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Inflation differentials : causes and consequences

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Executive summary

The ECB's monetary policy is based on a mandate of price stability, namely below but close to 2 % of inflation in the euro-area as a whole, i.e. the average of the national inflation rates. Although they converged strongly in the last thirty years, inflation differentials still remain. Those differentials are an important type of a macroeconomic adjustment mechanism in response to asymmetric shocks, even more in a monetary union since the exchange rate can't fully play its role. Those inflation differentials follow a core-periphery pattern, with peripheral countries (Greece, Ireland, Portugal and Spain) experiencing persistently higher inflation until 2008. We inquired why and found multiple causal factors.

- First, the process of economic convergence drove inflation upwards because of the Balassa-Samuelson effect and the economic integration leading towards a convergence of price level.
- Second, differences in the market institutions account for different dynamics. Since only few is centralized, there is room for national idiosyncratic developments, i.e. a potential cause of inflation differentials. For instance, level of competition in the goods market is negatively correlated with inflation. In the labor market, institutional features affect the formation of wage and favorable economic evolution induced low unemployment which put upwards pressure of price. The government influence price developments in several ways; management of administrated prices, indirect taxes and fiscal policy. Asymmetric transmission of monetary policy relative to financial market differences led to a more effective incidence in the periphery. Therefore, the pro-cyclical stance of the early 2000s led to overheating and higher inflation.
- Third, imported inflation might generate inflation differentials with different responses to a common shock like an exchange rate movement or commodity price. The share of imported goods and the strengths of the pass-through effect determine the effect of exchange rate on domestic prices, while the composition of import affect the impact of commodity price on domestic inflation.
- Fourth, we find a positive relation between output gap and inflation. Inflation differentials might therefore reflect desynchronized business cycle across Euro Area.

In the presence of inflation differentials, nominal values no longer mean the same things everywhere. At the same time, we must assess inflation differentials in a broader context of imbalanced Euro Area. On one hand, higher inflation implies real appreciation relative to his European partners. Along with wrong products specialization, it caused lower export growth and eventually deficit of the trade balance. On the other hand, higher inflation contribute to dig the current balance in lowering the real interest rates, in a context of already historically low nominal rates (due to reduction of currency risk and mispricing of country risk). Financial liberalization allows large flows of foreign capital into peripheral countries and eventually build-up of external debt. This influx of capital fueled consumption and asset price bubble (in particular, housing). The economic boom resulting from this cheap credit and easy financials conditions was in fine driven by over-optimism and was not sustainable. Neither was the rising indebtedness. The financial crisis of 2008 blew up the dynamics and called for rebalancing.

Unsustainable net foreign liability positions that can only be redressed at substantial macroeconomic costs; since improve productivity is useful but not likely to have quick effect and currency devaluating is impossible within the Euro Area, the burden of adjustment falls on prices and wages. That is, southern countries can restore international price competitiveness and thus their external balances through a prolonged period of disinflation. However, and this is a controversial issue, we argue that this program is doomed to fail in the short-run. Indeed, lower price can't overpass the fact that transition from consumption-driven to an export-driven economy can't happen overnight. The roots of the crisis are deeper than just a loss of price-competitiveness. According to us, the so-called sovereign debt crisis is only the tip of the iceberg. What is really at stake is all the institutional framework of the Eurozone, unable to deal with heterogeneity featured in across Euro Area members. Rethinking its design is necessary to ensure the survival of the single currency, flagship of the European Integration. However, this seems to be a road full of political pitfalls.

1 Introduction

The Maastricht Treaty, signed in 1992, created the European Union and led to the creation of the single European currency, the euro. It defined the mandate of the European Central Bank (ECB) as being "to maintain price stability". Later, the Government Council of the ECB precise the definition of price stability; it's to be understood as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below but close to 2 % over the medium term (Figure 1). This specification makes clear that the focus of monetary policy will aim the euro area as a whole.

This paper questioned this approach. Indeed, Eurozone inflation rate is nothing but the weighted average of national inflation rates. Such average can hide potentially huge disparities among EA members. Is there room for such differentials in a monetary union? Absolutely, since "they play an important role as a macroeconomic adjustment mechanism in response to asymmetric shocks" (de Haan, 2010). Moreover, the monetary union highlights their importance since monetary policy shift or nominal exchange rate adjustment can no longer be used because of the unique currency. The ECB itself stated that inflation differentials are "the product of an equilibrating adjustment process [...] and, as such, are not only unavoidable, but also desirable" (ECB, 2005).

Even if inflation differentials are useful in order to adjust in case of asymmetric shocks and regional economic imbalances in euro area countries, undesirable situations might emerge. If too large, some countries could experience deflation while others experience inflation (Sinn & Reutter, 2001). Deflation is harmful because it destroys real wealth, which, in turn, lowers both consumption and investments. If deflation persists, the country might experiences a deflationary spiral of price declines, and because of the sticky wages, real wages increase, thus profits and outputs fall, and unemployment rises. Another concern is the persistence of inflation differentials, which affect the transmission of monetary policy and eventually price competitiveness. Under these circumstances, uneven price developments across the Euro Area have generated plenty of academic attention.

