

# European Economic Convergence: Twenty Years Later

The real convergence between member countries of the euro area has not carried out according to the provisions that preceded the adoption of the Maastricht Treaty. 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 are only one 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 may 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 with 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. ■

**THE CHALLENGES** 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 as defined by 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 proponents of a monetary union were counting on lower risk premiums (inflation risk, currency risk) for creating real convergence<sup>(1)</sup> 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 peripheral 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.

The explanations of the crisis in the euro area today are not exhaustive, but such divergences certainly play a role and are today exacerbated. What are the mechanisms put in place to protect the euro zone and to address the urgent situation? What is the cost of achieving real convergence? To answer these two questions, we will need to define the instruments that must be put in place in order to achieve this<sup>(2)</sup>.

## 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 (EC, 1996)<sup>(3)</sup>. 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 of the countries with the lowest one. Other authors, such as Winkler (1995)<sup>(4)</sup>, note that these nominal criteria can function as signals, an indicator that a sound economic policy is in place. Wyplosz (1997)<sup>(5)</sup> 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 (Box 1).

### Box 1:

#### The criteria for an optimum currency area

The theory of optimum currency areas by Mundell (1961)<sup>(6)</sup> defines such an 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.

[1] *Real convergence* is the convergence of production structures, business cycles, and real quantities such as productivity and the real exchange rate. *Nominal convergence* is the convergence of nominal variables such as prices and monetary aggregates.

[2] In addition to this policy brief, also see Working Paper No. 2012-04, Centre d'analyse stratégique.

[3] EC (1996). First Progress Report on Economic and Social Cohesion. European Commission.

[4] Winkler, B. (1995). Reputation for EMU: An economic defence of the Maastricht criteria. Working paper, European University Institute.

[5] Wyplosz, C. (1997). EMU: Why and how it might happen. *Journal of Economic Perspectives*, 11(4):3-21.

[6] Mundell, R. (1961). A theory of optimum currency areas. *American Economic Review*, 51(4):657-665.

The theory of optimum currency areas was later clarified by McKinnon [1963]<sup>[7]</sup> and Kenen [1969]<sup>[8]</sup>. 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 trade 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 on demand in one sector will have little impact on an economy with a diversified production structure. This means that intersectorial 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.

The other criticism, based on the theory of the New Economic Geography (Box 2), shows the monetary union's pernicious effects caused by the polarization of industrial activities and increased inequalities between countries.

 **Box 2:**

**The theory of the New Economic Geography**

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 closed to consumers. Instead, they relocate their production units to areas where economies of scale are higher. This also increases the specialization in these regions and their vulnerability to asymmetric shocks.

In the early 1990s, these ideas were picked up again and developed for the case of a monetary union. Krugman and Venables [1990]<sup>[9]</sup> show 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 to gain easier access to markets. Krugman [1991]<sup>[10]</sup> and Puga [1998]<sup>[11]</sup> 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. Their main conclusion is that a country that opens up to international trade will automatically experience a greater specialization in its economic activity.

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)<sup>[12]</sup> and the debates following its publication<sup>[13]</sup>, deserve special attention since it outlines the forces in place and crystallizes oppositions that, twenty years later, have become crucial topics.

 **NOMINAL CONVERGENCE CRITERIA PRIOR TO THE MONETARY UNION WAS A FACTOR FOR REAL DIVERGENCE**

Given the difficulties from the start to ensure real convergence, the Maastricht Treaty established the nominal convergence criteria in hopes that they would lead to real convergence. This assumed, on the one hand, that the lower risk premiums and the free capital flows would generate real convergence and that, on the other hand, nominal convergence would induce real convergence with the endogeneity of an optimum currency area taken into consideration (Frankel et Rose, 1996<sup>[14]</sup>, 1997<sup>[15]</sup>, 2000<sup>[16]</sup>). In fact, 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 low level of real convergence can be explained by several factors such as the lack of transfers between countries, a single monetary policy imposed on different countries, differences in factor endowments and in demographic structures, to name a few. Without going into details, we will discuss the main aspects of the factors identified here.



