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20 Years of European Monetary Policy. From Doctrinarism to Realpolitik[1]

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Abstract

This paper describes the monetary policy of the European Central Bank since the birth of the Euro. The different economic situations and the monetary policies implemented during the mandate of each one of the three ECB presidents are analysed as a process of evolution. We study the situations of cyclical asynchrony together with the response given to it by the European monetary authority. We also assess the change experienced by the main economic indicators of the twelve founding countries during the 20 years of the single currency. The main conclusion obtained is that monetary policy has evolved from the strict approach defined in the Treaty on the Functioning of the European Union to an approach closer to that of the rest of central banks, which we have called "monetary realpolitik".

Keywords: Euro; monetary policy; ECB; cyclical asynchrony.

JEL classification: E50; E52; E58.

1. INTRODUCTION

In 1988 the European Council approved the objective of creating the Economic and Monetary Union (EMU), and the then-president of the European Council, Jacques Delors (CSEMU, 1989) proposed a three-stage EMU, which would culminate in 1999 with the creation of a single European currency. This meant that between 1990 and 1993 Member States would have to legalise the free movement of capital between member countries, and that between 1994 and 1998 a convergence plan of prices, interest rates and public finances would be applied together with the creation, first of a European Monetary Institution and then the European Central Bank (ECB). Finally, as of 1999 exchange rates would be fixed

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irrevocably and the single currency would be introduced in exchange markets, a process that would culminate with the physical introduction of the euro.

In 1992, the Member States of the European Economic Community approved the Maastricht Treaty, which legally consolidated the roadmap marked out by the Delors Report. In line with the plans set out in the report, the euro was born in currency markets in January 1999 with a value of 1.1789 USD/EUR. Three years later, in January 2002, the euro physically replaced the currencies of the twelve founding states: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain.

Besides being the year in which the euro was created, 1999 was also the year that saw Robert Mundell awarded the Nobel prize in Economics. The distinguished economist, who specialised in international economics, was the author of the concept "Optimum Currency Areas" (OCAS) (Mundell, 1961) and a staunch defender of the euro. His approach read as follows: OCAs depend on whether there are asymmetric shocks or not and on the stability achieved by the system. If monetary areas experience repeated asymmetric shocks, a small monetary area is preferable so that monetary policy can adapt to each country's situation. However, if asymmetric shocks are not relevant or do not exist and the monetary system achieves stability, then the greater the monetary area the better, since monetary union reduces transaction costs and foreign exchange risks, thereby encouraging the growth of trade and production.

When the euro began to circulate physically in January 2002, the new institution that would govern it was presented to Europeans; the European Central Bank (ECB). ECB monetary policy has undergone major ups and downs. The succession of governors coupled with vastly differing economic circumstances has given rise to vastly contrasting monetary policies whose effects have proven to be both positive and negative. In addition, European monetary policy has had to contend with extreme situations, such as global bubbles, banking crises, deflation, sovereign debt crises, etc. For this reason, the results of monetary union cannot yet be assessed with sufficient historical perspective. Nevertheless, in the present work we seek to provide some insights into the euro's 20-year history as well as that of its main institution, the ECB.

For this purpose, in the second section we analyse the influence of the "Washington consensus" on the design of economic union. In the third section, the monetary policy applied by the ECB in its 20-year history is described. In the fourth section, we assess to what extent the cyclical asynchrony associated with asymmetric shocks envisaged by the literature has proven relevant. In the fifth section, we analyse the evolution of fundamental economic variables related to monetary policy. Finally, in the sixth section we present our conclusions.

2. A MONETARY UNION CHILD OF ITS OWN TIME

The Maastricht Treaty is a child of its own time. In the field of economic theory, during the 1980s[2], the Neoclassical synthesis, which had established the framework of active economic policy, was being replaced by a new paradigm, the so-called new Neoclassical synthesis which was based on the existence of subjects with rational expectations that counteract by cancelling out the effects of economic policies in the medium term.

The 1980s were turbulent years. The international monetary system of fixed exchange rates had disappeared and the oil crisis continued to wreak havoc in the form of "stagflation". Financially, Latin American countries, which were highly exposed to foreign credit, had to endure a sovereign debt crisis known as the "tequila effect[3]". When intervening, the IMF promoted a policy of inflation control, linking the exchange rate to the dollar, and demanded economic liberalization.

It was in this economic environment that the economic recipe known as the "Washington consensus" was to emerge, the latter being a term coined by Williamson (1993). Williamson drafted a decalogue *à la* Ten Commandments that sum up a set of desirable economic policy reforms to be undertaken by Latin American governments in order to redirect their economies, regain the confidence of banks, and promote their countries' economic growth. See Table no. 1.

Table no. 1 – "Washington consensus" principles and articles of Treaty on the Functioning of the European Union (TFEU) inspired in this "consensus"

	Measures	**Art. TFEU consolidated versión**
1	Fiscal Discipline: Budget deficits, properly measured to include provincial governments, state enterprises and the central bank should be small enough to be financed without recourse to the inflation tax. This typically implies a primary surplus (i.e. before adding debt service to expenditure) of several percent of GDP, and an operational deficit (i.e. the deficit disregarding that part of the interest bill that simply compensates for inflation) of no more than about 2 percent of GDP.	126
2	Public Expenditure Priorities: Policy reform consists in redirecting expenditure from politically sensitive areas which typically receive more resources than their economic returns can justify, like administration, defense indiscriminate subsidies, and white elephant, toward neglected fields with high economic returns and the potential to improve income distribution, like primary health and education, and infrastucture.	
3	Tax Reform involves broadening the tax base and cutting marginal tax rates. The aim is to sharpen incentives and improve horizontal equity without lowering *realized progressivity*. Improved tax administration is an important aspect of broadening the base in the Latin context. Taxing interest on assets held abroad ("flight capital") should be another priority in the coming decade.	
4	Financial Liberalization: The ultimate objective is market-determined interest rates, but experience has shown that, under condition of a chronic lack of confidence, market-determined rates can be so high to threaten the financial solvency of productive enterprises and government. Under that circumstance a sensible interim objetctive is the abolition of preferential interest rates for privileged borrowers and achievement of a moderately positive real interest rate.	63
5	Exchange Rates: Countries need an unified (at least for trade transaction) exchange rate set at a level sufficiently competitive to induce a rapid growth in non-traditional exports, and managed so as to assure exporters that this competitiveness will be maintained in the future.	63
6	Trade Liberalization: Quantitative trade restrictions should be rapidly replaced by tariffs, and these should be progressively reduced until a uniform low tariff in the range of 10 percent (or at most around 20 percent) is achieved. There is, however, some disagreement about the speed with which tariffs should be phased out (with recommendations falling in a band between 3 and 10 years), and about whether it is advisable to slow down the process when macroeconomic conditions are adverse (recession and payments deficit).	119 Principles of open market economy
7	Foreign Direct Investiment: Barriers impeding the entry of foreign firms should be	63 y 64

	Measures	Art. TFEU consolidated versión
	abolished; foreign and domestic firms should be allowed to compete in equal terms.	
8	Privatization: State enterprises should be privatized.	106 Public service competition
9	Deregulation: Governments should abolish regulations that impede the entry of new firms or restrict competition, and ensure that all regulations are justified by such criteria as safety, environmental protection, or prudential supervision of financial institutions.	
10	Property Rights: The legal system should provide secure property rights without excessive costs, and make these available to the informal sector.	345 referred to national regulation

Source: Authors' compilation based on Williamson (1993) and the Treaty on the Functioning of the European Union

The Washington consensus soon faced a major predicament. Its simplicity and the technical solvency of the institutions which, according to Williamson, had agreed on the postulates, turned it into a global reference that reached beyond the Latin American crisis that had led to its creation.

