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The Impact of the Twin Financial Crises

A. (Tassos) G. Malliaris
Loyola University Chicago, tmallia@luc.edu

Mary E. Malliaris
Loyola University Chicago, mmallia@luc.edu

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The Impact of the Twin Financial Crises

By Anastasios G. Malliaris and Mary Malliaris[1]

We focus on the first 20 years of the Euro, from 1999 to 2019, and we split this period into two approximate decades to examine the performance of three benchmarks: the real GDP quarterly growth, the annualized real per capita GDP changes and unemployment. These illustrate that the underperformance of Europe is more evident during the second decade. Searching for causes we find that the Global Financial Crisis was an exogenous shock to the EU but its impact was large in both the U.S. and the EU. One major reason is that the U.S. responded quickly and aggressively both fiscally and via an unconventional monetary policy. The Euro area was constrained by a European Central Bank that focused on price stability and fiscal policy was not much of an option. The second shock of the Sovereign Debt Crisis was endogenous to the Euro area and it, more than the Global Financial Crisis revealed the original weaknesses and fragility of the European monetary union. This financial fragility quickly translated into declines in aggregate demand and economic underperformance.

This paper addresses the question "Why has Europe grown more slowly than the U.S.?" The time period for this comparison is the last 20 years and the focus is economic growth. Recall that on January 1, 1999, the Euro was introduced to the world global markets as an accounting currency, replacing the former European Currency Unit. On January 1, 2002, 12 European countries replaced their national currencies with Euros and several others followed later. Achieving monetary integration for a subset of countries already integrated economically as a European Union, was driven primarily by the macroeconomic doctrine that, under certain conditions, a common currency contributes to economic growth.

[1] Anastasios Malliaris: Department of Economics and Department of Finance; Mary Malliaris: Department of Information Systems and Supply Chain. Both at Loyola University Chicago, Quinlan School of Business, Schreiber Hall, 16 East Pearson Street, Chicago, Il, 60611.

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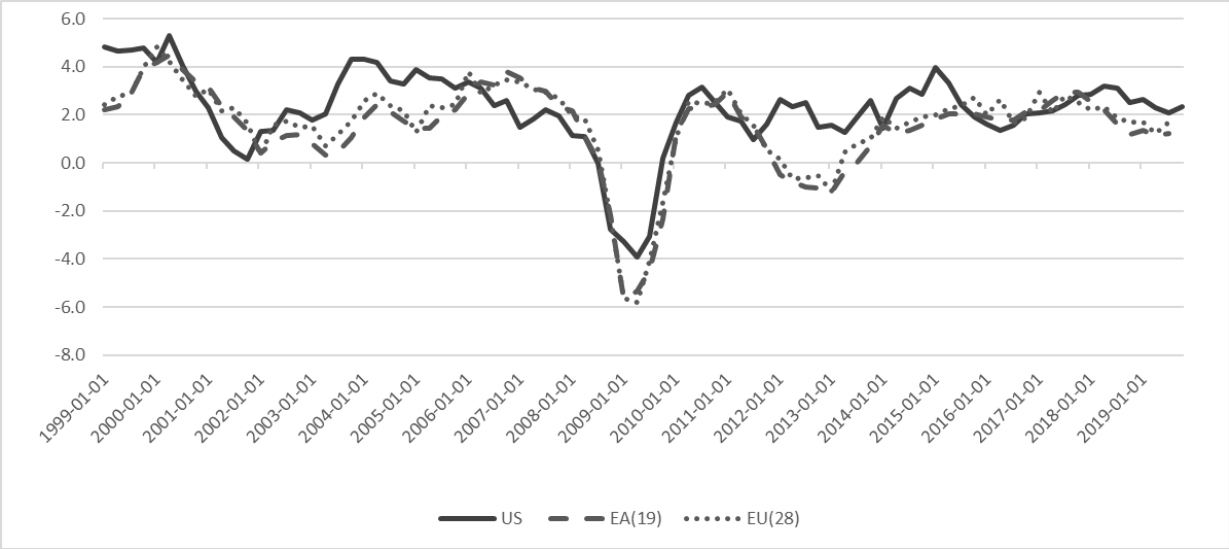
This paper presents selective evidence that economically Europe has grown more slowly than the U.S. and then we offer basic explanations. The evidence is selective and is presented in 3 graphs that follow. We acknowledge that a more exhaustive list of criteria could offer additional insights.

When we talk about Europe, we refer to two main groups of countries: The European Union (EU) and the Euro area, also called the Eurozone. The EU began as the European Economic Community and it was created by the Treaty of Rome in 1957 with only 6 members. Then, the EU grew to include 28 countries as members. Today, after Brexit, it has 27 members that include: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Portugal, Slovakia, Slovenia, Spain, Denmark, Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, and Sweden.

Among the 27 EU member countries, 19 have chosen to adopt the Euro as their common currency. These members have the European Central Bank (ECB) as the bank that conducts their common monetary policy with a primary emphasis on price stability. The 8 countries that belong to the EU but do not currently use the Euro are Denmark, Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania and Sweden.

In view of these two groups of European countries, economic data about Europe are grouped into two categories: European Union (27) and Euro area (19). Both groups are dynamic and evolving institutions. New members are added or exit at various times, for example Brexit. So, data require continuous statistical adjustments and are accompanied by stating the number of countries that are included in the appropriate calculations.

In our three graphs we evaluate quantitatively the growth performance of Europe (the two specific groups we have just described) versus that of the U.S. Graph 1 illustrates quarterly percent change from current to year ago of Real, Seasonally Adjusted GDP for the U.S., EU (28 with Great Britain included) and Euro area, EA (19). From Graph 1, we draw 3 basic observations. First, EU (28) and the EA (19) follow very similar patterns, with minor differences. Second, between these two groups the EU (28) grows faster than the EA (19).