[7] McKinnon, R. [1963]. Optimum currency areas. *American Economic Review*, 53(4):717-725.

[8] Kenen, P. [1969]. The theory of optimum currency areas: An eclectic view. *Monetary Problems of the International Economy*, 41-60.

[9] Krugman, P. and Venables, A. J. [1990]. Integration and the competitiveness of peripheral industry. CEPR Discussion Papers 363.

[10] Krugman, P. [1991]. *Geography and Trade*. MIT Press.

[11] Puga, D. [1998]. Urbanization patterns: European versus less developed countries. *Journal of Regional Science*, 38(2):231-252.

[12] Emerson *et al.* [1990], *One Money, One Market*. European Commission.

[13] Paul Krugman's answer to the report in 1993: "Lessons from Massachusetts to EMU". In Torres F. & Giavazzi F. [Editors], *Adjustment and Growth in the European Monetary Union*, Londres, CEPR and Cambridge University Press.

[14] Frankel, J. A. and Rose, A. K. [1996]. The endogeneity of the optimum currency area criteria. NBER Working Paper 5700.

[15] Frankel, J. and Rose, A. [1997]. Is EMU more justifiable ex-post than ex-ante?. *European Economic Review*, 41(3):753-760.

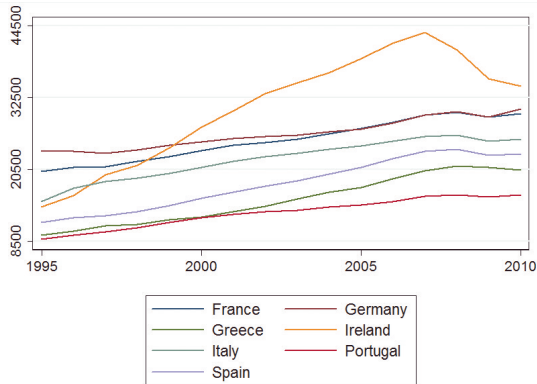
[16] Frankel, J. and Rose, A. [2000]. Estimating the effect of currency unions on trade and output. NBER Working Paper 7 857.

**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*. About twenty years after the creation of the EMU, what is noteworthy in terms of convergence or divergence of GDP *per capita*?

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, that showed strong growth rates until 2007, was able to converge. Before the crisis, growth remained strong in the peripheral countries without convergence.

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



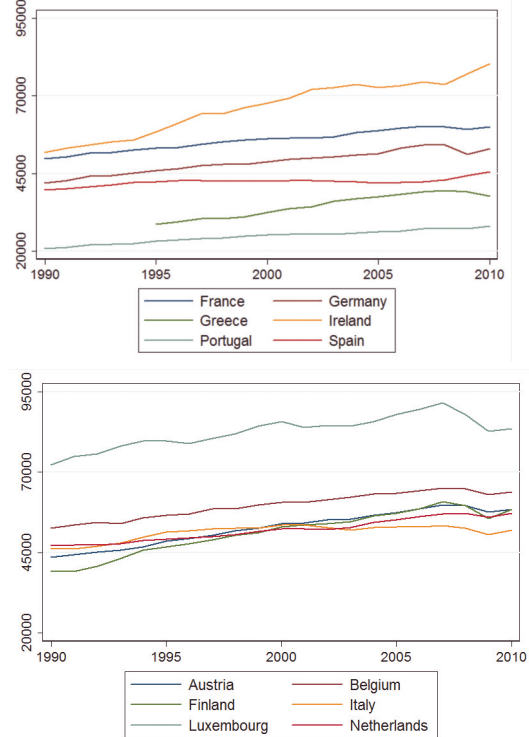
Source: Eurostat

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, in the case of divergence of GDP *per capita*, is productivity *per capita*. Figure 2 shows its evolution since the early 1990s.