The 80s were also turbulent years in Europe. The then European Economic Community, which was also suffering from stagnation, was faced with the need to forge ahead in the creation of the single market, and was in need of a qualitative leap. Economic union was not viable without the existence of real freedom in the movement of productive factors. The physical and economic frontiers that constrained the mobility of labour, goods and capital had to be removed. The main economic barrier was, however, exchange rates which destabilized commodity prices by applying a flexible exchange rate system. In an effort to stabilize exchange rates, in 1979 the EEC had launched a fixed exchange system with a limited fluctuation band, known as the European Monetary System (EMS). The EMS survived as long as international capital flows were limited by the states. Once the states liberalised capital movements the EMS became unsustainable, as shown by the operation of the financier George Soros who managed to remove the pound from the EMS on September 16, 1992 by a speculative downward attack against said currency.

Once the long-term unfeasibility of the EMS had become evident, the single currency became more urgent and inevitable, and the design of the single XXI century market was reflected in the Maastricht Treaty in 1992. This treaty defined the new economic and political architecture of the EEC, although this was done in light of the principles of the Washington consensus (see Table no. 1).

In terms of monetary policy, this architecture is basically included in Title VIII of the current Treaty on the Functioning of the European Union (TFEU). In Article 127, price stability is laid down as the objective of the European System of Central Banks (ESCB), which is made up of the ECB and the national central banks of all EU Member States, whilst Article 130 establishes the complete independence of the ECB when exercising monetary policy.

With regard to the relationship between the states and the ECB, Article 123 prohibits direct loans from the ESCB to any administration or public entity. Article 124 indirectly prohibits states and their institutions from accessing financing by imposing obligations on national financial institutions. Finally, Article 125 prohibits the European Union (EU) from taking on the debts of the states. That is, articles 123 to 125 force states to assume the full consequences of any debts they generate, without any possibility of monetization or mutualisation. In order to prevent these debts from occurring, Article 126, the longest in the TFEU, establishes in a preventive manner states' obligation to control public deficit.

In essence, all aspects related to monetary union basically consist of establishing an inflation control system that cannot be interfered with or damaged by public debt problems in order to completely separate inflation from public finances.

The problem with this monetary architecture is that, as a result of both the time in which the treaty was approved and the influence of the new neoclassical view of economics, it is accompanied by Article 63 of the TFEU which prohibits states from establishing any restriction on movements of capital both internally and with third countries and leads to the free floating of exchange rates. Article 64 of the TFEU, which refers to certain exceptions to specific foreign direct investments, accurately reflects the philosophy of the moment that permeates the treaty. Article 64.2 therefore states that "*whilst endeavouring to achieve the objective of free movement of capital between Member States and third countries to the greatest extent possible and without prejudice to the other Chapters of the Treaties, the European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall adopt the measures on the movement of capital to or from third countries involving direct investment – including investment in real estate – establishment, the provision of financial services or the admission of securities to capital markets".* Article 64.3 continues "*only the Council, acting in accordance with a special legislative procedure, may unanimously, and after consulting the European Parliament, adopt measures which constitute a step backwards in Union law as regards the liberalisation of the movement of capital to or from third countries".*

It is this combination of total liberalization of capital movements with third parties, coupled with a total ban on the possibility of financing states, that triggered a vulnerability which would ultimately spark a sovereign debt crisis between 2010 and 2012, a crisis that was inconceivable in a group of states that made up the world's second leading currency reserve. After the crisis, the ECB was forced to change its economic perspective, which was representative of the Washington consensus, as well as its strict vision on the original monetary policy in order to make the latter more flexible in its objective and to adapt it to the prevailing economic climate. The following section describes that evolution.

3. EUROPEAN CENTRAL BANK MONETARY POLICY. THREE PRESIDENTS, THREE POLICIES

On January 1, 1999, the European Central Bank assumed the management of the new currency, the euro, and with it the design and implementation of a single monetary policy within the framework of Economic and Monetary Union. Between January 1999 and December 2018, there were three presidents: Willem Frederik Duisenberg (1 July 1998 - 1 November 2003); Jean-Claude Trichet (1 November 2003 - 31 October 2011) and Mario Draghi (from 1 November 2011). During this period, a number of major economic developments took place. These included the burst of the "dot com" bubble and the burst of the international financial bubble in 2001 and 2008, respectively, the Great Recession in 2009, and the European sovereign debt crisis from 2010 to 2012. It is evident that neither the design of economic and monetary union nor that of the ECB had been devised to deal with such momentous events. The first twenty years of the European currency have thus proved difficult and tortuous while *doctrinarism* has evolved towards a *realpolitik* in terms of economic and monetary policy.

A. The birth: the Duisenberg era

The first tasks the ECB was confronted with were to define its policy objectives and to establish how it was to function in technical terms. It was therefore necessary to define a coherent and consistent approach towards monetary policy within a context of high uncertainty due to the transition from a monetary regime based on national monetary sovereignty towards one in which monetary sovereignty was transferred to a supranational institution. According to article 127 of the Treaty on the Functioning of the European Union, the ECB's objective is to ensure price stability. The ECB grounded its activity framework on four bases: (1) a quantitative definition of the objective of price stability; (2) designing an analysis framework to assess price evolution; (3) defining an operational framework to be developed by the ECB in application of its mandate; and (4) implementing a stable communication system.

As regards the first issue mentioned above (1), in 1998 the ECB Governing Council established that price stability would be reached when the year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area was below 2% while stating that price stability should remain as such over the medium term. The price stability objective was established for the whole of the eurozone as an upper bound, and no predetermined horizon was defined with regard to the medium term, since, among other reasons, the monetary transmission mechanism takes place over a variable and uncertain period of time (European Central Bank, 2011).

With regard to the foundations on which monetary policy decisions would be based (2), the ECB chose to adopt two analytical perspectives known as pillars: the economic pillar, based on analysing the short to medium-term determinants of price developments and focusing particularly on real activity and cost factors; and the monetary pillar, based on the link between prices and monetary aggregates. The ECB would therefore take its decisions in accordance with economic and monetary developments. The second pillar granted a leading role to money, which entailed assuming *de facto* the monetarist strategy of the Bundesbank. The ultimate goal of adopting such an approach was to take advantage of the Bundesbank's reputation for containing inflation, and thereby gain credibility as a central bank. The first reference value for M3 growth established by the ECB was 4.5% per annum, which was the result of applying the money quantity equation (Castañeda and Congdon, 2017), although the ECB did not commit to mechanistic behavior (Hartmann and Smets, 2018) since it was deemed that during the first moments the currency was in force there might be behavioural shifts that would lead to increased volatility in money growth. The monetary pillar also involved monitoring other monetary aggregates and banking system assets, in particular credit for households and corporations.

As regards operativity (3), the ECB defined a conventional operational framework based on controlling the interest rates of operations carried out with counterparty entities and commercial banks, as well as controlling the quantity of credit facilities. ECB monetary policy intended to use the banking system as its basic transmission mechanism by influencing the quantity of money and the economy through the interest rates on loans granted to commercial banks, and through the interest rates paid on deposits. Nevertheless, the ECB defined a broad array of operational instruments which ranged from open market operations to establishing upper and lower limits (ceiling and floor) to the overnight market interest rate (EONIA) by means of marginal lending and deposit facilities. Reserve requirements were also included in the toolkit available to the ECB.

Finally, with regard to communication (4), the ECB called press conferences to be given by the President and the Vice-President immediately after each governing council meeting. Other channels of communication were also used such as the Monthly Bulletin (Economic Bulletin since January 2015) as well as public speeches and interviews given by members of the executive board (Hartmann and Smets, 2018).

