



European economic convergence: Twenty years later

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Abstract

Real convergence in the member countries of the euro area has not carried out as expected. Even though the *subprime* crisis was a trigger, the current crisis is most likely due to factors related to the implementation of the monetary union in itself. In particular, the differences in real interest rates and in credit to the private sector seem to explain much of the overall movement towards more heterogeneity. However, labor costs that are often regarded as a cause for the crisis do not seem to be an important source of divergence. In addition, productive activities are polarizing in the EMU because of increasing returns to scale and externalities associated with the creation of a large single market. Paradoxically, the Structural Funds that are supposed to support the development of infrastructure could have increased these differences by facilitating trade between countries at the heart of the euro area and countries in the peripheral areas. Nevertheless, the influx of capital to the countries catching up to other euro area member countries remains effective as long as the convergence objective is maintained. In this case, the Structural Funds or other similar structures may be a trigger for productive investments.

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1. Introduction

The Economic and Monetary Union (EMU) was created with the intention to build an harmonious European Economic Area. This goal required prior compliance with convergence criteria in the Maastricht Treaty (1992). In the 1990s, all the members underwent a convergence of inflation rates, interest rates and exchange rates. Even though some differences in debts and deficits persisted, the real interest rates converged very quickly towards the German rate, the lowest rate at the time.

The cuts in risk premiums (inflation risk, currency risk) should have led to a real convergence between member countries. Together with the free movement of capital, a nominal convergence should have resulted in more productive investments in countries that were previously poorly endowed with capital. This should then have led to higher productivity and higher wages in these countries while remaining competitive and thus also stabilizing their current accounts. The European Commission believed in this optimistic view regarding the outcome of integration. Although real convergence, including adjustments in the southern countries of the EU, was first identified in the 1990s, today it is clear that this scheme did not work. Instead, real divergence between countries can be observed. Among the many reasons behind this that have been studied in various literature, this paper identifies at least two of them.

Several authors emphasize that the real divergences within the EMU are paradoxically the results of the nominal anchor itself. Ever since the monetary area has been in place, the single monetary policy has led to diverging real interest rates, which in turn has caused very strong credit growth in some peripheral countries. At a time of adjustment, the differences created in the current accounts are not in themselves alarming and will most likely be transitional. Instead of being sources of productivity, credit inflows have fueled asset bubbles in shares and real estate, sources of financial instability. These differences in credit flows appear to be a much better explanation of current account imbalances between member countries of the euro area than labor unit costs.

Other authors stress the idea that the monetary union will increase, rather than decrease, the differences between European regions. Economic integration will promote the concentration of economic activities. This increased concentration will make European regions more sensitive to idiosyncratic demand and technology shocks. Therefore, these idiosyncratic shocks, combined with factor mobility, induce divergent growth paths between the European regions (Krugman, 1993).

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The explanations of the crisis in the euro area today are not exhaustive, but such divergences certainly play a role and are today exacerbated. If the ambitions to sustain and continue the euro area remain, what are the mechanisms put in place to address the urgent situation? What is the cost of achieving real convergence? To respond to these two questions, we will need to define the instruments (and its governing structure) that must be mobilized in order to achieve this.

2. In the early 1990s, the European Commission emphasized the important benefits of a monetary union, but did not deny the potential costs

According to the European Commission, the prevailing idea in the early 1990s was that nominal convergence would improve the overall environment for investment and growth (CE, 1996). In an economic area in which exchange rates are irrevocably fixed and in which inflation rates are low and nearly identical, the risks are lower. Thus, real interest rates in the various countries should converge towards the interest rates found in the countries with the lowest rates. Other authors, such as Winkler (1995), note that these nominal criteria can function as signals, an indicator that a sound economic policy is in place. Wyplosz (1997) interprets them as a force of stability: the single currency will only be stable if these nominal criteria are respected.

However, this optimistic vision of creating a monetary union between European countries is opposed by at least two types of criticism. One of the criticisms, based on the theory of optimum currency areas, points out that the countries only meet a handful of the criteria for the establishment of a monetary union. The other one, based on the theory of the New Economic Geography (NEG), shows the monetary union's pernicious effects caused by the polarization of industrial activities and increased inequalities between countries. A report prepared by the Directorate General for Economic and Financial Affairs (European Commission) attempts to assess these potential costs against the benefits of a monetary union from an academic point of view. It concludes that the creation of the euro area is justified. The report, directed by Emerson et al. (1990), and debates following its publication, deserve special attention since it outlines the forces in place and crystallizes oppositions that, twenty years later, have become crucial topics.

Based on the main lessons of the theory of optimum currency areas (inset 1), one of the basic criteria for forming a monetary union is high labor mobility, which is very low among European countries. To respond to this criticism, the Emerson report asserted that although this theory certainly provides useful information, it cannot be considered as a sufficient overall framework in which costs and benefits of a monetary union can be analyzed. The authors added that the empirical applications of this approach are *scare, inconclusive* and *sometimes exaggerated*. They also pointed out that economic theory has evolved considerably in several important branches since the 1960s but that the reviewing of this theory has not kept pace. Thus, the analysis of the monetary union does not need to be limited to this *rather narrow* approach.

Inset 1 : The criteria for an optimum currency area >0

The theory of optimum currency^a areas by Mundell (1961) defines an optimum currency area as a set of regions (or countries) for which the profits to form a monetary union, and thus to renounce the use of the exchange rate as an economic policy instrument, outweighs the costs of not having the union.

The main requirements for the creation of a monetary union relate to:

- low degree of economic shock asymmetry that the countries are faced with;
- low disparity of responses that the member states exhibit when faced with a common shock;
- high mobility of production factors (labor and capital) and in more general terms, efficient adjustment mechanisms.

Among these criteria, the decisive factor is undoubtedly the mobility of production factors, especially the labor factor. For instance, in the case of two different countries producing goods, any shift in demand from one country to another would cause a trade deficit, rising unemployment and a recession in the country producing the good for which demand has decreased. Conversely, the country subject to favorable demands will be faced with a trade surplus, an increase in economic activity and inflationary pressures. In a world where prices are sticky in the short-run and in cases of fixed exchange rates, the adjustment would involve workers migrating from the country with a contracting economy to the country experiencing an expanding economy. Through migration, workers would experience a reduction in costs associated with the establishment of the monetary union. Thus, even in a currency area where the economic cycle is not fully correlated between the countries, it may nevertheless be optimal if labor is sufficiently mobile.

The theory of optimum currency areas was later clarified by the work of McKinnon (1963) and Kenen (1969). McKinnon (1963) suggests a new criterion based on the degree of openness and interdependence of economies likely to be part of a monetary union. Thus, for countries forming an economic and monetary union, the savings made from reduced transaction costs will be even higher than the intra-area commerce in itself. Kenen (1969), meanwhile, believes that the diversification of production structures can be considered as a criterion to form a currency area. According to him, an adverse shock to demand in one sector will have little impact in an economy with a diversified production structure. This means that inter-sectorial mobility can substitute international labor mobility. He concludes that because countries with a diversified production only experience attenuated effects from asymmetric shocks, they can easily take part in a currency area.

^aThis inset is based on Hédreville (2010).

A second criticism studied in the Emerson report concerns the position of Krugman, the leader of the New Economic Geography. Krugman argues that due to increased specialization in the various regions, the expansion of a monetary union could be fatal if affected by asymmetric shocks (inset 2). Although the authors of the Emerson report acknowledge that the economic center of the community can derive benefits from economies of scale, they emphasize that there is no evidence that this will continue and become more pronounced. They recall that the least favored regions also have other advantages. Moreover, according to surveys conducted at the time, companies seem willing to relocate to the peripheral regions if a competitive advantage in the domestic market were to arise. In addition, the intra-industry specialization is fully consistent with a monetary union because it decreases the likelihood of asymmetric shocks and adjustment problems, the Emerson report indicates.

Despite the fact that the Emerson report envisions limiting polarization effects, the authors recognize the danger of persistent inequality between countries and between regions. They point out that this is not a recent concern and that it has helped initiate the development of a

regional policy at the EU level. These policies, adopted in 1971, were centered on the principles of coordinating regional aid schemes, which were designed to minimize competition distortions within the EU, while protecting the national objectives of regional development.

Inset 2 : The theory of the New Economic Geography >0

The theory of the New Economic Geography shows that the reduction in transportation costs after joining a monetary union decreases the incentive for firms to be based close to consumers. Instead, they relocate their production units to areas where economies of scale are higher, that is, areas with larger markets. This also tends to increase the specialization of these regions and increases their vulnerability to asymmetric shocks.

This idea is not completely new. Marshall (1890) is the first to have introduced the notion of *local economies*, also called externalities. He found that firms derive more benefits by being closer to other producers within the same region. He separated *local economies* into three aspects: technological externalities, the presence of a large pool of skilled and stable labor and finally the presence of a large number of suppliers.

In the early 1990s, these ideas were picked up again and developed for the case of a monetary union. Krugman and Venables (1990) shows that the elimination of trade barriers (which can be viewed as the same as a reduction in transportation costs between countries) will result in a centralization of production in order to take advantage of economies of scale and in order to gain easier access to markets.