Note that there are clear disparities between countries in terms of productivity. For Spain, productivity is situated below the average of European countries.

It decreased between 2004 and 2008 before recovering and improving as of 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.

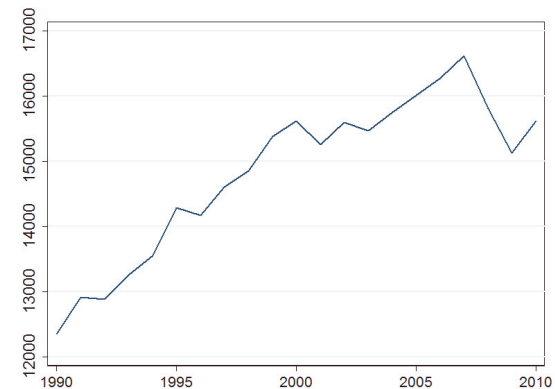
**Figure 2**  
Trend (in euros) of labor productivity per person employed within the euro area, 1990-2010



Source: OECD

To illustrate this, we measure disparities in terms of productivity (see Note, Figure 3). It appears that differences in productivity never stopped increasing until the crisis: neither the single currency, nor the transfers between countries have succeeded in decreasing the growing differences observed in productivity.

**Figure 3**  
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 construction, is always positive. The higher the standard deviation, the greater the dispersion.

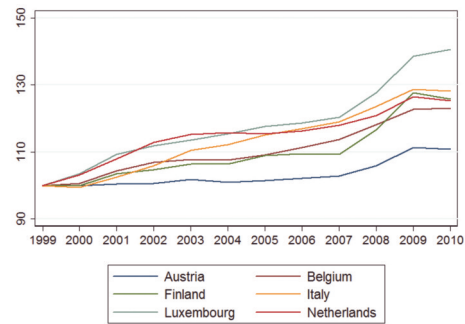
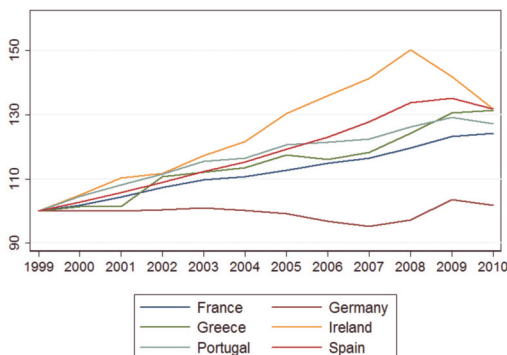
Sources: OECD and author's calculations

**The evolution of labor costs is not the only factor explaining the imbalances in the current accounts within 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 (1990) assumed that wage growth was sustainable if paired with productivity. The Emerson report showed that the convergence of labor costs without productivity growth would only lead to small areas of regional unemployment. But with the balance of payments crisis in peripheral countries, the debate on whether the convergence of unit labor costs exists has spurred again. The prevailing opinion attributes intra-European imbalances to the differences in competitiveness. The ECB goes as far as to attribute the cause of the crisis to *excessive and persistent differences* in competitiveness. What do the data say?

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)<sup>(17)</sup>. Most studies concluding that a divergence in unit labor costs exists (for example, Artus (2012)<sup>(18)</sup>), I use the year 1999, *i.e.*, that of the creation of the monetary union, as base year. Their results are reproduced in figure 4. The graph indicates the existence of diverging unit labor costs. However, by using a different base year, the conclusion can be altered. To avoid such problems, I use level series, *i.e.*, non-indexed.