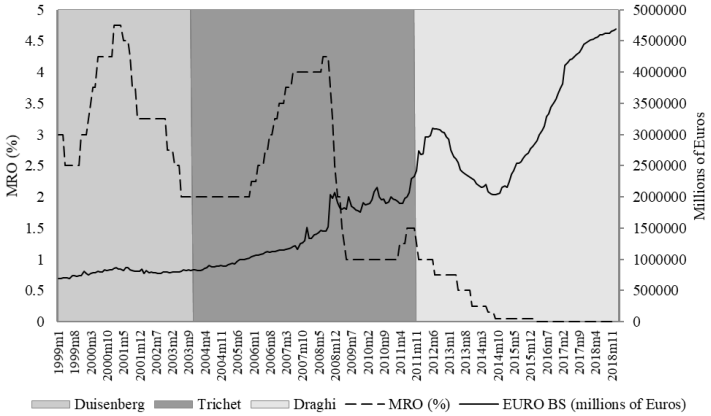


Figure no. 1 – Evolution of the MRO and the Eurosystem balance sheet
Source: Authors' compilation based on data of European Central Bank

In 1999, the early days of the euro were marked by prices growing below the ceiling set by the ECB, which led the ECB to cut interest rates by fifty basis points in April 1999. However, faced with upward pressure on prices in the short run because of the increase in oil prices and the evolution of M3 over its reference value, the ECB increased interest rates by a total of 225 basis points between November 1999 and October 2000 (see Figure no. 1). In 2001, against the backdrop of the dot-com bubble burst, the ECB embarked on a reduction of interests rates that reached a total of 150 basis points. Later on, in 2002, when Germany went into recession, it applied another gradual reduction of 125 basis points until interest rates fell to 2%.

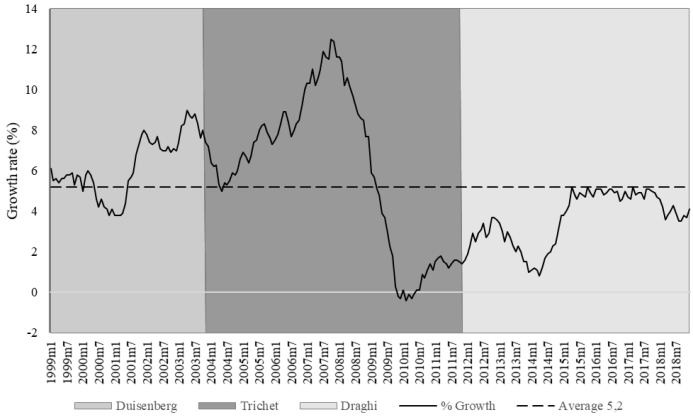


Figure no. 2 – Evolution of M3
Source: Authors' compilation based on data of European Central Bank

As regards the monetary pillar, annual M3 growth accelerated considerably from mid-2001 onwards (see Figure no. 2). However, as pointed out by Hartmann and Smets (2018), the ECB did not deem this increase to pose any risk to price stability in the medium to long term since it was mostly due to major shifts in the portfolios of private investors who turned to acquiring safer and more liquid assets included in M3 because of the slump in global stock markets. During Duisenberg's term in office, the Eurosystem balance sheet only increased by 17.85% (see Figure no. 1). The last day he was in office the exchange rate was 1.1622 USD/EUR, which was virtually identical to the value it had held on the first day the currency had been in operation.

B. The response to the crisis: Trichet or resistance

When Trichet assumed the presidency of the ECB on 1 November 2003, monetary policy strategy had been revised. As a result of this revision, the relevance of the monetary pillar was downgraded. Even though the ECB formally kept the analytical framework based on the two pillars in place, short-term interest rates were now determined on the basis of assessing macroeconomic developments (see Flassbeck and Lapavitsas, 2015). Monetary analysis thereby became a means of cross-checking economic analysis from a medium to long-term perspective, which was reflected in the introductory statements of the monetary policy press conferences in which economic analysis was granted ever-increasing priority over monetary analysis (see Castañeda and Congdon, 2017).

In a symposium held by the ECB in 2006 aimed at discussing the role of the monetary pillar, it was pointed out that monetary analysis was evolving from the more constrained perspective of the quantity theory of money to a broader approach which considered other analyses, including the role of financial frictions and financial intermediation in macroeconomic developments (Hartmann and Smets, 2018). In other words, the theory of efficient financial markets and rational expectations, with failures of short-term asymmetric information, was imposed on the orthodox monetarist theory of money.

Another relevant change, linked to the debate on the risk of deflation resulting from the German recession of 2002 and 2003 and that would mark subsequent policy, was the clarification that the ECB considered price stability to involve keeping inflation below 2%, but close to this value, over the medium term.

From 2003 to 2005, interest rates did not change in a context of economic recovery. However, as of late 2005, the ECB opted for a gradual rise in interest rates up to 4% in June 2007. Despite the increase in the interest rate, by this time the ECB balance sheet had swollen by 47.63% compared to its value at the end of Duisenberg's period in office, while the monetary aggregate M3 was growing at a year-on-year rate of around 12%, well above the reference value of 4.5%. This period after the physical creation of the euro was characterised by credit facility that would end up triggering sizeable trade imbalances in peripheral countries. It was the first time during the euro's lifetime that problems of cyclical asynchrony were to emerge.

Once the first signs of the financial crisis had appeared in 2007, the ECB's actions focused on liquidity management, taking concerted action with the world's main central banks. The ECB resorted to massive and immediate liquidity injections while eliminating limits to the access of counterparties. The Fed also resorted to measures of liquidity provision to tackle the paralysation of the wholesale market while expanding its operational

framework in relation to its counterparties and the collateral that these could make use of (Ayuso and Malo de Molina, 2011). Among such measures, liquidity swaps between central banks were agreed in order to be able to offer liquidity lines in foreign currency.

Surprisingly, in July 2008, in the middle of a banking liquidity crisis and in the aftermath of the Bear Stearns bankruptcy, the ECB decided to raise the interest rate by 25 basis points to 4.25%, since it deemed that rising oil prices posed an inflationary risk (see Figure no. 1). However, this increase lasted only three months. This raising of interest rates remains one of the least explicable episodes of ECB monetary management in its 20-year lifetime.

Until September 2008, the ECB had treated the crisis as a liquidity problem which was specific to financial institutions and grounded on the mutual mistrust these entities displayed towards one another. Indeed, after June 2007, the ECB kept interest rates at a high level, since it did not foresee a recession but quite the opposite, that is, future inflationary pressures. This is borne out by the hike in interest rates in June, while unlimited liquidity was provided in order to deal with the problem in the interbank market. When the Lehman Brothers bankruptcy triggered the global financial crisis, the ECB lowered the interest rate from 4.25% until it reached 2% in January 2009. In February 2009, the ECB rate cut was considered insufficient and the ECB again cut the interest rate, leaving it at 1% in May. By the end of 2008, the Fed, which had been applying a policy of systematic interest rate reduction since September 2007, had already reduced its policy rate target to 0-0.25% (see Figure no. 3).

2009 was a year of innovation in the field of monetary policy. The ECB operational framework underwent a reform which entailed modifying its system of refinancing tenders by adopting a fixed rate full allotment policy. Moreover, the collateral framework was broadened while admission criteria were eased. The maturity of long-term monetary loans was also substantially lengthened and specific asset purchase programmes were implemented. The aim was to restore the monetary transmission mechanism that had been interrupted (Millaruelo and del Río, 2013). The study by Borrallo Egea and Hierro (2015) includes a broad description of the measures adopted by the ECB, the Fed and the Bank of Japan in the period spanning 2007 to 2013, as well as a survey of how effective they were.

