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The European Central Bank, the Euro, and Global Financial Markets

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European monetary union, thought by many to be a pipe dream when first proposed in 1969, became a reality in 1999. After decades of debate over whether a single currency was feasible for Europe, scholars are now focusing on the more immediate question of whether monetary union has made Europe better or worse off. The euro was launched as an electronic currency and accounting unit in January 1999, and has been in circulation since January 1, 2002, in Germany, Austria, Belgium, Spain, France, Finland, Greece, Ireland, Italy, Luxembourg, the Netherlands, and Portugal. Three European Union member countries—Denmark, the United Kingdom, and Sweden—have not introduced the euro. The population of the euro zone is slightly larger than that of the United States, while U.S. GDP per capita is about 1½ times that of the euro zone.

The euro zone is likely to be expanded eventually to 22 countries by the addition of the ten new member states that joined the European Union on May 1, 2004: Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia. These countries currently participate in a (probationary) exchange-rate mechanism known as European Monetary System II. Bulgaria and Romania are currently termed "acceding countries" and are expected to join the European Union in 2007, while possible countries for future accession include Turkey, Macedonia, Croatia, Albania, Bosnia and Herzegovina, Serbia, Montenegro, and Kosovo.

The euro has had some successes. The European Central Bank (ECB) has managed monetary policy in a way that has treated a 2 percent rate of inflation as

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a target level, and inflation has exceeded this rate only slightly. European interest rates are probably lower than they would have been had the German Bundesbank remained the predominant central bank in Europe. The euro is second only to the U.S. dollar in use and importance in international money and capital markets, which is an impressive statistic for a currency which has only been in circulation for four years.

But a strong case can be made that European monetary union has thus far proven to be no more than the sum of its parts.[1] The euro is less widely used than the combination of European currencies—the German mark, French franc, Italian lira, Dutch guilder, and so on—that it replaced. Some countries have benefited from the euro, most visibly those with lower costs of issuing government debt, while others have suffered under policies designed for the European Union as a whole rather than their own economic circumstances.

The fundamental issue is that European economic integration is built on a group of countries each of which wants to stay largely as it was before integration. Although monetary union is now a reality, many citizens in Europe are still grappling with the question of how truly unified they care to be—as exemplified by the French and Dutch votes that blocked ratification of the proposed European Union constitution in summer 2005. European institutions like the European Central Bank are more like additions to the original member country institutions, rather than new constructions that efficiently take on European economic policy making. The European Central Bank is subject to the same tension that exists for all European institutions, a desire for more integration combined with reluctance to cede national political control. Europe's economy has been little affected by monetary union because the distribution of power among those in charge of European monetary policy decision making, and the implementation of those decisions, remains too highly decentralized to take advantage of the possible gains. It should come as no surprise, therefore, that the performance of the European economies has not changed dramatically with integration and that the global role of the euro is not much different than the combination of currencies that it has replaced. Although the euro has not mattered much so far, it also hasn't been under severe political or financial stress yet, and there are reasons for concern as to how well it will function when severe macroeconomic or financial shocks eventually occur.

[1] There is a vast literature on the prehistory of European economic and monetary union with discussions of what was likely to happen; for examples, see Flam (1992) and Bean (1992) in this journal, or Kenen (1995). A related literature considered whether monetary union was likely to be a good idea; for examples, see Wyplosz (1997) and Feldstein (1997) in this journal.

The European Central Bank as an Institution

History

The conception of an economically unified Europe is an astonishing development from a historical perspective. After all, France and Germany and other European nations went to war with each other three times in the 75-year period from 1870 to 1945. European leaders became convinced that the only way to secure a lasting peace was to unite economically and politically. The first step in this direction was the integration of coal and steel industries in the early 1950s. In 1957, with the signing of the Treaty of Rome, the European Economic Community and the European Atomic Energy Community were established. Twelve years later in December 1969, the European Economic Community decided to make economic and monetary union an official goal of European integration.[2] A group chaired by Pierre Werner—at the time the Prime Minister of Luxembourg—was given the task of drawing up a report on how this goal might be reached by 1980. The group submitted its final report, an ambitious plan that would result in full liberalization of capital within Europe and a new single currency in October 1970. Indeed, this plan envisioned fiscal as well as monetary union. The first stage of the plan, which involved a narrowing of intra-European currency fluctuation margins, was launched just as the Bretton Woods exchange rate system collapsed and world currency markets went into turmoil. The timing could not have been worse and the fledgling monetary union project was brought to an abrupt halt.[3]