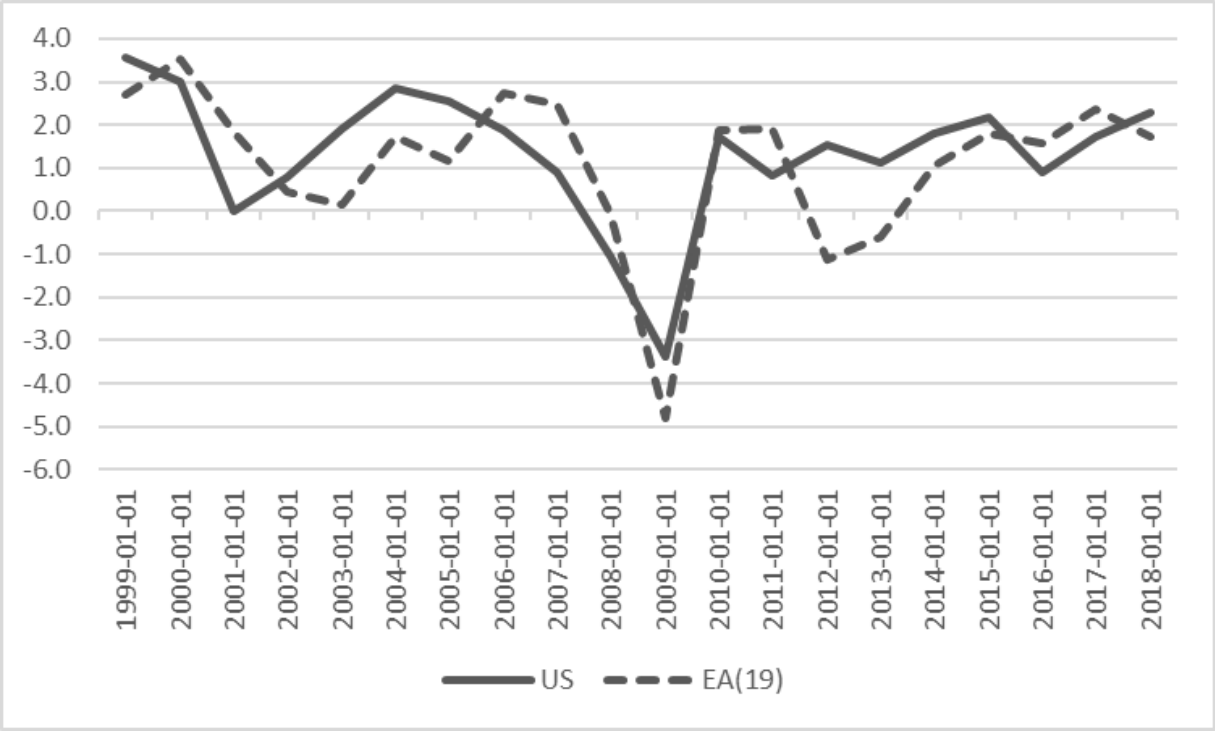


Graph 1. Comparisons of Quarterly Percent Change from Year to Year ago of Real Seasonally Adjusted GDP for the U.S., EU (28 with Great Britain included) and EA (19)[2]

Third, the U.S. performs better overall than both EU (28) and the EA (19), although the graph illustrates short intervals with these two groups doing better than the U.S. For example, in the early 2001-02, 2006-08, 2011-12, and 2015-17 periods, Graph 1 indicates slower growth for the U.S. However, the line that denotes U.S. growth appears to be above the corresponding growth of the other two groups for a larger portion of time. Calculations for the continuously compounded annual growth rate show that during the 1999 to 2019 period, the U.S. rate is 2.06%, the EU (28) rate is 1.56% and the Euro area (19) rate is 1.36%. This evidence supports the conclusion that during the past 20 years the U.S. economy, on grounds of real GDP growth, has outperformed Europe.

Graph 2 gives the per capita, annual, real GDP for the U.S. and the EA (19) for about the same period. Note that the most recently available data to the Euro area cover 2018. By construction, these data are much less volatile than the ones in Graph 1 and suggest that per real capita GDP for the Euro zone is not growing as fast as the real per capita GDP of the U.S. Furthermore, since both the U.S. and the Euro area have about the same population, around 340 million, the

[2] Graph 1 is produced by the authors from the Federal Reserve Economic Data (FRED) of the Federal Reserve Bank of Saint Louis. FRED recognizes Eurostat and the U.S. Bureau of Economic Analysis as sources of original data.



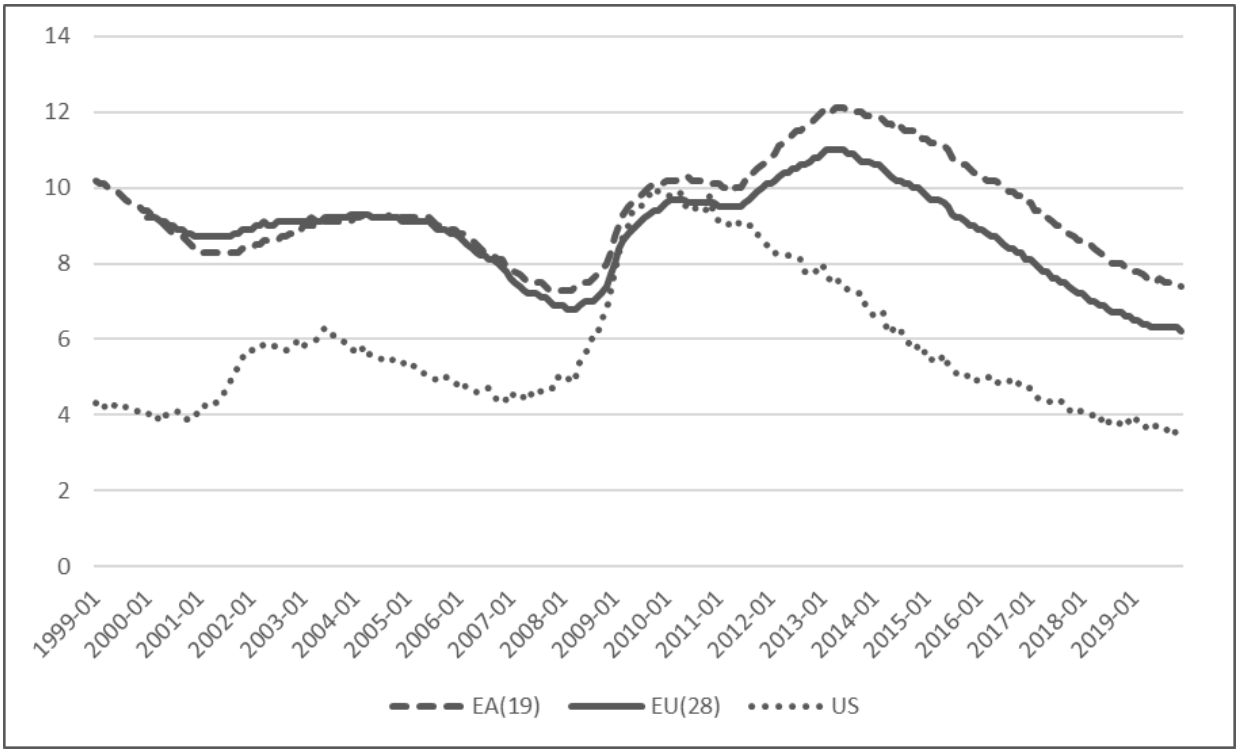
Graph 2. Per capita Real Annual Percent Change in Gross Domestic Product for the U.S. and the Euro area (19 countries)[3]