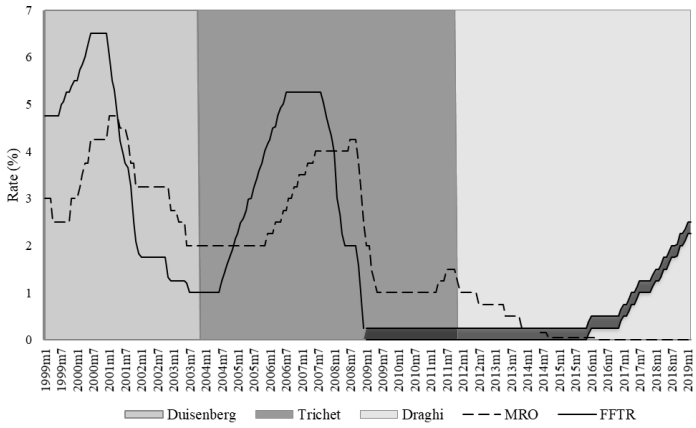


Figure no. 3 – Evolution of key Policy Rates

Source: Authors' compilation based on data of European Central Bank and Board of Governors of the Federal Reserve System (US), Federal Funds Target Range, retrieved from FRED, Federal Reserve Bank of St. Louis

The key difference between the performance of the ECB and the Fed was that as of November 2008 the Fed considered there was a problem of solvency in financial institutions and decided to remove committed or illiquid assets from the market and to create a monetary base through a quantitative easing programme, the so called Large Scale Asset Purchases Program (LSAP). This programme consisted of purchasing agency debt; mortgage-backed securities and U.S. treasury securities. This constituted the first round of quantitative easing and involved purchasing 175 billion dollars in agency debt, 1.25 trillion dollars in agency MBS, and 300 billion dollars in longer-term treasury securities. Against the Fed's LSAP, the ECB launched the Covered Bond Purchase Programme in May 2009 under which the Eurosystem made non-sterilized outright purchases of covered bonds guaranteed by high-quality assets whose worth was limited to an aggregate volume of 60 billion Euros. Such an amount, negligible in relation to that of the Fed's programme, made clear the refusal of the entity led by Trichet to apply measures of quantitative easing (see Figure no. 4).

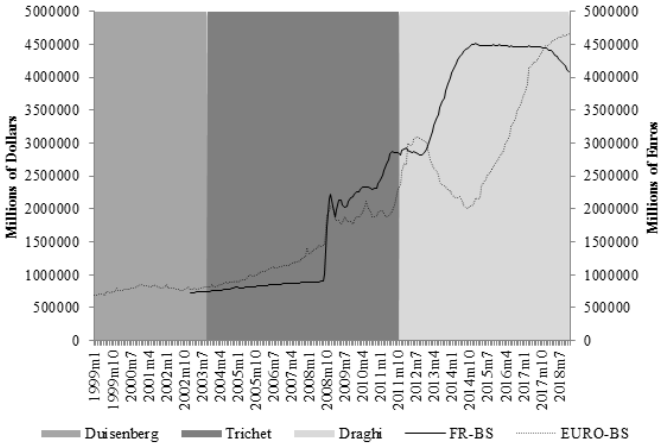


Figure no. 4 – Evolution of Eurosystem and Federal Reserve balance sheets
Note: Central Banks' balance sheets are proxied by Central Banks' total assets
Source: ECB Statistical Data Warehouse and Board of Governors of the Federal Reserve System (US), total assets, retrieved from FRED, Federal Reserve Bank of St. Louis.

The ECB's alternative to quantitative easing was to lengthen the maturities of monetary loans. In October 2011, the last month that Trichet headed the institution, the ECB announced it would offer one-year loans to counterparties. However, in December, with Draghi now at the helm, the measure was executed in the form of three-year loans repayable from the first year. These were the three-year longer-term refinancing operations (3-year LTRO). Through two large-scale refinancing operations carried out in December 2011 and February 2012, a total of 1,018.7 billion euros was allotted.

Before the crisis, conventional ECB policy was mainly conducted through the credit channel. Aware of this, the ECB designed a kind of "transitory" quantitative expansion, replacing what is quantitative easing in the strict sense, and whose aim was to reactivate the credit channel. However, the policy of injecting funds through three-year loans to financial institutions did not prove to be effective and failed to reactivate the transmission mechanism while liquidity did not make it through to the real economy (see Borrallo Egea and Hierro, 2019).

The other episode the ECB was faced with under Trichet's mandate was the sovereign debt crisis. Now is not the time to explain how the crisis came about since it lies beyond the scope of our aims. It should, however, be noted that this crisis was linked to the design of economic and monetary union and to the ban on monetary financing of governments laid down in Article 123 of the TFEU. As pointed out by De Grauwe (2011a), eurozone governments do not control by fiat the currency on which they issue debt, which is why for these governments it is as if such debt were issued in a "foreign" currency. As a result, governments lack the capacity to guarantee to bondholders that they will always have enough cash to pay off the bond at maturity (De Grauwe, 2011b). This results in governments becoming vulnerable during liquidity crises in sovereign debt markets and being open to contagion among one another (see De Grauwe, 2011b). Thus, what was a small problem affecting Greece - according to the Eurostat report, Greece had understated its deficit by 6,312 million euros, 2.64% of its GDP and 0.068% of eurozone GDP that year – turned into a second economic recession and a matter of the euro's very survival.

In 2010 Europe embarked on an anti-deficit crusade, generating a procyclical policy that also increased countries' debt in relative terms. The sovereign debt markets of countries whose financial systems exhibited greater weakness became illiquid, while German debt became a safe haven. This led the risk premium of the countries affected to soar. The situation became unsustainable to the point that not only did the financial fragmentation of the eurozone considerably worsen, but even the very survival of the euro was questioned. In response to this, in May 2010 the ECB launched the Securities Market Programme (SMP), which was designed to purchase sovereign debt securities in secondary market interventions for a limited volume and for a limited period. In 2010, the programme was only active from May to July and involved some 70,000 million euros of sovereign debt, again a figure that was some considerable distance from the amount of debt purchase accumulated by the Fed in the USA. The fact that this programme was limited in time and volume resulted in its failure to resolve the situation (see De Grauwe, 2013). However, this symbolic participation allowed the ECB to form part of the Greek bailout supervisory group, together with the European Commission and the International Monetary Fund (IMF). Later on, this ECB role would be generalized through the creation of the European Financial Stability Facility and the European Stability Mechanism (Tortola and Pansardi, 2019).

Despite the sovereign debt crisis, in April 2011 the ECB took yet another hard to justify decision by raising interest rates, with the official rate reaching 1.5% in July 2011, where it only remained until October when Trichet ceased to be ECB president.

The second president of the ECB left without having contained the sovereign debt crisis, with the economy on the brink of recession as a result of pro-cyclical fiscal policies, with citizens' image of the euro having deteriorated (54% of Europeans considered that the euro had not helped to offset the crisis (European Parliament, 2012), and without having applied quantitative expansion, and having raised the interest rate. Moreover, when Trichet left the ECB, the euro was trading at $1.40.

C. The new orthodoxy: Draghi and the realpolitik

In November 2011, Mario Draghi assumed the presidency of the ECB in the context of a new economic recession in the eurozone (the so-called double-dip recession). Faced with this situation, he reversed the rise in interest rates by reducing the MRO between November

and December by a total of fifty basis points, a cut which was followed by another twenty-five-basis point reduction in July 2012. In addition, Draghi corrected the announcement of one-year LTROs, making them three-year LTROs. In addition, credit institutions' minimum reserve requirement was lowered from 2% to 1%, while the range of assets eligible as collateral was again expanded.

While these measures led to a temporary easing of tensions, the crisis in the sovereign debt markets did not abate, while the irreversibility of the euro project was questioned by some experts. The ECB's problems had gone beyond the inflation target and now faced the challenge of avoiding the destruction of the euro.

With the risk premiums of Italy and Spain's sovereign debt having soared above 600 basis points, on 26 July 2012 Draghi decided to put an end to the sovereign debt crisis. At a conference in London, the most decisive to date in the history of the eurozone, Draghi spoke the words whose mere utterance were to change the direction of the markets: "Within our mandate, the ECB is ready to do whatever it takes to preserve the euro and believe me, it will be enough". Within a few days, a new programme of selective sovereign debt purchase, Outright Monetary Transactions (OMT), had been announced. Through this programme, the ECB would selectively buy, with an unlimited amount, short-term sovereign bonds in the secondary markets of the countries that had previously requested assistance from the European Financial Stability Facility (EFSF) or the European Stability Mechanism (ESM). The OMT was never actually applied since its mere proclamation was enough to bring the sovereign debt crisis to an end. OMT stands as the best example ever of the announcement effect of a monetary policy measure.