At the instigation of France and Germany, efforts to coordinate monetary policy and stabilize exchange rates were renewed in March 1979, with the creation of the European Monetary System, based on the concept of fixed but adjustable exchange rates. The currencies of all the member states, except the United Kingdom, participated in the exchange rate mechanism. The principle was that exchange rates were based on comparisons with the European Currency Unit or ECU, a European unit of account, which was a weighted average of the participating currencies. A grid of bilateral rates was calculated on the basis of exchange rates for national currencies expressed in terms of ECUs, and currency fluctuations had to be contained within a margin of 2.25 percent either side of the bilateral rates (with the exception of the Italian lira, which was allowed a margin of 6 percent).

After ten fairly successful years of the exchange rate mechanism, a new push was made to achieve monetary union. This effort culminated with a report and the

[2] Dyson and Featherstone (1999) provide a comprehensive analysis of the political and economic process that led to European economic and monetary union.

[3] In March 1972, the Europeans attempted to restart monetary union by creating the "snake in the tunnel": a mechanism for the managed floating of currencies (the "snake") within narrow margins of fluctuation against the dollar (the "tunnel"). But the snake of managed exchange rates was thrown off course by the oil crises, the weakness of the U.S. dollar, and the differences in national economic policy. It lost most of its members in less than two years and was finally reduced to a "mark" area comprising Germany, Belgium, Netherlands, Luxembourg, and Denmark. See Gros and Thygesen (1992) for further discussion.

so-called Delors proposal in 1989, which included the creation of a new, completely independent institution, the European Central Bank or ECB, which would be responsible for the common monetary policy. The Delors approach to monetary union (which was codified in the Treaty of Europe) included a precise timetable which was (to the surprise of many) largely followed. The first stage of the plan mainly involved the elimination of all restrictions on within-European capital movements, as well as the creation of greater separation between central banks and governments. Specifically, central banks were prohibited from offering overdraft facilities to public authorities and public undertakings, and public authorities were prohibited privileged access to other financial institutions.

In stage two of the plan, which took place on January 1, 1994, member states were to make significant progress towards economic convergence in both monetary and fiscal policies. A European Monetary Institute, whose task was to strengthen cooperation between the national central banks and to carry out the necessary preparations for the introduction of the single currency, was also established. Stage three was to be European monetary union for all but Denmark and the United Kingdom, who obtained opt-out clauses allowing them the choice to remain outside the euro zone.

In a striking example of déjà vu, European currency markets went into crisis in 1992, just as they had in the early 1970s during the first push toward monetary union. Markets did not believe that the quasi-fixed European Monetary System exchange rates were sustainable given the disparate economic situations across European countries; for example, France was in recession, while Germany was in the midst of unifying. The British (who had only joined the European Monetary System in 1990) and the Italians were the first to be forced to break away from the agreed-upon exchange rate zones and to allow their currencies to depreciate in September 1992. The Irish punt, the Portuguese escudo, and the Spanish peseta all soon were allowed to depreciate as well. During summer 1993, the French franc also came under strong pressure, and European Union governments responded by changing the rules to allow exchange rates in the future to fluctuate by up to 15 percent on either side of their central rates, in place of the 2.25 percent band that had previously prevailed. Doubt was once again cast on the feasibility of European monetary union.

In a display of amazing (or some might say reckless) resolve, after surviving the currency turbulence in 1992 and 1993, European leaders stayed the course toward monetary union. The European Central Bank was established in 1998 and the new European currency, the euro, was officially launched on January 1, 1999.

Internal Structure and Mandate of the European Central Bank

The constitution of the European Central Bank is contained in an annex to the Maastricht Treaty of 1993. The European Central Bank is part of the European System of Central Banks, along with the national central banks of all member states of the European Union. Governors from national banks inside the euro zone (meaning that Britain, Denmark, and Sweden are not included, since they have not

adopted the euro) take part and are responsible for euro-zone monetary policy decisions. The headquarters of the European Central Bank is in Frankfurt, Germany.

