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JAUME I

## HAS THE INTRODUCTION OF A COMMON CURRENCY(Euro) LED TO THE CONVERGENCE OF EU COUNTRIES?

### Productivity Analysis in the EU context

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**ABSTRACT:** Has the introduction of a common currency (EURO) led to the convergence of EU countries? A review in the EU context. In this paper I try to answer this question by analysing different papers provided by the literature, focusing on the Total Factor Productivity (TFP) as an important component explaining differences per capita income across countries and the local allocation of production factors. Relying on the theories of Optimum Currency Areas (OCA), I conclude that the introduction of a common currency in the EU context has not led to convergence of EU countries over time and that differences between rich and poor EU countries remain. But I observe some convergence “clubs” that have economic, historical and trade links before the introduction of a common currency. In this sense, I ask whether fiscal union could be an element of economic convergence in the European Monetary Union (EMU), and largely in EU context.

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**Keywords:** European Monetary Union, Total Factor productivity, OCA, economic convergence, fiscal union.

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## 1.Introduction

The 1st of January 2022 was the 20th anniversary of the introduction and circulation of a common currency in the European Union, the euro. Upon its introduction, the euro has been immediately adopted by 12 countries (which joined EMU) aiming to make progress towards greater economic and social integration in the European territory, where very soon more actors adopted this new currency. Today, the euro is present in 19 countries (and more than 340 million Europeans), in the context of the EU, and is a strong and secure currency trusted by European citizens and international markets.

In this respect, 20 years later, I discussed whether the introduction of a common currency has led, as a result, to a process of economic growth (and productivity growth as a key to it) and, in the medium to long term, the convergence of EU countries from developing countries towards developed countries, a process known as a “catch-up” effect).<sup>1</sup> To answer this question, I analyze productivity levels in EU countries and the effects over time of this process (convergence and economic growth).

A country's economic growth is usually measured by the growth rate of GDP per capita, and to some extent can indicate the level of well-being of a country or region. In this work, I am interested in studying long term economic growth variables, because economic integration and convergence need time to produce (Solow, R.M., 1956). Although there are other models, like the one Acemoglu & Robinson (2012), propose in their work “Why nations fail?” where the differences in economic growth and development in different countries or regions are the result of differences in political and economic institutions.<sup>2</sup>

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<sup>1</sup>This effect maintains the hypothesis that poorer economies in per capita income will tend to grow at faster rates than richer economies, as the Solow Model, (1956), explains. In addition, this type of convergence is known, in the literature on economic growth, as “beta convergence”.

<sup>2</sup>In this research, Acemoglu & Robinson, (2012), set a number of rights (for example to assembly, to vote, to trade, private property and patent rights, information rights) along with responsibilities for societies and institutions as a whole, e.g., division of powers, enforcement and equality before the law, justice and the importance of investing in education and health as

In the current literature, I have some theories that try to explain how a country or a region grows, but other questions arise when I introduce the context of the union of countries and the different levels of integration among them. In this context, two main theories appear: On the one hand, the theory of economic integration involves the elimination of trade barriers between two or more countries or regions in order to take advantage of international trade or specialization and create large economic areas. On the other hand, the theory of optimum currency areas that explores the idea of a bloc of countries (in a common geographical area) that has great economic integration, as for example the European Monetary Union (EMU), which generates benefits for the union as high trade flows, no exchange rate risk, more synchronized economic cycles, financial support from the central bank against negative shocks, shared policy actions in some sectors such as agriculture or migration.

Throughout this work the analysis to the empirical literature in the EU context will allow me, and my readers, to have the proper information to accept or reject the initial hypothesis of no convergence in the EU area. Some findings in previous works about EU point out that the presence of convergence has been observed in some group of countries “clubs” shows some level of convergence process in productivity levels or per capita income (these clubs, in general, have had still strong commercial, geographical, economic and historical links) such as the BENELUX countries plus the economies of Denmark and Sweden or another “club” with three major economies in Europe as Germany, France and the UK. <sup>3</sup> Despite these findings, the introduction of a common currency has three main benefits to highlight in EU countries, as noted by work of Papaioannou (2021): First, most euro area countries increased their TFP levels (this index represents some proxy of real productivities). But these effects need to maintain in long run to translate in wealth and redistribute this wealth to general developing countries population in order to reduce the large differences in productivity levels between EU countries. Secondly, this positive effect has reduced productivity disparities between the EU and the US. Finally, in Europe, the increase in per capita income in many EU countries has been due to the start of the economic integration process that began decades ago, as concluded by authors as Badinger (2005).

engines of social and economic growth. In contrast, these authors put in second place factors such as history, climate, geography, the ignorance of their leaders or the values of each society as main predictors of the differences in economic growth and development in different regions or countries in the world, appearing a new economic field to future research known as “the new institutional economics”.

<sup>3</sup>The papers of Papaioannou (2021) and Margaritis et al. (2006) show these effects on convergence process.

In this work, I study the convergence of EU countries focusing on per capita income and productivity. The paper is organized in three main parts: First, I introduce some theoretical concepts (the economic integration effects, the different levels of this concept and some benefits and costs of the process), as well as, the historical evolution of the Optimum Currency Areas (OCA) theory.

Second, I continue analyzing what are the economic effects of the introduction of a common currency in the countries of the EU (this analysis show the effects in the Euro Area in per capita income and productivity terms). In fact, I study: what has been the evolution of productivity (TFP analysis) when the euro was introduced? Any process of convergence is observed in EU countries? These effects have inequalities increased or decreasing?. And I want to close this introduction by asking ourselves whether the EU fiscal union is the key to achieving significant stability, and in the long term, a process of convergence between EU countries?

Finally, the paper concludes and proposes some ideas for further research. In particular, I propose the creation of an interactive productivity index using TFP which is an important indicator of the economic growth in whatever economy. The policymakers could use this indicator to create policies to enhance growth and european convergence.

## **2.Global analyses of the issue: Economic Integration: Concept, Effects and Levels.**

For me, the concept of economic integration is a process by which two or more countries or regions progressively remove barriers between them (mainly trade-related) in order to take advantage from their benefits. With this process, two economies or regions with their respective markets are integrated faster or slower, depending on the context, into a single market where policies are common. Not only monetary policy but also the Agricultural Common Policy (CAP) that seeks to protect and assist the interests of European agricultural businesses and families. It should be noted that in any integration process, the parties involved lose sovereignty depending on the degree of integration.

Among other definitions of the concept of economic integration in the literature, I find that the main authors on this subject have defined it in different ways. According to

Balassa (1961), in his book entitled "The Theory of Economic Integration" he defines it as "the abolition of discrimination within an area". In this sense, the Balassa's definition has the idea that the process of economic integration try to eliminate restrictions to movement of commodities (for example with external tariffs) and capitals that "discriminate" foreign goods (maybe more valuable or cheaper) against national ones. This elimination of barriers between countries could create a common welfare. Another important author, Kahnert et al. (1969) defines it as "the process of removing progressively those discrimination which occur at national borders". Finally, Machlup (1977) has defined it as "the process of combining separate economies into a larger economic region".

Among the effects derived from the process of economic integration I can separate them according to the pioneering work of Viner (1950) entitled "The Customs Union Issue", which explains the effects as static and dynamic.

On the one hand, static effects relate to the effects of the economic integration process on trade. In this sense, according to the authors Hosny, A (2013); Marinov, E (2014) there are two effects on trade: trade creation and trade diversion. The first effect occurs when, after signing trade agreements between members of the customs union, products are substituted from a country of the union that produces them more expensively to one with an advantage (in technology, raw materials or labour) that allows it to produce and export them to the rest of the members at a lower cost.<sup>4</sup> Moreover, this mechanism of reducing relative product prices has positive effects on consumption. Second, "trade diversion" occurs when the production of a product is diverted from the efficient producer to less efficient producer.<sup>5</sup> For the latter purpose, tariffs are used to protect against competition from outside and thus ensure intra-union trade in that product. I have seen that the first effect generates benefits for all while the second one generates losses for some members. So these authors point out that in general terms, in order to ensure the viability and improve the welfare of a customs union, it is necessary that trade creation outweighs trade diversion.

On the other hand, the dynamic effects focus on analysing the mechanisms that make

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<sup>4</sup>The original idea of trade creation is assignate to the English economist, David Ricardo who explain this concept in the theory of comparative advantages (*Principles of Political Economy, 1817*), one of the most important contributions in international trade theory.

<sup>5</sup>The original idea comes to the Canadian economist, Jacob Viner that named this concept in the article "*The Customs Union Issue*" published in 1950.

output grow through productivity or increase the endowment of productive factors by increasing competition and expanding the size of the market. It should be noted that, according to the handbook Jordán Galduf, J.M. (2005): Economía de la Unión Europea, the process of economic integration does not imply that all members of the Union take advantage of these effects in the same way, generating inequalities that endanger the Union's viability.