Krugman (1991) and Puga (1998) examine, in turn, the geographic distribution of economic activities between two regions as a result of economic integration or as a result of reduced transportation costs. More specifically, they analyze the effects induced by a reduction in transportation costs in terms of the concentration (agglomeration) of economic activities between the two regions. The main conclusion drawn from these two papers is that a country that opens up to international trade will automatically experience a greater specialization in its economic activity.

Regionally, Fujita and Krugman (1995) showed that with increasing returns to scale, lower transportation costs and labor mobility, an agglomeration effect is likely to occur. The agglomeration process attracts workers because of a greater variety of products and higher real wages.

According to the Emerson report, it is thus clear that national economic policies should promote nominal convergence in order to guarantee an eventual real convergence. Although these criteria must first be met, a monetary union will eventually lead to gains that outweigh the costs. However, twenty years later, all indicators seem to show that nominal convergence has been a factor of real divergences. In addition, the Structural Funds' aims to prevent regional disparities between countries in the monetary union have not been able to restrain the polarization of economic activities.

3. Prior to the monetary union, the nominal convergence criteria could have been a factor of real divergences

Given the difficulties from the start to ensure real convergence, the Maastricht Treaty established the nominal convergence criteria in hopes that they would build real convergence. This idea is commendable if, on the one hand, the lower risk premiums and the free capital flows generate real convergence and if, on the other hand, nominal convergence induces real convergence with the endogeneity of an optimum currency area taken into consideration (Frankel and Rose, 1996, 1997, 2000). However, persistent real divergences between countries have been observed over the past two decades.

These differences have been found through several channels, including per capita wealth, productivity, current accounts and real credits in the respective countries. The current crisis within the Economic Union shows that these differences threaten the sustainability of the euro. The low level of real convergence can be explained by several factors such as the lack of transfers between countries (inset 3), an inadequate single monetary policy, differences in factor endowments, and differences in demographic structures, to name a few. Without going into details, we will discuss the main aspects of the factors identified here.

Inset 3 : How American economists regard the creation of the euro area >0

In the 1990s, many studies looked into how to assess empirically whether European countries were good candidates for forming a currency area. Although relatively old, these articles address issues that are still relevant.

In a seminal study, Eichengreen (1991) highlighted the fact that the real exchange rate varies three to four times more between European countries than between states in the United States. He also found that there was a greater correlation of shocks among the American states compared to European countries. Using regional unemployment rate estimates, he established that labor mobility was higher in the United States than in Europe. He interpreted these results as indicators that Europe was far from an optimum currency area similar to the one in the United States. Other studies using the same framework of analysis have led to similar results.

Many economists also stress the United States federal system's abilities to ensure a fiscal redistribution that offsets specific shocks to regions. Such a mechanism does not exist in Europe. Based on data for the United States, Sala-i Martin and Sachs (1991) conclude that a dollar reduction in the per capita disposable income of a region decreases its federal taxes by 34 cents and increases its federal transfers by 6 cents. Thus, within the United States, the overall change in federal spending and revenues offset 40% of the decline in disposable income. Similarly, Bayoumi and Masson (1995) concluded that the structure of the United States federal income tax offsets 28 cents for every dollar of income within the region. By comparing Europe and the United States, Inman and Rubinfeld (1992) show that *with a centralized monetary policy, a fiscal policy that reduces the impact of economic shocks specific to countries is necessary*. These studies thus insist that budget transfers partially offset asymmetric shocks between regions in the United States.

In a detailed analysis of potential lessons that the euro area can learn from the United States' experience, Eichengreen et al. (1990) conclude that monetary integration would limit budgetary independence. For these, the range of fiscal transfers in the European Union needed for an optimal area should be significantly greater than transfers in the United States since regional shocks are on average stronger in European countries than in the United States.

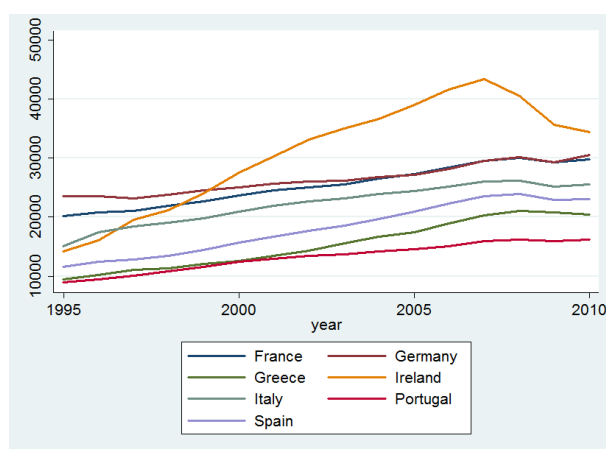
Tobin (2001) finally summarizes the skepticism of many economists with respect to the euro area: the lack of a centralized authority for budgetary redistribution, very slow adjustment of wages and a monetary policy objective that does not explicitly account for employment, production and growth. His conclusion is that the euro area is *a lot less equipped* to cope with asymmetric shocks than the monetary union in the United States and is therefore less optimal.

However, Frankel and Rose (1996, 1997, 2000) develop strong objections to the standard use of the optimum currency area theory as a tool to assess the future viability of the euro area. They show that the criteria of this theory are largely endogenous. In other words, once a country joins a monetary union, the economy adjusts to the new environment. Participation in a monetary union is likely to increase trade between member countries and thus increase the correlation between national business cycles, which allows countries to move closer to the criteria of optimum currency areas.

3.1. Despite fairly strong growth in less developed member countries within the monetary union, the disparities in living standards and productivity continue

Since the establishment of the Economic and Monetary Union, the first objective has been to ensure an harmonious development. This requires a convergence of living standards, that is, GDP per capita. Twenty years after the creation of the EMU, what is noteworthy in terms of convergence or divergence of GDP per capita?

Figure 1 – Evolution of GDP per capita in some of the euro area countries, 1995-2010



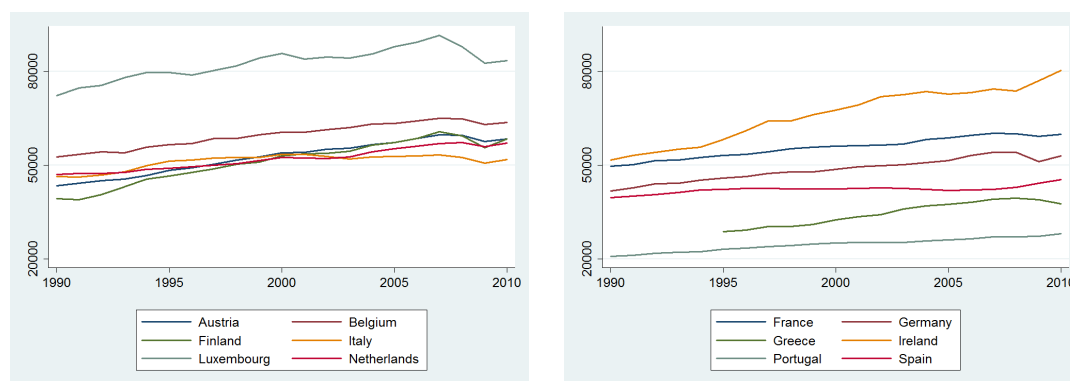
Source: Eurostat.

Figure 1 shows the evolution of GDP per capita between 1995 and 2010 in two countries at the *heart* of the euro area and five countries in peripheral areas.

The figure shows that despite the strong growth in peripheral countries until the 2000s, this was not sufficient for them to catch up to the living standards in France and Germany, countries at the heart of the euro area. Only Ireland, a country that showed strong growth rates until 2007, was able to converge. Before the crisis, growth remained strong in the peripheral countries without convergence. There are also disparities at different spatial levels within these countries. Even though the existence of convergence between European countries at certain times is noticeable, a different dynamic emerged *within* the countries: rich regions in a country converged towards each other, while poor regions failed to converge towards rich areas.

However, the lack of convergence of GDP per capita is more a consequence than a cause. It reveals differences in other parts of the economy and other sources of heterogeneity. The first source of heterogeneity observed in the case of divergence of GDP per capita is related to productivity per capita. Figure 2 shows the evolution of productivity per capita since the early 1990s.

Figure 2 – Evolution of labor productivity per person employed within the euro area, 1990-2010



Note: labor productivity per person employed is defined in this dataset as real output (gross value added) divided by total employed persons. Sources: OECD.

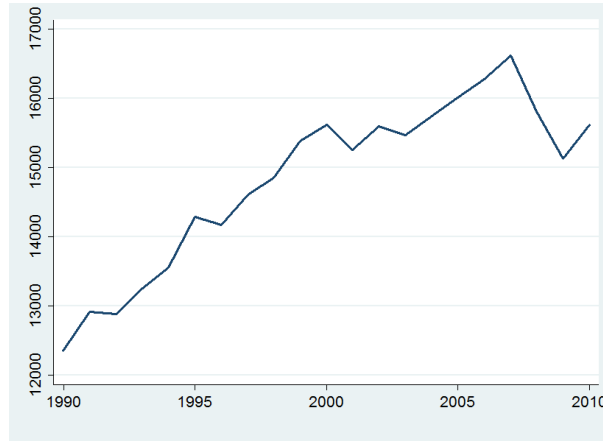
Note that there are clear disparities between countries in terms of productivity. For Spain, productivity is situated below the average of European countries. It significantly decreased between 2004 and 2008 before recovering and improving starting in 2009. In general, the changes in almost all countries remain erratic even if an upward trend can be observed. It is therefore difficult to draw conclusions about the convergence of productivity in the euro area. Countries like Greece and Spain have been left behind compared to Ireland and have struggled to reach the average level of productivity within the EU.