In this paper, we basically address the issue of a single monetary policy having to deal with heterogeneous countries. In particular, we treat the concern of having an inflation-target based on the Euro zone inflation rate (i.e. the average of national inflation) since such average can hide potentially huge disparities across member states. This paper is organized as following. Section 2 takes a look at the data to check whether inflation differentials exist and their importance. Section 3 looks for explanations for such differentials. Section 4 is interested in the consequences of those inflation differentials, in particular in the context of the ongoing crisis. Finally, section 5 provides the main insights and policy implications.

2 Stylized facts

Figure 2 puts the inflation rates across Euro Area in an historical perspective. As a methodology concern, we'll only consider EA12 in this paper[1]. In addition to a general decreasing, we observe a strong trend of convergence emerging in the period. The massive disparities disappeared; for proof, the range between the highest and the lowest rates fell from 19.2 % in 1980 to 2.1 % in 1999. In the 90s, this movement seems to accelerate in the run-up to EMU. An historical reminder proves useful here. The Maastricht Treaty, mentioned previously, set out the blueprint for the EMU. In particular, it established five convergence criteria which need to be complied with in order to adopt the euro. One of them required that inflation shall be no more than 1.5 % higher than the average of inflation rates in the three EU member states with the lowest inflation. This aimed to harmonize monetary policies across Euro candidates at the dawn of monetary union (for a smooth transition). As a result, getting a grip on inflation was a necessity for whoever wanted to be part of the EMU. Improvement of policy-making and discipline were thus required. Greece didn't meet the criteria for 1999; this explained why Greece followed the convergence with lag, due to his later arrival in EMU.

Turning now to the period that interests us, e.g. since the introduction of the single currency, we must acknowledge the fact that a single monetary policy doesn't imply a single inflation rate. On the contrary, inflation differentials still exist and can be quite substantial (of course not of the magnitude of those in the 80s, but still significant). For instance, average inflation was 1.63 % in Germany and 2.82 % in Spain on whole the period. Is there any indication about the trend; i.e. evidence of further convergence, or divergence, or having reached a new equilibrium? Figure 4 provides mixed results about a hypothetical convergence. Inflation rates did tend to congregate until 2007. But ever since, it's hard to tell. On the whole period, standard deviation fluctuates but stays close to 1 %. A key question is the nature of those differentials: Do they result from idiosyncratic movements or do we face a structural phenomenon? Are they lasting or just passing? Intuitively, we are tempted to separate the so-called core and periphery. Figure 5 displays the result. This aggregation is clearly interesting, and arouses two observations:

- A strong core-periphery pattern emerges, which lead us to claim that this is a structural phenomenon. Southern countries have persistently higher inflation. National idiosyncrasies couldn't explain a so regular scheme. The data suggest that peripheral countries, less developed, faced higher inflation and core countries, more developed, lower inflation.
- This pattern occurs until 2008. The financial crisis hit everybody and induces deflationary pressure for both subsets. What happened ever since? If it marked the end of two distinct path of inflation, we've stated earlier that this doesn't mean convergence (disparities went from "between" to "among" subset).

Anyway, we need to explain those two phenomena.

3 Causes

Now that we have underscored the existence of inflation differentials, we need to explain them. Since inflation is a complex phenomenon, it should be clear from the start that there is not one factor, but rather a range of potential explanations (moreover in a monetary union as large as the Euro Area). The point of this section is to identify them, and if possible to bring out

[1] That is, the first adopters of the euro (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain) plus Greece who joined in 2001. We then exclude the last adopters (Cyprus, Estonia, Malta, Slovakia and Slovenia). We justify this approach by the fact that they only joined recently the Eurozone (between 2007 and 2011), meaning it is too soon for new dynamics due to the monetary union to fully emerge. Furthermore, the financial crisis may have disturbed the data during this period.

evidence. We have constituted four families of causal factors. Namely, the Euro-Area factors, the national factors (themselves being separate as internal or external) and the business cycle. Last subsection focuses on the results and draws the big picture.

3.1 Euro-Area factors : integration and catch-up process

From the start of EMU, all members didn't feature the same level of economic development. Figure 6 illustrates this statement and provides an interesting relationship; Low-income countries experienced higher inflation rate on average during the period 99-07. If this phenomenon is clearly not specific to the Euro Area, we can't attribute the differentials to different monetary policy stance here. Economic theory provides an argument to explain this observation; the Balassa-Samuelson effect.

Since many economists think that it is the main cause of inflation differentials in the Euro area, we must understand it. The Balassa-Samuelson effect relies on the comparison of the growth of labor productivity between the tradable and the non-tradable sector. We shall then define those notions (especially as the distinction will come back later in the paper); the tradable sector of a country's economy represents the goods and services that are -or could be- internationally traded. The non-tradable sector, unlike the tradable sector, is made up of the sectors whose outputs, both goods and services, cannot be traded. As a matter of fact, most manufacturing products belong to the tradable sector, while most services like education, construction, retail, etc. belong to the non-tradable sector. Therefore, the non-tradable sector is commonly referred as the services sectors. The main difference between those two sectors is how the price is determined. Indeed, as a tradable good or service can be internationally traded, the law of one price should apply, meaning that it should cost the same amount wherever it is bought. Otherwise, arbitrage is possible. Tradable goods' price depends therefore of global supply and demand. In comparison, the price of a non-tradable service is determined by the local or national supply and demand.