According to the pioneer in these studies, there are four levels of economic integration: Preferential Trade Agreements, Free Trade Areas, Customs Unions, Common Market. In addition, I can include Monetary Unions as the highest level of economic integration, although other studies speak of political union. In any case, I will define the first five levels of integration:

- PTA: These agreements mean that certain products are traded between the participants of the agreement with lower tariffs than those existing on third countries.

- FTA: At this level the agreements between the partners mean that there are no tariffs and trade restrictions between the members of the agreement, but these barriers remain in place vis-à-vis third countries (e.g. EFTA).

- CU: At this level the partners of the union agree to set both a common tariff and a common trade policy vis-à-vis countries outside the union (e.g. EEC).

- MC: This level has a high level of economic integration of its members. It has characteristics of the Free Trade Area (the elimination of tariffs and non-tariff barriers between members) and of the Customs Union (they maintain a common trade policy and tariff towards the outside world). The novelty at this level of integration is the freedom of movement of goods, services and factors of production throughout the territory of the common market (e.g. MERCOSUR).

- EMU: I reach the highest level of integration for many manuals and authors, which is the Economic and Monetary Union. At this level, the characteristics of the previous levels are maintained, plus the centralisation and unification of monetary policy (a Central Bank is established to control and dictate these policies). In addition, other policies such as agriculture, defence, foreign trade, etc. are coordinated from the central institutions of the union (e.g. EU). At this level, member countries share the same currency if they are within the monetary union.



- UP: Under this level, full economic integration has been achieved. The members of this union have ceded practically all control of economic policies (both monetary and fiscal), and these are common.

Finally, it is worth noting that the benefits of greater economic integration include, according to Balassa (1962) and Hosny (2013): increases in competitiveness that increase the efficiency of companies, greater use of economies of scale, greater sources of financing and investment between member countries, greater specialisation of countries with comparative advantages in certain industries, technology transfers, greater availability of labour and also more trained labour. All these benefits translate into higher productivity and income gains that improve the welfare and quality of life of the citizens of the member countries.

On the other hand, the clearest cost associated with greater economic integration for the countries involved is the loss of national sovereignty by having to cede control of macroeconomic policies and follow common policies even if they are not the most efficient for national interests. For example, in the case of the European Monetary Union (EMU), the EU authorities have exclusive control over policies such as trade and international agreements, the common fisheries policy, monetary policy and competition rules affecting the single market.<sup>6</sup> Although the EU retains these competences, member states have competences in which the EU cannot oppose existing laws of member states or put in place new ones, for example in Public Health, Industry, Culture, Tourism, Sport, Education and Training or Civil Protection.

### **3. Historical development and modern approach: The Historical Evolution Of Optimum Currency Areas Theory.**

The theory of optimal currency areas has its starting point in the 1960s. I could define the concept of optimal currency area as that area/geographical zone under which its members obtain the greatest economic benefits by sharing a single currency and, therefore, having a higher level of economic integration.

The authors par excellence of this theory are: Mundell (1961); Mckinnon (1963) and Kenen (1969). The beginning of this theory is under the hand of the famous article, <sup>6</sup>There is a flexibility clause that EU authorities can use, with many conditions, to go beyond their competences.

published in 1961, "A Theory of Optimum Currency Areas" by the economist Robert Mundell. In this article the concept of optimal currency area is defined as a region that must have as an essential element a high degree of mobility of productive factors, specifically, the differences of opinion in this concept for different authors such as Meade, Scitovsky or Mundell is the degree of mobility necessary to draw the scope of the region. For Mundell, it is clear that the optimal currency area is not the world, but the region (understood as a geographical area of the world composed of two or more countries that meet certain criteria developed by the Optimal Currency Area theory) is more feasible to achieve this optimality. Therefore, flexible exchange rates with regional currencies should be imposed.

Another important question is the type of exchange rate system that prevails in the currency area. In this sense, the author, using a simple model of two countries and two products with full employment and balance of payments equilibrium, considers the differences that arise when comparing a fixed exchange rate system with a single currency versus one with national currencies connected by fixed exchange rates. Mundell's conclusion is that no matter what type of currency area is proposed (flexible exchange rates with national currencies are not preferable to the single currency or national currencies + fixed exchange rates), it cannot solve a problem of inflation in one country or region without creating unemployment in the other (the same is true in the reverse situation). What is important for the author here is to define the optimal territory of the currency area.

Although the author stresses that the optimal currency area is the region, currencies represent the national sovereignty of countries. And therefore, the concept of optimum is only applicable in areas of the world where there are profound political changes such as in Western Europe and the former colonies because the monetary reorganization into a single currency requires a political commitment by countries to take the necessary steps to move towards each other as members of a larger, supranational entity. When the author speaks of profound political changes, I understand that he is referring to the various treaties that the first countries to form a common market signed after the years following the Second World War (for example the Treaty of Paris with the creation of the ECSC (1951) or the Treaty of Rome (1957) with the creation of EEC, the initial point of the EU).<sup>7</sup> But it is questionable whether Western Europe is a single

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<sup>7</sup>**The European Coal and Steel Community (ECSC)** was an organisation of European countries (namely France, Federal Germany, Italy, Belgium, Luxembourg and the Netherlands) which, by means of this agreement, wanted to obtain and distribute the necessary resources for the coal and steel industries. And so make these countries less dependent on third countries.

region since the great process of economic integration that this area of the world has undergone has led it to form a monetary and economic union but it still faces problems such as the lack of mobility of labour, language barriers, the lack of fiscal and political union that make it doubtful whether it is truly an "optimal" area.

The second author who forms the basis of this theory is McKinnon, and with his article published in 1963, whose name appears as "Optimum Currency Areas", he focused on the importance of another element that countries had to comply with if they wanted to form optimum currency areas. In this case, for the author, the degree of trade openness of the applicant country or region had to be taken into account (and was defined by the author as the ratio of tradable to non-tradable goods) for the formation of these currency areas. McKinnon's paper attempts to answer which type of exchange rate system is more favourable for maintaining domestic price stability.

Like Mundell (1961), McKinnon defined the concept of "optimum" as that currency area where both fiscal-monetary policy and flexible exchange rates vis-à-vis the outside world are used to best meet the three policy objectives of full employment, a balanced balance of payments and domestic price stability. The question he asks through a model of several optimal currency regions and considering a single currency area is whether or not it should have flexible exchange rates vis-à-vis the rest of the world?

For McKinnon, if the single currency area is sufficiently small, i.e. under the assumption of fixed foreign prices and domestic prices of tradable goods are pegged to foreign prices, the terms of trade will remain unchanged by domestic policy actions (terms of trade, the ratio of the price index of exports to the price index of imports). Based on this scenario, the author asks: Is it better to apply more flexible external exchange rates or to conduct monetary-fiscal expansion or contraction policies to keep the external balance in balance? In response to this question, McKinnon argues that as a small economy becomes more open to the outside world, flexible exchange rates are less effective in controlling the external balance and domestic price stability. Therefore, the optimal situation for a small, open economy with flexible exchange rates is to use a fixed exchange rate policy (or a common currency linked to the prices of a much larger single currency area, for the author is the "outside world") avoiding speculative exchange rate movements. On the other hand, if it is a large, closed economy, he

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**-The European Economic Community (EEC)** was formed following the signing of the Treaty of Rome (1957) under the same members as the ECSC with the aim of increasing economic integration under a common market and a customs union. In 1993 it was renamed the European Community (EC).

recommends using flexible exchange rates to stabilise income. But if the same economy is very open, too much variability in exchange rates will cause domestic price levels to spiral out of control.

Following this author's research, he asks: What are the effects of trade openness in a (small) economy with flexible or fixed exchange rates on optimal economic policies?

I have that in small currency areas in order to maintain the value of the currency, fixed exchange rates are necessary. Economic growth and efficiency in these areas arises from the movement of capital between these small areas.

However, if the currency area is large enough and international trade is stable, a fixed exchange rate is sufficient to maintain the value of the currency. But if international trade becomes unstable by changing the relative prices of tradable and non-tradable goods in such a way that in order to maintain full employment and the external balance, it is necessary to apply a flexible exchange rate system where domestic changes in price levels will not wreck the value of the currency.

Finally, the author recommends investigating the effects of trade openness in larger currency areas that may affect international prices.

Another contribution made by Mckinnon is a qualification of the criterion of mobility of productive factors that appears in the article by R. Mundell (1961). Mckinnon qualifies that it is not only necessary to consider factor mobility between regions but also between industries in different regions. If markets demand a certain product manufactured with higher specialisation in one region than another, industries could be developed in the depressed region to manufacture the most demanded product and thus avoid migration between regions (this happens when there is immobility of factors between industries). Policies should be aimed at allowing the mobility of factors of production between regions and industries, which is a favourable situation for the creation of an optimal currency area.