The graphs clearly show that although a general upward trend of all productivities in the area has existed, they have not converged. To show this, a summary measure of disparities in terms of productivity has been created. Figure 3 shows the evolution of these disparities since the early 1990s. It appears that differences in productivity have never been increasing. Neither the single currency nor the transfers between countries have succeeded in decreasing the growing differences observed in productivity.

3.2. Labor costs do not seem to explain the diverging current accounts of the member countries in the euro area

The second source of heterogeneity can be induced by the different types of labor market functioning, reflected in the evolution of unit labor costs. The Commission defended the idea that wage growth was sustainable if paired with productivity. The Emerson report shows that the convergence of labor costs without productivity growth will only lead to small areas of regional unemployment. With the balance of payments crisis in peripheral countries, the debate on whether the convergence of unit labor costs exists has spurred yet again. The dominating position attributes intra-European imbalances to the differences in competitiveness. The ECB goes

Figure 3 – Evolution of disparities in productivity per person, 1990-2010



Note: We use the standard deviation to measure disparities throughout time. This is an indicator of dispersion which, by its construction, is always positive. The higher the standard deviation, the greater the dispersion. Sources: OECD and the author's calculations.

as far as to attribute the cause of the crisis to *excessive and persistent differences* in competitiveness. What do the data show?

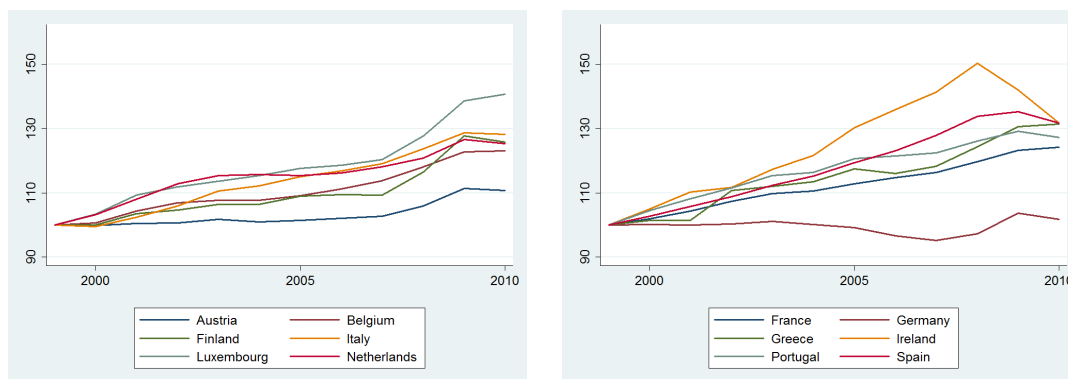
A vast literature on the evolution of unit labor costs in the euro area exists, but no consensus has emerged from it. The conclusions of these studies highly depend on the base year used to construct the index of unit labor costs (Gros, 2012). Most studies that conclude that a divergence in unit labor costs exists (for example, Artus (2012)) use the year 1999, *i.e.*, the year of the creation of the monetary union, as the base year. Their results are reproduced in figure 4. The graph clearly shows the existence of diverging unit labor costs. However, by simply using a different base year, the conclusion can be inverted. To avoid such problems, we chose to use series in level.

Figure 5 illustrates the change in the level of unit labor costs in the euro area since the early 1990s. It appears that in the period 1990 to 2010, unit labor costs have more or less converged, especially after the early 2000s, *i.e.*, after the introduction of the EMU. This shows that using the variables as an index is not adequate to judge the convergence or the unit labor costs in the currency area.

Of course, although there are some differences in unit labor costs inside the euro area, there are also other differences in the national labor markets (type of contracts, segmentation, flexibility, unemployment insurance). Nevertheless, the observed convergence in unit labor costs is more accurate than it is for other aggregates such as productivity and GDP per capita.

Since adjustment through biases in the nominal exchange rate is impossible in a monetary union,

Figure 4 – Evolution of unit labor costs, 1999-2010 (base 100 in 1999)



Note: The unit labor cost is the ratio between total labor costs and real output. 2005 is the base year of real production. Sources: OECD and the author's calculations.

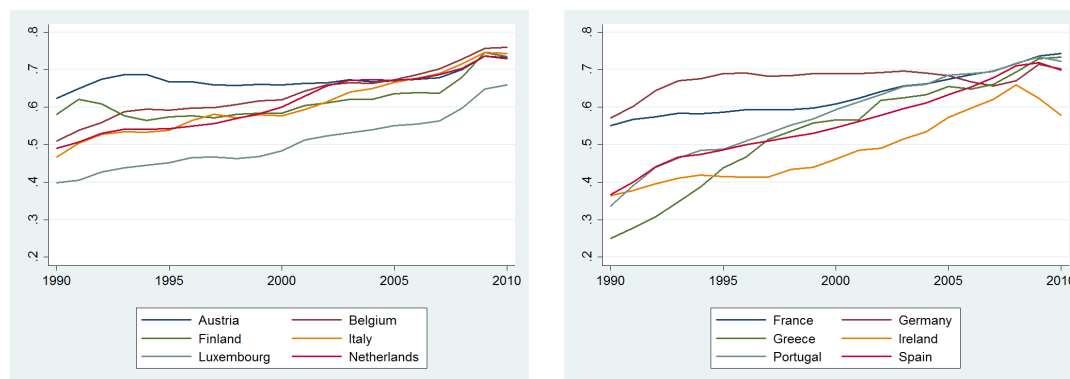
any divergence in unit labor costs, however small, may lead to disparities in current accounts. The evolution of the disparity in current accounts in the euro area in the period between 1990 and 2010 can be observed in figure 6. Thus, we can see that until the crisis, differences in current accounts evolved unevenly while displaying an upward trend.

3.3. The common monetary policy induces different real interest rates that drive an influx of capital and strong credit growth in some countries, often a destabilizing factor

As noted earlier, the Maastricht Treaty concluded that EU countries would converge, have the same nominal interest rates and equal inflation. Countries were thus forced into these conditions during the decade preceding the introduction of the single currency. Indeed, there was a low level of inflation during this period. The convergences of inflation and nominal interest rates have thus generated the convergence of real interest rates, a dramatic change for some countries. Once the single currency was adopted, the inflation heterogeneity, induced by differences in production structures and in institutions, generated real interest rates and, consequently, diverging real credits. This heterogeneity can be observed in figure 7. It shows an increasing divergence in real credits since the introduction of the single currency. Again, the financial crisis caused a downturn starting in 2007.

In the case that unit labor costs alone cannot be used to explain the divergences in current accounts, the reasoning used here can be refined in order to account for these divergences. In fact, all members had to fulfill the nominal convergence criteria in order to gain membership in the European economic and monetary union. By regrouping a number of countries that had converged in terms of the nominal requirements, the ECB could have imposed a single interest rate (based on the average inflation rate) on all member countries. Instead, the common

Figure 5 – Evolution of unit labor costs, 1990-2010



Source: OECD.

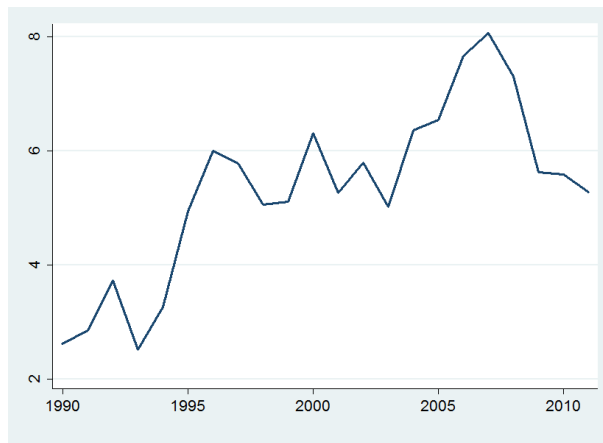
monetary policy led to diverging real interest rates and consequently, other real divergences emerged because of their effects. Indeed, in a monetary union, countries with inflation rates higher than the average have by definition low real interest rates, while those with inflation rates lower than the average have high real interest rates. This real interest rate heterogeneity caused by the monetary policy is known as the *Walters critique*¹. A consequence of this is for example that it stimulates credit, driving up the rate of investments, which leads to lower savings rates that boost economic activity and thus enhances higher inflation rates in the first group of countries, whereas it reduces the credit expansion in the second group of countries. In principle, this mechanism conduces a catch-up period for lagging countries. If the level of investment created structurally levels the field for the different economies, such occurrences must be transitional.