The Balassa-Samuelson hinges on differences in labour productivity growth between the tradable and non-tradable sector. It then supposes that this growth is generally higher in the tradable sector. Since the price is set world widely, those productivity gains lead to higher wages (without modifying the unit labor cost). With labor mobility between sectors, higher wages are accordingly constraint in the non-tradable sector. But since this raise is not offset by higher productivity, it means that the price of goods in the non-tradable sector has to go up (since unit labor cost has risen). Therefore, countries with a large difference between labour productivity growth rates in the tradable and non-tradable sectors will experience higher inflation rate. The Balassa–Samuelson effect is often associated with the process of convergence in living standards across economies: countries that are in the process of catching-up normally display strong productivity growth in the tradable sector, while productivity developments in the non-tradable sector are normally more similar across countries. This effect exposed developing countries to a higher inflation rate until their productivity level converges to the productivity level of developed countries.

While the B.-S. effect concerned the non-tradable goods price, it can be argued that convergence in price also happens in the tradable sector. Indeed, the law of one price mentioned earlier technically holds in absence of any distortions. This never happens in reality. However, the market liberalization and integration monitored by the European Commission had dampened some distortions (like tariffs, etc.). Further, a single currency suppresses exchange risk, reduces transaction costs and offers greater price transparency. Combination of those processes is likely to foster trade and competition across the Euro Area. Droop in distortions in European market makes the law of one price more binding and allows thus mere convergence of price in

the tradable goods (i.e. differentials in inflation rates until full price convergence).

3.2 Internal factors : institutions and economic policy

Although strong, the process of "Europeanization" - that is currency union, economic integration, strengthened political coordination, etc. - is still far from complete. As corollary, it means that there is still much room for national idiosyncratic developments. As market-based economies, price-setting is the result of the contact between supply and demand. We must therefore consider the national institutional features, in the largest sense, in order to apprehend inflation across Europe. Indeed, differential institutional characteristics influence wage developments, production costs and profit margins. We are therefore interested in the goods and labor markets institutions. At the same time, we must highlight the role of economic policy as a fine-tuning role for the economy.

a. The goods and the labor market institutions

Institutions are to be taken in a large sense and include the level of competition, public intervention, regulation, etc. Since this is where prices are set, it is from first-order to understand how institutions can affect inflation. We focus here on competition, for which Przybyla and Roma (2005) highlighted the role for price dynamics. Using mark-up as proxy, they showed that higher competition leaded to lower inflation rates (as it gets harder to raise his price in presence of many competitors). Borg (2009) inquires on the level of mark-up across EU, and finds considerable cross-country and cross-sector heterogeneity. This can be surprising with the single market and the common competition policy monitored by the Commission. However, those concern mainly the tradable sector. Anyway, the author finds out that the level of mark-up in an economy is "negatively related to the size of the economy, to the level of development, and to the degree of openness of the economy." Size and/or openness would indeed increase the number of (potential) competitors, while development (GDP per capita as proxy) would go with aversion for monopolistic structures and taste for diversity (presence of substitutes). Precisely, Greece and Portugal match those criteria by being small, poor and relatively closed economies.

We must also study the labor market contribution to inflation via his role in wages-setting. Labor market institution includes wage bargaining, employment protection, unemployment compensation and minimum wage, etc. This is not a European competence, therefore each Member State of the European Union has its own system. Jaumotte & Morsy (2012) argue that labor market institution played a major role in the persistent inflation differentials in Greece, Portugal and Spain. They estimated that their rigid labor market institution contribute to 0.7 % on average per year. In their words, "Inflation is more persistent when employment protection is high, collective bargaining is characterized by intermediate coordination, and union density is high. Those give more market power to the workers to negotiate increases in their wages that compensate for inflation and thereby contribute to future inflation." The presence of indexation[2] may also hamper the process of adjustment as it includes rigidity. Besides, it may account for the persistence of inflation since the companies willing to keep their profits unchanged raise their prices, causing automatic indexation of wages to the prices, the wages heighten and so on. In addition to the institutional context, wages also depends on economic environment. In particular, wages should normally respond to unemployment. When unemployment is low, competition between firms to hire becomes fiercer and drives wages upwards. On the contrary, high unemployment implies moderate wage growth since there are many unemployed competing for jobs. Those are normal sequences of a competitive labor market. Okun's law links employment with output. As

[2] Automatic indexation of wages to inflation occurs in Belgium, Luxembourg, Spain and Finland.

it appeared, output growth has been higher in periphery and this is reflected in unemployment until 2008 (figures 7 and 8). As expected, the relation between wages and unemployment is negative (as pointed out by the correlation factor), in line with the Philips' curve. Favorable economic evolution in Spain, Italy, Greece and Ireland led to a constant reduction of unemployment and to upwards pressure on wages. Portugal, who experienced an economic slump (Blanchard, 2006), saw labor cost rising although rising unemployment. In Core countries, lower growth and structural reforms led unemployment to rise and wage moderation.