The OMT marked the beginning of a shift in ECB monetary policy, since the programme prioritised preserving both the currency and the eurozone over the inflation target. These measures were strongly contested in Germany to the point that the president of the Bundesbank, Jens Weidmann, threatened to resign if Germany supported them, and a group of economists, citizens and German MPs appealed to the German Federal Constitutional Court. The latter rejected the appeal in 2016, after consulting the European Court of Justice, thus leaving the way open for such a shift in European monetary policy.

The European economy, suffocated by the instability of the sovereign debt crisis and deficit control policies, fell into a deflationary recession while the three-year LTRO transitory stimulus came to an end and the ECB's balance sheet returned to its previous position. Against this backdrop, the ECB prepared to implement an unprecedented expansionary monetary policy. During an initial phase, conventional monetary policy was exhausted. By the end of 2013, the interest rate had reached 0.25%, and in September 2014 the scope for lowering interest rates any further had reached its end when it stood at a symbolic 0.05%. In other words, it had hit the zero lower bound where the deposit facility entered negative territory (entities had to pay to keep deposits in the ECB).

In June 2014, the ECB again resorted to long-term refinancing operations for periods of up to four years, conditioned by granting loans to the non-financial private sector. These operations were the Targeted Long Term Refinancing Operations (TLTRO). The latter demonstrates the failure of the three-year LTRO vis-à-vis activating the ordinary transmission channel in the eurozone, that is, the credit channel. In addition, two programmes for acquiring private assets were implemented in key market segments for monetary transmission: the Asset-Backed Securities Programme and the third Covered Bonds Purchase Programme (ABSPP and CBPP3, respectively).

However, the most important policy change came about in January 2015 when the ECB announced definitive quantitative easing. This was a large-scale asset purchase programme that would take effect in March 2015 (five and a half years after the Fed had begun to apply it in the US), and which was called the Expanded Assets Purchase Programme (APP) and which included, in addition to the ABSPP and the CBPP3, the Public Purchase Asset Programme (PPAP). The APP was designed to acquire a total of sixty billion euros of public and private bonds per month until September 2016, which was equivalent to a liquidity injection of more than 10% of the eurozone's GDP. In March 2016, the volume of purchases was expanded to 80 billion a month until March 2017, in addition to implementing a new programme which would be embedded in the APP and which is known as the Corporate Sector Purchase Programme. The programme was aimed at purchasing bonds issued by non-financial corporations in the eurozone. At the end of 2016 it was decided to extend the programme by an additional nine months (until December 2017) while reducing the volume of monthly purchases to 60 billion euros. In October 2017, it was again decided to extend the programme at least until September 2018 while the volume of monthly purchases was again reduced to 30 billion euros (Hernández de Cos, 2018). In the last recalibration of the programme, it was established that between October and December 2018 the volume of monthly purchases would be reduced to 15 billion euros. Finally, on 13 December 2018 the ECB decided to end the purchase of assets through the APP. The result of this quantitative easing is that by the end of 2018 the ECB Balance stood at 4,669 billion euros, doubling the existing October 2011 balance sheet, when Trichet had left the presidency, while the exchange rate at December 31 stood at 1.1450 USD/EUR, again close to its value when the euro had been born.

The completion of this programme has given rise to a new phase in which the ECB must decide on the reinvestment policy of the amounts derived from the maturity of the securities acquired (see Arce *et al.*, 2019).

In short, the historical evolution of eurozone monetary policy evidences how the ECB has always lagged behind the Fed when applying policies aimed at dealing with the crisis. However, as the crisis deepened, the ECB's response grew bolder, more proactive and less conventional (Tortola and Pansardi, 2019). This transformation, which did not occur during the presidency of Trichet, responded more to circumstances than to its own initiative. Draghi opted for a monetary policy for the euro's salvation that ultimately led to monetary realpolitik. The ECB has therefore evolved from being a mere controller of inflation to becoming a key actor in the Union's economic policy, assuming a role which is closer to the Fed's than to the one that can be drawn from a strict reading of the Treaty of the Union.

4. CYCLICAL ASYNCHRONY IN THE EUROZONE

As described above, in 2001, after the outbreak of the dot-com bubble crisis, the ECB began an expansionary policy, reducing the interest rate from 4.75% in May 2001 to 3.25% in November of the same year. The interest rate remained untouched for a year until it was again cut when Germany went into recession, and which left it at 2% in June 2003, where it stood until December 2005. This expansionary policy, which was fairly reactive to the financial bubble burst and the German economic situation, entailed a significant growth of M3 – between May 2001 and December 2005 it grew at an annual average rate of 7.3%, well above the 4.5% originally established– together with strong trade imbalances in eurozone peripheral countries. Micossi (2015) points out that monetary policy seems to have been pro-cyclical for the peripheral countries

and counter-cyclical for Germany and the core countries during much of the past decade. This would mean we are facing the first problem of cyclical asynchrony in the history of the euro.

We assess the question of asynchrony by building a variant of the Concordance Index proposed by Harding and Pagan (2002). In order to define a variable that represents the business cycle, we employ the real GDP growth of the 12 founding countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, and Spain) and the aggregate real GDP growth of these 12 economies. We create a binary variable which represents the business cycle of each of them. This variable, which is defined as S_{it}, takes the value 1 when real GDP growth is positive and 0 otherwise. Likewise, we build S_{et}, which represents the business cycle of the Euro-12 as a whole following the same procedure. GDP series are obtained from Eurostat. Using these variables, we estimate the Concordance index for each period, which is expressed as follows:

$$I_t = \frac{1}{N}\left(\sum_{i=1}^{N} S_{it}S_{et} + \sum_{i=1}^{N}(1 - S_{it})(1 - S_{et})\right) \quad (1)$$

where I_t is the Concordance index estimated for each period t, N is the number of countries, S_{it} is a binary variable representing the business cycle for country i in period t, and S_{et} is the binary variable of the business cycle of the Euro-12. The closer the value of the index is to 1, the more cyclical synchronization there is. The sample used in this study covers the 12 countries that make up the Euro-12 and the period spanning from the first quarter of 1999 to the fourth quarter of 2018, with quarterly data frequency.

We also build an index calculating the cyclical synchronization of each country with respect to the Euro-12 during the period studied.

$$I_i = \frac{1}{T}\left(\sum_{t=1}^{T} S_{it}S_{et} + \sum_{t=1}^{T}(1 - S_{it})(1 - S_{et})\right) \quad (2)$$