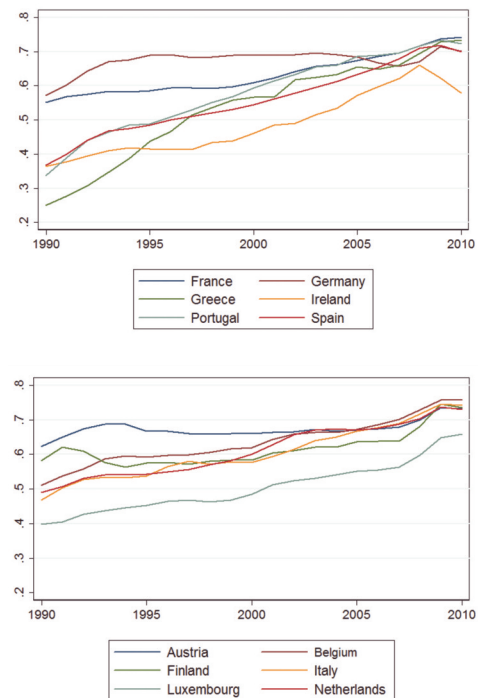
**Figure 4**  
**Unit labor costs, 1999-2010**  
**(base 100 in 1999)**



Sources: OECD and author's calculations

Figure 5 illustrates the change in the level of unit labor costs, in the euro area, since the early 1990s. In the years 1990-2010, unit labor costs have more or less converged, especially after the introduction of the EMU in the early 2000s, *i.e.* The first section showed that there was a divergence of productivity within the EMU. Consequently, the convergence of unit labor costs reflects strong wage growth in countries with low productivity.

**Figure 5**  
**Trend of unit labor costs, 1999-2010**



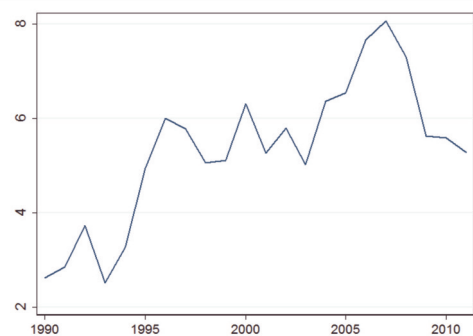
Source: OECD



[17] Gros, D. [2012]. Macroeconomic imbalances in the euro area: Symptom or cause of the crisis?. *Policy Brief* (No 266).

[18] Artus, P. [2012]. Zone euro : l'erreur de conception est l'oubli de l'hétérogénéité structurelle ; elle peut conduire à l'éclatement de l'euro. *Flash économique*, n°288.

**Figure 6**  
**Disparities in current account balances, 1990-2010**



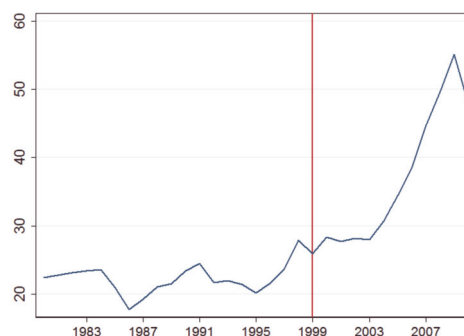
Sources: WEO (IMF, 2011) and author's calculations

Since adjustment through biases in the nominal exchange rate is impossible in a monetary union, any divergence in unit labor costs may lead to disparities in current accounts. This evolution of the disparities in current accounts can be observed in figure 6, for the euro area, in the years 1990-2010. Thus, we see that until the crisis, differences in current accounts evolved unevenly while displaying an upward trend.

**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 required that EU countries would converge, have the same nominal interest rates and level of 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 credit to the economy. 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.

**Figure 7**  
**Disparities in credit to the private sector, 1980-2010**



Sources: WDI (WB, 2011) and author's calculations

Since unit labor costs alone do not explain the divergences in current accounts, the reasoning used here can be refined in order to account for these divergences. In fact, all euro zone members had to fulfill the nominal convergence criteria in order to join the European economic and monetary union. By regrouping those 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) for all member countries. Instead, the common 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<sup>(19)</sup>. 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.



[19] Walters 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.