Price and wages are usually correlated but their relation is kind of ambiguous. Presumably, a price/wage spiral is likely to occur with one bolstering the other and vice-versa. This situation relies greatly on expectations; if workers expect high inflation in the future, they will ask compensation to match these prices (thereby protecting real incomes). Those wage growth mean higher cost for firms, which are likely to be passed to price. Such self-fulfilling expectations contribute to persistence of inflation.

b. Fiscal policy and the role of national government

Aside from those market mechanisms, some prices are set either by legal statute or by a standard procedure formulated as an official policy. Come to mind the water supply, public transport, pharmaceutical products, cultural services, electricity and gas, etc. Those administered price represent 11 % of the HICP basket (euro area average) with differences going from 5 % in Finland to 23.6 % in Portugal (Fritzer, 2011). Management of those goods and services price is led to the national government discretion. This must however be relativized since those prices can only affect inflation rate significantly on rare occasion like health or education reforms. Moreover, those represent one-off factors, which can't explain persistent differentials. Similarly, change in indirect taxation like VAT should affect inflation but with short-lived impact. Therefore it has not been a driver of inflation. For instance, fiscal consolidation in 2011 gave rise to higher VAT rates (2.5 % on average) in GIPS countries while this has not (yet?) happened in Core countries. Those uneven developments have probably affected inflation in 2011, with declining effect thereafter. However, it can be argued that indirect taxes are likely to play a bigger role in the future with the general tendency to rebalance the fiscal burden from direct to indirect taxes in order to reduce labour costs.

National government can also affect inflation via fiscal policy. Indeed, it remains largely decentralized in Europe today (EU budget represents only 1 % of GDP). To ensure fiscal discipline, the Stability and Growth Pact (SGP) forbid deficit over 3 % of GDP (and public debt over 60 %). However, it proved not binding as Germany, France and others did not satisfy the criteria in the early 2000s. Simply plotting fiscal policy with inflation provides weak results (Figure 9). This doesn't mean the absence of relation, as composition of taxes and expenditures might matter, as much as the cyclical context (which is to be discussed later). Regarding our situation, Ireland and Spain generated fiscal surplus on the period while Greece and Portugal faced recurring fiscal deficit. It is therefore hard to draw any straight conclusions here.

c. ECB, Financial market and the transmission of monetary policy

Central Bank ⇒Financial System ⇒Real Economy

The banking sector and more broadly the financial system is the channel of implementation of monetary policy. All the tools of the ECB (interest rates, open market operations, reserve requirements, etc.) affect the economy through the financial system. As a one-size-fits-all monetary policy, the decisions taken must be applied for the EA as a whole. We wonder if

the implementation is uniform as well or if asymmetric transmission could happen through the financial sectors. If it was the case, interest rates proposed to households and firms wouldn't be in line with the short-term rates set by the Central Bank. Asymmetric transmission occurred precisely because of inflation differentials. In the presence of common nominal interest rates, they imply unequal real interest rates across Eurozone. In particular, they are lower in peripheral countries. Lower real interest rates reduce relatively the cost of borrowing and the benefits of sparing. This leads to a credit and economic boom, which put further pressure on inflation. The section on consequences will get back deeper on this argument, but we should keep on mind the circularity process : high inflation could be self-reinforcing.

Another asymmetric transmission occurred through different workings of the financing of the economy across Europe (Artus, 2012). Credits are accorded to households and firms mainly with fixed interest rates in the North and with variable rates in the South (Figure 10). It implies that monetary policy is more effective in Periphery as the interest rates adjust quickly to the money market rates. The process is slower with the Core because of contract rigidity. Figure 10 also displays the interest rates paid by households and firms relatively to the Repo rates (set by ECB). We can observe a higher sensibility in Italia and Spain, while French and German rates are less dependent on Repo dynamics. In the beginning of the 2000s, the threat of recession in the core countries leads the ECB to engage in loose monetary policy (as recession is a threat for price stability). This expansionist stand affected more southern countries than the north, which bolster their growth rates as more and more people get accessed to credit. Again, this credit boom put pressure on inflation rates, generating inflation differentials.

3.3 External factors : exchange rate and trade patterns

In a globalized world, inflation also depends on international factors, e.g. the price of imported goods which affect directly the consumption basket of domestic consumers. Imported inflation might generate inflation differentials with different responses to common shock (exchange rate or commodity price). The share of imported goods and the strengths of the pass-through effect determine the effect of exchange rate on domestic prices, while the composition of import affect the impact of commodity price on domestic inflation. We consider those three aspects.

Degree of openness, representing the size of the import sectors, is relevant for domestic prices as it exposed more or less the price index to exchange rate shocks. It appears that degree of openness is very heterogeneous across EA12[3] (Figure 11), thereby generating different levels of exposure. Specifically, a depreciation (appreciation) of euro that is, higher (lower) imports price, would bolster (hinder) inflation in countries that import more. If the size of imports with respect to non-Euro Area members matters, it can be argued by extension that geography also matters since trade flows still rest greatly on geographical distance. Regions on the edge of the Euro Area would then be more exposed to extra-trade and then their inflation more dependent on the exchange rate. The data don't infirm this hypothesis, since Spain, Italy and Greece imports relatively most outside of EU than average. The Dutch first place should be understood by its prominent role as port platform.