difference between their real per capita GDP measured in U.S. dollars is widening. Calculations from the data presented in Graph 2 show that for the 2000 to 2018 period, the continuously compounded annual, real growth rate of per capita income for the U.S. is 1.21% versus .94% for the Euro area. This is added confirmation in favor of the U.S.

Graph 3 gives another measure for the comparison between the performance of the U.S. economy and the two European groups. Economic reasoning suggests that countries with high levels of unemployment compared to natural rates of 4% to 5% for modern developed countries, forego potential economic growth. Graph 3 demonstrates that compared to the U.S., where unemployment is impacted by the business cycle but returns back towards its natural rate during periods of recovery and expansion, both EU (28) and EA (19) experienced high levels of persistent unemployment. Actually, some members of these groups reached significantly high

[3] This graph is also produced by the authors from FRED. FRED acknowledges credit for the original data to the U.S. Bureau of Economic Analysis and the World Bank.

levels of unemployment (not shown graphically), such as during August 2013 when unemployment in Greece rose to 27.6%, in Spain to 26.2% and Italy to 12.3%. Unemployment for 2019 averaged 7.5% in the Euro area compared to 3.7% in the U.S.



Graph 3: U.S., EU (28), Euro area (19) unemployment rates for the period 1999-2019[4]; The source of this graph is the OECD data.

This high level of unemployment in Europe is further confirmation that the U.S. has outperformed Europe in terms of broad economic measures.

I. Contribution and Overview

The 3 graphs presented support the assertion that the U.S. economy has outperformed the EU and in addition they highlight the quantitative impact of both the Global Financial Crisis (GFC) first, and the Sovereign Debt Crisis (SDC) that followed. This is not a surprise since the GFC of 2007-09 has been described as the worst crisis since the Great Depression of the 1930s. Graph 1 demonstrates that declines in real GDP were larger for both European groups than the U.S.

[4] The authors produced this graph from OECD data collected from several sources including the Bureau of Labor Statistics.

economy. Also, unemployment increased to around 10% for the U.S., EU (28) and EA (19) during 2007-2009. But in mid-2009, the U.S. started recovering while both European groups entered the second crisis. Graph 1 clearly highlights the double-dip recessions of both EU (28) and EA (19). The European SDC that peaked during 2010-12, contributed decisively to Europe's underperformance and further increased unemployment. Both during the GFC and in particular during the European SDC, the EA (19) underperformed the EU (28). The contribution of this paper consists in offering a narrative of the impact of these two financial crises on the economic and monetary integration of Europe.

We proceed in 4 steps: first, we review why Europe moved to a single currency? Second, we discuss the early performance the Euro. Third, we evaluate the impact of the GFC and connect it to the European SDC, and finally we conclude by assessing the main causes of underperformance of the European economy.

II. Why did Europe move to a Single Currency?

This essential question is motivated by the evidence presented in the 3 graphs. They illustrate that during the GFC and also during the European SDC the EA (19) underperformed economically in relation to the EU (28). Certainly, this unexceptional economic performance could not have inspired the creation of the Euro. To explain why Europe moved to a monetary integration, we need to describe what the expectations for the creation of a single currency were, and what went wrong need. Searching for answers takes us to past periods, prior to the last two decades.

The chronology of European economic and monetary integration is rich in momentous developments, intergovernmental conferences, pieces of legislative initiatives, treaties and countless economic reports. The Werner Report (1970) recognized the importance of financial developments as drivers of trade and growth 50 years ago. These included inflation, interest rates and exchange rates. The Report argued that "Economic and monetary union will make it possible to realize an area within which goods and services, people and capital will circulate freely and without competitive distortions. The implementation of such a union will effect a lasting improvement in welfare in the Community and will reinforce the contribution of the Community to economic and monetary equilibrium in the world." (Werner Report (1970, p.9).

The global economic problems of the first energy crisis of 1973-74 brought recession, inflation and high interest rates in the U.S. and Europe that lasted for several years. Europe during this difficult period made modest progress towards monetary integration. The Single European Act of 1986 was the first major revision of the Treaty of Rome that proposed the forming of a Single Market by the end of 1992. The Delors Report (1989) was inspired by the recovery of Europe and the U.S in the early 1980s and boldly advocated an economic and monetary union. Logically, it was argued that a Single Market would lead to a Single Currency. This was proposed in the Maastricht Treaty of 1992.