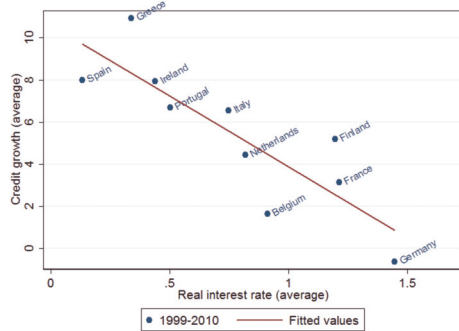
This argument is illustrated in figure 8, which shows the negative relationship between real interest rates and average credit growth rate. In peripheral countries where the inflation rates are the highest, the real interest rates are also the lowest and consequently, the average credit growth rate is 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 point, 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.

Figure 8

### Relationship between real interest rates and credit growth



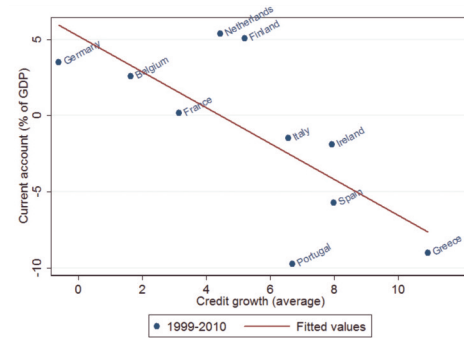
Sources: ECB, WEO, WDI and author's calculations

This increased demand has led to a construction boom in Spain 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 between 1999 and 2010. The difference between the country with the highest average credit growth rates and the one with the weakest generates a 10 point current account deficit difference.

Figure 9

### Relationship between credit growth and current accounts



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

Furthermore, by imposing a single interest rate to all its member countries, the monetary union has introduced another channel, the real exchange rate, through which 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.

However, the common monetary policy cannot explain all the differences observed in real values, since the European integration is not only achieved through a nominal anchor. 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.

## ▶ POLARIZED ECONOMIC ACTIVITIES AND INCREASED TERRITORIAL DISPARITIES BETWEEN COUNTRIES IN THE EURO AREA, DESPITE THE EU STRUCTURAL FUNDS

The other source of heterogeneity in the monetary union, also discussed by Emerson *et al.* (1990) is the agglomeration of economic activities. This would reverse the development goals of a balanced economic area. Since the early 1990s, the debate has been intense. In 1993,

Krugman responds to the Emerson report with a paper entitled *Lessons from Massachusetts for EMU*. His main argument, which goes against the European Commission, is that the construction of an economic and monetary union increases the tendencies of a country to specialize according to its comparative advantages. Agglomeration of economic activities will thus develop 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 Krugman's position (1993), the European Commission defended the idea that *a strong local investment policy can lead to convergence between regions* (EC, 1996). The Structural Funds' regional policies can sustain growth, affect the European geography of economic activities and thus, also the process of convergence in Europe.

**Given the likely polarization of economic activities within the monetary union, the European Commission strengthened the role of the Structural Funds for least-developed regions**

Reducing wealth disparities between regions is one of the founding objectives of the EU (Article 158 of the Treaty establishing the European Community). The Delors Report (1989)<sup>(20)</sup> was aware of the potential negative effects induced by a monetary union and insisted that a strengthening of the regional policy had to be accompanied by financial instruments for a balanced regional and socio-economic development. Large domestic disparities and a level of national development well below other member countries characterize Greece, Spain and Portugal. The budget allocated to territorial cohesion policies (Structural Funds and Cohesion Fund) accounts for one third of the EU budget (EUR 347 billion for 2007-2013), which is more than the budget for the Common Agricultural Policy. The issues surrounding the efficiency of the funds' dual objective, growth and convergence, have been brought up during the negotiations for the next EU budget.