The pass-through effect, which is the percentage by which import price rise when the currency depreciates by one percent, depends on the pricing behavior of foreign firm. For instance, a US firm may decide in response to a euro depreciation to lower its $-price in the same proportion in order to stay competitive in Europe (this maintains the euro-price unchanged). This illustrates

[3]Because of unavailability of data for extra-EA trade, we use extra-EU data. Figure 11 shows the percentage of extra-EU imports relative to total imports. We are full aware of the loss of precision due to the omission of UK,Sweden, Denmark, etc., but we assume that those data reflect, at least partially, the heterogeneity in extra-EA imports.

the potential absence of reaction of domestic price to the depreciation. In fine, the pass-through effect depends on competition and regulation devices. Campa, Goldberg & Gonzalez-Minguez presented an empirical analysis of transmission rates from exchange rate. They find estimates of exchange rate pass through in EA12 ranging from 0.56 to 1.04. Such heterogeneity implies asymmetric price responses to a common exchange rate shock. It is worth mentioning the absence of Core-Periphery pattern.

Finally, the composition of imports conditions the impact of commodity price on domestic prices. It might reflect economic specialization and/or consumption patterns, and eventually provoke inflation differentials. For instance, a country specialized in renewable energy production would be partly immune from increase of oil price, while others would endure inflationary pressures. To test the impact, we use the energy dependency (proportion of energy that is imported). We find a loose but non-negligible relationship (Figure 12); the more the dependency, the higher the inflation.

However, those external factors haven't the reputation to be major drivers of inflation (see Arnold & Verhoef, 2004). Moreover, volatility of exchange rate and oil price prevents from establishing clear and explicit relationship with inflation.

3.4 Cyclical factors : business cycle

Inflation differentials in a monetary union may also arise if countries' business cycles are not synchronized nor have very different scales. We can indeed expect booming economies to experience higher inflation, and lower inflation in economies growing below potential. To measure the business cycle, we use the output gap which is the difference between the actual GDP and the potential GDP. If the output gap is positive, it means that the economy is outpacing its potentials which would induce inflationary pressure. If it is negative, the economy runs under capacity and produces downward pressure on inflation. Figure 13 plots the relationship between inflation and output gap. As predicted, the relationship is positive, but quite weak.

So, if we agree that the differences in inflation across the euro area countries are partially explained by the output gap, we must ask ourselves about the difference of business cycle across countries. Figure 14 exhibits the average output gap for the 1999-2007 period and reveals heterogeneity. High business cycle might explain higher inflation for Spain and Ireland but not for Greece and Portugal. Low business cycle hampered increase of price in the traditionally low-inflation countries like Germany, Netherlands and Austria.

3.5 The big picture

To recap our findings so far, we have found multiple reasons to explain inflation differentials. Most of them justify higher path of inflation in Greece, Ireland, Portugal and Spain. Namely[4], convergence, low rates (more on this later) leading to economic boom (high real growth, GDP over potential, low unemployment, higher wages), more rigid labor market and higher external exposure (at the margin). It can be argued that inflation differentials reflect basically different economic shapes. Further, we noted the persistent as well as self-fulfilling and potentially self-reinforcing natures of inflation.

[4] All the causal factors don't account uniformly across the countries. All over the paper, we consider the periphery as one. If similarities do exist, we still use a shortcut (Gros & Alcidi, 2010).

Optimum currency area theory focused on asymmetric shocks when addressing currency union sustainability. We found out that asymmetric structures are as important, if not more. Even symmetric shock can trigger different response thanks to national features, such. Indeed, we have argued that even monetary policy or exchange rate movement (that is, common shocks) had different impact across the Euro Zone. Accordingly, we identified two mechanisms justifying inflation differentials: asymmetric shocks (fiscal policy, institutional framework, economic specialization) and common shocks with asymmetric transmission (monetary policy, exchange rate). We argue that inflation differentials were endogenous to the monetary union. Since it may have been predicted, we have to spot whether those are harmful or not. Examine their consequences will give us insights about their (un)desirability.

4 Consequences

In the previous sections we have tried to identify the causes of the inflation differentials among the euro countries. We are now going to discuss about the consequences of those inflation disparities, and more precisely, what does a higher – or conversely, a lower – than average inflation rate implies in respect with the domestic demand and the exports.

In the first part, we will to talk about the impacts of inflation differentials on price-competitiveness through the change of real exchange rate. We will also briefly examine the effects of the emerging countries on the loss of competitiveness. In the second part, we will observe the consequences of the inflation disparities on the savings and the incentive to borrow, through the real interest rates. Therefore we will analyze the current account imbalances in regard to the two first parts and explain why higher inflation leads to deficit in current account. Finally, we will study the financial crisis and try to come up with some adjustments to the unsustainable external deficit.