The interface between meticulous economic reasoning and intense political negotiations that took place after the Delors Report for a Single Market and the convergence towards a Single Currency can briefly be summarized in three main economic arguments. First, there is a natural economic complementarity between a Single Market and a Single Currency. A Single Market promotes competition, lowers prices, increases efficiency and leads to better financial decisions by firms. These benefits decrease in an environment of multiple national currencies if sudden and sizable changes occur in exchange rates among member countries. A Single Currency eliminates such risks, reduces uncertainty and contributes to economic growth.

Second, sudden and sizable shocks from outside the Single Market, such as an oil price increase or increases in U.S. interest rates, may lower the vulnerability of national members, if they belong within a Single Market that also adopts a Single Currency. Experience during the years of the oil crisis in mid-1970s and later in the mid-1980s, when U.S. interest rates skyrocketed, showed that the Deutsche Mark had suffered significant volatility. It was reasoned that a single currency, representing a much larger single market than just one national economy, might be less vulnerable.

The third argument addressed the goal that a Single Market also promoted free capital flows within member countries. There was strong agreement that a unified European financial market with free capital flows would work best with a single currency. It was argued that allocation of capital within a single market with a single currency would be more efficient, increasing investments and contributing to growth. Such efficiencies would be created by eliminating currency convertibility and hedging costs and reducing financial uncertainty from the convergence of prices and interest rates.

These arguments were discussed and debated during the decade of the 1980s and early 1990s. Academics, such as Eichengreen (1991) argued that, according to the theory of optimum currency area, if financial shocks impact all member countries symmetrically and if there is a high degree of factor mobility among them, then it is optimal to adopt a common currency. This paper also evaluated labor mobility and the incidence of shocks in Europe by comparing them with similar measures for Canada and the U.S. The conclusion was that Europe remains further from the ideal of an optimum currency area than the hypothetical currency unions of Canada and the U.S. Beyond numerous academic studies about a single currency, organized labor in Germany and other major European members of the Single Market, policy makers and political leaders, all appeared to favoring the prospect of a Single Currency for the economic and political future of Europe.

Thus, as a consensus was shaping about a Single Market with a Single Currency mainly during the 1980s, a totally unpredictable event of colossal political significance occurred. In November 1989 the Berlin Wall fell. Among numerous historical consequences, it paved the way for German reunification in 1990 between West Germany and the German Democratic Republic (East Germany). This unification proceeded without detailed blueprints, lasted over 20 years, cost West Germany 2 trillion Euros and impacted the role of Germany in the monetary integration of Europe. Germany became immersed in the reunification undertaking, adopted softer fiscal and monetary policies imposed by political and economic realities, and welcomed other countries, such as France, to play a more active role in European monetary integration.

With the Maastricht Treaty[5], officially called the Treaty of the European Union, signed on February 7, 1992, Europe announced its enthusiastic pursuit for a single currency, the Euro. The well-known Maastricht criteria included rules that determine whether a country was ready to adopt the Euro as its national currency. The Maastricht criteria included targets or rules for inflation, limits for budget deficits, national debt, interest rates, and exchange rates. Once countries joined the monetary union, their national currency was replaced by the Euro and exchange rate fluctuations ended. The ECB has as its main goal price stability and as its main tool, short-term interest rates. Thus inflation across member countries is under the responsibility of the central bank. Public sector debt and deficits remained the primary responsibility of

[5] Published as Treaty on European Union, signed at Maastricht on 7 February 1992 in the Official Journal of the European Communities, C191, Volume 35, 29 July 1992.

national governments. To enforce national discipline there are no provisions for the lender of last resort function for national governments that face fiscal challenges.

We can now formulate a brief answer to the question raised in this section. Europe chose a common currency after the economic benefits of its creation had been debated economically and politically. Benefits included elimination of exchange rate fluctuations, supplementing the Single Market with a Single Currency and promoting free capital movements across member countries, with all these benefits in turn contributing to a more efficient capital allocation and more rapid growth. In addition, political circumstances developed that were tremendously favorable for implementing the Euro strategy. Adding the creation of the ECB and authorizing it to pursue monetary stability using interest rate policies and calling national governments to adopt deficit and debt limits was thought at the time to be the best that political and economic realities could allow.

Thygesen (2016), a distinguished academic at the University of Copenhagen and a Member of the Delors Committee on European Monetary Union, eloquently elaborates that there "were clear omissions in the framework agreed upon, some deliberate and some due to lack of foresight that was most avoidable. There was excessive optimism regarding the ability or willingness of national governments to accept the constraints of being part of a single currency area and more basic disagreements on what kind of fiscal underpinnings were required". The next 2 sections review early Euro performance and later difficulties when the twin crises appeared.

III. The Early Performance of the Euro: 1999-2007

The goal of economic and monetary union was achieved with the introduction of the Euro on January 1, 1999. On that date the national currencies of member countries ceased to exist independently and their exchange rates were locked at fixed rates against the Euro and indirectly each other. The notes and coins of the old currencies remained as legal tender until the Euro replaced them all on January 1, 2002. The first day the Euro traded in Foreign Exchange markets was Monday, January 4, 1999, closing at approximately U.S. $1.18.

Eleven nations adopted the Euro on January 1, 1999. They were Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain. Greece became the 12th Member state to adopt it on January 1, 2001.

To evaluate the performance of the Euro during 1999 to the end of 2007, we consider certain criteria: First, the creation of the Euro was the culmination of a very long, complex, and challenging process. It progressed in cycles of optimism and disappointment as a steadily increasing number of member countries moved from a customs union to a single market and then to a single currency. The rapid review in section II described the Maastricht Treaty as the foundation for economic and monetary union. Annexed to this Treaty was the Statute of the European System of Central Banks and the creation of the ECB. A precursor to the ECB was founded, named the European Monetary Institute, to prepare the way for establishing the main functions and monetary policies of the central bank to follow. Numerous decisions were made for the selection of countries participating in the single currency, the determination of exchange rates between national currencies and the Euro, the introduction of new financial instruments denominated in Euros, the establishment of the ECB, the launching of new Euro and much more. We now know that the years of preparation for a single currency from 1992 to 1999 as well as the functioning of the Euro evolved successfully and damaging debacles were avoided. The establishment of credible institutions and the multitude of technical decisions proceeded successfully.