This argument is illustrated in figure 8, which shows the negative relationship between real interest rates and average credit growth rate. In peripheral countries where the inflation rates are the highest, the real interest rates are also the lowest and consequently, the average credit growth rate is the highest. Between 1999 and 2010, the difference in inflation between the country with the highest inflation rate (Greece) and the country with the lowest inflation rate (Germany) was 1.74 points, which could have caused a deviation of 11 percentage points in average credit growth rates.

These differences in credit growth rates induced by different real interest rates have in turn generated a divergence in current accounts. Indeed, this easy credit induced by the common monetary policy has stimulated demand in the peripheral regions, all while avoiding going hand in hand with corrections in production structure deviations. This increased demand has led

¹Walters was Margaret Thatcher's economic advisor. He speculated that the economic and monetary union could be unstable due to the fact that different rates of inflation and monetary policies would lead to different real interest rates.

Figure 6 – Evolution of disparities in current account balances, 1990-2010

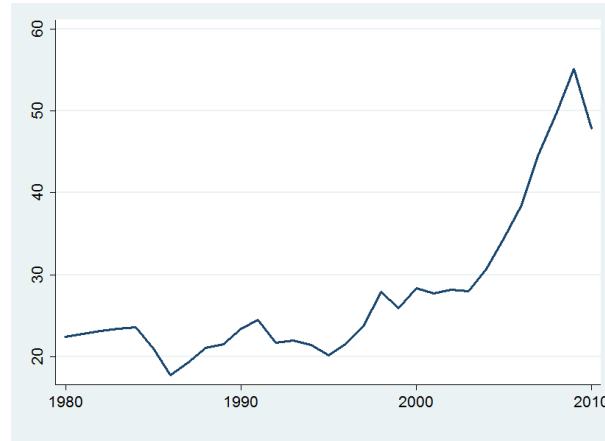


Sources: World Development Indicators (FMI, 2011) and the author's calculations.

to a construction boom in Spain (inset 4) and Ireland, while it resulted in consumption that lead to, among other things, the current account deterioration in Greece and Portugal. This is illustrated in figure 9, which shows the strong negative relationship between high and average credit growth rate and current account deficit means between 1999 and 2010. The difference between the country with the highest average credit growth rates and the country where it is weakest generates a 10 point current account deficit difference.

Furthermore, by imposing a single interest rate to all its member countries, the monetary union has introduced another channel: the real exchange rate. Through the real exchange rate, diverging current account balances are exacerbated rather than attenuated. In a monetary union, countries with the highest inflation rates automatically have the most overvalued real exchange rates, which further deteriorate their current accounts. The inflationary spiral induced by the heterogeneity of credits could have counteracted the efforts made to achieve uniform prices induced by the law of one price. The common monetary policy could thus have created real divergences.

Figure 7 – Evolution of disparities of credit to the private sector, 1990-2010



Sources: World Development Indicators (BM, 2011) and the author's calculations

Inset 4 : Monetary policy, credit expansion and real estate bubble in Spain >0

The Spanish banking crisis is, in many ways, emblematic of the malfunctions and imbalances that have accumulated in several countries in the euro area during its first decade. The sharp fall in real interest rates led to a strong expansion of credit to the private sector (figure 8), associated with a large influx of foreign capital in Spain.

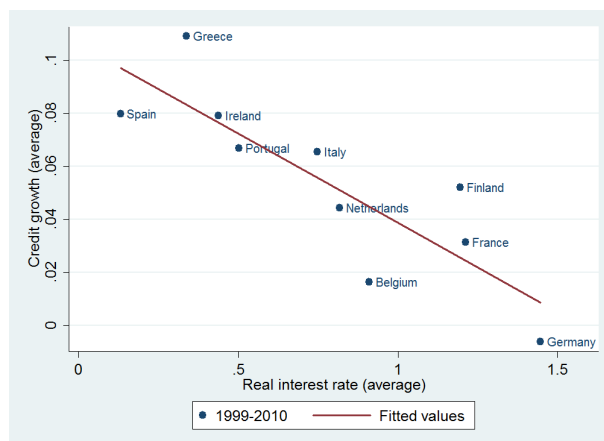
However, the capital has mainly resulted in a surge of real estate assets (asset shares in other countries) and not productive investments that would have allowed for productivity growth. Indeed, the real estate and construction sectors have low productivity rates and low tech substances. However, these investments were an important contribution to improving employment, which remained high until 2007.

The increase in bank lending was the reason for rising housing prices until June 2008, peaking at 16.6% between 2002 and 2005. The amount of mortgages has also increased sharply. In June 2011, the total amount of mortgages could be estimated at 97% of GDP (EMF, 2012). Individuals could buy houses without personally investing. According to the European Mortgage Fund (2008), residential debt in Spain increased from 23.9% of GDP in 1998 to 61.6% in 2007.

The economic difficulties that Spain is currently facing are mainly the consequences of massive non-productive investments from economic agents in construction and real estate sectors. Indeed, the low real interest rates induced by the monetary policies are what led Spanish households to borrow more in order to finance investments in real estate, which in turn created a housing bubble. Between 2005 and 2007, more than 800 000 houses were built per year, a strong growth in this sector, and more than what was built Germany, France and Italy combined. However, only around 350 000 houses were actually in demand (Sénat, Rapport d'Information n° 385). Thousands of these houses were not sold after construction, but they can nevertheless be found in the banks' balance sheet, which explains why the economic crisis in Spain and the distrust between the financial markets and Spain's banks is so severe. In addition, the slow growth experienced in Spain in recent months, its rising risk premiums and its deflation-induced economic crisis have made the various debts a heavy burden to carry.

The Spanish economy can be caricaturized as a model based on a *single product* (see section 4.3) and based on excessive leverage real estate developers and households, has faced a particular shock. The excessive specialization in construction and the concentration of jobs that ensued has thus made it easy for shocks on credits and financial assets to harm this type of economy.

Figure 8 – Relationship between real interest rates and credit growth



Note: The credit is granted by banks to the private sector. The nominal interest rate is the 3-month interbank rate. The real interest rate is the difference between the nominal interest rate and the inflation rate in each country. Sources: ECB, WEO, WDI and the author's calculations.

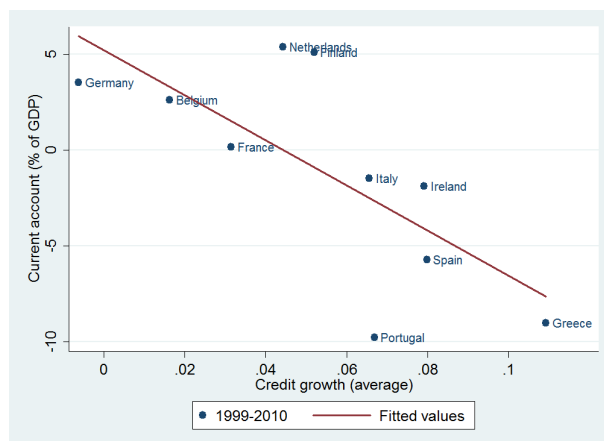
However, the common monetary policy, based on the simple reason that European integration is not solely realized through a nominal anchor, cannot alone explain all the real differences observed. Other factors mentioned earlier, such as the difference in national institutions, inadequate transfers between EU countries, and especially the differences in production specialization, also play a role.

4. The Structural Funds' aims to prevent regional disparities between member countries in the monetary union have not be able to restrain the polarization of economic activities

The other possible source of heterogeneity in the monetary union, also discussed in the report directed by Emerson et al. (1990), is the agglomeration of economic activities. This would reverse the development goals of a balanced economic space. Since the early 1990s, the debate has been intense. Krugman responds to the Emerson report with a document entitled *Lessons from Massachusetts for the EMU* in 1993. His main argument, which goes against the European Commission, is that the construction of economic and monetary union (with the elimination of trade barriers) increases the countries' tendencies to specialize according to their comparative advantages. Agglomeration (*clustering*) of economic activities will develop following this and can ultimately lead to poor business cycle synchronizations. In such a case, a potential demand shock would then likely make countries vulnerable to asymmetric shocks with varying impacts. Some areas would be more affected than others.

Arguing against the position taken by Krugman (1993), the European Commission defended

Figure 9 – Relationship between credit growth and current accounts



Sources: ECB, WEO, WDI and the author's calculations.

the idea that *a strong investment in the regions can lead to convergence between regions* (CE, 1996). The Structural Funds' regional policies can affect growth and the economic environment of European regions and thus also the process of convergence in Europe.

4.1. Mindful of a possible polarization of economic activities within the monetary union, the European Commission strengthened the role of the Structural Funds for least-developed regions

In 1988, the significance of differences in and between regions and countries, as well as the prospects of deepening the integration following the adoption of the Single European Act, caused a major change in the EU's structural policies. The Structural Funds, the instruments of the European Investment Bank (EIB) and other financial instruments assisted the EU with implementing its policies.