4.1 On price-competitiveness through the change of real exchange rate

As said earlier, level of inflation of a certain country in relation to the average inflation affects significantly its competitiveness. In particular, countries with higher-than-average inflation rates experience real appreciations, i.e. suffer a loss in competitiveness in comparison with other countries. Figure 15 shows the constant appreciation of peripheral countries. The opposite also stands; countries with relatively low inflation rates become more competitive. The result is that export demand in countries with higher inflation rates is inclined to decrease, which has a lowering effect on prices in these latter countries. Conversely, export demand in lower inflation rates' countries tends to rise, which has a surging effect on prices in those countries. This appreciation should have had adverse effects on activity as export should weaken. This countercyclical adjustment hasn't happened in the booming periphery. Papademos (2007) suggested two explanations; adjustments take time to materialize, and it could have been offset by favorable effects, as "substantial interest rate decreases in the run-up to EMU, EU structural funds support, immigration flows and financial liberalization." At the time, he also specified that those circumstances were unlikely to persist, and urges national government to take measures. A critique, addressed by Felipe & Kumar (2011) and Estrada et al. (2012), is that price does not make anything and hides the non-price competitiveness. As often related to Germany's, the ULC failed to capture differences in quality of the products (which can justify differences in wages). The bigger picture of competitiveness contains human capital, infrastructure, product market regulations, the legal and institutional framework, taxes, etc.

Another factor that explains the loss in price competitiveness of exports from the EU can be

found in the emerging countries that are able to offer low-cost goods and therefore, strengthen the competition. The chart below shows the degree of overlap in export specialization with China. As we can see on the graph 16, the four countries that share the most their exports specialization with China are Portugal, Spain, Italy and Greece. Not surprisingly, those countries appear to have the worst current accounts among the EU members but we will see the current account imbalances furthermore in the section 4.3. From this point, we can easily conclude that countries that shared the most their exports with the emerging countries suffered a loss in competitiveness and thus a loss in their current accounts.

4.2 On saving and investment through the real interest rates

In this section, we look at the financial evolution in the periphery. Figure 17 puts together investment and saving, as % of GDP, since 1999. We observe a steady decreasing of savings of the peripheral countries, constantly lower than investment. This decrease is due to low interest rates and expectations of higher income in the future. In the north countries however, the savings remain above the investments. Since the real interest rate influences the aggregate demand and in fine the inflation rate, the inflation rate plays a crucial role in a country's savings.

As mentioned, the interest rates play the main role. A low interest generates two effects; on one hand, less incentives to save and, on the other hand, the reduction of the cost of borrowing. As a consequence, the investment and the consumption are boosted and the aggregate demand increases too. As mentioned earlier, there is potentially an interest-inflation spiral where lower the real interest becomes, higher the inflation goes. Difference between investment and saving is filled in by foreign capital. Financial liberalization and deregulation provide all the capital available; no restrictions could prevent the capital to flow freely. It results in easy financial conditions, with low rates. We must talk about the evolution of interest rates.

Strong convergence occurs among national long-term interest rates in the run-up to EMU (Figure 18). Clearly, peripheral countries experienced the sharper decrease. Three arguments can be made. First, the introduction of the euro suppresses the exchange risk premium on interest rates as a strong currency such the euro would be more stable, less volatile. Second, the virtually absence of spread reflected the fact that investor judged any EA members as equally creditworthy. Financial markets failed to recognize that introduction of euro did not necessarily eliminate sovereign and country risk (confusion of exchange risk premium with credit risk premium). One might respond that bailout was implicitly expected; Southern euro area governments and countries may have been considered riskier than their northern euro area counterparts but financial markets could expect the EU to bail out southern Europe in case of serious trouble (effectively eliminating the sovereign risk premium to almost zero). Although bailout is explicitly forbidden by the Maastricht Treaty, it is indeed hard to conceive European countries letting a partner go bankrupt without doing anything. This moral hazard issue may have blurred the appreciation of national solvency. Anyway, this lack of market discipline led to a failure of assessing risk and thus his mispricing. Third, since nominal interest rates were equals in every country within the EA, inflation differentials generate disparities in real interest rates. Therefore, member countries that experience a relatively high inflation rate will have a lower real interest rate. Inflation amplifies the low rates issue. The three factors are related to the monetary union, and resulted in the spread between investment and saving, meaning inflows of foreign capital.

To sum up the last two sections, we can say that a country with higher than average inflation rate will see its price-competitiveness fall because the national goods become relatively more expensive, which in turn makes the prices going down again due to the decline of the exports. Meanwhile, if a country has a higher than average inflation rate, its real interest rate decreases, which in turn makes the prices even higher than its first level due to the rise of

the investments and the drop of the savings. In conclusion, both assumptions lead in opposite direction so it leaves us with an ambiguous and unknown result on prices.

4.3 Emergence of unsustainable external imbalances

The last two sections advanced arguments which put pressure on the national current balances. As a result, substantial and persistent imbalances developed in current accounts across the Eurozone countries (Figure 19). Core countries generated important surplus and peripheral countries saw steady deteriorating deficits (Figure 20). Those external imbalances reached magnitude never seen in history for developed country. Such extremes have been made possible by deregulation, liberalization and integration of the European financial sector, which allows huge cross-border capital flows. As we have seen, current surplus (deficit) means lending (borrowing) to other countries. As a result, recurring deficits come down to accumulate an external debt (vis-à-vis the rest of the world). Figure 21 shows the evolution of external position: Peripheral countries pile net foreign liabilities and Core countries net foreign assets. It is worth affirming by the way that such indebtedness would not have been possible without the low rates resulting from the single currency.