According to its founding law, the primary objective of the European Central Bank is unequivocally stated as price stability, with economic growth as a (decidedly) secondary objective. Specifically, Article 105 of the Maastricht Treaty defines that "the primary objective of the ECB shall be to maintain price stability" and that "without prejudice to the objective of price stability, the ECB shall support the general economic policies in the Community." This mandate is in contrast to the U.S. Federal Reserve, which has a multiple mandate of price stability, full employment, and moderate long-term interest rates.[4] The European Central Bank has the exclusive right to authorize the issue of banknotes and coins; however, the national central banks handle the technical aspects of euro issuance. The European Central Bank's other tasks include conducting foreign exchange operations, the holding and management of official foreign reserves, the promotion of the smooth operation of payment systems, and the collection of statistical information necessary for fulfilling its tasks. Importantly, no provision was included in the Maastricht Treaty for the European Central Bank to act as a lender of last resort in the case of financial crisis, nor does the European Central Bank have supervisory powers over European banks—both of these roles are still held by the national central banks or other national authorities.

The main decision-making body of the European Central Bank is the Governing Council, which includes the twelve governors of the national central banks and six members of what is called the Executive Board. The Executive Board includes the president and vice-president of the ECB, and four members that are appointed "on the basis of professional merit and monetary/banking experience." The heads of state of the member countries appoint members to the Executive Board, though the process is a secretive one. Viewed from the outside, the appointments seem to be based on implicit quotas, so that three or four members of the Executive Board are from the four large countries (Germany, France, Italy, and Spain) with the small countries fighting over the remaining slots. The procedure does seem to select people set in a common mold. According to Giavazzi and Wyplosz (2004), "[T]hey all currently come from successful careers in their own national central banks. They share a penchant for caution and secrecy, a distance from the markets' logic and from the latest academic thinking."

The Executive Board is responsible for day-to-day management and the implementation of Governing Council policy decisions. The Maastricht Treaty states that Governing Council policy decisions, in turn, be made by simple majority, meaning that the preferences of the twelve national central bank governors, who are appointed by their respective national governments, dominate the decision

[4] This U.S. Federal Reserve mandate is in section 2A of the Federal Reserve Act (dispersed throughout 12 USC; ch. 6, 38 Stat. 251, December 23, 1913). See ⟨http://www.federalreserve.gov/generalinfo/fract/sect02a.htm⟩.

making. Neither the European Parliament nor the Executive Board have a say in (or veto power over) appointments of national central bank governors.

In December 2002, the Governing Council decided to limit the number of voting rights of the Governors of the European Central Bank to 15, through the use of a tiered rotation system, which would take into account the likely problems that would arise with euro-zone enlargement. Under the new system, governors will continue to participate in all meetings of the Governing Council, regardless of whether they hold a voting right. The rotation system was designed to ensure that the governors with the right to vote would be from member countries which, taken together, are representative of the euro zone's economy as a whole. In practice, this will mean that the governors of the larger countries (which form the first tier of the rotation system) will vote more frequently than governors of smaller countries. Of course, expanding the representation of the governors from its current twelve up to 15 dilutes the power of the Executive Board further. In contrast, the Open Market Committee of the Federal Reserve has twelve votes, of which a majority of seven are the centrally appointed members of the Federal Reserve Board of Governors and a rotating group of five are presidents of the regional Federal Reserve banks.

The normal frequency of Governing Council meetings is every two weeks; in contrast, the Federal Reserve's Open Market Committee has only eight scheduled meetings per year. The first meeting of the month for the Governing Council is typically devoted to evaluating whether interest rates need to be adjusted and the second meeting is left open for discussion of other tasks of the Eurosystem, including portfolio management of official foreign reserves and oversight of the operation of the payment system.

A few days prior to the Governing Council meetings, members receive a copy of the "Orangebook" (named for the color of its cover) prepared by the European Central Bank's chief economist, which provides an analysis of euro-zone economic and monetary conditions and, importantly, a policy recommendation. The Governing Council self-describes its monetary policy decisions as being made by consensus (which may or may not be the same as the simple majority rule suggested by the Treaty), so that there is no "formal" voting record. For comparison, the Fed's Open Market Committee on the Thursday preceding a Tuesday meeting receives the "Greenbook," which contains the staff's analysis and forecasts of economic conditions, and just before the meeting committee members receive a "Bluebook," which updates economic conditions and lists policy options, but never provides policy recommendations (Pollard, 2003).