The decade preceding the transition to a monetary union in Europe generated a large amount of literature based on empirical analyzes and predictions about the risks of conflict and polarization within countries of the EU. The European Commission, responsible for carrying out the project of the Single Market and for the convergence in the euro area, did not deny that the risk of regional disparities within the Union were increasing (since they already existed, the convergence project should have allowed the least developed countries to catch up with the richer countries) and were becoming more severe. Thus, among its objectives in 1986, the Treaty on the Single European Act in Article 130a seeks to reduce disparities across regions and the delay among the least favored regions. The risk that economic polarization could lead to the development of large and powerful agglomerations and thereby trigger issues related to equal spatial distribution was predictable. To limit this negative effect, the Delors Report (Delors, 1989) had recommended

to strengthen EU's cohesion policies. The report traced the evolution of the EU's economic and monetary integration based on its most concrete aspects such as objectives, the European monetary system, and its problems and prospects. Thus, when adopting the package of measures agreed upon in Brussels in February 1988, the need to complete the project to eliminate market barriers by strengthening the EU's regional and structural policies was clearly recognized. The report clearly stated that EU policies supporting an overall balanced development were an essential aspect for the Single Market.

A monetary union with a weak convergence of economic policies would be unlikely to stand the test of time, which could affect the EU. In the economic field, the measures aimed at reducing existing disparities should be implemented through fiscal consolidation programs in the countries concerned and through more efficient structural and regional policies. Reforming the Structural Funds and doubling their resources would also be beneficial in order to increase the capacity of EU policies to promote regional development and avoid regional imbalances. The Delors report highlights that if regional imbalances are not seriously taken into account, the economic union will be exposed to serious economic and political risks. This is why it is central to pay special attention to the efficiency of a policy in order to reduce structural and regional disparities and promote a balanced development throughout the EU.

Similar concerns are also expressed in the first *Report on the economic and social cohesion* published by the European Commission in 1996 in which the necessary role of Europe in promoting economic and social cohesion is established.

To limit the negative effects induced by the Economic Union, the European Community adopted a regional policy coupled with financial instruments in order to balance regional and socio-economic development faced with deviations created in the 1970s among member countries. Funding for these objectives was provided by the Structural Funds. Greece, Spain and Portugal were characterized by large domestic disparities at levels well below their national development before they joined the EU. Their successive entries accentuated the differences between member countries. The Structural Funds were supposed to help accelerate the catch-up process for regional areas, counteract the effects of agglomeration, and ensure uniformity on the EU territory. These credits are intended to strengthen the productive potential in the regions that receive them through investments in physical (especially transportation infrastructure) and human capital.

Several evaluations show that the Structural Funds have helped create jobs in regional areas under the so-called Objective 1²:

- Between 1989 and 1994, 600 000 jobs were created in Portugal, Greece, Ireland and Spain. The GDP per capita in these countries rose from 68.3% to 74.5% of the EU average, a decrease in disparities in terms of GDP per capita of 3% compared to the EU average
- Between 1994 and 1999, 1.7 million jobs were created and the Structural Funds had an impact on growth in Portugal (4.7%), Greece (2.2%), Spain (1.4%) and Northern Ireland (1.3%)

In recent years, the Structural Funds have been substantially increased in poorer regions. Despite these efforts, the effect of the Structural Funds concerning the reduction of regional disparities

²Objective 1: *promoting development and structural adjustment in regions lagging behind*

is mixed. These different rates show that the transfers made through the Structural Funds were only immediately able to impact disparities in income to a limited extent due to their low share in the EU budget, which only makes up 1.27% of the member countries' GDP. The majority of the budget is devoted to common agricultural policy.

Most indicators suggest that the Structural Funds are a simple mechanism for transferring income. But this is not enough in order to enable countries to resist the growing disparities recorded. The third progress report on cohesion prepared and presented by the Commission in 2005, describes the current regions in the enlarged EU in terms of income levels, employment and productivity. It shows that disparities in GDP per capita are considerable (200 out of 254 regions are below the target employment rate of 70% at the regional level) and that even though disparities have narrowed since 1995, regional differences have grown sharply in several member countries throughout the EU.

A comparison which assesses the extent of assistance provided under the EU's Cohesion Policy can be found in the Emerson report. It compared the Structural Funds to the Marshall Plan. The Marshall plan, which amounted to 1% of GDP in the United States, contributed on average about 2% to the annual European GDP during the period 1948-1951. The effort of the EU added up to about 0.5% of GDP in the EU per year, but since it is a long term commitment it represented, in cumulative terms, about 6.5% of GDP in the EU during the period 1989-1999. In these terms, the United States committed about 4% of its GDP between 1948 and 1951.

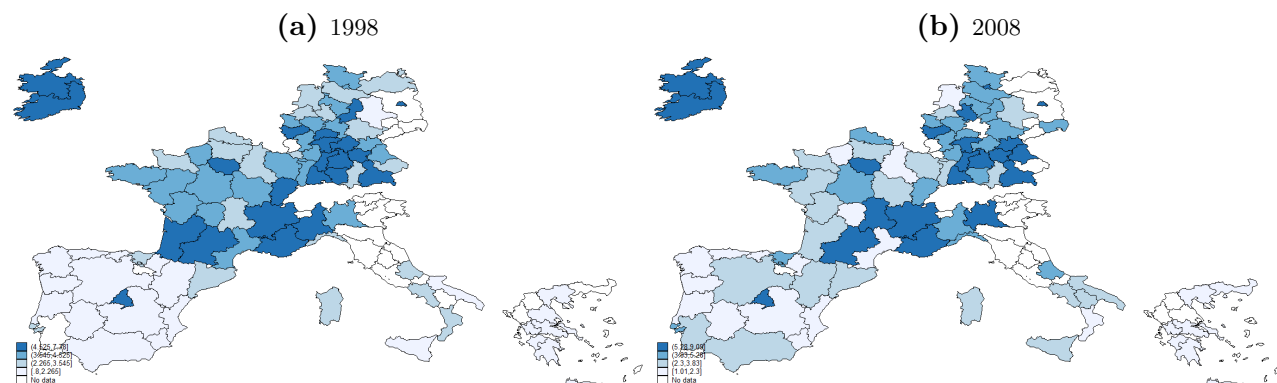
It is difficult to measure the impact of structural policies and expenses pertaining to income convergence within the EU. However, some effects are remarkable, such as improved transportation infrastructure and increased financing for projects. 30% of the Structural Funds are earmarked for investment in infrastructure, mainly in the transportation sector (Martin, 1998). Yet, the New Economic Geography presents a paradox: the improvement of transportation infrastructure and telecommunications services in disadvantaged areas have played against them by facilitating agglomeration effects.

4.2. Despite the amounts allocated to the regions, the phenomenon of agglomeration of economic activities with high added value has increased

Has the objective of maximizing growth in the member countries, which itself is justified by the pursuit of greater efficiency, been achieved through the spatial concentration of economic activities, leading to more regional divergence? These various concerns between openness to international trade and changing patterns of production are not specific to Europe. Hanson (1998) noted that most American lawmakers near the Mexican border strongly supported the North American Free Trade Agreement (NAFTA), while those near the Canadian border were against it by fear that companies in their districts would relocate to the south of the United States. What can the euro area learn from this? Is there a centrifugal phenomenon specific to activities in Europe? Has specialization increased in the EMU countries?

Figure 10 shows the distribution of employment in high tech sectors in 1998 and 2008 in France and Germany, countries at the heart of the euro area and five countries in peripheral areas: Portugal, Italy, Ireland, Greece and Spain.

Figure 10 – Concentration of employment in high tech sectors, 1998 and 2008



Source: Eurostat and the author's calculations.

Based on the figures, it appears that employment in high tech sectors is mainly concentrated in the two countries at the heart of the euro area, especially in southern Germany, south-eastern France (the region Rhone-Alpes), and northern France (Ile-de-France). The south of Ireland, Northern Ireland, central Spain and northern Italy are the only regions in the peripheral areas where high levels of employment in high tech sectors can be found.

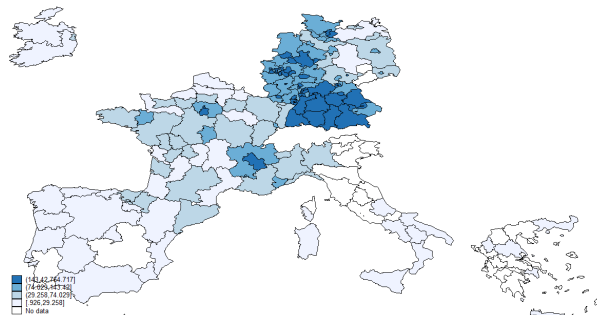
Figure 11 shows the distribution of patent applications by region in the countries listed above in 2009. Again, it is clear that patents tend to be more concentrated in the core countries, particularly in the southeast and northern France and southern Germany. R&D in the peripheral countries such as Ireland and northern Italy seem to be very far from having the same level performance as countries at the heart of the euro area.

Ireland's case is important. The data clearly show that this is a country where the concentration of patents changes when employment in high tech sectors is very high. One explanation for this paradox is Ireland's ability to attract multinational cooperations (mostly Anglo-Saxon) through very attractive tax levels, especially in the field of electronics (see section 4.3).