Second, the Euro brought several immediate benefits. Transaction costs occurring in the exchange of one national currency for another, say buying German Deutsche Marks and paying with French Francs were eliminated. Salvatore (2002) suggests that the estimated annual savings were about $30 billion per year. More importantly, the excessive volatility of national currencies impacted by country specific economic and financial shocks, was eliminated with the introduction of the Euro. The elimination of national currency volatility reduced financial uncertainty and contributed to increased direct investments in the Eurozone. More generally, the Euro reduced the cost of borrowing both among Euro members but also internationally since it was viewed as a stable global currency.

Third, the Euro brought financial stability. The stability of the Euro as a preferred currency qualification can be traced to the promise given by the architects of the European monetary integration that “the Euro will be as strong as the Deutsche Mark”.

Trichet (2009) offers key statistics to support the stability of the Euro. For example, the average annual inflation rate during the Euro’s first decade was 2.2%, exactly equal to the

average annual inflation rate in Germany in the 1990s (before the Euro's adoption). Additionally, the average annual inflation rates in Germany in the 1980s were 2.9% and in the 1970s were 4.9%. Trichet also notes that the 2.2% average annual inflation rate just cited, was somewhat above the European Central Bank's inflation target of 2%. However, when one takes into account that during that period, economic conditions were turbulent with crude oil prices moving from a low of $20 in December of 2002 to a high of $90 in December of 2007, the 2.2% record is quite satisfactory.

Considering inflation expectations, the ECB succeeded during the first decade of the Euro to anchor them at levels consistent with price stability. In addition, the Euro's stability engineered by successful monetary policies driven by its independence and commitment to price stability, were also confirmed by financial markets. Trichet cites the example of the 30-year and 50-year Euro-denominated government bonds that were priced by financial markets to yield 4.1%.

Fourth, the Euro, from its adoption to the beginning of the GFC contributed to economic convergence in the Euro area. Economists distinguish between different types of economic convergence. Three broad areas are considered: nominal convergence of interest rates and inflation rates; real convergence of income levels, productivity, employment and other real macroeconomic variables; and, convergence of business cycles and financial cycles. The theoretical underpinnings of such convergences express an evolution of the national economies towards uniformity and symmetry that reduce possible conflicts for monetary policy. For example, if certain member countries have high inflation and interest rates with slow growth while others have low inflation and interest rates with moderate growth, then a uniform monetary policy cannot simultaneously operate to benefit both groups. Studies by Franks et al. (2018) and also by Marelli et al. (2019) carefully address issues of convergence in the Euro area. Franks documents early successes during1999 to 2007 but with major disruptions after the GFC. Graph 3 gives a visual illustration of unemployment convergence between EU (28) and EA (19) prior to the 2007-09 crisis and how dramatically this convergence was upset and worsened by the two shocks of the twin crises.

Fifth, contrary to the skepticism of some well-known economists, such as Feldstein (1997), the Euro succeeded in its first decade to quickly advance and become the second most successful global currency after the U.S. Dollar. It outperformed the Japanese Yen, the British Pound

Sterling, the Australian Dollar, the Canadian Dollar and the Swiss Franc, among other. Salvatore (2002) shows that the Euro started in its first year 1999 with a 12.5% share among currencies in official holdings of foreign exchange reserves and ended in 2007 with a 25% share. Put differently, while the Euro began by replacing the Deutsche Mark that had attained in its last year 1998 a 12.1% share, it steadily increased its international status as a global currency to double its share by 2007.

The analysis in this section supports the argument that the European monetary union with the celebrated introduction of a common currency worked efficiently and numerous procedural issues were executed well. The eminent example is the establishment and operation of the ECB and the rise of the Euro to the second position as a global currency after the U.S. Dollar. However, these developments did not translate to faster real GDP growth for the Euro area. In particular, the Euro area did not experience faster economic growth than the EU (28). Together, EA (19) and EU (28) underperformed the U.S. during certain intervals but the opposite also occurred during the first decade of the Euro. Finding reasons for this underperformance during the early years of the Euro is challenging. The second half of the period under examination offers more conclusive explanations. This is presented next.

IV. The Twin Big Shocks

This section examines the GFC of 2007-09 and the SDC of the Euro area as it searches for reasons to explain the economic underperformance of Europe compared to the U.S. during the last 10 years. Both crises were significant economic and financial shocks and have been investigated in great detail. In this section we offer the broad consensus views of these two crises that portray the GFC originating in the U.S. and then spreading to Europe and elsewhere to become truly a global crisis, while the SDC was strictly a European crisis.

The consensus views also address the responses to the GFC by both the U.S. and Europe and the responses to the SDC by the EA (19). The U.S. responded faster and more substantially to the GFC compared to the Euro area. The Euro area was restricted institutionally by financial and fiscal constraints that delayed rapid and timely measures to reduce the impact of the SDC. Thus, the narrative that emerges is this: since 2007, the U.S. had only one crisis and it responded quickly and effectively to contain it, while the Euro area had two shocks with less effective responses. Consequently, Europe's underperformance can partially be attributed to these two

shocks and the responses of policy makers. This narrative is presented in a little more detail below.

The GFC began as a subprime mortgage lending problem when housing prices started declining in late 2006 and 2007. As housing prices continued to decline, eventually up to 30%, derivative products whose prices were contingent on housing values also declined, often in an accelerated pace. So, the financial crisis evolved to become one of the worst financial disasters since the Great Depression. There were several components. First, there were microeconomic factors, including excessive subprime lending, financial innovation, and increasingly complex and opaque derivative and structured securities, inadequate and inaccurate risk management strategies, poorly designed financial deregulation, inadequate credit evaluation by rating agencies and by credit originate-to-distribute models of banking, and finally, reduction in ethical standards.

Second, macroeconomic factors also played an important role, such as a relatively easy monetary policy during 2004-07, a global savings glut, excessive housing credit availability at low interest rates, low down payments, and high leverage. Economists such as Jorda, Schularick, and Taylor (2015) describe asset bubbles caused by such factors as leveraged bubbles.