To close the presentation of the most influential authors in this theory of optimal currency areas, the article entitled "The Theory of Optimum Currency Areas: An Eclectic View" was written by Kennen and published in 1969. In this article, the argument is put forward that in economies with a more diversified productive fabric, negative shocks to an industry or product manufactured in a given country or region will

not have such a negative effect on competitiveness, wages, prices or employment as they will in less diversified economies. For the former, joining a monetary union is more favourable, as their domestic exchange rates are not as affected by negative shocks to any one product or industry.

At this point, three criteria for the formation of optimal currency areas have been presented: -mobility of productive factors; -degree of trade openness and finally the diversification of products in an economy together with the three authors who laid the foundations of this theory: Mundell, Mckinnon and Kennen.

So far I have talked about the most important authors who form the basis of this theory, but in the 70s of the last century other authors appeared who have made great contributions to the study of this economic phenomenon. The authors to be highlighted, among others, and whose contributions are described here are: Corden (1972); Mundell (1973) and Ishiyama (1975).

Corden, whose 1972 article is entitled "Monetary Integration", makes several notes on the work of his predecessors. For this author, the concept of monetary integration is that of a geographical area in which there is a union of (fixed) exchange rates together with an integration of financial markets (in which there is free mobility of factors). For the author at that time (1972) there are two types of exchange rate unions: On the one hand, the pseudo-exchange rate union (the European case at that time) where a group of countries maintain fixed exchange rates within the union but there is no common monetary policy and no central bank to ensure compliance and establish parity. On the other hand, the complete exchange rate union where a central bank control monetary policies ( to maintain parity within the union members currencies) and manage the foreign exchange reserves to fluctuate the reference currency of the union with the foreign currency as for example the dollar. This system is closer to the creation of a common currency area.

Furthermore, Corden stresses that the creation of a monetary area has not had an impact on the benefits of creating it, but has simply been said to reduce the costs of forming a union when the countries that want to form it meet a series of criteria mentioned above. As for the concept of optimum, the fact that the creation of a monetary area is feasible does not in turn imply that it is optimum.

One criterion for the formation of an OCA is the flexibility of wages and prices, which explains the effectiveness of the adjustment of exchange rates. According to the author, the greater the degree of openness of an economy vis-à-vis the other members of the EU, the better it is to have fixed exchange rates vis-à-vis them. In this sense, the idea of establishing fixed exchange rates among the members of an exchange rate union is to avoid the instability of international prices on trade, which is generally greater than the variability that a country can suffer, and that these countries (which consume and produce many products subject to international trade, have a greater exposure to international markets) are commercially dependent on each other and have a greater interest in each other that there should be stability in trade prices, which translates into maintaining parity between the members of the union.

Furthermore, based on the work of McKinnon, he points out that it does not matter what type of exchange rate system is used in a currency area, but rather the degree of trade openness of the member economies, which will have a greater or lesser impact on the costs of creating the union. Finally, Corden points out that new members of a monetary union should have domestic price stability to avoid a subsequent loss of currency competitiveness upon joining the union.

In this new paper published in 1973, Mundell who began his research on the concept of optimal currency areas qualifies some of the conclusions he gave in his first research in 1961. In this article, he defends labour mobility as an adjustment mechanism when a negative shock creates a depressed region and a more prosperous region in a monetary union. But he points out that mobility implies relocation costs and labour is often not so mobile (this problem is blamed on EU countries). Then, as an alternative, he proposes capital mobility but says that between two countries with their own currencies the situation is not viable in the long term. Because unless they are countries that establish a set of rules or control mechanisms and comply with them (credibility with respect to each other), eliminating uncertainty about and both benefiting from the losses or gains of these agreements. Uncertainty about the negative shocks that would affect exchange rates and trade between these two countries causes a devaluation in the country affected by the shock in its production, losing purchasing power (impoverishment) of this country compared to the other, leading to an unequal distribution of goods consumed by both countries. And if there are no agreements to help each other in this situation, a devaluation-impoverishment spiral could occur, leading both countries to lose in the long run, given that they depend commercially on each other in the model proposed by Mundell in this paper.

Therefore, the author argues that after the formation of an optimal currency area, countries will share risks as an adjustment mechanism (through the common currency or by getting rid of international reserves to defend the common currency) of a negative shock in one of the member countries. The counterpart to this situation would be when each country has its own currency (flexible exchange rate) with the affected country bearing the full cost of the shock. The most beneficial scenario for the countries in a monetary union is when they share the same currency and share the risks, and in the event of negative shocks to their economies there is this automatic mechanism of sharing the costs (with a variability of production and real income).

Then, in 1975, Ishiyama enters the scene, in whose article he asks: What is the appropriate territory for creating a currency area? In the following lines, the author revises and qualifies Mundell's criterion on the mobility of productive factors.

As for the question posed by Ishiyama, he puts forward two main views. On the one hand, the vision of the initial authors of this theory of the OCA who defend that those territories, whatever their scope, which fulfil the criteria set out by these authors will be able to outline the appropriate territory to constitute a monetary area. It is worth recalling criteria such as the mobility of factors between regions, the degree of openness of the economy and the diversification of products or industries in the economies. In addition, there are views that support that these criteria must be met for the correct formation of a currency area, and that the starting point of a currency area is a country with its possible constituent regions. In response of the question of Ishiyama's paper, the appropriate territory for a currency area will be the result of these decisions and analyses of costs-benefits of the future members.

Ishiyama analyses and sets out his vision of the criterion of mobility of productive factors between the regions of a currency area. For the author, this criterion should be distinguished between the different factors. In certain situations, the mobility of one factor acts as an adjustment mechanism, while the mobility of another factor aggravates the situation, which means higher costs for countries or regions. More importantly, the "costs" involved in the mobility of the labour factor from one region or country to another are not taken into account. There are costs of different languages, values, climate, religion and others. These have not been taken into account and part of the problem of the lack of labour mobility in the EU may be due to these costs.

During the 1980s there were practically no contributions to this theory, since for the economic discipline it remained simply a theoretical idea that has been developed with the appearance of new authors in subsequent years, but beyond the US no other monetary areas are observed during this decade. Until 1990, when the EU started the steps and actions to implement an economic and monetary union on the European continent. At this point, the theory of optimal currency areas regained strength because of the possibility that the experiment initiated by the EU was a real example of an optimal currency area among developed countries.

In this sense, a stream of new authors has emerged who call this stream the "new theory of OCA. In this new theory, the authors set out new criteria, problems and benefits of the formation of currency areas and focus to a large extent on the European Economic and Monetary Union (EMU). Among the authors I have highlighted in this section are: Frankel & Rose (1997); Calvo & Reinhart (2002) and De Grauwe et al. (2003).

I begin with the article by Frankel & Rose (1997), in which the authors argue that countries must fulfil the criteria established in the earlier literature for joining a monetary union (in this case EMU) if not before their entry, i.e. ex-ante, then ex-post, in order for the union to function properly and for them to enjoy the benefits or lower costs of entry and relinquish control over monetary policy.

Moreover, these authors speak of one concept that should be qualified: the concept of specialisation. Starting from the premise that the economic literature explains that international trade flows and the correlation of international business cycles are endogenous variables. Based on this first premise, they argue that greater trade openness between countries or regions can lead to a specialisation of one country in one product for a relative advantage over another, which leads to an asynchrony of economic cycles between these countries or regions (it is not good to share a common currency). However, measures to bring about greater economic integration between countries or regions do increase the synchronisation of business cycles (it helps in terms of macroeconomic policy to apply it in a homogeneous way for member countries) and therefore it is more favourable to form an EMU. Furthermore, they have found that when there are important trade links between two regions or countries (even before the union) they have a higher correlation of their business cycles. Therefore, for these authors, it is more favourable to form a monetary union if the countries have a high bilateral trade history, which will make their business cycles more correlated, and



this in turn facilitates economic integration and the formation of a monetary union between these two countries or regions. Conversely, a high trade openness leading to a high specialisation of a region or country will put this country or region in a sub-optimal position to form a monetary union.

Continuing with another contribution to this new theory is the work of Calvo & Reinhart (2002). In this paper entitled "Fear of Floating" the authors discuss the effectiveness of monetary policy and how it influences the decision to join or not to join a monetary union. The main question they ask is "Why can a lack of credibility (of take the actions needed to maintain the parity of the official exchange rate of the country to their anchor) lead to a fear of floating (they refer to the exchange rate)?"

In this paper they analyse the behaviour of exchange rates, as well as various indicators that affect this behaviour (foreign exchange reserves, interest rates, monetary policy) to see whether the country's policies are in line with the "official" type of system in that country (39 countries analysed from 1970 to Nov 1999).