Of course, it is difficult to measure the impact of the structural policies. However, several developments are worth highlighting. First, the method of allocating the funds (which takes into account the level of GDP *per capita* of the country and not of the region itself), redistributes resources primarily between individuals in the same region, as noted by Santos (2008)<sup>(21)</sup>. For example, 81% of the funds received by Spain, a net recipient of structural funds in 2007-2013, came from its own contribution. Of the 81%, two thirds of what was spent in a given region was funded by the region itself. Under such a scheme, the Structural Funds are simply a common tool for regional investment policy.

On the other hand, if positive influences do exist, they seem to benefit areas that were already developed. According to the advocates of the New Economic Geography, the effects of structural funds seem to be paradoxical since the improvement of transportation infrastructure and telecommunications (the sector receiving the most funds, i.e. 22% of the total funds' budget in 2007-2013) in disadvantaged regions plays against them by increasing the effects of agglomeration. Indeed, better access in disadvantaged areas can lead to a greater concentration of production sites in developed areas boosted by economies of scale.

**Despite the amounts allocated to the regions, the agglomeration of high-value-added activities 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 concerns between openness to international trade and changing patterns of production are not specific to Europe. Hanson (1998)<sup>(22)</sup> noted that most American lawmakers in circumscriptions close to the Mexican border strongly suppor-



[20] Delors, J. [1989]. Rapport sur l'Union économique et monétaire dans la Communauté européenne.

[21] Santos, I. [2008]. Is structural spending on solid foundations?, *Bruegel Policy Brief*, 2008/02.

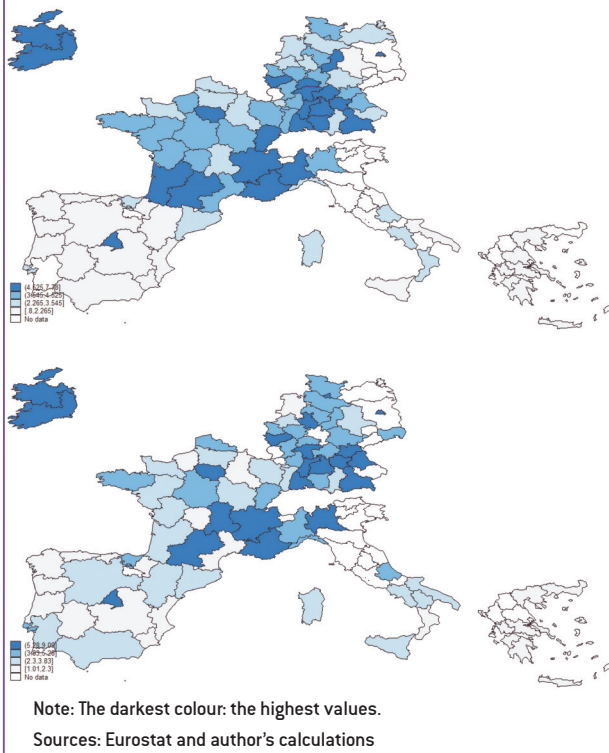
[22] Hanson, G. [1998]. North American economic integration and industry location. *Oxford Review of Economic Policy*, 14(2):30-44.



ted 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? Did specialization increase in the EMU countries?

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

**Figure 10**  
**Employment in high tech sectors, as a share of total employment, 1998 and 2008**



It appears that employment in high-tech sectors is mainly concentrated in the two countries at the heart of the euro area, especially in Germany, France (the region Rhône-Alpes), and France (Île-de-France). In the peripheral areas, Ireland, central Spain and northern Italy are the only regions with high levels of employment in high-tech sectors.

