-price competitiveness factors like product quality are normally associated with higher prices, leading to opposite movements in ULC and REERs. In addition, structural factors like the regulatory quality, efficiency of the institutions, rule of law, can all influence the actual and expected return on investment while not necessarily affecting labour costs. For this reason, the WCI can explain inward FDI as it captures all other structural factors that are affecting the rates of return on capital in addition to price competitiveness. To provide evidence on this issue we estimate the following equation:

$$(20) \quad FDIis_{i,t} = \alpha + \beta_1 X_t + \gamma \Theta_t + \varepsilon_{i,t}$$

where *FDIis* is inward FDI as a percentage of GDP, while the other variables retain their previous meaning. Equations (18)-(20) are estimated using the Common Correlated Effects estimator (Pesaran, 2006; Chudik & Pesaran, 2015) which has the advantage of returning consistent estimates when series are non-stationary and cross correlation among panels exists. Endogeneity is accounted by using an Instrumental Variables formulation of the estimator (CCEIV) where the regressors are instrumented by their first and second lags. Cross correlation is captured by introducing cross sectional averages of all variables as further regressors (the vector Θ_t).

We show the estimation results for equation (18-20) in Table 2. The WCI is the only significant determinant of both intra-EU and intra-Euro Area market shares (second and third panels) whereas *ULCs* performs slightly better to explain total market shares in global trade (first panel). The latter result is not surprising as the WCI is based on equilibrium wages for the EMU, hence failing to capture the effect of developments outside the EU.

As for the supply-side competitiveness effect, we confirm that the WCI has a higher explanatory power both within the EU and the Euro Area (Table 2, lower panel columns 1-6). Finally, we also find that the WCI is the only significant determinant of FDI inflows (Table 2, lower panel columns 7-9). Yet, contrary to the other estimates, the WCI becomes significant only when using the CCEIV approach, meaning that the endogeneity problem is more relevant in the relation between FDI and WCI. The result is interesting, as it would signal that competitiveness in the Euro periphery must have been higher before the crisis than is nowadays acknowledged. Our results corroborate the studies by Gross (2016), and Gabrish & Staehr (2015) mentioned before that explained the increase of ULC by capital inflows, and the Blanchard & Giavazzi (2002) model if FDI raised the equilibrium wage levels. To disentangle these factors would require further studies.

Summing up, these results confirm the better performance of the WCI in explaining the relative competitiveness of Euro Area members.

5. Conclusions and policy implications

This paper provided an alternative approach to the standard ULC and REER competitiveness measures. Building on the recent literature critical of the EU approach to macroeconomic imbalances, we argued that the focus on current account and ULCs developments could be misleading because current accounts are loose proxies for competitiveness and show little relation with ULC dynamics. However, we go further by designing a measure for wage cost levels and we show that this indicator is more efficient. The traditional cost indices used by the European Commission and other international organizations rely on the choice of an arbitrary base year and ignore the possibility of substantial disequilibria at that time. While wage setting obviously matters for competitiveness in the short run, we posit that *it is impossible without an appropriate benchmark to say whether wages are too high or too low*.

To overcome these problems, we developed an innovative approach for measuring comparative advantages in monetary unions. We have derived the benchmark for determining equilibrium wage levels in the European Union from the assumption that the return on capital in a given country or industry ought to be the same as the average return on capital in the Euro Area. Wage levels are competitive if they are below equilibrium, contributing to levels of profitability that are above the Euro Area average, so that they can attract investment and accelerate economic growth. By contrast, wages above equilibrium are hampering regional and sectoral growth. Thus, the comparative advantage of higher profitability within the currency area will determine regional and sectoral divergences in growth rates. While this advantage may be desirable to foster catch-up growth in low-income regions, the long run sustainability of a monetary union will require balanced growth between regions and member states in the Euro Area. The WCI is, therefore, an important variable for designing strategies of balanced economic growth, which would require nominal wages to be equal or at least close to equilibrium wages. To focus on factors that improve the equilibrium wage would be an important policy innovation. The approach can be applied to regions (countries) as well as sectors, provided the appropriate statistical data are available (European Commission, Wifo, ZEW 2018). Our evidence has shown that the WCI performs better than traditional indicators of competitiveness in explaining countries' performance on international markets and in attracting FDI.

Furthermore, the WCI provides a different narrative with respect to the standard core-periphery dualism. According to the WCI, changes in competitiveness reflected the *convergence* toward equilibrium wages and returns on capital in most EMU countries before the crisis. This is an important and encouraging insight. However, there were exceptions to this pattern. France and Portugal increased their initial overvaluation, while some of the new member states became even more undervalued. The post-crisis adjustments indicate that reductions in competitive gaps took only place in Spain and Portugal, but France, Slovenia and Austria continued to increase their overvaluations. In addition, we show that the Greek position deteriorated substantially during the years following the debt crisis. The strong recessionary effects of the wage cuts under the adjustment programs caused a massive reduction in equilibrium wages because of the fall in capital productivity.