They point out that with the exception of Europe, the rest of the world has been moving towards flexible exchange rates as shown by the data they share on the IMF which states that 97% of IMF member economies maintained fixed exchange rates vis-à-vis the outside world by 1970, falling sharply to 11% by 1999.

Turning to the question of the effectiveness of monetary policy. Calvo & Reinhart argue that a country's exchange rates are influenced by the behaviour of interest rates and inflation targets of a country or region (in addition to the behaviour of the trade balance, which is not important to explain in this paper). In this sense, countries that have problems of lack of credibility (in general this work shows that they are emerging economies) in carrying out the monetary policies that they have announced, are afraid to let their exchange rates float because they have a high transmission of exchange rates on prices, and this translates into increases in the inflation rate, leading to a depreciation of the currency (under a system of flexible exchange rates). It also causes a flight of foreign capital in search of higher yields (in the face of inflation), cutting off a source of financing for these countries. In short, credibility in the application of monetary policies has an impact on the effectiveness of their transmission (monetary policy) to the aggregates, achieving stabilising interest rates, inflation rates and thus exchange rates.

As a final conclusion, if the country does not have the credibility to defend the value of its national currency, entering a monetary union (and losing monetary autonomy) is not a serious problem since it was subject to not being able to smooth its exchange rate in the face of negative shocks or speculative attacks. It should either fix its currency or join a monetary union with a country or region with a greater capacity to defend the common currency.

The paper by De Grauwe et al. (2003) concludes this review of the historical evolution of the theory of optimal currency areas. In this paper, the authors discuss the importance of regions or countries providing their labour markets with greater flexibility in order to better adjust to negative shocks.

In this paper they discuss the need for flexibility in the labour markets of the members of a monetary union. This idea would imply reforming labour markets to prevent shocks to the economies of a monetary union from being asymmetric in nature. By making labour markets more flexible through deregulation if they are too rigid, the countries of a monetary union will be able to adjust better to these shocks.

Among the benefits of this flexibility are: improved labour market functioning, higher employment (lower unemployment), higher contributions to public coffers (lower public expenditure on unemployment benefits), improved public budgets, higher consumption, higher wages, higher economic growth.

In conclusion, then, for these authors, greater coordination in providing greater flexibility to the labour markets of the members of a monetary union would imply lower costs for all members in forming this union.

#### **4. An Analysis over time of the Effects of Monetary Integration in EU and the Euro Area: What does empirical literature have to say?**

Throughout this study I will try to answer the question: Has the introduction of a common currency led to economic convergence in EU countries? In order to try to answer this question, the empirical literature on this subject mainly works with two variables that quantify these economic effects on a country or a group of countries: on the one hand, productivity (labour and multifactor) in section 4.1 and on the other, in per capita income in section 4.2.

In the study of the theories of optimal currency areas, I can see how the study carried out by Petrovic et al. (2020) analyses the most beneficial conditions for a country or a group of countries to form part of a monetary and trade union. From the conclusions of this study, I see that the integration of different markets such as goods and labour markets produces a better allocation of resources, and therefore, better economic results than if these countries with similar characteristics were independent. In addition, these countries that join have more balanced public budgets, thus increasing the welfare of their citizens.

However, following the same study, the authors point to scenarios where the economic performance of the union is worse, reaching suboptimal results in the most critical cases. Among the scenarios and conclusions that matter most to our topic of study, I see that this article shows evidence that as long as the differences in productivities between the countries that form a union are not very high, and these are coupled with low human capital mobility restrictions, the economic performance of the union is good. On contrary, if one delete human capital mobility restrictions between countries that form the union and the productivity gaps are large, this situation can produce labour migration effects that increase income inequalities across countries, as well as poorer synchronisation of business cycles and monetary policy transmission that call into question the union's viability.

Fiscal integration mechanisms are capable of reducing these inequalities between countries by supporting the income of countries with lower levels of productivity, raising aggregate demand and avoiding unidirectional migratory movements (towards countries with better productivity and living standards) that decapitalise the poorest country and affect its future productive capacity.

Throughout this paper I see that conclusions are presented in line with the main authors on this subject (Mundell, Frankel and Rose, etc.), pointing out the importance of trade openness and human capital mobility as mechanisms that smooth out the asymmetries of economic cycles between the countries of the union with similar technologies, contributing to full employment and price stabilisation.

The survival of monetary unions is linked to the resolution of social problems by the leaders and institutions of the union. These problems stem from the economic inequalities that exist between the countries belonging to a monetary union. In this sense, the authors (Petrovic et al.) point out that these could be mitigated over time

without the need for policies, although the time periods for countries to converge towards similar living standards could be long and could generate social instability.

#### **4.1 Effects of Economic Integration on Productivity of EU and the Euro Area.**

What have been the effects of the economic integration process on the productivities of the euro area countries, and more broadly on the EU countries ?

In this sense, among the main results I can highlight that different studies reject the hypothesis of a convergence of productivities between EU countries, specifically the works of Margaritis et al. (2006) or Sondermann (2013). With the first looking at labour productivity for the EU16 + Norway ( which is used to see if there are different effects for countries that have trade and geographical ties with the EU but are not members of the union). And the second analyzing the same variable but in this case for the countries of the Eurozone. Although there is no evidence of a convergence of productivities at the aggregate level, different studies have found the existence of groups of countries that have converged at similar production levels, these have been classified as "clubs or clusters" convergence.

As a result of the above, the effects of economic integration have improved productivity levels (either reflected in labor productivity or in TFP ) as practically all the analyzed works emphasize. Specifically, I have found that the growth of productivities has been heterogeneous over time and between different countries as highlighted by the work of Papaioannou (2021). In addition, the total productivity of the factors (PTF) was increased with the introduction of a common currency, being just the moment of pre-entry and the first years where the countries improve more their productivities.

Finally, the differences in the evolution of production levels in the EU countries are the result of: differences in institutional aspects, Differences in the levels of technology transfer (note the role of informal channels such as those that have promoted these transfers to countries with fewer resources ) that have reduced the gaps between different EU countries as highlighted by the work of Kutan & Yigit (2009). This paper also highlights the role of investment in education and training of human capital, as well

as increased investment in R&D levels as elements that differentiate over time the productivities of EU countries.<sup>8</sup>

Moreover, mainly because of the differences in the levels of the PTF ( key element in the economic development of a country or region) as reflected in the work of Beugelsdijk et al. (2018) which has found as differences in the productivities, and beyond the levels of economic development, are the result of differences in the quality of their institutions, more favourable historical trajectories in the subsequent economic development, proximity to economic powers with which to establish commercial and economic ties, a higher percentage of people engaged in sectors that provide greater added value, among other factors that have been pointed out by the different studies analyzed.

Among the main methodologies used by the authors mentioned for the analysis of the effects of economic integration on productivity, panel data have been used ( that are able to analyze macroeconomic phenomenons for different countries and over time, combine the advantages of time series and cross-sectional) together with this type of data, There are the Development Accounting Technique that we have talked about in the work of Beugelsdijk et al. ,2018 or the Synthetic Control Method ( comparing a treatment group to which the policy applies or suffers the effects of integration in these studies and purchased with another group that has not suffered this effect, the control group) and together with the difference estimator, the effect of the policy on all countries is analysed).<sup>9</sup>

#### **4.2 Effects of Economic Integration on EU per Capita Income and the Euro Area.**

As for the effects of integration on the per capita income of the EU, and the countries of the Eurozone. In general terms, these effects are heterogeneous ( with countries that have NOT gained in terms of income growth compared to if they had kept their respective currencies as for example Germany or France compared to others that have come out winning as Ireland, according to the work of Puzello, 2018). However, other

<sup>8</sup>Informal mechanisms include attendance at conferences, technical reports or scientific articles.

<sup>9</sup>The development accounting technique tries to use a Cobb-Douglas production function (relating output to the inputs to produce it, such as technology, human and physical capital) that is expressed in per worker terms, dividing L by all the production factors and with constant returns to scale (i.e. if we increase inputs by 2, output will increase in the same proportion) to find out whether economic differences between countries are due to differences in Total Factor Productivity (TFP) or in the factors of production themselves (both the quantity and quality of the human and physical capital factors).  $Y = AK\alpha(Lh)^{1-\alpha}$  (Cobb-Douglas production function, with A (TFP) and K (physical capital), h (human capital) and  $\alpha$  (as the human and physical factor's elasticity to the output that is constant to  $\alpha = 1/3$ , the typical value assigned to this parameter in the literature, such as the example of Beugelsdijk et al. (2018).

studies such as Badinger's (2005), point out that although the effects of economic integration on income growth rates have not been sustained over time, EU countries today would be around 20% more "poor" in terms of per capita income.