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

**Figure 11:**  
**Patent applications by regions, as a share of total applications of a country, 2009**

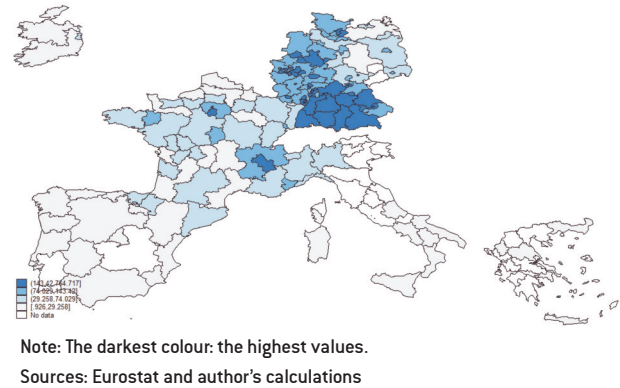
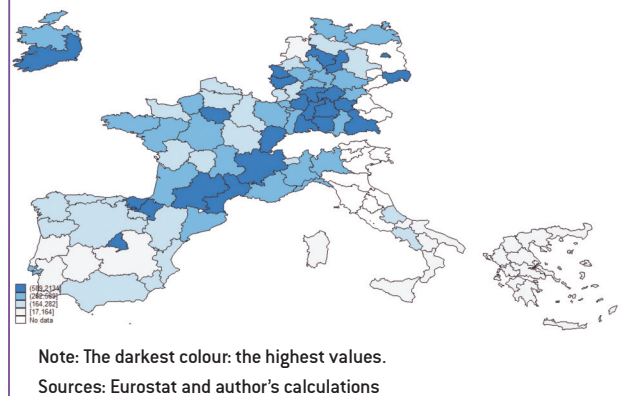


Figure 12 gives the concentration of R&D expenditures for 1995 and 2009. These results also show that there is an agglomeration effect within the EMU. Despite the research programs that have been implemented (EC, 1996) by the Commission to help peripheral countries to contravene this concentration, the expected results were not achieved.

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



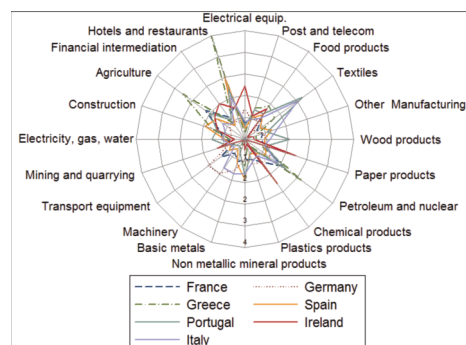
Even though these figures show that there is a global effect of strong agglomeration in the core euro zone countries at the expense of the peripheral countries, the figures fail to show the disparities that exist both within the countries and between the countries. Indeed, as the New Economic Geography explains, agglomeration is the result of a strong specialization.

**Differences in specialization could explain an increased polarization of activities**

Comparing the specialization within the countries of Europe, and how it evolved particularly between the peripheral countries and two countries at the heart of the euro area reveals an interesting dynamic in many ways. The average specialization of industries in these countries is analysed for the years 1995 to 2007 with production as a measure of specialization. Using the Balassa index<sup>(23)</sup> (Amiti, 1998)<sup>(24)</sup>, we estimated the specialization of twenty industries for the aforementioned countries (figure 13). The data stem from the EU KLEMS database (O'Mahony and Timmer, 2009)<sup>(25)</sup>.

The indexes for twenty industries highlight that the peripheral countries are more specialized than France and Germany (figure 13). 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 a sensitive case because even though they specialize more and more, their production levels remain lower than in 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 euro zone. 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, France experiences a decline of its specialization.

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



Sources: EU KLEMS and author's calculations

These observations corroborate and refine the predictions made by Krugman according to which a single European market would push the less-developed member countries in the peripheral areas towards greater specialization, while the member countries at the heart of the euro area would grow stronger and more diversified. As a result, the peripheral countries are more exposed to shocks. Regional policies through the Structural Funds have neither counteracted this intense specialization nor their perverse effects. An analysis of the responses of each individual country highlights further and more in-depth details. When countries are taken separately, several results for France and Spain<sup>(26)</sup>, from 1995 to 2005, are worth emphasizing.