In itself, current deficit is not a problem. Better; it might reflect the result of an efficient allocation of resources (which is desirable); capital should be used for the most efficient projects, and therefore flow towards low-income countries if they have better prospects. Current imbalances might then be the natural consequence of a convergence process. More efficient allocation of resources was by the way the precise goal of financial deregulation/liberalization. In allowing capital to flow freely, it promoted external imbalances. Expected convergence of periphery fostered capital inflows; prospect of economic growth and productivity gains would indeed attract foreign capital in search of higher returns. At the same time, periphery inhabitants would reduce their savings with expectations of higher income (the role of expectations must be highlighted, as we shall see). The recipe is thus complete; we have borrowers and lenders likely to find common ground.

The problem is that such convergence was much weaker than expected. Foreign inflows were used to finance consumption and to fuel the housing bubble and not in innovation, raising capacity, high-growth firms, etc. As a result, GDP growth reflected higher (unskilled) employment, while productivity didn't improve much. At least, not enough to justify the amount of debt. This means that they were accumulating debt that they could not afford. Economic agent had been over-optimistic about the future. Current imbalances may have reflected convergence but they were becoming unsustainable. At the same time, they were rising. This is the situation where we stood in 2007, at the dawn of the financial crisis.

4.4 The financial crisis and the burst of the bubble

Rising external imbalances created dependency on foreign capital. The need for capital inflows led them vulnerable to the financial crisis of 2008; Doubts about solvency and risk aversion caused inflows from northern countries towards southern countries to freeze. This is equivalent to the phenomenon of "sudden stop", for which Silvia Merler and Jean Pisani-Ferry (2012) observed three waves in the periphery. Namely, during the financial crisis, in the spring 2010 (agreement over IMF/EU program for Greece, with contagion effect over Portugal and Ireland) and at the end of 2011 (generalized panic over the whole Euro Area). That is during intense distress in the financial sector. This loss of confidence in GIPS countries led even sometimes to a reversal, by fear of default over the debt. Such reallocation of portfolio reflects the "flight to quality" phenomenon, as investors sell what they perceive to be higher-risk investments (Periphery' asset) and purchase safer investments (Core' asset). This implies higher (lower) interest rates in the

periphery (core), which explains the progressive divergence of interest rates on sovereign debt (with the re-emergence of country risk). At the same time, the Eurosystem subdued the process by substituting private funding by public finding through the TARGET2 accounts (Figure 22). In turn, this allows the current account to land smoothly (relative to abrupt adjustment like what occurred in Baltic countries).

On the inside front, indebtedness from households and firms turned definitely into insolvency when housing and asset prices fell and interest rates soared. This caused distress in financial sector (in addition to the freeze of the interbank-market), which eventually needed to be bailed-out. As it turned out, public debt explosion (Figure 23) is largely the legacy of excessive private debt, and not of previous unsound fiscal policy (at least in Spain and Ireland). Thereafter, the fiscal situation is hampered by the economic recession, driven by deleveraging, loss of confidence, tightening of credit access, higher interest rate and the adjustment process (more on this later). The former driver of growth, namely over-optimism and low rates, are gone. Moreover, the pro-cyclical nature of the policy-mix magnifies the recession (high interest rates and fiscal consolidation). Inflation differentials and lack of flexibility may have even worsened the crisis, with inflation keeping up in 2008 and 2009 despite the onset of the crisis. As a result, this prevented a quick adjustment of wages and prices to the new economic conditions, imposing a higher real cost on the economy.

Nowadays, public debt crystallizes all concerns in the whole periphery. However, the so-called "Sovereign debt crisis" is misnamed as public debt is just the tip of the iceberg. What is more at stake is the design of the Eurozone, unable to address the issue of heterogeneity across Europe.

4.5 The controversial adjustment process

Unsustainable net foreign liability positions that can only be redressed at substantial macroeconomic costs. Moreover, adjustment mechanisms are scarce and costly in the euro area. Improve productivity and competitiveness (as advocated by Jaumotte and Sodsriwiboon, 2010) is useful but difficult and unlikely to have short-term effect. Structural reforms that have been set up won't bring results before a few years. Moreover, the even nature of currency union prevents the southern countries to devaluate their exchange rates in order to gain competitiveness. Without productivity gains and without devaluation, the burden of adjustment falls on prices and wages that need to fall and real interest rates that need to rise in southern relative to northern Europe. That is, southern countries can restore international price competitiveness and thus their external balances through a prolonged period of disinflation. Such a process is accompanied by a painful period of economic contraction and will take a number of years to resolve. Figure 7 illustrates the adjustment taking place with a growing unemployment and falling wage.

However, if necessary in the long-run, this process is doomed to fail in the short run. Since everybody is deleveraging at the same time, consumption and investment plunged. Therefore, imports don't increase anymore. Indeed, we observe most of the adjustment occurring through fall of aggregate demand. For instance, improvement in the Spanish trade balance results from imports stagnation rather than boom in exports (Figure 24). If export sector is surely hampered by sluggish European economic situation, there is more to the story. As noted previously, peripheral countries such as Spain or Ireland based their growth on sectors like construction and building that is, non-tradable sectors. Transition towards an export-driven economy can't happen overnight. Even strong intern devaluation can't overpass this fact. Especially as peripheral countries experienced des-industrialization, that is smaller tradable sector and lower export capacity. Figure 25 explicits the rise of service and construction (before 2008), while the industry

represented less and less of the total value added. Time will be needed to see if the small rebound of industry in 2010 is durable or only the mechanical effect of lower dwelling building. Anyway, the point is that lower price can't hide the structural weakness; small tradable sector, low-end specialization, low productivity gains, etc.