What is obvious is that connected with the differences in production that we mentioned in the previous section, the process of European economic integration has not achieved (for the moment) a convergence of the EU countries, nor of the Eurozone countries. In this sense, Borsi & Metiu (2015) talk about the emergence of "clubs" of convergence in income levels (which relate to the geographical and commercial proximity of countries ) separating into two clubs: countries of South-East Europe versus North-West Europe. Other works have found other compositions of the clubs such as, for example, Marelli et al. (2019) separating into two clubs: the oldest members of the EU( have low rates) compared to the new members (present higher growth rates). Finally, the work of Monfort et al. (2013) notes that the poorest countries have experienced strong per capita income growth but that the inequality gaps between the different clubs that make up the EU still persist, making it difficult to achieve the desired economic convergence.

The methodology used for the analysis of these effects is similar to that used in the previous section with the use of the synthetic control method. But in this section neoclassical models of economic growth have been used ( as the model of Solow and Swan where from a Cobb-type production function Douglas and under certain conditions of it economic growth is based on a difference between capital per worker and depreciation of physical capital reaching a situation where the growth rate is 0, and this is the steady state, only technological progress can make an economy grow in the long term. In these models, convergence between countries with different levels of income but with the same steady state is achieved over time and with different rates of growth, the country with the lowest initial income) with different variations depending on the factors to be controlled.

Conclusion, the emergence of different per capita income convergence clubs and sub-clubs leads to the conclusion that the EU and the currency area have not resulted in a common convergence. European countries still have large inequalities in competitiveness, wages, prices, living standards and productivity that are "difficult" to resolve in the short to medium term. It begs the question of whether the expansion of the EU towards Eastern Europe, where countries are more unequal than the rest of the EU, is logical. There is a need for reforms and policies aimed at converging EU

countries in the long term.

## **5. Descriptive analysis of the economic effects of monetary integration in the UE**

In this section, I present the evidence in a series of figures comparing a scenario prior to the introduction of the euro (I choose 1997, because other years prior to this year there is no data available for all the countries analysed) with a final one, in 2019 (I have chosen 2019 because it is the year prior to Brexit with the exit of the United Kingdom from the EU and it is one of the most important economies on the European continent). The idea is to look at the evolution of the main variables that for me mark these economic and living standard inequalities. In this sense, I analyse the evolution of real per capita income and productivity levels (using a proxy such as TFP). As well as some variables that are related to income and productivity, such as the total number of hours worked per worker per year, public expenditure on R&D or the GDP generated by each economy per hour worked (this can be translated in terms of productivity and value added of the activities that have a greater weight in each economy of the union). Moreover, a second reason for producing these figures is to see these two speeds of the European economies, seeing a clear separation between the "poor" countries and the "rich" countries (during this work different articles talk about the non-convergence in a single block of the countries of the Eurozone and the EU) creating these different "clubs" of convergence, with large socio-economic differences and that with the different economic crises have led to widening these differences in levels of wealth and quality of life. I have tried to choose the largest number of EU member states, but I decided not to include some European countries (such as Malta or Cyprus) because they are too small and their aggregates are not important to explain the relationship between income, R&D expenditure, productivities, hours worked per worker in each country. In short, I try to have from 23 member countries in some graphs to 25 member countries in others, and this is due to the availability of specific data for each figure.

In general terms, the set of figures I have prepared presents evidence for not rejecting the initial hypothesis: "The introduction of the Euro has not led to the convergence of EU countries". Specifically, when I refer to the term convergence, it is in terms of per

capita income or productivity levels that allow these income levels to be reached over time.

Here are some of the findings that stand out in this set of figures: First, countries with higher levels of productivity, along with more developed production systems and technologies (TFP) tend to be richer countries, maintaining that wealth or increasing it over time. In the case of the EU, I found that for the period analyzed (1997-2019) there were some improvements in productivity levels (especially in Eastern European countries, which joined the EU in the first decade of the 2000s, and which have the lowest incomes) as they entered a common market and implemented market economy or even mixed systems that have benefited the socio-economic development of these economies.

Secondly, those EU countries whose output is higher are not only richer, but also work fewer hours a year compared to poor countries. In other words, each hour worked is much more productive in some countries than in others. The graphs show that Europe's North-Central countries are the richest and the ones producing the higher monetary value per hour worked, in comparison Eastern Europe's countries (which constitute economies characterised by their low productivity and, above all, by activities that produce a low added value). In relation to this part, the above mentioned richest countries invest greater amounts of public-private spending in R&D than poor countries do, that is to say, in generating new fields of study, inventions, more efficient productive systems or applications to the development of new technologies to generate greater wealth and benefits for their companies and, therefore, for their citizens.

Finally, the last conclusion I have drawn from the set of figures is that the introduction of a common currency and the subsequent enlargement of the EU to include some Eastern European countries has mainly benefited the latter by improving their growth and economic development. However, before the Euro and today, there are still large economic inequalities in the EU (between the old EU members and the new ones, the countries of Central-Northern Europe and those of the European periphery), and these have increased after several periods of economic crisis, which have highlighted these major structural differences between EU members. The formation of groups of countries with similar convergences (as seen in the studies discussed throughout this paper) whose different living standards can lead to social tensions that put the long-term viability of the euro at risk.



Figure 1.

Total Factor productivity and Real GDP per capita in 1997, by economy

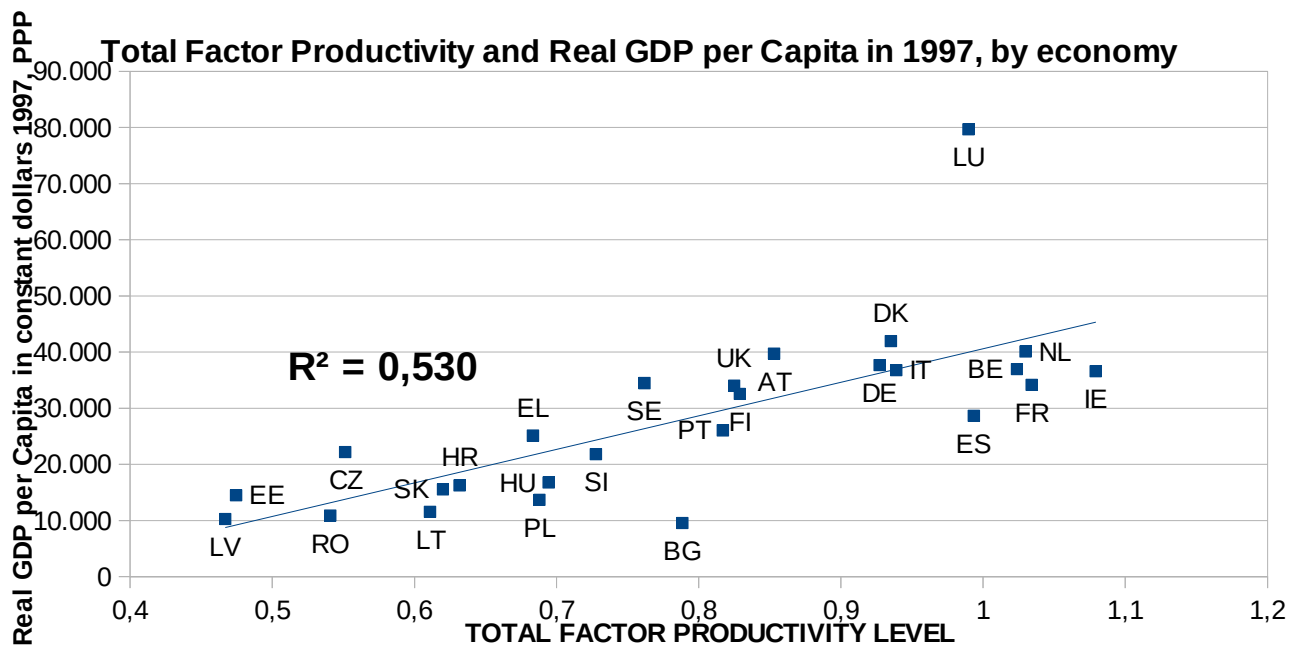


Figure 1: Total Factor productivity and Real GDP per capita in 1997, by economy

Figure 2.