Figure 12 shows the concentration of R&D expenditures for 1995 and 2009. These results show that there is an agglomeration (*clustering*) effect within the EMU. Despite the research programs that have been established (CE, 1996) by the Commission to help peripheral countries to contravene this concentration, the results desired have not occurred.

Even though these figures show that there is a global effect of strong agglomeration in the central European countries at the expense of the peripheral countries in the EMU, the figures fail to show the disparities that exist both within the countries and between the countries. Indeed, as the New Economic Geography explains, agglomeration is the result of a strong specialization in the countries dealt with next in this document.

Figure 11 – Concentration of patent applications by regions in 2009



Source : Eurostat and the author's calculations.

4.3. Increased polarization could be explained by differences in specialization

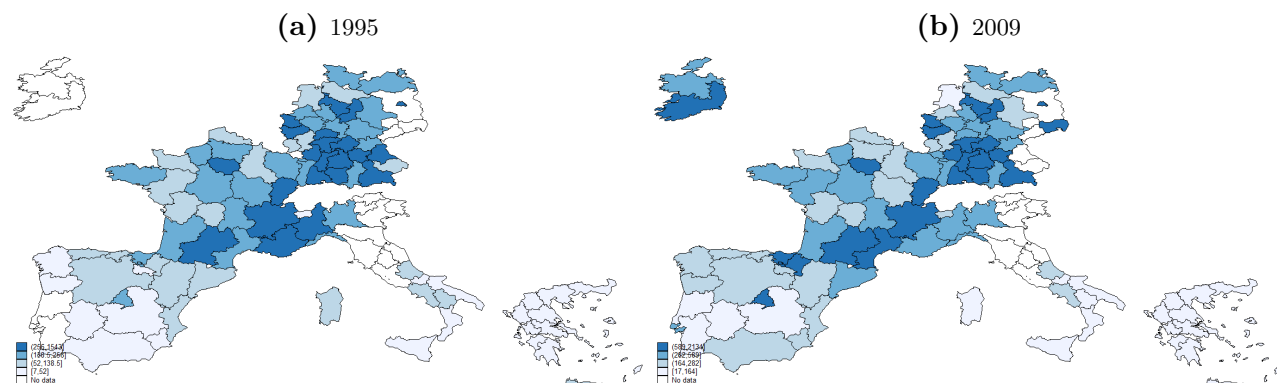
The comparative analysis of the evolution of specialization within the countries of Europe, particularly between the peripheral countries (Portugal, Italy, Ireland, Greece and Spain) and two of the countries at the heart of the euro area (France and Germany) reveals an interesting dynamic in many ways. Using a time horizon ranging from 1995 to 2007 and choosing to use production for measuring specialization provides results concerning the average specialization of industries in these countries. The approach to specialization used is measured in terms of production and not in terms of international trade. Thus, using the Balassa index³ (Amiti, 1998), we estimated the specialization of twenty industries for the aforementioned countries. The data stem from the *EU KLEMS* database (O'Mahony and Timmer, 2009).

After analyzing the indexes for twenty industries, it appears that overall, the peripheral countries are more specialized than France and Germany. Germany and France de-specialize even though they continue to maintain a certain level of production in high tech and knowledge sectors and in advanced industrial sectors. In particular, Germany remains the most specialized country in transportation equipment and machinery sectors. Spain and Portugal are complicated cases because even though they specialize more and more, their production levels remain lower than other EU countries. Italy, Spain and Greece are highly specialized in the hotel and catering industries. Spain is more specialized in construction than any other member of the EMU. The French situation corroborates what Amiti (1998) described: although the level of specialization in many areas remains higher than the average of the euro area, there is a decline in specialization within France.

Observing the diagram (figure 13) highlights that European countries in most cases are relatively

³Let B_{ij} be the Balassa index, we then have: $B_{ij} = (q_{ij}/q_j)/(q_i/Q)$ with q_{ij} production in each industry i (according to the EU classification) in each country j , q_j is total industrial production in each country j , q_i is total European industrial production i , Q is total industrial production across all of Europe. If the indicator is above 1, the country specializes in the sector.

Figure 12 – Concentration of R&D expenditures, 1995 and 2009



Source: Eurostat and the author's calculations.

specialized in specific sectors. With regard to Germany and France, their relative importance in industrial production allows them to retain a prominent place in different sectors.

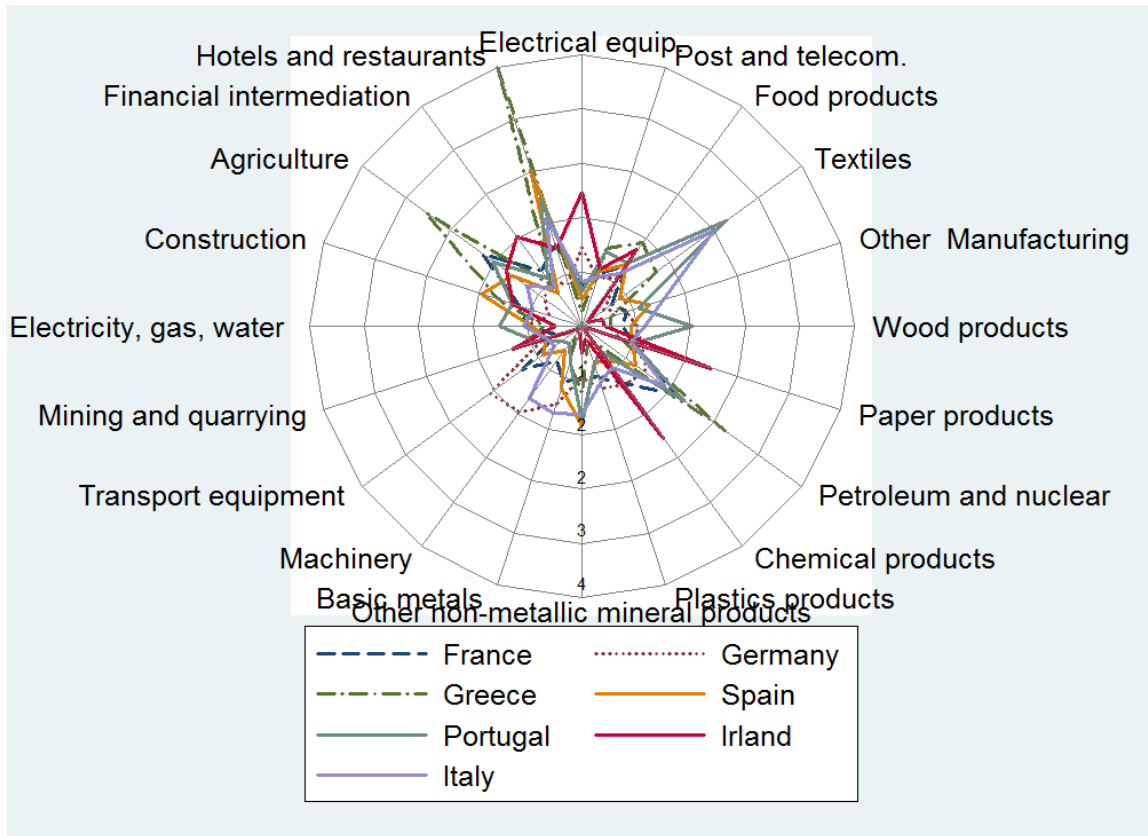
Based on the predictions made by Krugman, the Single European Market should lead the EU countries to specialize more. This is noticeable between 1995 and 2007 when the peripheral countries became more specialized, while risking increased exposure to various shocks. Given these results, we can infer that the Single European Market has more or less increased the specialization of countries and has consequently increased the chance of specific shocks. Regional policies through the Structural Funds have neither counteracted this intense specialization nor their perverse effects.

A detailed country analysis highlights further characteristics for the period 1995 and 2007 (figure 14).

In France, de-specialization in certain industries benefitted other industries. Thus, the country remained heavily specialized in agriculture, fishing, hunting, and in anything related to nuclear fuel and petroleum products. Regarding the chemical industry, food processing, and transportation equipment, France remained highly specialized, although its production declined slightly in 2007 compared to 1995 for the last two industries mentioned. During the same period, France saw an increase in its hotel industry, indicating a growing specialization in this sector (figure 14a).

Germany continued to be highly specialized in the production of transportation equipment and material, as well as in the machinery sector. Its specialization in transportation equipment was higher than that of France. The nuclear fuel and petroleum products industries, as well as optical and electrical equipment are also well developed in Germany, although the country seems to have increasingly de-specialized in electrical equipment (relocating to Eastern Europe and Asia), non-metallic mineral products, the construction sector and the hotel and restaurant sectors (figure 14b).

Figure 13 – Comparison of the specializations within the peripheral and core areas of the euro zone



Sources: EU KLEMS and the author's calculations.

In Portugal, the production of industrial units experienced a downward trend overall between 1995 and 2007. However, it basically increased its specialization in the textile industry (in which Portugal is highly specialized), in the hotel and catering industries, in agriculture, and in nuclear fuel and petroleum products (figure 14c).