While public discussion currently has focused almost exclusively on adjustment of the weaker countries, some economists have claimed that the stronger countries should also contribute. Indeed, actual adjustment programs are unsustainable and threaten social cohesion with record unemployment and impoverishment. Besides, core countries benefited from external imbalances as they could export more goods and lend more money. Further, excessive borrowing is the counterparty of excessive risk-taking from the north. There is thus a joint responsibility to the actual crisis. Core countries should share a part of the burden, for example by slowing (or even reversing when possible) their fiscal consolidation or by raising the inflation-target of the ECB. Since competitiveness is a relative concept, higher wage in the North would help to soften the adjustment in the South. Lower inflation rate than average would be facilitated if the average was higher. However, this is unlikely to happen because of the political infeasibility.

5 Conclusion and policy implications

Inflation differentials are a natural phenomenon in monetary unions. Indeed, the absence of exchange rate movement – and low labor mobility in EA case – highlights the importance of the price as a channel for adjustment to asymmetric shocks. As stated earlier, such asymmetric shocks come either from shocks specific to one country or from a common shock unevenly transmitted because of different economic structures (fiscal and wage policies, market rigidity, economic specialization, different stages of the business cycle, etc.). As far as the Euro Area is concerned, inflation differentials results of multiple factors; structural as cyclical, temporary as persistent, market- as policy-related, etc.

This paper identified factors that help to explain the build-up of inflation differentials across euro area countries during the pre-2008 period and those that were at work during the period of "rebalancing" after 2008. From our stylized facts, we found out a marked periphery-core scheme with GIPS countries experiences constantly over-the-average inflation rates. All over the paper, we have tried to exhibit the fact that inflation dispersion was only but a reflection of a larger phenomenon of imbalance across the Eurozone, reflecting structural heterogeneity. Indeed, most of the underlying factors explaining higher inflation come from different economic dynamics at play, including convergence.

Such disparities in inflation rates across Eurozone challenge the policy-making of the ECB. To get the official stand, we selected a speech given in 2007 by Lucas Papademos, Vice-President of the ECB at the time.

> *Needless to say, but I will say it anyway to make it abundantly clear, the single monetary policy cannot address the ULC growth and inflation divergences in individual countries. And since it cannot do it, it should not attempt to do it and it will not do it. [...] Having said that, it is evident that structural reforms, wage-setting processes and budgetary policies must contribute to reverse competitiveness losses in individual euro area countries*[5]

This means that the ECB is considering literally his mandate by only taking care of EA-wide inflation. Since the central bank lacks instruments to implement differentiated monetary

[5] Papademos (2007)

policies, it declines responsibility and leaves the management of inflation differentials to the national authorities. Understanding the size, persistence and determinants of inflation differentials is nonetheless useful to properly assess area-wide inflation dynamics for the design of monetary policy (ECB, 2012).

Anyway, the persistence of remaining inflation dispersions had come with cost dispersions and diverging external positions. The financial crisis of 2008 blew up the unsustainable dynamics and called for rebalancing. Ever since, developments in inflation differentials appear to be mostly related to changes in national policies aimed at reducing imbalances. Although it is has turned into a so called Sovereign Debt Crisis, we argue that this is just the tip of the iceberg, hiding structural heterogeneity across the Euro Area and weak European governance.

The weak institutional context appeared insufficient through the crisis. During his presentation, Larch talked about the failure of the Great Moderation Paradigm (Larch, 2012). Most likely, this is the inadequacy of European governance with the heterogeneity of Euro Area countries. Surely, this is the reflection of the fact that the euro area was not an optimal currency area from the start. Participating countries differ with respect to economic structure. So, when the ECB advocates only but more price flexibility to facilitate adjustment (ECB, 2003), we argue it misses the point and did not address the fundamental issues.

We do claim that most of the actual troubles are related to the single currency. For instance, indebtedness of this magnitude - the root of the crisis - would not have been possible without the euro. This does not mean that the euro is a bad thing per se, but rather that his design was inadequate and fundamentally flawed (See for instance De Grauwe, 2011 and 2013). No mechanisms were put in place to deal with issue of this type. As said by Larch during his presentation:

> *There was insufficient EU capability (de facto) to enforce fiscal discipline of Member States (SGP), no possibility to monitor and enforce implementation of policies to address identified macroeconomic imbalances, no established sovereign debt crisis resolution mechanism for euro-area member states, no integrated European supervisory and regulatory architecture for financial institutions despite rapid financial market integration, fragmented national regulations and supervisory frameworks, no macro/micro European supervision or resolution authority.*[6]

Rethinking the Eurozone is necessary to ensure the survival of the single currency, flagship of the European Integration. However, this seems to be a road full of political pitfalls.

[6] Larch 2013

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