Total Factor productivity and Real GDP per capita in 2019, by economy

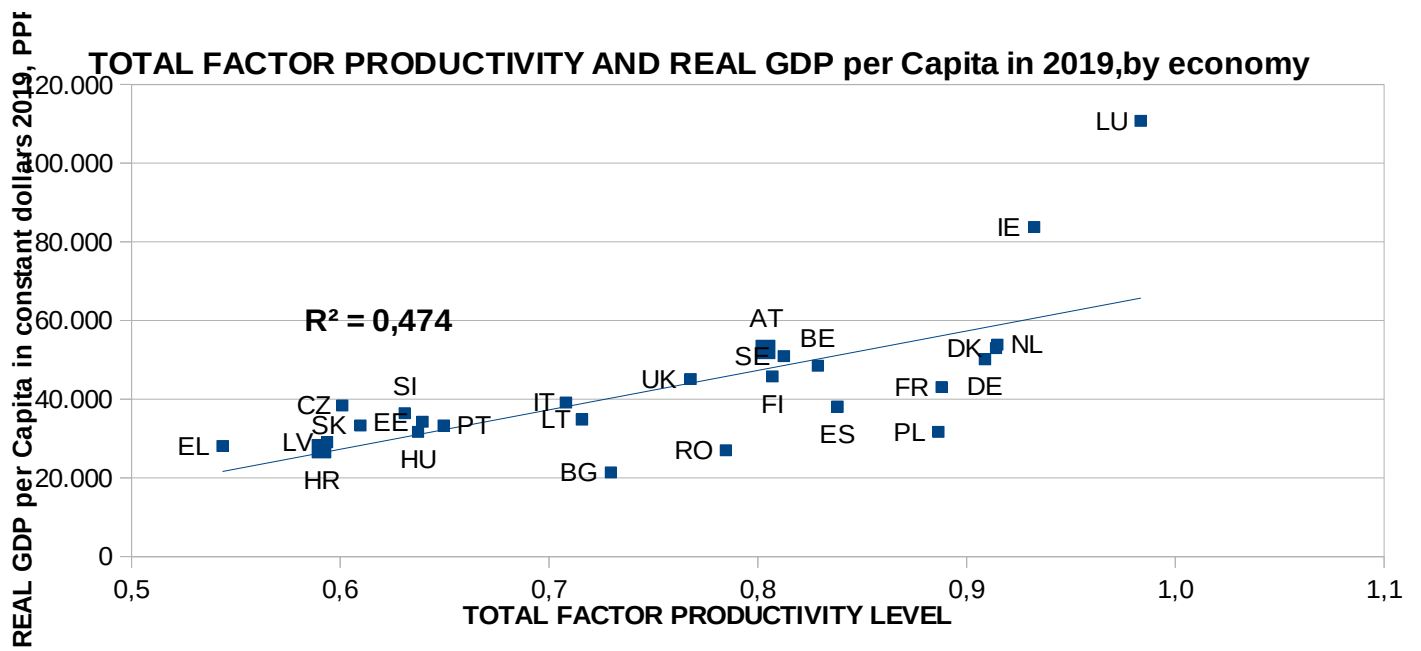


Figure 2: Total Factor productivity and Real GDP per capita in 2019, by economy

Figure 3.

Total annual Hours Worked per worker and GDP per Hour Worked in 1997, by economy

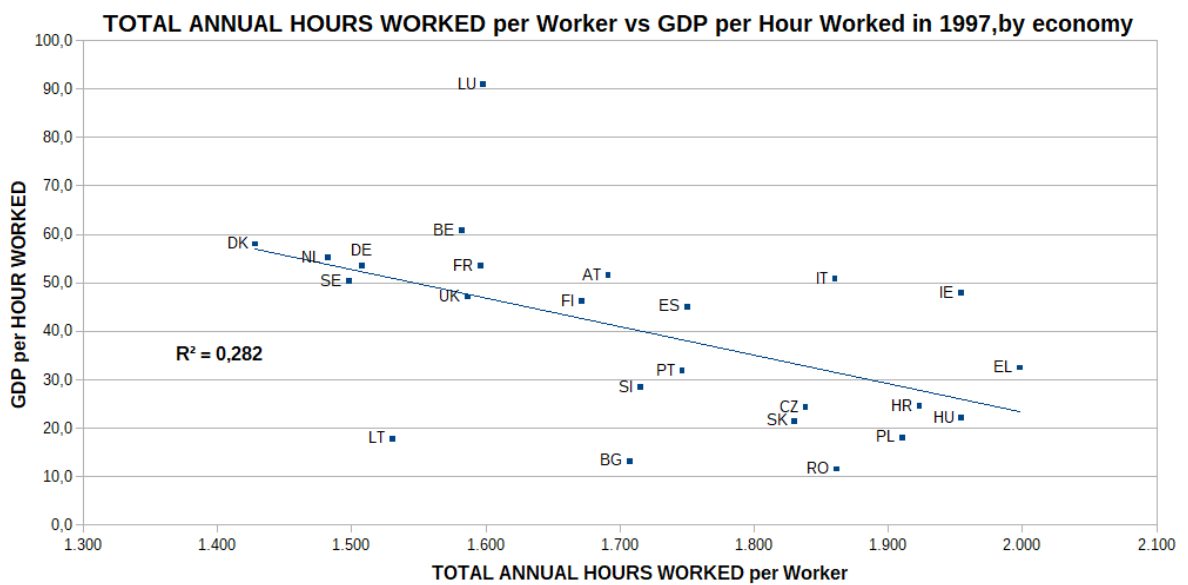


Figure 3: Total annual Hours Worked per worker and GDP per Hour Worked in 1997, by economy

Figure 4.

Total annual Hours Worked per worker and GDP per Hour Worked in 2019, by economy

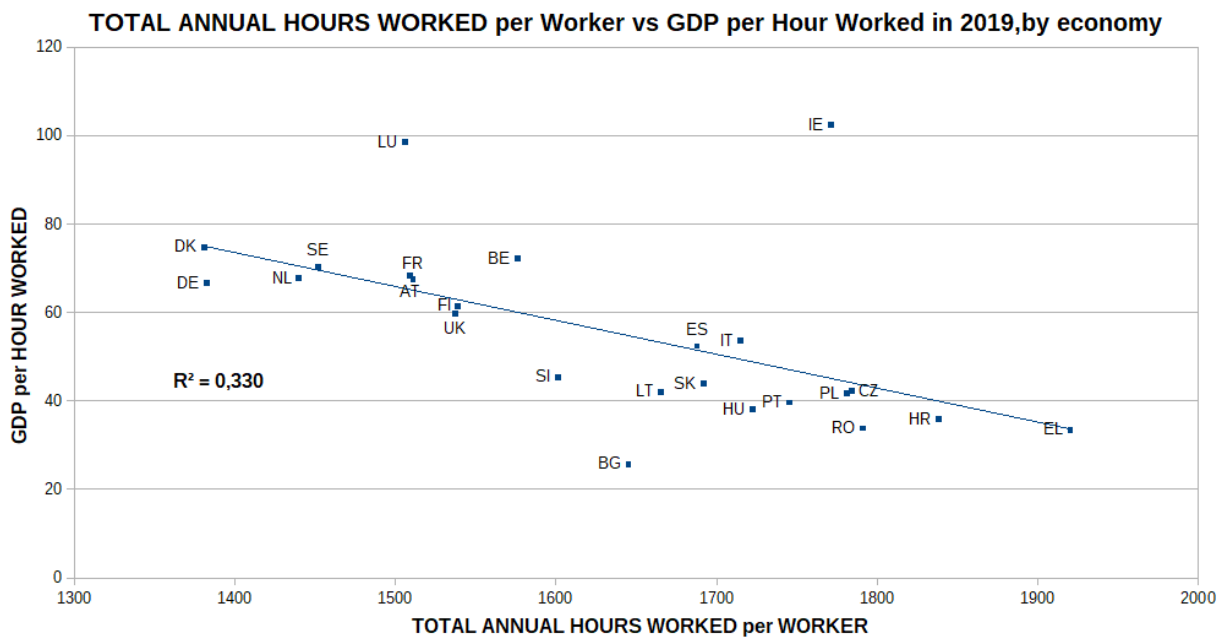


Figure 4: Total annual Hours Worked per worker and GDP per Hour Worked in 2019, by economy

Figure 5.

Total annual Hours Worked per worker and Total Factor Productivity in 2019, by economy

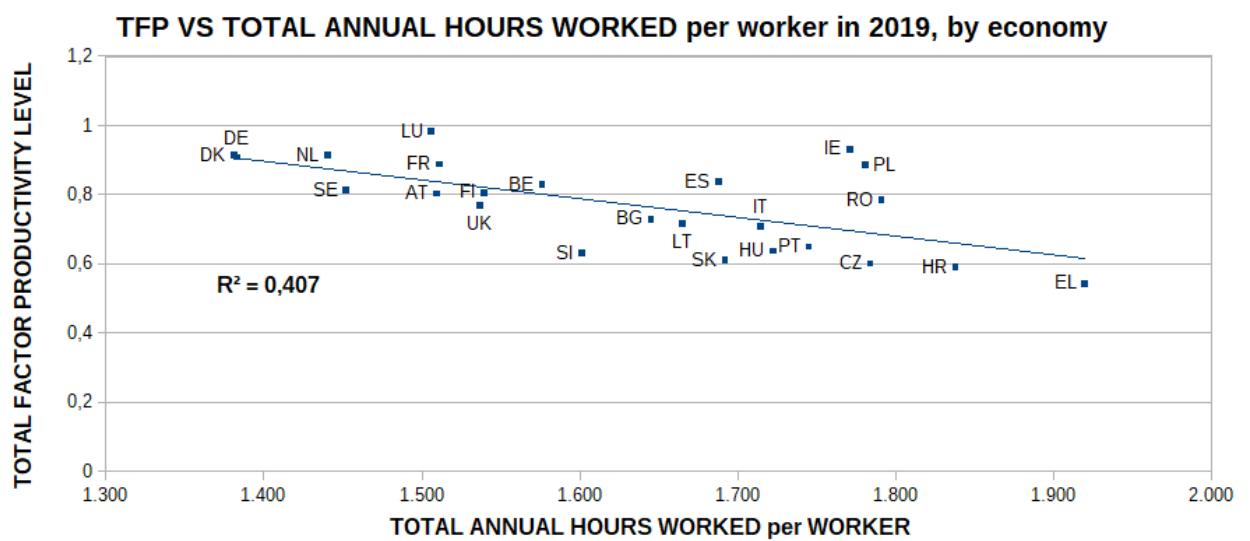


Figure 5: Total annual Hours Worked per worker and Total Factor Productivity in 2019, by economy

Figure 6.