Third, the shadow financial sector, including financial intermediaries that, like banks, facilitate the creation and allocation of credit, also impacted the crisis. The lending activities of the shadow financial sector are not regulated with the same objectives and tools as banks. Examples of such financial entities or activities include investment banks, hedge funds, special purpose entities, mutual funds, insurance firms, asset management, and structured investment vehicles, among others. Two large investment banks that belong to the shadow financial sector, namely Bear Stearns and Lehman Brothers failed in 2008. They were financing much of their long-term less-liquid real estate investments with short-term and more liquid funding through selling commercial paper. Bear Stearns stock was trading at $93 a share in February 2008 and by mid-March the insolvent firm agreed to be taken over by JPMorgan for $2 a share. The Lehman Brothers commercial paper market dried up in early September 2008, and after certain attempts to be bought by another financial institution failed, it declared bankruptcy on September 15, 2008. At that point nearly the entire commercial paper market valued at approximately $500

billion dried up and the Federal Reserve bought the American International Group for $85 billion on September 16, 2008 to prevent a complete financial meltdown.

All this quickly impacted the real economy. According to the National Bureau of Economic Research, the Great Recession started shortly after the subprime mortgage problems in December 2007 and lasted until June 2009. During this period, more than 15 million workers were permanently displaced from their jobs, the unemployment rate increased from 4.8% to 10%, and real GDP dropped by 4% from its previous cyclical peak during the 4th quarter of 2007 to the trough of the 2nd quarter of 2009. Also, the S&P 500 declined from its peak of 1561 on October 12, 2007 to 676 on March 9, 2009, a drop of 57%. These dramatic economic and financial developments created an urgency for devising suitable monetary and fiscal policies to tackle the crisis.

The bankruptcy of Lehman Brothers on September 15, 2008 was particularly difficult for the Fed because the achievement of stable employment growth and low inflation, during the long period from the mid-1980s to 2008, had given it much credibility for stabilizing the U.S. economy. It had also validated the use of fed funds as a tool to achieve its dual mandate. So when unemployment reached a high of 10% during the Great Recession, the Fed's objective function had to prioritize targeting unemployment over inflation. The importance of job creation as the primary goal of the unconventional monetary policy is expounded in Baghestani (2008), Evans (2010), and Kuttner (2018).

During September 2008, fed funds were between 1.75% and 2%. Three months later, during December 2008, fed funds had fluctuated between 0% and 0.25%. This great tool during normal monetary policy over several decades had reached the zero level and was of no further use. In late 2008, the Fed decided to use an unconventional method to stimulate the U.S. economy constrained by the zero lower bound of fed funds. These tools included the so called Large-Scale of Asset Purchases (LSAP) or Quantitative Easing (QE). The tool of QE consists of the Federal Reserve purchasing longer-term U.S. Treasury securities and agency mortgage-backed securities (MBS) with the aim of driving down longer-term interest rates, thereby stimulating economic activity.

Bernanke (2009, 2012) argues that QE works via the portfolio balance channel. This channel proposes that different classes of financial assets are not perfect substitutes in portfolios formed

by investors. If the Fed can purchase large quantities of a certain asset and influence its price and therefore its yield, such changes in these assets may, through arbitrage transactions, spread to other asset classes. Gertler and Karadi (2015) offer evidence on the nature of the monetary policy transmission mechanism and Williams (2011) reviews the early empirical evidence of the effectiveness of the unconventional monetary policy.

Pieces of the unconventional monetary policy modeling evolved gradually. Bernanke (2012) and Kuttner (2018) discuss the progression of QE in detail. It was not known at the beginning how many rounds of QE would be necessary for the restoration of financial stability and economic recovery in the real economy. Today, with the benefit of historical experience we know that the Fed executed 3 main rounds of QE that ended in late 2014.

QE1 was announced by the FOMC on November 25, 2008. The plans were for the Fed to purchase $600 billion of Mortgage Backed Securities (MBS) and Agency Debt. The strategy was officially implemented on December 15, 2008. It was extended on March 18, 2009 when the FOMC announced the purchase of an additional $750 billion of MBS and $300 billion of Treasuries. The plan was concluded by December 2009, about a year later.

QE2 was announced by Chairman Bernanke in his Jackson Hole speech on August 27, 2010 and officially implemented in early November 2010. QE2 consisted of $600 billion of Treasury Bonds purchases. On September 21, 2011, the FOMC announced plans for purchasing $400 billion of longer-dated Treasuries by selling shorter-dated ones. This was known as Operation Twist. This Program was extended by an additional $267 billion on June 20, 2012.

QE3 was announced by the FOMC on September 2012. It did not specify the total amount but indicated monthly purchases of $40 billion of MBS. This amount was increased by another $45 billion of purchases of Treasuries on December 12, 2012. This monthly amount of Large Scale Asset Purchases of $85 billion consisting of both MBS and Treasuries continued for all of 2013 and was tapered gradually over 10 months prior to its termination on October 29, 2014. Bernanke (2015) gives a detailed narrative of monetary and fiscal initiatives during this period and Malliaris et al. (2016) expand the consensus narrative by considering behavioral dimensions of the crisis.

How did the GFC that began in the U.S. move to Europe? One fundamental fact of the 21st Century is that global financial markets are very well integrated. The collapse of Lehman Brothers and the rescue of the largest U.S. insurance company, AIG, the following day, created enormous volatility in global financial markets. Banks in both the U.S. and Europe faced large asset write-downs, increased counterparty risks and skyrocketing demand for liquidity. Liquid assets were sold at fire-sale prices and disorderly deleveraging spread to shadow banking. Working capital was disrupted, bank lending standards were tightened, real activity in investments, production, consumption and global trade were all reduced and stock markets crashed. While all these financial activities were moving extremely rapidly, housing prices in the U.S. and certain European countries continued to decline. Ireland, Spain and the United Kingdom, that had undergone housing booms prior to the GFC, experienced large declines in residential investments. In addition, and very special to the Euro area, was the fact that the lowering of interest rates during the 2000 to 2007 years produced huge loan demand from Greece, Ireland, Portugal, Spain and even Italy that was financed by German, French and other banks from advanced economies of the Euro area. The GFC suddenly stopped such lending and this affected the value of these loans as risk premia increased. All 3 graphs and the two tables below illustrate that the Great Recession in the U.S., EU (28) and EU (19) occurred, almost simultaneously and overlapped substantially.