The European Central Bank was established as an independent institution, presumably in part because of the vast academic literature arguing that political independence is essential if a monetary authority is to make sound policy decisions. Article 107 of the Maastricht Treaty establishes the political independence of the European Central Bank. Executives of the European Central Bank are not to seek or take instructions from any other institution or government body, European or national, and the European governments are not to seek to influence the decision-

making bodies of the European Central Bank. Lengthy nonrenewable terms in office are another way to encourage independence. The terms of office for central bank members are for eight years and are nonrenewable. Members of Germany's Bundesbank Directorate, which serve a similar role as the ECB Executive Board, also have eight-year nonrenewable terms. Members of the U.S. Federal Reserve Board of Governors are appointed for much longer, 14-year nonrenewable terms; also, new members can be appointed to serve the remainder of a term if a Governor resigns early, and then can be appointed for a full 14-year term of their own.

Given that the European Central Bank was *designed* to be independent, it is ironic that much of the criticism leveled at the ECB revolves around the perception that it is excessively independent and undemocratic. The ECB does not publish or invite comments on its proposed decisions. It provides immediate information (via a press conference) about its policy decisions, though it does not provide the rationale for its decisions. In contrast, the analogous U.S. policy-making body, the Federal Reserve Open Market Committee, provides in its press releases a description of any policy change, the vote, the names of any dissenters, and their preferred policy action. Every year the European Parliament has passed a resolution calling on the ECB to publish minutes of the Governing Council meetings. The Governing Council has always declined to do, although they have indicated that minutes may eventually be released after a 20-year (!) lag. The European Parliament gives advice on appointments to the Executive Board of the European Central Bank, but has no veto power over appointments, no authority over the governors of the national central banks, few powers of persuasion (as highlighted by debate over the releasing of the minutes), and no power to change the laws governing European Central Bank. Indeed, the charter of the ECB can only be changed with the unanimous consent of the signatories to the Maastricht Treaty and ratification of the changes by the national parliaments.

But the failure to publish minutes may be a symptom of a deeper issue; Buiter (2004) suggests that the current practice of not releasing the voting record of the Governing Council may provide members cover for nationalistic voting preferences. The official rationale for not publishing this information is that confidentiality will protect individuals from pressure to vote in line with narrow national interests, but confidentiality can cut in other directions as well. Meade and Sheets (2002) argue that the monetary policy decisions of the European Central Bank from 1999 to 2001 are consistent with national central bank governors voting in line with their national interests. (Interestingly, this pattern also holds true for policy decisions of the Federal Open Market Committee, which are found to be in line with governors' regional interests.)

European Central Bank independence must be viewed in the context of an institution where a large majority of the members of the Governing Council are appointed in a highly decentralized fashion. The structure of the European System of Central Banks most resembles the German Bundesbank, which in turn, resembles the U.S. Federal Reserve System. The ECB was modeled on the Bundesbank, both because Germany had a large influence on its design, and because of the

perception that the Bundesbank represented "best practice" among the European central banks. One important difference between the ECB (and the Bundesbank) and the Fed, however, is that power at the Governing Council resides with the national banks, whereas power at the Fed resides with the Governors (and not the regional Federal Reserve banks). The current, highly centralized, power structure of the Fed Open Market Committee, on which only five of the Federal Reserve bank presidents vote at any one time, was not created until 1933—20 years after the establishment of the Federal Reserve. It was not until the 1935 Amendment to the Federal Reserve Act that the regional Federal Reserve banks were prohibited from conducting independent open market operations (Wynne, 1999). Friedman and Schwartz (1963) make the case that the decentralized distribution of power in the early decades of the Federal Reserve led to inappropriate and overly contractionary monetary policy decisions, which in turn may have precipitated, and certainly prolonged, the Great Depression. The ECB should take this experience as a cautionary tale.

The greater decentralization of the European Central Bank is also reflected in its relatively small staff; around 700 staffers at the ECB, compared with over 20,000 for the Bundesbank and 16,000 for the Bank of France. Although the number of national central bank staff has fallen since 2000, the euro zone still packs 16.1 central bankers for every 100,000 of the population, compared with 6.8 per 100,000 in the United States and 3.1 per 100,000 in the United Kingdom (*Central Bank Directory 2006*, 2005).