Annual spending in Research and Development(R&D) as % of GDP and GDP per capita in 2019, by economy

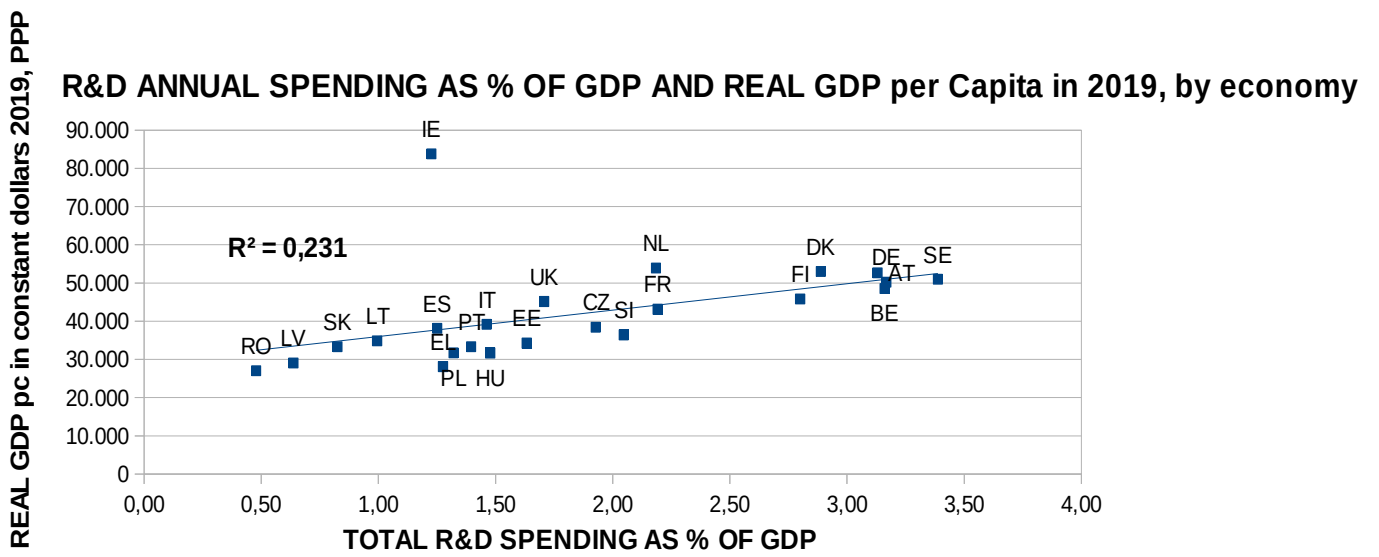


Figure 6: Annual spending in Research and Development(R&D) as % of GDP and GDP per capita in 2019, by economy

Figure 7.

Comparing Rich vs Poor EU countries and their TFP levels in 1997, by economy

### COMPARING RICH VS POOR EU COUNTRIES AND THEIR TFP LEVELS, 1997

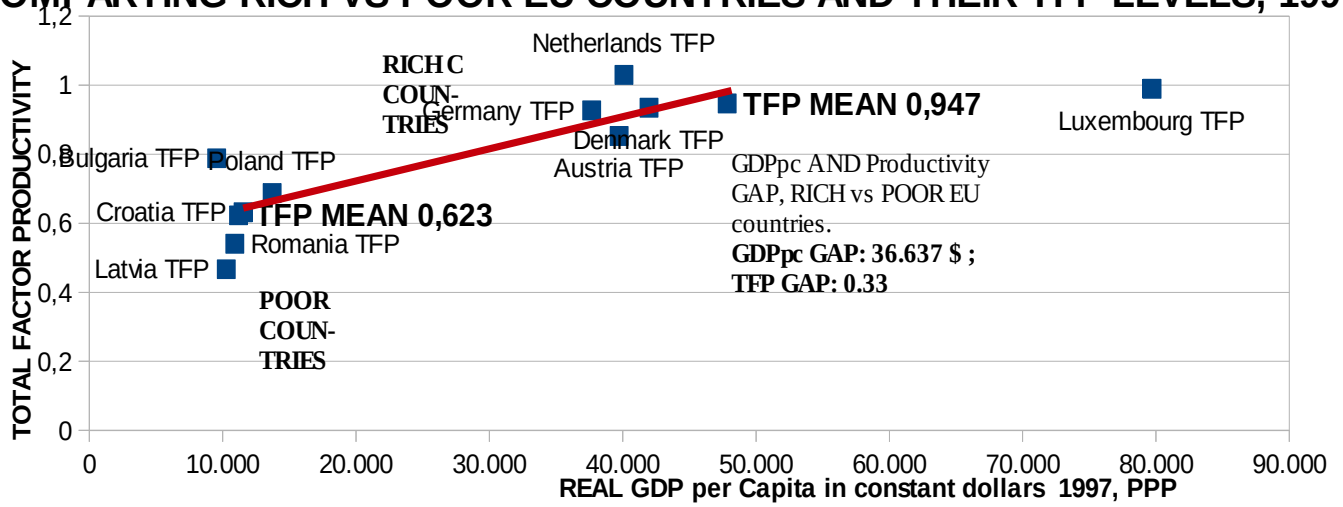


Figure 7: Comparing Rich vs Poor EU countries and their TFP levels in 1997, by economy

Figure 8.

Comparing Rich vs Poor EU countries and their TFP levels in 2019, by economy

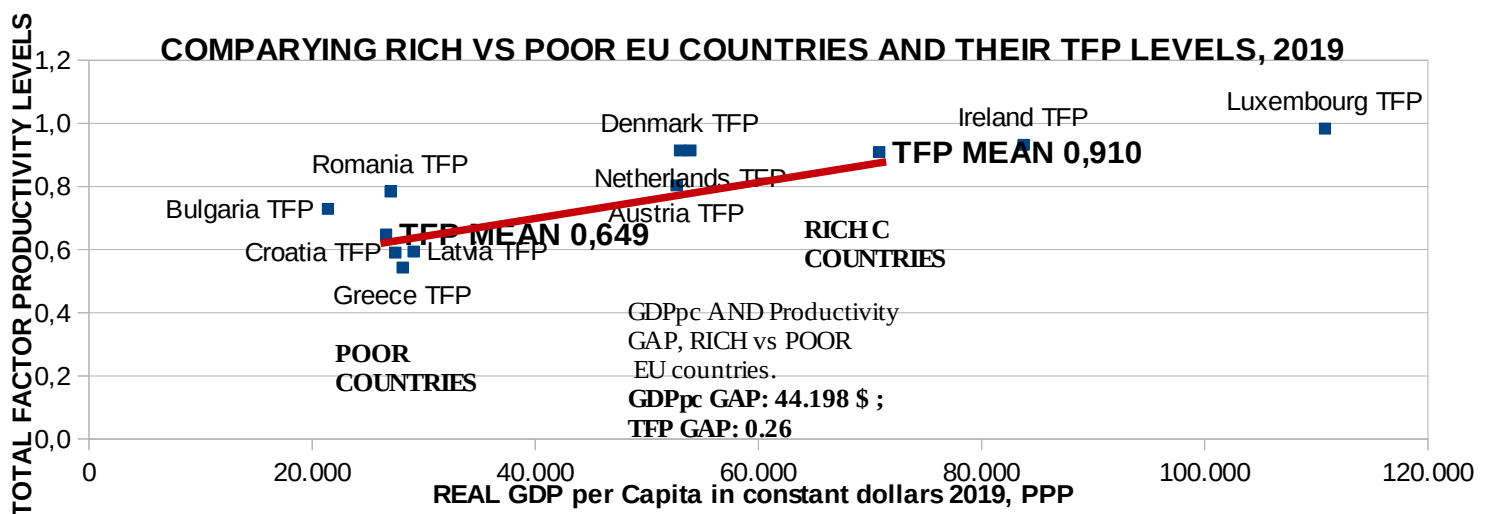


Figure 8: Comparing Rich vs Poor EU countries and their TFP levels in 2019, by economy



Finally, I have build a table with the Growth in GDP per capita and TFP in 2009 and I can observe the large and negative effects of the finacial crisis in the EU context:

Figure 9.