In France, de-specialization in some industries benefited other industries. Thus, the country remained heavily specialized in fishing, hunting, and in activities 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 registered an increase in its hotel industry, indicating a growing specialization in this sector (figure 14.)

[23] Let  $B\{ij\}$  be the Balassa index, we then have:  $B\{ij\} = \{q\{ij\}/qj\} / \{qi/Q\}$  with  $q\{ij\}$  production in each industry  $i$  (according to the EU classification) in each country  $j$ ,  $qj$  is total industrial production in each country  $j$ ,  $qi$  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.

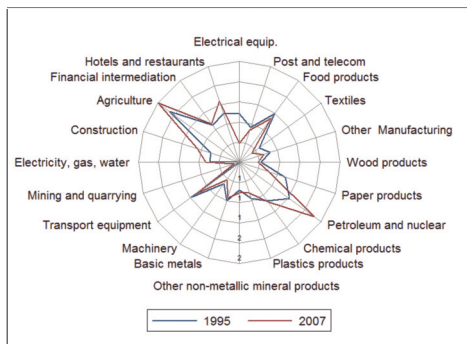
[24] Amiti, M. [1998]. New trade theories and industrial location in the EU : A survey of evidence. *Oxford Review of Economic Policy*, 14(2):45-53.

[25] O'Mahony, M. et Timmer, M. [2009]. Output, input and productivity measures at the industry level: The EU KLEMS database. *Economic Journal*, 119(538):F374-F403.

[26] For results from other countries, see Working Paper No. 2012-04, Centre d'analyse stratégique.

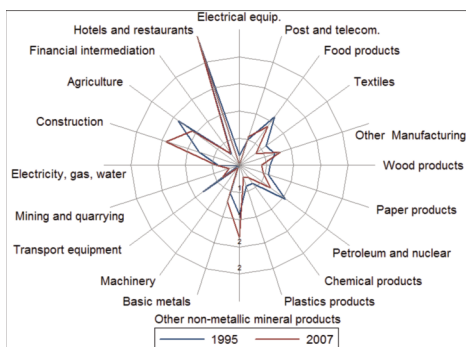
Spain, like Portugal, gave up several industrial sectors in order to specialize in other industries, mainly the construction sector, non-metallic minerals industry and the hotel and catering industry. Sectors experienced a slow-down in specialization because Spain gradually focused less on specializing and more 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 15).

**Figure 14**  
**Specialization in France**  
**for 20 industries, 1995 and 2007**



Sources: EU KLEMS and author's calculations

**Figure 15**  
**Specialization in Spain**  
**for 20 industries, 1995 and 2007**



Sources: EU KLEMS and author's calculations

**CONCLUSION** This analysis showed that the gains brought by the EU did not automatically create real convergence between member countries. The nominal convergence required by the Maastricht Treaty has instead produced real disparities by affecting credits, which raises questions concerning the appropriate monetary policy for the EMU. The risk of creating divergences requires that the monetary authorities have the possibility to better differentiate especially in allocating credit increases to specific countries. This could be possible through a differentiated macro-prudential policy.

Moreover, the economic integration has led to an agglomeration of economic activities, in which the biggest losers are the countries in the peripheral areas. The Structural Funds have not been able to counteract this process. The next EU budget negotiation could be an opportunity to review the role of these funds, which have so far proved insufficient for reaching the goal of homogenization. In addition, explicit criteria to reach this goal could be included in the allocation process itself. The Structural Funds could thus become an instrument dedicated to enhance productivity in the peripheral areas and to enable them to catch up with the countries at the *heart* of the euro area.

► **Keywords:** nominal convergence; real divergence; optimal currency area; polarization of activities.



Mouhamadou Sy, Economy Finance department



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Press office:  
Jean-Michel Roullé,  
Communication manager  
+33 (0)1 42 75 61 37 / 06 46 55 38 38  
[jean-michel.roulle@strategie.gouv.fr](mailto:jean-michel.roulle@strategie.gouv.fr)

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