Spain, like Portugal, gave up several industrial sectors in order to specialize in certain other industries such as mainly the construction sector, non-metallic minerals industry and the hotel and catering industry. Certain sectors experienced a slow-down in specialization because Spain gradually focused less on specializing and instead focused on the construction sector between 1995 and 2007. The development of real estate and construction has certainly increased specialization in the electricity, gas and water sectors (figure 14d).

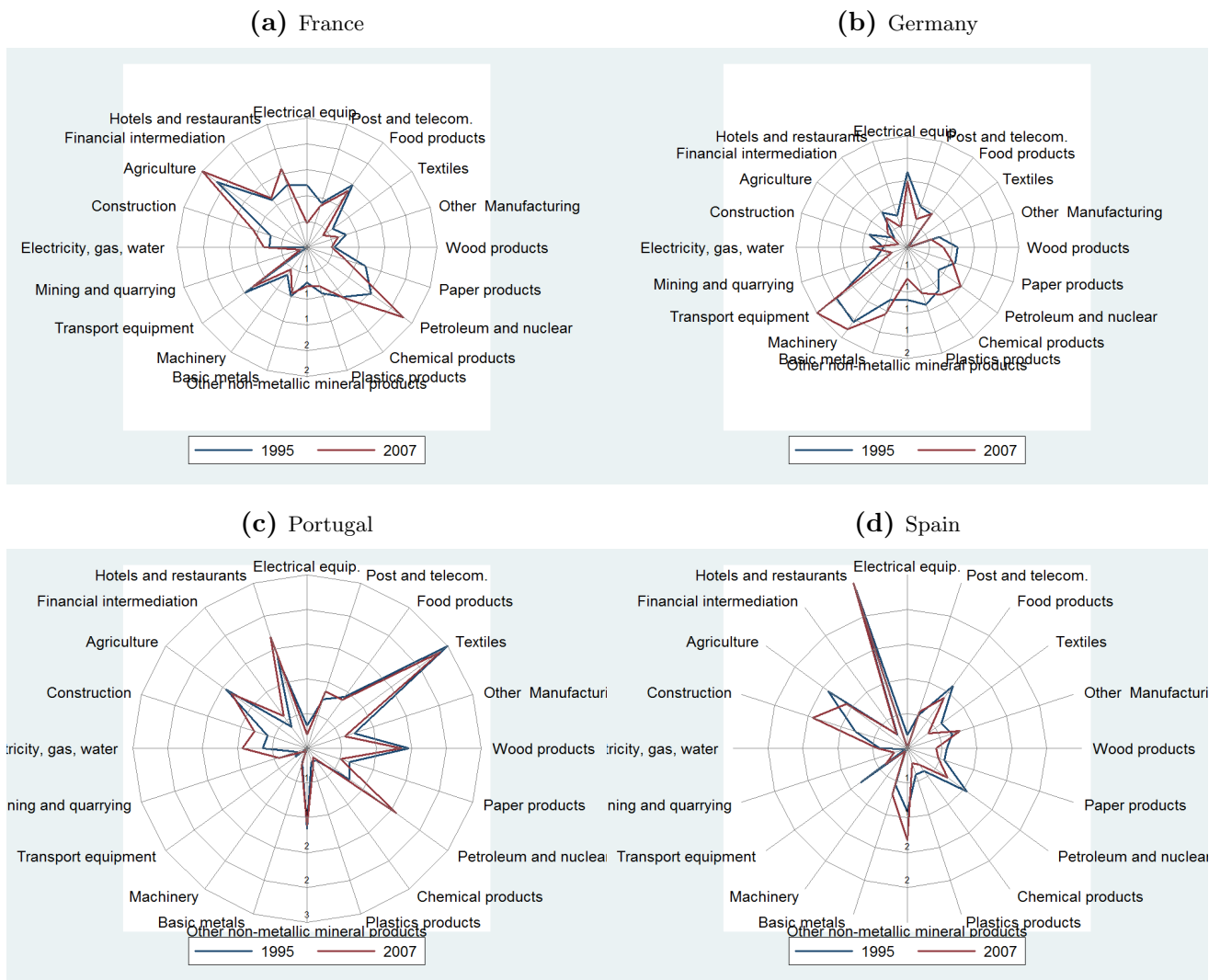
Italy, like most of the peripheral countries, increasingly specialized in the hotel and catering

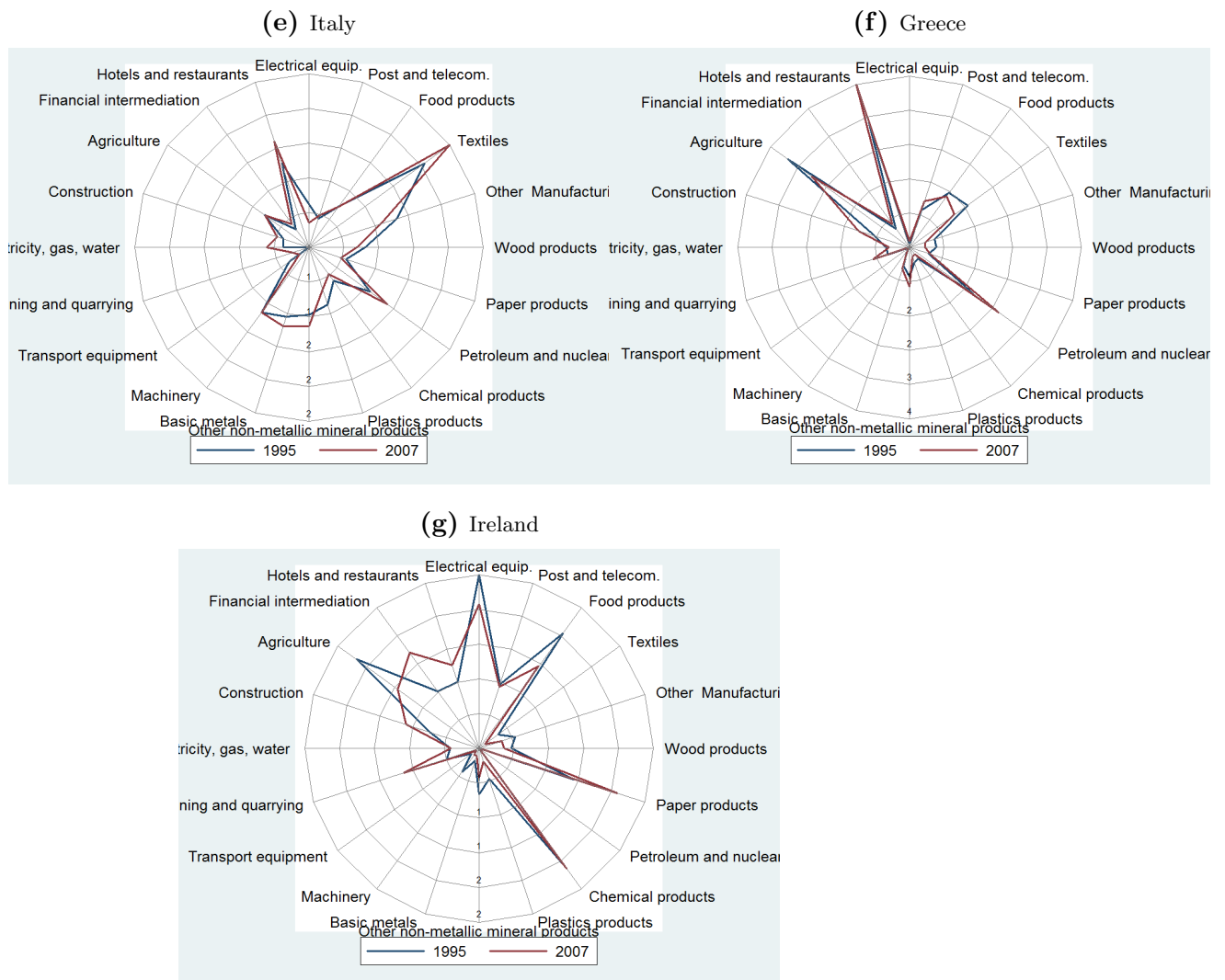
industry, textile industry and de-specialized in many other sectors. During this period, it developed its nuclear fuel industry and petroleum products, non-metallic mineral products, basic metals and machinery in which it continued to be relatively more specialized in than the average in the European area (figure 13e)).

Greece was highly specialized in industries requiring less skilled labor and in R&D (figure 13f). Thus, it was highly specialized in hospitality and catering industries, as well as nuclear fuels and petroleum products. It was moderately specialized in mining and quarrying industries, and in non-metallic mineral products. However, although it experienced a slight decline in agriculture, Greece continued to remain highly specialized in this sector.

Ireland was highly specialized in the chemical industry, in papermaking, in mining and in financial intermediary. For sectors such as hotel and catering, or construction, the country's index was higher than the average of the euro area (figure 13g).

Figure 14 – Specialization in 20 industries in 1995 and in 2007





Source: EU KLEMS and the author's calculations.