The decentralized distribution of power at the ECB does not make it inherently inefficient. Indeed, a case can be made that because the national central banks have local knowledge and accountability, they may be in a better position to manage and implement monetary policy than a more centralized institution. A case could even be made that a more decentralized organization will foster competition between regions for best practice. There is little evidence to date that decentralization has led to bad policy outcomes for euro-zone countries. There is also little evidence of competition among national central banks (or national governments) leading to improvements in euro-zone policy making. It is worth remembering that European governments, not the national central banks, are the ones that pushed for monetary union. In this context, it is remarkable that there is not more friction between the national central banks and the ECB. A reluctance to confront this friction may well explain why the ECB has not made more strides to centralize. The concern is whether this approach will continue to be appropriate when European capital markets and banking systems become more integrated (a process that monetary union will presumably foster). Centralized financial surveillance and crisis management will be needed once pan-European financial markets develop, yet the institution that seems most suited for this task, the ECB, currently has no jurisdiction to do so.

The role of the European Central Bank as the representative of European monetary interests is still evolving and is at times awkward. For example, the ECB represents Europe at some parts of the G-7 meetings of finance ministers and

central bank governors (from the United States, Canada, Japan, France, Germany, the United Kingdom, and Italy); at other parts of these meetings, the national central banks of France, Germany, and Italy join the proceedings and the president of the ECB leaves (Truman, 2005). There is no European representative of the European fiscal authorities because there is no euro-zone fiscal authority. The United Kingdom attends European economics and finance minister meetings but is not a participant in the euro zone; however, it is a full-fledged member of the G-7. The euro zone also has a president, known as Mr. Euro, who represents the interests of the euro zone at certain international meetings.

The European Central Bank does not formally answer to any one institutional body (or perhaps answers to too many). Thus, the president of the ECB presents the annual monetary report to four different groups: the European Parliament; European economics and finance ministers; the European Commission (the executive branch of the European Union); and the European Council (European heads of state).

The Maastricht Treaty

Widespread violations of the Growth and Stability Pact in the aftermath of the Maastricht Treaty vividly illustrate that Europe's national governments are willing to pursue their desires to run unfettered national macroeconomic policies. (In the context of the rejection of the European Constitution in 2005, it is worth remembering that the Maastricht Treaty itself barely came into effect: it was initially rejected by Danish voters (the Danes later approved a modified version of the treaty which exempted them from, among other things, joining the euro zone) and only just squeaked through with a "yes" vote of 50.5 percent in France in 1992.)

The Maastricht Treaty laid out four criteria that countries must meet to become eligible to join the euro zone. First, a country's inflation rate was not to exceed the average inflation rate (measured with the consumer price index) of the three best- performing member states by more than 1.5 percent. Second, long term interest rates (measured using long-term government bonds) were not to exceed by more than 2 percentage points the average of the three best-performing member states. Third, the exchange rate of a country's currency must have stayed within the normal margins provided for by the exchange rate mechanism, for at least two years, without devaluing against the currency of any other member state. Fourth, a country's government-deficit-to-GDP ratio must not exceed 3 percent and its ratio of government debt to GDP must not exceed 60 percent. The official wording of the fiscal prudence criteria allows for some flexibility. It allows a breach of the reference value for the budget deficit if the figure has declined substantially and is approaching the reference value, or if circumstances are such that divergence is thought to be "exceptional and temporary." The public-debt criterion can be exceeded if the ratio is falling and approaching the reference value steadily. After countries join the euro zone, they are supposed to continue to adhere to the fiscal prudence criteria through the provisions of the 1997 Stability and Growth Pact.

Indeed, under the pact, national governments that violate the 3 percent deficit rule were to be fined up to one-half percent of GDP.

However, violations of the Stability and Growth Pact have been widespread. In 2000, one year after the euro was launched, five of the eleven countries in the euro zone (Greece joined the euro zone in 2001) were in violation of the public debt rule. A strict interpretation of the pact is clearly not being imposed; in 2005, the three largest euro-zone economies—France, Germany, and Italy—were out of compliance with both the budget deficit and public debt rules. No fines were imposed as a consequence of these violations. Instead, the Stability and Growth Pact was revised in 2005 to allow more flexibility for countries in the midst of structural reforms or business cycle downturns.