Our results showed that competitiveness differences are not always correctly represented by ULCs and REERs. This is most obvious in the case of the strong but hidden competitiveness advantage in Central and Eastern European Countries. These countries show far larger competitive distortions in their favour than the southern crisis countries have to their disadvantage. Avoiding macroeconomic imbalances in the Euro Area is an important objective, especially given that there is no fiscal union that could correct market distortions. The European Commission would improve its policy recommendations by including the Wage Competitiveness Index into its Macroeconomic Imbalance Procedure.

Another analytical advantage of the WCI is that it incorporates not only labour but also capital productivity. The *Rehn-Meidner* rule, which informed the Macroeconomic Dialogue, focused only on labour productivity, ignoring the impact of capital productivity on equilibrium wages. Yet, relative capital productivity ($\frac{ACE_{\epsilon}}{ACE}$) is a crucial variable in determining cost advantages. It is clear from equation (12) that the *Rehn-Meidner* rule would only work if the regional economy would be in perfect equilibrium and without changes in the tax ratios, depreciation of capital and average capital efficiency. This is highly unrealistic. Theoretically, it would be possible to compensate productivity losses by tax cuts, but this is not sustainable in the long run. Hence, the only successful strategy for the sustained improvements of standards of living through competitiveness consists in raising capital productivity over and above the Euro Area average. This should be a prominent policy objective for the periphery member states in the Euro Area.

Appendix

Table A1.

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Figure 1. ULC indices in the European Union (1999=100). Source: own elaboration on AMECO. EA Core: AUT, BEL, DEU, FIN, FRA, LUX, NLD. EA Periphery: ESP, GRC, IRL, ITA, PRT. EA NMS: CYP, EST, LTU, LVA, MLT, SVN, SVK. CEECs: BGR, CZE, HUN, POL, ROM. EU opt out: DNK, GBR, SWE.

Figure 2: Coefficients of variation /CV) in the RoCs in the Euro Area and main clusters. Source: own elaboration on AMECO. Cluster 1 (cl1): AUT, BEL, DEU, ESP, FIN, FRA, GRC, ITA, NLD, PRT, SVN. Cluster 2 (cl2): IRL, LUX, CYP, EST, MLT. Cluster 3 (cl3): LTU, LVA, MLT.

Figure 3. Comparison between WCI, ULC and REER in the Euro Area: percentage changes 1999-2007. Source: own elaboration on AMECO

Figure 4. Comparison between WCI, ULC and REER in the Euro Area: percentage changes 2010-2016. Source: own elaboration on AMECO

Figure 5. Actual versus Equilibrium Wages in Selected Member States. Source: own elaboration on AMECO

Table 1 Equilibrium wages and competitiveness: EU-wide comparison (€ 000)

Area	Country	Equilibrium wages (th€)			Absolute competitiveness (th€)			Relative Competitiveness (%)		
		1999	2007	2016	1999	2007	2016	1999	2007	2016
EA	Ireland	36.6	53.2	78.2	-8.7	-8.7	-29.4	76.2	83.7	62.4
EA	Slovakia	5.2	15.8	21.7	-1.0	-5.1	-5.9	81.5	67.8	72.8
EA	Lithuania	4.1	13.5	19.1	-0.3	-3.5	-5.1	92.0	74.2	73.3
EA	Malta	15.8	22.5	31.7	-2.7	-4.3	-8.2	83.1	80.9	74.1
EA	Luxembourg									
EA	g	52.8	70.0	86.3	-11.6	-15.0	-21.3	78.0	78.6	75.3
EA	Latvia	3.5	12.9	17.2	0.2	-2.3	-2.6	106.8	82.0	85.1
EA	Cyprus	21.0	26.3	27.9	-4.3	-2.6	-3.5	79.3	90.1	87.4
EA	Portugal	14.1	18.3	22.2	0.4	1.2	-1.8	103.0	106.4	92.1
EA	Germany	29.9	34.5	42.0	0.9	-1.0	-1.4	103.0	97.0	96.7
EA	Spain	22.6	27.5	32.7	-0.6	0.9	-0.5	97.4	103.2	98.5
EA	Italy	29.2	33.6	36.0	-2.3	-0.5	-0.4	92.1	98.5	98.9
EA	Estonia	5.7	15.1	18.4	-1.0	-2.5	-0.2	82.5	83.5	99.1

Table A1. Cluster classification based on levels and changes in the RoC (1995-2016)

	Cluster 1	Cluster 2	Cluster 3
AUT	22	0	0
BEL	22	0	0
CYP	0	21	1
DEU	22	0	0
ESP	22	0	0
EST	7	15	0
FIN	22	0	0
FRA	22	0	0
GRC	22	0	0
IRL	0	17	5
ITA	18	4	0
LTU	2	5	15
LUX	0	20	2
LVA	5	5	12
MLT	0	19	3
NLD	22	0	0
PRT	22	0	0
SVK	0	9	13
SVN	22	0	0

Source: own elaboration on AMECO. * The table indicates the number of observation for each country that belong to a given cluster, for example Estonia after 2004 is with cluster 1, Italy too got into cluster 1 from 1999. Countries are assigned to the cluster where the majority of observations belong.