The World Economic Outlook by the International Monetary Fund (2009) offers a comprehensive analysis of the GFC and clearly illustrates the global character of the crisis. It also documents that the impact of the GFC on Europe was more substantial than that on China or certain large developing countries such as India or Brazil. The Outlook also describes that Europe was slow to arrive at a coherent policy response. The European Economic Recovery Plan[6] called for discretionary fiscal measures initiated mostly at the national level of a 1.5% of the Euro area GDP or € 200 billion stimulus over 2 years. The same report indicates that the ECB had already cut interest rates during 2008 and signaled that additional cuts may be considered in the future. Trichet (2009) describes how the Governing Council of the European Central Bank lowered the key interest rates by 2.25% between October 2008 and January 2009.

[6] Commission of the European Communities, 2008, Communication from the Commission to the European Council: A European Economic Recovery Plan, Brussels 26.11.2008.

Country	Average	Annual							
	1994-2003	2004	2005	2006	2007	2008	2009	2010	2011
United States	3.3	3.5	3.1	2.7	1.9	-0.3	-3.1	2.4	1.8
Euro Area	2.2	2.2	1.7	3.2	3.0	0.4	-4.4	2.0	1.4
Germany	1.5	0.7	0.8	3.9	3.4	0.8	-5.1	4.0	3.1
France	2.2	2.5	1.8	2.5	2.3	-0.1	-3.1	1.7	1.7
Italy	1.7	1.7	0.9	2.2	1.7	-1.2	-5.5	1.8	0.4
Spain	3.6	3.3	3.6	4.1	3.5	0.9	-3.7	-0.3	0.4
Netherlands	2.9	2.2	2.0	3.4	3.9	1.8	-3.7	1.6	1.1
Belgium	2.3	3.3	1.8	2.7	2.9	1.0	-2.8	2.4	1.8
Austria	2.4	2.6	2.4	3.7	3.7	1.4	-3.8	2.1	2.7
Greece	3.5	4.4	2.3	5.5	3.0	-0.2	-3.3	-3.5	-6.9
Portugal	2.7	1.6	0.8	1.4	2.4	0.0	-2.9	1.4	-1.7
Finland	3.8	4.1	2.9	4.4	5.3	0.3	-8.5	3.3	2.7
Ireland	6.9	4.4	5.9	5.4	5.4	-2.1	-5.5	-0.8	1.4
Slovak Republic	4.4	5.1	6.7	8.3	10.5	5.8	-4.9	4.2	3.3
Slovenia	4.1	4.4	4.0	5.8	7.0	3.4	-7.8	1.2	0.6
Luxembourg	4.4	4.4	5.4	5.0	6.6	0.8	-5.3	2.7	1.6
Estonia	5.7	6.3	8.9	10.1	7.5	-3.7	-14.3	2.3	7.6
Cyprus	4.3	4.2	3.9	4.1	5.1	3.6	-1.9	1.1	0.5
Malta	…	-0.5	3.7	3.1	4.4	4.1	-2.6	2.5	2.1

Table 1. Annual Percent Change in Real GDP for U.S. and EA (17) during 2004-2011[7]. The first column reports averages of Annual Percent Changes in Real GDP during 1994-2003.

Trichet describes this as an "unprecedented reduction in such a short period" that was taken because there were no risks of inflationary pressures, confirming the price stability mandate of the ECB.

Table 1 gives detailed data about the performance of the U.S. Economy vs. the Euro Area (17), before, during and after the GFC. This Table offers three important insights. First, for the period of 1994-2003, the U.S. outperformed the Euro Area with 3.3% vs. 2.2% average annual rate of real GDP change. Second, the Great Recession brought declines of -.03% in 2008 and -3.1% in 2009 for the U.S. vs. 0.4 and -4.4% respectively for the Euro area. Third, all 17 members

[7] The authors constructed this table from extensive data presented in the original source: International Monetary Fund. World Economic Outlook, October 2012: Coping with High Debt and Sluggish Growth, (page 191).

of the Euro area experienced declines in 2009, ranging from a low of -1.9 for Cyprus to a high of -14.3% for Estonia. Further declines occurred for some European members during 2010 and also

Country	Average	Annual							
	2001-10	2011	2012	2013	2014	2015	2016	2017	2018
United States	1.7	1.6	2.2	1.8	2.5	2.9	1.6	2.4	2.9
Euro Area	1.2	1.6	-0.9	-0.3	1.4	2.1	1.9	2.5	1.9
Germany	0.9	3.9	0.4	0.4	2.2	1.7	2.2	2.5	1.5
France	1.3	2.2	0.3	0.6	1.0	1.1	1.1	2.3	1.7
Italy	0.3	0.6	-2.8	-1.7	0.1	0.9	1.1	1.7	0.9
Spain	2.2	-1.0	-2.9	-1.7	1.4	3.6	3.2	3.0	2.6
Netherlands	1.4	1.5	-1.0	-0.1	1.4	2.0	2.2	2.9	2.6
Belgium	1.6	1.8	0.2	0.2	1.3	1.7	1.5	1.7	1.4
Austria	1.5	2.9	0.7	0.0	0.7	1.1	2.0	2.6	2.7
Ireland	2.8	0.3	0.2	1.4	8.5	25.1	3.7	8.1	8.3
Portugal	0.7	-1.7	-4.1	-0.9	0.8	1.8	2.0	3.5	2.4
Greece	1.8	-9.1	-7.3	-3.2	0.7	-0.4	-0.2	1.5	1.9
Finland	1.7	2.6	-1.4	-0.8	-0.6	0.5	2.8	3.0	1.7
Slovak Republic	4.9	2.8	1.7	1.5	2.8	4.2	3.1	3.2	4.1
Lithuania	4.3	6.0	3.8	3.5	3.5	2.0	2.4	4.1	3.5
Slovenia	2.7	0.9	-2.6	-1.0	2.8	2.2	3.1	4.8	4.1
Luxembourg	2.7	2.5	-0.4	3.7	4.3	3.9	2.4	1.5	2.6
Latvia	3.8	6.4	4.0	2.4	1.9	3.0	2.1	4.6	4.8
Estonia	3.4	7.4	3.1	1.3	3.0	1.8	2.6	5.7	4.8
Cyprus	3.3	0.4	-2.9	-5.8	-1.3	2.0	4.8	4.5	3.9
Malta	2.0	1.3	2.8	4.6	8.7	10.8	5.7	6.7	6.8