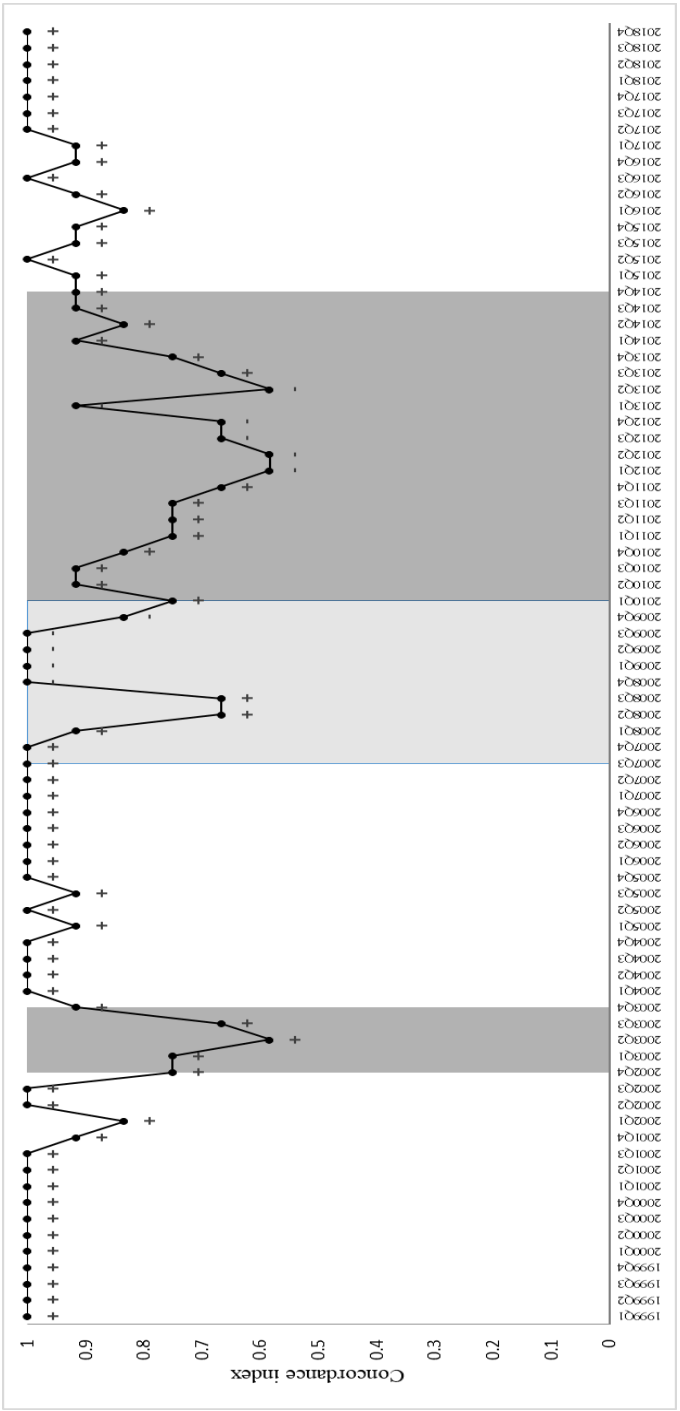
where I_i is the Concordance index for each country and T represents the periods covered by the study.

Finally, we can obtain an indicator of the average synchronization during the whole period and for all the countries that make up the Euro-12. This Concordance index, I, is given by the following formula:

$$I = \frac{1}{NT}\left(\sum_{i=1}^{N}\sum_{t=1}^{T} S_{it}S_{et} + \sum_{i=1}^{N}\sum_{t=1}^{T}(1 - S_{it})(1 - S_{et})\right) \quad (3)$$

Figure no. 5 shows the evolution of the estimated Concordance index. It shows lower cyclical synchronization between the second quarter of 2002 and the end of 2003. This is caused by the economic slowdown experienced by part of the eurozone, especially the German economy whose domestic demand fell as a result of the internal economic problems it had been suffering since reunification in 1989-1990 (BIS, 2003). The slowdown also affected other countries in the eurozone such as Italy, Portugal, France, and the Netherlands. In contrast, countries such as Greece, Spain, and Ireland experienced relatively strong growth, bolstered by favourable monetary conditions (IMF, 2003). These conditions are associated with the expansionary monetary policy applied by the ECB, which we referred to above.

Figure no. 5 – Concordance index (1999Q1-2018Q4)



Source: Authors' compilation. ****** *The signs +/- are representative of whether in the E-12 area the variation of GDP was positive / negative, and the shaded areas coincide with the German recession of 2002/2003, the international financial crisis and the sovereign debt crisis*

The outbreak of the financial crisis that led to the Great Recession generated a new desynchronization. In this case, it was triggered by the different timing at which each economy entered recession, since while some countries went into recession in the first quarter of 2008 for most of them this did not happen until the fourth quarter. The asymmetry generated by this staggered process was transitory, since in the first quarter of 2009 all economies were in recession and, therefore, in the same business cycle.

Finally, the sovereign debt crisis experienced by the eurozone caused the greatest cyclical asymmetry to have been seen in these 20 years. This crisis mainly affected the peripheral countries (Greece, Spain, Italy, and Portugal), which experienced a second recession during the period spanning from 2010 to 2014 as a result of the asymmetric shock derived from the difficulties they had financing their debts and the pro-cyclical nature of the austerity programmes. During this period, other economies such as the Netherlands and Finland, also suffered recessions, although these were shorter than in the previously mentioned countries. In contrast, countries such as Germany, Belgium, France, Ireland, and Luxemburg maintained positive growth rates, thus giving rise to asymmetry in the business cycle of the Euro-12. After the first quarter of 2015, coinciding with the start of the "Quantitative Easing" implemented by the ECB, a new period of cyclical synchrony commenced, reaching the value 1 in the Concordance index in 2017, and which remains until the latest available data, which refer to the fourth quarter of 2018.

Figure no. 6 shows the Concordance index of each country with respect to the business cycle of the Euro-12, which could be interpreted as the percentage of quarters in which the country has been in synchrony with the Euro-12. The most synchronous group of countries consists of the Netherlands, France, Austria, Belgium, Ireland, and Finland. The most asynchronous countries have been Greece, the hardest hit by the sovereign debt crisis, and Germany, because of its singular crisis at the beginning of the period. In any case, the results show that no country exhibits a business cycle on a regular basis other than that of the Euro-12.

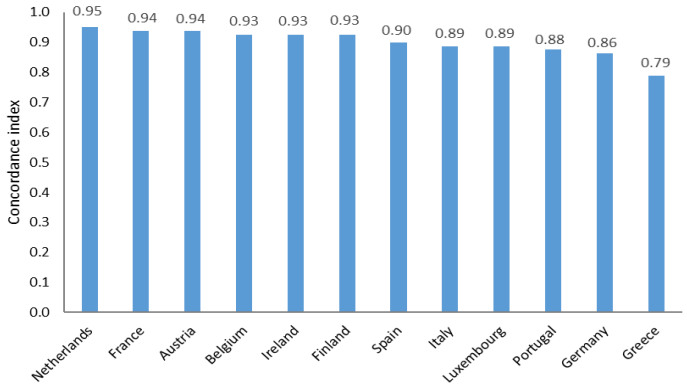


Figure no. 6 – Concordance index by country
Source: Authors' compilation

Finally, the value of the average Concordance index (I) for the whole sample is 0.9. This value indicates that 90% of the observations were synchronous and that the likelihood of a country having been affected by an asymmetric shock with respect to the Euro-12 would have averaged 10%.

There has been widespread controversy surrounding cyclical asynchrony in common currency areas, both in theoretical and empirical studies. In the theoretical field, questions discussed include whether monetary union increases business cycle synchronization due either to the increase in bilateral trade (Frankel and Rose, 1998), to the transmission of technological innovations and knowledge (Coe and Helpman, 1995), to fiscal policy coordination (Frankel and Rose, 1998; Inklaar *et al.*, 2008) or to the risk share associated with financial integration (Imbs, 2004) or whether, in contrast, synchronization is reduced by countries' exposure to asymmetric shocks resulting from the fact that the increase in international trade leads countries to specialize in production (Krugman, 2001) and that the risk share derived from integrating capital markets generates greater assurance, leading countries to greater productive specialization (Kalemli-Ozcan *et al.*, 2003).

Much of the empirical literature has sought to ascertain whether there are asynchronies between core eurozone countries (considered in most studies to be: Germany, the Netherlands, Austria, Belgium, and France) and periphery eurozone countries (Gouveia and Correia, 2008; Konstantakopoulou and Tsionas, 2011; Soares, 2011; Lehwald, 2013; de Lucas Santos and Delgado Rodriguez, 2016; Belke *et al.*, 2017; Ahlborn and Wortmann, 2018). There has also been concern (using an array of different methodologies) about determining whether synchronization has increased or decreased with the advent of monetary union (Furceri and Karras, 2008; Goncalves *et al.*, 2009; Gogas, 2013; Papadimitriou *et al.*, 2016) and whether it has increased or decreased since the financial crisis (Grigoras and Stanciu, 2016).