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Table 1 – Chronology and key documents by the EMU consulted for this paper

Date	Document	Main ideas
1985	<i>White Paper on the completion of the internal market</i> (CE, 1985)	<ul style="list-style-type: none"> - Establishes an agenda with the necessary actions to be taken in order to achieve the Single Market by December 31st 1992; - Stresses the commitment to abolish all types of barriers, to harmonize the rules, to bring laws and tax structures closer together, to strengthen monetary cooperation and supporting measure needed to encourage European firms to work with each other cooperate; - The Commission is aware of the risk associated with increased mobility opportunities without barriers for people, property and financial services moving to more advantageous economic zones and leading to exacerbated regional disparities, which could endanger the objective of convergence. This implies that resources from the Structural Funds must be used in a more effective and innovative manner, hence the importance of strengthening the funds.
1986	<i>Single European Act</i> (CE, 1986)	<ul style="list-style-type: none"> - Signed in Luxembourg on February 17th and in The Hague on February 28th 1986, it entered into force on July 1st 1987; - In accordance with Article 158 of the Treaty, the Cohesion Policy is primarily intended to reduce disparities between the levels of development in the various regions.
1989	Jacques Delors <i>Report on Economic and Monetary Union in the EU</i>	<ul style="list-style-type: none"> - In April 1989, Jacques Delors, President of the European Commission, released the <i>Delors Report</i>, which envisions the implementation of the Economic and Monetary Union (EMU) in three phases; - It notes that a more effective coordination of economic policies between the different national authorities is needed; - EU policies to support an overall balanced development are essential for the Single Market; - Decision-making authority must be transferred from member states to the EU in the fields of monetary policy and macroeconomic management; - Wage flexibility and labor mobility are necessary in order to eliminate differences in competitiveness across countries and regions and in order to avoid a relatively large decline in output and employment in areas of low productivity; - Uncoordinated and diverging national fiscal policies would undermine monetary stability and create imbalances in the real and financial sectors within the EU; - If the large differences in wage levels are not warranted by differences in productivity, this will lead to economic tensions and pressures on a monetary expansion; - Establishing the European System of Central Banks which will be responsible for formulating and implementing monetary policy, managing exchange rates and reserves, and maintaining a proper functioning

<p>for payment systems and price stability.</p>	<p>1990 <i>An empirical assessment of factors shaping regional competitiveness in problem regions</i> (Nam and IFO, 1990)</p> <ul style="list-style-type: none"> - Among many factors, infrastructure, innovation and human resources are generally referred to as the <i>foundations of regional economic competitiveness</i>; - Regional disparities could be caused by differences at these levels; - A region with better infrastructure is likely to have good economic performance, so disadvantaged regions could experience a clearing by improving their transportation infrastructure; - At the basis of regional competitiveness are national factors (exchange rates and interest rates, resulting from macroeconomic policy) and regional factors (transportation quality, energy, telecommunications, and education)
<p>1990 Emerson, M. <i>Single market, single currency: an assessment of potential benefits and costs of establishing an EMU</i></p> <ul style="list-style-type: none"> - A thorough assessment of the likely economic effects in terms of costs and gains based on the needs to create an economic and monetary union in Europe; - Addresses issues related to price stability, growth efficiency, adjustment to economic shocks, given that the countries lose one of their best monetary policy and exchange instruments for stabilizing; - National economic policies are put forward to ensure effective progress in nominal convergence so that the real convergence process is not jeopardized; - Traces the first move towards a regional policy at the EU level in 1971 with the adoption of the coordination principles for regional aid schemes. They aim to minimize distortions in competitiveness competition within the EU while protecting the national regional development objectives; 	
<p>1991 <i>The regions in the 1990s</i> (CE, 1991)</p> <ul style="list-style-type: none"> - The fact that severe regional disparities in GDP per capita and unemployment rates continue to exist can be attributed to differences deeply ingrained in the system regarding competitive advantages determined by a number of factors; - One factor that explains regional disparities is the differences in the ability of firms to innovate and in the capacity of regions to support R&D; - The Structural Funds can be considered as an income transfer mechanism in addition to income (GDP) generated in the member countries and regions themselves; - They represent a transfer of income estimated at 1.2% of GDP in 1989 and 1.6% in 1993, rates which show that the transfers made through these funds can only immediately impact disparities in income to a limited extent; - Observes a recovery in industrial employment growth in the EU, particularly in Spain and Portugal, because of these regions' increasingly attractive outside capital since 1987; - The historical development of the innovation process within industries and modern businesses, characterized by advanced technology and an intense research activity, is leading to concentrated industry and business areas in some of the major cities in the EU, while traditional and less research-oriented industries are overrepresented and more commonly located in less advantageous regions. 	

1997	<i>First report from the commission on economic and social cohesion</i> (CE, 1996)	<ul style="list-style-type: none"> - Addresses four main issues: have the economic and social disparities between member countries, regions and social groups declined over time leading to <i>an overall harmonious development in the EU</i>? What role have the member countries' policies and contribution played? Aside from structural policies, how have EU politics reacted to the requirements contained in the Treaty regarding the objectives of cohesion? What have the effects of EU's structural policies been? - The macroeconomic policies pursued by the countries to strengthen cohesion have resulted in significant - The reform of the Structural Funds in 1988 increased their redistributive effects in favor of disadvantaged member countries and regions.
2000	<i>The location of industries and the specialization of regions in the EU</i> (Laurin and ECFIN, 2000)	<ul style="list-style-type: none"> - Given that one of the EC's missions is the convergence of regional economies, balanced regional development can be challenged by agglomeration forces that would shape the industrial location in the process of industrial restructuring; - A review of academic studies: Ethier (1979 and 1982), Helpman & Krugman (1985), Grossman & Helpman (1990, 1991 and 1995), Krugman (1991) envision an economic divergence between the more developed industrial regions; - It is an extension of a study by Hallet (2000) that was conducted for the European Commission on the specialization and regional concentration within the EU. By containing the data on gross value added used, it attempts to understand the evolution of specialization in regions between 1980 and 1995.
2001	<i>Ajustement aux chocs asymétrique</i> (Amati and Patterso, 2001)	<ul style="list-style-type: none"> - The report asserts that the euro area will be less vulnerable to external shocks than the EU countries when considered separately; - Most research indicates that a very small number of shocks to the EU countries are country specific. Some of these shocks are sector-specific with no particular effect on the exchange rate or on the monetary policy. A high proportion of shocks are regionally asymmetric shocks; - As a conclusion, the establishment of a mechanism to manage the consequences of asymmetric shocks on relative regional incomes, employment and growth is proposed in the euro area.
2005	<i>Third progress report on cohesion: Towards a new partnership for growth, jobs and cohesion</i> (CE, 2005)	<ul style="list-style-type: none"> - Presents an update of the situation and trends emerging in the regions since the Third Report on Economic and Social Cohesion in February 2004. As part of the mid-term review of the Structural Funds, it covers several important topics in the field of regional policy and cohesion. - Establishes the basic principles for the reform of regional policy and cohesion in the EU for 2007-2013; - In the EU-15, the low-income regions are concentrated geographically in southern Greece, Portugal, in the southern parts of Spain and Italy, and in the new states in Germany; - Differences between member countries are more marked in productivity than in employment rates; - All in all, even though the disparities in the EU have declined since 1995, the disparities declined more between countries than between regions. In several member countries, regional disparities have increased; - Based on GDP per capita, disparities between member countries remain significant; - The prevailing disparity levels in the EU reflect the need for active cohesion policies; - The Spring European Council has called for greater synergies between EU funds and the EIB projects in

R&D.	<p>2008 <i>European Cohesion Policy 1988-2008: Investing in the Future of Europe</i> (CE, 2008)</p> <ul style="list-style-type: none"> - The EU has reached a high level of economic and social convergence since 1988. Greece, Spain, Ireland and Portugal, the main beneficiaries of the cohesion policy, have grown steadily. Between 1995 and 2005, Greece has caught up with the rest of the EU27. Its average has increased from 74% to 88% of EU average. Spain's has increased from 91% to 102%, while Ireland has a GDP equivalent to 145% of the EU average whereas it was at 102% a decade earlier; - Between 1995 and 2004, the number of regions with a GDP per capita below 75% of the EU average fell from 78 to 70, while the number of regions with a GDP below 50% of the EU average also decreased from 39 to 32.
<p>2010 <i>European Commission, structural change, and globalization</i> (CE, 2010)</p> <ul style="list-style-type: none"> - From 2000 to 2006, the European Regional Development Fund (ERDF) took action in assisting EU regions faced with structural challenges (declining industrial areas, rural economies, economic areas dependent on fisheries, etc.); - Based on a statistical analysis of regions and twelve in-depth case studies, this report examines the extent to which interventions financed by the ERDF offer a solution to the challenges resulting from globalization and structural changes; - Three types of structural changes were noted from 1999 to 2005: (i) regions with economic performance below the average in 1999 and with no change in 2005, (ii) areas with good performance in 1999 and still well above the average in 2005, (iii) regions that have developed on the basis of their previous specialization and that have experienced substantial progress. ; - In six of the twelve case studies the effectiveness of ERDF interventions were mixed; - Regional policy makers should be aware that when designing the interventions financed by the ERDF, early responses that strategically focus on innovation and internationalization, rather than on regional development (intra-regional) issues or preservation of employment, are more effective in responding to the challenges of structural change. 	



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