For the European Central Bank, the failure of countries to abide by the Stability and Growth Pact illustrates that even after European countries had agreed to certain elements of a common macroeconomic policy, the countries followed their perceived national interests nonetheless. The failure to follow agreed-upon rules for fiscal policy suggests that the decisionmakers in the member countries look first at what policy suits their own country, and only second at what policy suits Europe as a whole. This breakdown of fiscal coordination within the euro zone makes the ECB's job of setting euro-zone-wide monetary policy all the more complicated. In apparent response to the lack of enforcement of the Stability and Growth Pact, in November 2005 the ECB stated that it would only accept member government securities with a rating of A– or above as collateral in its refinancing operations (described in detail in the next section).

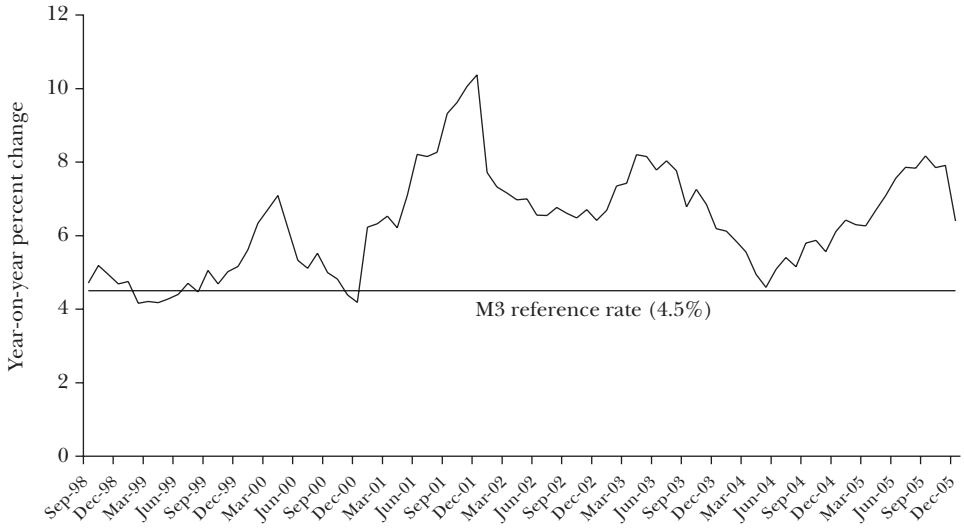
European Central Bank Policy

The European Central Bank came into being during a particularly volatile period for global financial markets and has succeeded in creating a stable euro-zone money market. Criticisms of the European Central Bank come from both directions: both that it has run an overly loose monetary policy and allowed inflation to exceed the bank's stated targets, and also that it has run an overly tight monetary policy without sufficient attention to unemployment rates and economic growth. But on both sides, the complaints are only mild ones. Overall, the ECB deserves good marks for its performance to date.

European Monetary Policy

The most controversial element of the monetary policy strategy of the European Central Bank is the role assigned to the growth of monetary aggregates, specifically a reference value of 4.5 percent for annual M3 growth. Of course, the money supply is useful as a policy target only if a stable link exists between the money supply and inflation. In the U.S. economy, the relationship between the money supply and rate of inflation was fairly stable during the 1960s and 1970s, but then the relationship became volatile and uncertain during the 1980s, at which