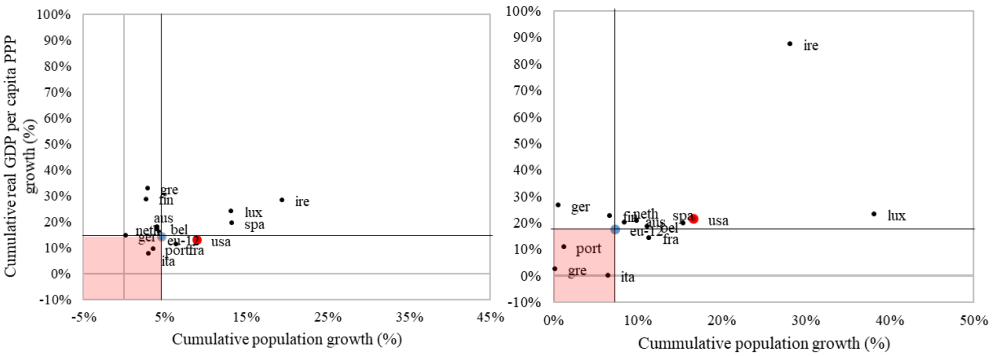
5. A BRIEF ECONOMIC BALANCE OF 20 YEARS OF THE EURO

Although evaluating the effects of the ECB's monetary policy on the real economy lies well outside the scope of this article, we deem it necessary to at least examine the developments that have taken place in the real economy of European countries during the 20 years of the euro. For this purpose, we present a very simple scheme of variations and average values referring to fundamental values in pairs and we distinguish two periods: the period of economic expansion, spanning from 1999 to 2008, and the whole period from the introduction of the euro in 1999 to 2017, the last year for which data are available for all the variables.

For the calculations, we take again the 12 founding countries and compare them with their aggregate performance, which we call Euro-12. In addition, we include data for the United States in order to have a comparative reference for the eurozone.

A. GDP per capita and population

Output growth is one of the main indicators of a country's economic evolution, although a country's dynamism is also shown by its population growth. Countries attract population because of the opportunities that emerge within them. The most dynamic countries, with the greatest potential for growth, are those whose output per capita and population grow at the same time and vice versa.



a) 1999-2008 **b) 1999-2017**

Figure no. 7 – Cumulative GDP per capita growth vs cumulative population growth

Source: Authors' compilation based on data of World Bank, Eurostat and U.S. Bureau of Economic Analysis, Real Gross Domestic Product and U.S. Bureau of Economic Analysis, Population, retrieved from FRED, Federal Reserve Bank of St. Louis.

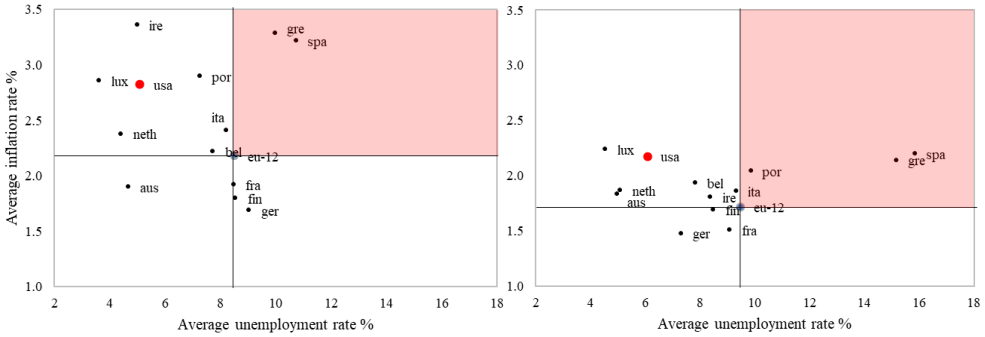
Figure 7 (a) shows the cumulative GDP per capita growth in purchase power parity and the cumulative population growth for each country during the expansion period. We observe that the Euro-12 experience a GDP per capita growth rate higher than the United States, but a population growth of almost half. We also observe a strong growth in peripheral countries such as Greece, Ireland[4], Finland, and Spain with little growth in Italy and Portugal.

Figure 7 (b) shows the same variables for the whole period and therefore, the effects of the crisis and its mismanagement. The US performs better, which is explained by its better handling of the crisis. It should be remembered that Europe experienced a double recession, applied a pro-cyclical fiscal policy, and delayed quantitative easing. The figure also reflects the disastrous effects of the crisis and how it was mismanaged in Greece, and, to a lesser extent, in Portugal. However, the most worrying result is that Italian GDP per capita did not grow during the period, even though Italy was not particularly hard hit by the crisis. German GDP growth is significant, but with the peculiarity that its population remained virtually stagnant, despite the attention which the issue of immigration raises in the country.

B. Inflation and unemployment

Figures no. 8 (a) and 8 (b) show the average inflation and unemployment rates for the periods 1999-2008 and 1999-2017, respectively. Both show similar and less changing features.

As can be seen, both in the period of expansion and in the period as a whole, the US maintained higher inflation rates and lower unemployment rates. In both periods, the difference in inflation is around 0.5 points and 3.3 points in unemployment. By countries, the most noticeable finding is that Spain and Greece are some considerable distance away from other countries and from the average values of the Euro-12 while they display high inflation rates and significantly high unemployment rates. On the other hand, France and Germany are the least inflationary economies.



a) 1999-2008 **b) 1999-2017**

Figure no. 8 – Average unemployment and inflation rates

Source: Authors' compilation based on data of Eurostat and U.S. Bureau of Labor Statistics, Unemployment rate and World Bank, Inflation, consumer prices for the United States, retrieved from FRED, Federal Reserve Bank of St. Louis.

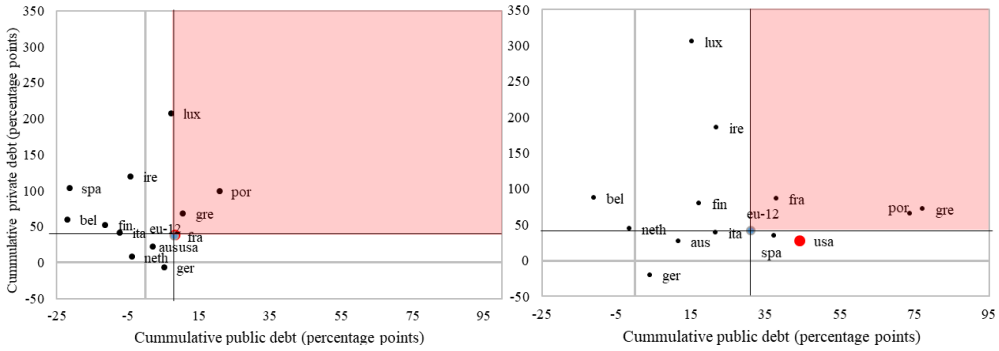
As regards monetary policy, one key point shown by Figure no. 8 is that inflation remained around the 2% rate set by the ECB as a target, although the onset of the crisis after 2008 had a major impact on this data, leaving it at an average of 1.72% for the whole period.

C. Public and private debt

The third pair of variables appears in Figure no. 9, where the variation of cumulative public debt and private debt is shown, measured in percentage points of GDP, during the periods 1999-2008 and 1999-2017, a) and b) respectively.

Figure no. 9 (a) shows that, in the first period, expansion was associated with a growth in private debt, which quadrupled that of public debt. The growth of private debt was similar to that of the United States. Nevertheless, there was huge dispersion, with countries such as Germany where credit even declined, and others where it grew at rates well above the average. In this regard, Luxemburg stands out with a growth of over 207 percentage points of GDP. This figure bears out the notion that monetary policy might have been counter-cyclical for Germany and the core economies, but pro-cyclical for the peripheral countries (Micossi, 2015), since considerably above average, and in some cases even disproportionate, monetary expansion took place.