Table 2. Annual percent change in Real GDP for U.S. and EU (19) during 20011-2018[8].

during 2011. In particular, during 2011 Greece continued its unprecedented decline of -6.9%. Also Portugal recorded a -1.7% decrease in its real GDP, while Italy and Spain had very low growth. Actually, since the International Monetary Fund revises and updates data, Table 2, produced in 2019, shows that in 2011, Greece had -9.1%, Spain had -1%, and Portugal -1.7% (same in both tables) change and in 2012 and 2013 the Euro area experienced its SDC. What caused it?

[8] Source: International Monetary Fund. World Economic Outlook, October 2019.

Baldwin et al. (2015) carefully formulate a consensus narrative. They thoroughly describe how certain periphery countries such as Greece, Ireland, Italy, Portugal and Spain borrowed heavily during the 2000-2007 period from banks in Germany, France, and the Netherlands, as discussed earlier. This lending financed aggregate demand and growth in these periphery countries and when the GFC was triggered by the Lehman Brothers' bankruptcy, global liquidity dried up almost immediately and these loans stopped. Two immediate consequences followed: first, with lower aggregate demand, some economies experienced recessions in 2008 and 2009. Simultaneously, the lending banks were faced with nonperforming loans and liquidity risks. So, while shadow banks in the U.S. had invested in subprime mortgages and mortgage backed securities whose values were determined by housing prices that were declining, major European banks had made substantial loans whose values depended on the ability of peripheral members to pay substantially increased interest rates.

These same Eurozone banks were also heavily invested in their own nation's public debt. This created a new problem endogenous to the Euro area, namely the sovereign-bank loop. This loop began by transmitting a shock from a periphery country such as Greece, Ireland, Italy, Portugal and Spain that experience a deterioration of sovereign creditworthiness. Banks that held such sovereign debt immediately suffered a drop in the value of their sovereign debt holdings. But this value reduction in the banks' holdings endangered the bank's perceived solvency, and reduced lending pursuits. Deteriorating bank conditions put pressure on domestic governments to bail out these banks and further reduced government creditworthiness. Concurrently, reduced lending by banks and increased deterioration of domestic governments' solvency impacted negatively the real economy and lower tax revenues.

Brunnermeier et al. (2016) call this "the Sovereign-Bank Diabolic Loop" and have developed a model to describe it analytically. Baldwin et al. (2015) describe a narrative of how this loop began with Greece's announcement in spring 2010 that its 2009 government deficit was revised to 15.4% of its GDP, up from the previously reported 13.6% and its government debt was 126.8% (instead of 116%) of its GDP. They also trace the Greek Bailout of May 2010, the Irish bailout of November 2010, the Portuguese bailout of May 2011 and connect these to the banking sector via the contagion spreads, defined as the difference between national 10-year government bond yields and those of Germany in percentage points. Lane (2012) also studies the dynamics

between of the European sovereign debt crisis and the banking crisis and concludes that "the origin and propagation of the European sovereign debt crisis can be attributed to the flawed original design of the euro. In particular, there was an incomplete understanding of the fragility of a monetary union under crisis conditions, especially in the absence of banking union and other European-level buffer mechanisms. Moreover, the inherent messiness involved in proposing and implementing incremental multicountry crisis management responses on the fly has been an important destabilizing factor throughout the crisis". Lane (2012, p. 65).

V. Conclusions

There were several reasons for the formation of the European Union and its evolution from a customs union to a single market and a monetary union with a single currency for a subset of the members. One, perhaps the most significant, is the achievement of a stable economic growth measured versus the U.S. economy that represents the desired conversion at some distant future point. We asked the question: did Europe grow more slowly than the U.S. in order to motivate some numerical comparisons, but more importantly to suggest possible drivers of underperformance.

When we focus on the first 20 years of the Euro, from 1999 to 2019, we realize that such a period of two decades is too short for splendid conclusions. Nevertheless, we split this period into two approximate decades and examine the performance of three benchmarks: the real GDP quarterly performance, the annualized real per capita changes and unemployment. These illustrate that the underperformance of Europe is more evident during the second decade.

Searching for causes we find that the GFC was an exogenous shock to the EU but its impact was large in both the U.S. and the EU. One major reason is that the U.S. responded quickly and aggressively both fiscally and via an unconventional monetary policy. The Euro area was constrained by an ECB that focused on price stability and fiscal policy was not much of an option. The second shock of the SDC was endogenous to the Euro area and it, more than the GFC revealed the original weaknesses and fragility of the European monetary union. This financial fragility quickly translated into declines in aggregate demand and underperformance.

Both the exogenous GFC and the endogenous SDC gave the Euro area the opportunity to introduce reforms for financial stability by addressing both banking and fiscal fragilities. The protagonists of monetary union from the Werner Report (1970) to Maastricht (1992) labored under powerful constraints that today's criticisms cannot remove. With a rich institutional heritage on economic and monetary integration, the recent twin crises offer the EU a great opportunity to fix existing reasons of economic and financial instabilities, so its potential economic growth may be achieved in the future.

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