Growth in TFP and GDP pc in 2009, by EU economy.

Country.	TFP	GDP	
<a href="#">Austria TFP</a>	-4,5	-4,2	AT
<a href="#">Belgium TFP</a>	-0,3	-2,9	BE
<a href="#">Bulgaria TFP</a>	-3,9	-2,9	BG
<a href="#">Croatia TFP</a>	-5,4	-7,7	HR
<a href="#">Czech Republic TFP</a>	-1,3	-5,5	CZ
<a href="#">Denmark TFP</a>	-2,8	-5,7	DK
<a href="#">Estonia TFP</a>	-3,0	-16,9	EE
<a href="#">Finland TFP</a>	-7,6	-9,3	FI
<a href="#">France TFP</a>	-2,0	-3,5	FR
<a href="#">Germany TFP</a>	-4,5	-5,7	DE
<a href="#">Greece TFP</a>	-1,8	-4,8	EL
<a href="#">Hungary TFP</a>	-3,4	-6,9	HU
<a href="#">Ireland TFP</a>	0,7	-6,4	IE
<a href="#">Italy TFP</a>	-4,5	-6,2	IT
<a href="#">Latvia TFP</a>	-5,1	-14,7	LV
<a href="#">Lithuania TFP</a>	-6,7	-16,1	LT
<a href="#">Luxembourg TFP</a>	-2,4	-5,2	LU
<a href="#">Netherlands TFP</a>	-4,8	-4,3	NL
<a href="#">Poland TFP</a>	2,5	1,8	PL
<a href="#">Portugal TFP</a>	-1,9	-3,3	PT
<a href="#">Romania TFP</a>	-6,6	-5,0	RO
<a href="#">Slovak Republic TFP</a>	-3,1	-6,0	SK
<a href="#">Slovenia TFP</a>	-5,9	-9,2	SI
<a href="#">Spain TFP</a>	-1,7	-4,8	ES
<a href="#">Sweden TFP</a>	-4,4	-5,4	SE
<a href="#">United Kingdor TFP</a>	-8,8	-5,2	UK
<b>TFP EU</b>	<b>-3,6</b>	<b>-6,4</b>	<b>EU GDP</b>

*Texto 1: This major crisis affected practically all EU countries. I see that the average growth, in EU countries, of both TFP and GDP pc are negative and show values of -3.6 % and -6.4 %, respectively. In detail, I see that the biggest falls in income levels have been in countries such as Estonia , Latvia, Lithuania (poor income countries). On the other hand, I see that the richest countries like Luxembourg, Ireland, the Netherlands show falls in pc income growth of between -4% and -7%, far from the two figures for the poor countries mentioned above. It could be concluded that although the economic and financial crisis of 2009 had a negative impact on all EU economies, in the poorer economies the impact was generally greater, creating more inequality and divergences between EU countries.*

Table 1: Growth in TFP and GDP pc in 2009, by EU economy.

## 6. Conclusions

In this paper I have analysed the effect of common currency area on convergence and found that in the case of EMU, the introduction of a common currency has not involved a process of convergence within the EU countries, **non-rejecting the initial hypothesis** (*the introduction of a common currency (Euro) did not contribute to the convergence of EU countries*). Moreover, this process has not been achievable in terms of per capita income or productivity over time, as shown by different articles Beugelsdijk, S. et al. (2018); Borsi, M. et al. (2015); Sondermann, D. (2014); Margaritis, D. et al. (2006). Nevertheless, these papers show that there are clubs of convergence, that is, different blocks of countries that show convergence between them and “whose formation has to do with strong commercial, economic and geographical links previous to the euro” (for example I have the Benelux plus Denmark and Sweden or another club formed by Germany, France and the UK).

The question that arises is What are the factors that explain the non-convergence as a single block in Europe?. I found some evidences of divergencies in the paper of Beugelsdijk S. et al. (2018), comparing European countries in: productivity levels represented by TFP or labour productivity (“these differences are large and persistent over time”), institutional quality (in the sense of the quality of laws, rights, political responsibility and separation of powers ), human capital and qualification of the workforce ( investment in education and number of years of educational attendance per capita ) , investment in R&D and the efficiency of intellectual property laws that allow researchers to monetize their ideas , historical drifts ( for example, the countries that, in the past, joined the Sovietic Union with economic planning system are developing economies, with structural, economic and institutional deficits ), economies of scale installed in the more developed countries of the union ( this means more generation of revenues, added value and richer economies, in essence). I elaborate some graphics about these topics that you can consult in **section 5**.

Although the process of convergence has not been reached, I can show some positive conclusions on the process of economic integration and implementation of the EMU: One conclusion is that “the introduction of a common currency has led to an increase, in most Eurozone countries, total factor productivity levels (TFP)”, Papaioannou (2021). Another finding is that “the process of economic integration in Europe, initiated in 1950, has meant per capita income growth in the EU (a fifth higher than if the process had not taken place”, according to the analysis of Badinger, H., 2005).

The economic and financial crisis hit everyone, and the EU was no exception. Furthermore, these crisis have led the central banks of the most developed countries to use the tool of monetary policy on many occasions to mitigate the negative effects on markets and economies, forgetting the other major macroeconomic policy tool, fiscal policy. With the role of monetary policy exhausted (i.e. it has no significant effects on the real economy), the collapse of a large part of the European financial sector, the introduction of mechanisms to prevent future crises such as the ESM (European Stability Mechanism) and the OMT (Outright Monetary Transactions) and even the financial bailout of several EU countries (Greece, Ireland, Portugal and even Spain) have exposed the fragility of the EMU.<sup>10</sup> The public opinion, in general, is directed towards the lack of a fiscal union as an adjustment mechanism in a monetary union.

There are different proposals, that I recommend studying in future papers, to increase fiscal integration as: For example, if I talk about risk sharing, I can explain the proposal of Petrovic et al. (2020), in which the authors design a fiscal instrument, inspired by insurance mechanisms, whereby the stability of the union depends on the obligation and cooperation of the states to co-finance this fiscal tool (through budgetary surpluses) at other times it can be used to help Member States with budgetary imbalances by reducing beneficial effects for the stability of the union, according to the authors.

In short, the EU, and in particular the Eurozone, have in fiscal union a new common policy to deal with future crises and increase economic integration that will lead to greater stability and better levels of well-being together.

The EU project began a few decades ago and European citizens and their countries with their institutions and politicians have been able to join the path of different cultures, markets, languages, customs, values and institutions across the European continent. And not only all that, but also reach a deeper level of integration with the introduction of a common currency, the creation of European institutions such as the central bank to carry out the monetary policy of the union, the freedom of movement of European citizens, capitals and goods, the introduction of an European health card, common

<sup>10</sup>**The ESM is a mechanism** for providing financial assistance to euro area countries. This mechanism was created by the EU in 2012, the member states are its partners and its main objective is to ensure financial stability in the euro area.

**The OMT is a mechanism** created in 2012 to facilitate the purchase of euro area countries' sovereign debt in secondary markets by the ECB. Specifically, bonds with maturities of 1 and 3 years are purchased. And these purchases are subject to compliance with domestic reforms in the debtor countries.

political actions in different areas such as the agricultural sector, migration policy and cooperation within the members states in judicial and police matters.

Despite all the breakthroughs, the EU project has not yet been completed, I can see in our work that no process of convergence between member states, as a single bloc, has taken place alongside the 20th century while inequalities remain. This affects the stability of the union, gaining place in recent years anti-European parties and nationalisms. It is also evident that in the recent years, the EU has faced different challenges, such as the financial, economic and debt crisis, the migration crisis or the COVID-19 that put pressure on national health systems.

These problems have been tackled, but some questions arise to solve: the latest problems arising from the Russian invasion of the territory of Ukraine, the significant dependence on raw materials coming from external countries, the role of cryptocurrencies in the context of the EU, the control of illegal immigration at EU borders, refugees from war, Member States' debt imbalances, the challenges of the green economy and the renewable energies that the EU wants to promote, the promotion of the silver economy and the major problems in some Member States with their pension systems.

Finally, after this analysis, I could launch a question and a proposal for further research: Is fiscal union a solution to achieve greater stability and, in the long term, a process of convergence between EU countries?. Subsequently, I propose the creation of a tool to measure the TFP of the Member States and their regions, in order to see the evolution of productivities over time. This idea could help European and national policymakers introduce policies aimed at stimulating this key component of economic growth and wealth in the EU and its regions.

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