When analysing the whole period, private credit is found to have decreased in the peripheral countries when compared to the first period, while it increased in some of the core countries, such as France. However, the most noteworthy finding is the over-indebtedness of Ireland and Luxemburg and above all, due to its economic importance, the reduction in private debt in Germany as a result of the euro.



a) 1999-2008 **b) 1999-2017**

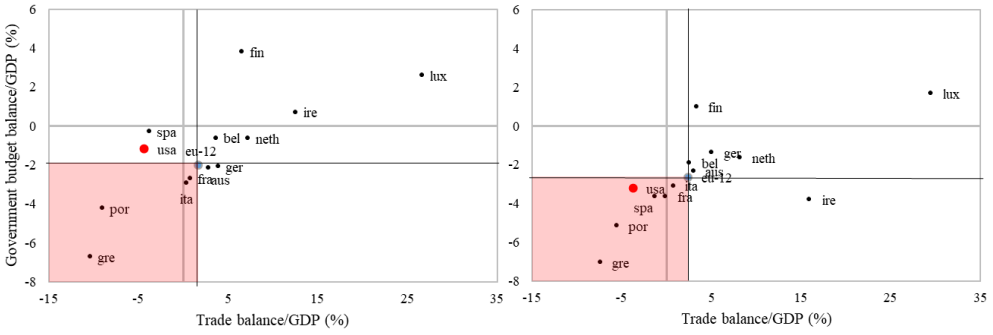
Figure no. 9 – Cumulative public debt and cumulative private debt

Source: Authors' compilation based on data of Eurostat and OECD National Accounts Statistics and Financial Statistics

As for public debt, Figure no. 9 (a) shows how well it performed during the expansion phase and reflects a growth in accumulated public debt during the financial and sovereign debt crises. Nonetheless, the growth of public debt was lower than in the US, where no policies of reducing spending were applied and automatic stabilizers were allowed to work more freely. Greece and Portugal, the countries which suffered the bailout the most, were those that ended up accumulating the greatest public debt, although this accumulation was also linked to the contraction of their GDPs.

D. Trade and government balance

The last aspect considered is the evolution of each country's trade and government budget balance. Figures no. 10 (a) and 10 (b) compare the average government balance with the average trade balance for the periods 1999-2008 and 1999-2017, respectively.



a) 1999-2008 **b) 1999-2017**

Figure no. 10 – Average trade and government budget balance

Source: Authors' compilation based on data of Eurostat and U.S. Bureau of Economic Analysis, General government net lending/borrowing for United States and International Monetary Fund, Trade balance, retrieved from FRED, Federal Reserve Bank of St. Louis.

Both figures show a positive relationship between the trade balance and the government balance. Peripheral countries tend to appear in the lower left quadrant with negative trade and government balances. In this regard, France and Italy stand apart from central European core countries, which tend to have lower budgetary deficits and positive trade balances. External imbalances during the initial expansive period, which would ultimately prove to be the main cause of the economic difficulties suffered by countries such as Portugal and Greece, are evident. Likewise, the negative data in terms of public deficit is also related to their GDP contraction.

In comparative terms, the US and the Euro-12 differ in the same way as the peripheral countries do. The US has a somewhat larger government deficit, but above all it has an external deficit while the Euro-12 maintains a surplus with the rest of the world.

6. CONCLUSIONS

All in all, the euro's 20-year history has been a kind of frenetic tale in which constitutional limits, people with different monetary perspectives, and extreme economic situations, ranging from financial bubbles to depressions and spanning a sovereign debt crisis, have interwoven and overlapped.

The global regulation of the euro and the ECB was forged in times of liberal predominance and based on the ECB's independence against the backdrop of a new world of perfect capital mobility. As regards both the objective and monetary policy, the quantitative theory of money was their major influence -a single objective, inflation, and a variable to be controlled, the amount of money- while Duisenberg, the first president of the ECB, defined a monetarist type functioning structure.

With regard to the economic circumstances surrounding the first stage of the euro, once the first phase of the dot.com bubble had passed, the ECB faced the problem of the German recession, which constituted the first asymmetric shock and the first cyclical asynchrony within the eurozone and opted for monetary expansion. The latter led to an overreaction of private indebtedness in peripheral economies that was to have consequences later on.

The succession of Duisenberg by Trichet put an end to monetarist inspiration but not to expansive policy, which remained in place until 2005. The monetary pillar that sustained the decisions ceased to have any influence and monetary policy wandered through the territory of the new orthodoxy. The collapse of the interbank market in August 2007 put all central banks on their guard, and the ECB, like the other central banks, provided counterparties with limitless liquidity. Finally, when the global financial bubble burst in September 2008, the ECB began experimenting with all kinds of formulas in an effort to reactivate banking credit. One fundamental difference was, however, that Trichet refused to apply the quantitative easing that had been implemented in the US in 2010. This resulted in what has been known as the euro crisis or European sovereign debt crisis. The debt markets of the peripheral countries became illiquid and the ECB only reacted by forming part of the Troika that oversaw the bailouts while making symbolic debt purchases and supplying more money to the banking system using debt as collateral. These monetary policy experiments proved useful neither in terms of reactivating the credit channel nor in dealing with the asymmetric shock in the peripheral countries. Trichet's mandate ended with a rise in the interest rate against the backdrop of a recession in Europe and with a euro that was clearly overvalued.

The arrival of Draghi gave rise to an expansive monetary policy which, for the first time, exhausted all the room available for lowering interest rates, yet failed to reduce tensions in sovereign debt markets. When the attack on the euro became evident, Draghi reacted with the announcement of what would later be the non-implemented OMT. The announcement sparked an implicit change in the ECB's objective. It would be impossible to safeguard the price stability which the treaty of the union pursued if the euro ceased to exist. A new aim, namely the desire to ensure survival, therefore took precedence over the goal of containing inflation.

However, this was not all. OMT involved another change, since it allowed selective purchase of debt from the countries that were bailed out. In other words, ensuring the euro's survival took precedence over the principle of not financing states.

With some articles of the Treaty on the Functioning of the European Union having been reinterpreted, and after having suffered a second unnecessary recession, coupled with the evident existence of cyclical asynchrony between countries resulting from asymmetric shocks, the ECB followed the Fed and opened the door to quantitative easing. However, such a move arrived five years late whilst monetary union was being questioned by the very citizens who had mainly supported it at first.

By the end of 2018, the ECB had been in existence for twenty years. It has become a central bank comparable to the Fed and to the Banks of England, Canada or Australia, detached from its original doctrinarism and bound to the real needs of the economy, having thus awoken in a new era: the era of "Monetary Realpolitik".

As of December 31, 2018, the euro exchange rate again stood close to its original level.

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Notes

[1] This text includes part of the lecture entitled “Spain in the eurozone. Stability and crisis” which I delivered on March 7, 2019 at the conference held in Seville on “Twenty years of the euro: Achievements and Challenges”, organized by the Universities of Seville and Coimbra, and in which the two co-signers of the work participated.

[2] In September 1981, I received my first class in macroeconomics and, throughout the course, we were taught the model corresponding to Neoclassical synthesis, following Samuelson’s evolved exposition format. In September 1986, I taught my first macroeconomics class. The model I taught incorporated the aggregate supply curve obtained from the short and long-term Phillips curves. In just six years, macroeconomics had changed.

[3] The liquidity crisis in Latin American debt markets that led to the suspension of payment of Mexico’s debt in August 1982 is known as the “tequila effect”.

[4] Ireland is an outlier for the period as a whole due to Ryanair’s relocation and the relocation of important transnational companies for fiscal reasons.

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