Figure 1
Euro-Zone Money (M3) Growth Rate



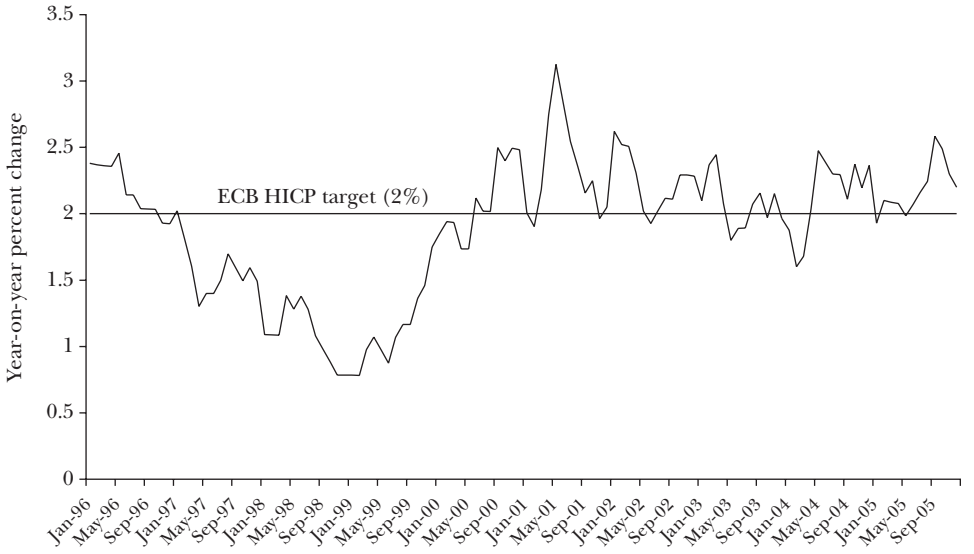
Source: European Central Bank.

time the Federal Reserve switched away from targeting monetary aggregates. However, the German Bundesbank successfully followed a monetary targeting regime and Germany was presumably keen for the ECB to continue its tradition.

The money growth rule (originally described as the "first pillar") is nearly impossible to implement, as Cecchetti and O'Sullivan (2003) point out. The European Central Bank defines M3 to include only currency deposits and marketable financial instruments *held by euro-zone residents*, which requires the ECB to know the identity of the ultimate owners of the relevant instruments, a non-trivial task. In any case, and to its credit, there is little evidence that the ECB has, in fact, put much weight on monetary aggregates in its monetary policy decisions. Figure 1 shows that the euro-zone M3 growth rate (year-to-year percentage changes) exceeded its reference value of 4.5 percent continuously since 2001. Euro-area M3 growth averaged 6.4 percent from 1999 though 2005.

The second (and curiously less controversial) pillar of the ECB's monetary policy involves monitoring a range of indicators, such as wages, price indices, and business confidence. The two pillars are used to maintain an inflation target for the euro zone of less than 2 percent per year. Figure 2 shows the euro-zone measure of inflation over the period 1996 through 2005. Inflation generally exceeded the 2 percent target after 2000. In practice, the ECB has behaved as if 2 percent were the midpoint of its inflation range, not the ceiling. It is notoriously difficult to measure inflation, and because the index tracked by the ECB (the harmonized index of consumer prices, which attempts to measure inflation in a common way across the euro-zone countries) excludes the housing costs of owner-occupiers, the index may

Figure 2
Euro-Zone Inflation
(based on the harmonized index of consumer prices)



Source: ECB Monthly Bulletin.

well understate the true rise in the cost of living. Calculations by the OECD suggest that if owner-occupied housing costs were added in, average inflation in the euro zone in 2004 would have been 2.7 percent, rather than the published 2.1 percent. An alternate view, based on the conjecture that European statistical agencies do not fully take into account quality improvements in goods and services in their calculations of cost of living, is that euro-zone inflation is overstated.

The main way the European Central Bank provides liquidity to the market is through open market operations, known as "refinancing operations," which are conducted according to a pre-arranged schedule on a weekly and monthly basis. In practice the ECB (through the national central banks) gives banks reserves in exchange for securities, and then reverses the transaction. The ECB also provides overnight loans to banks at the "marginal lending rate."[5] One of the main motivations for banks to borrow from the ECB is to satisfy their minimum reserve levels, which require banks to hold a level of deposits at their national central bank equal to 2 percent of their outstanding loans. These reserve requirements are said to have

[5] Technically, the Governing Council determines the "spread" between the marginal lending rate and the target refinancing rate. In practice, the marginal lending rate has been set at 100 basis points above the refinancing minimum bid rate (European Central Bank, 2004). By way of comparison, the federal funds rate in the United States plays a role similar to the refinancing rate, and the U.S. discount rate (which is set at 100 basis points above the federal funds rate target) is largely equivalent to the ECB marginal lending rate.

been imposed at the German Bundesbank's insistence, but unlike the Bundesbank, the national central banks pay interest on these bank deposits (as well as on deposits of overnight funds beyond those required to meet the minimum reserve requirements).

The Governing Council makes the day-to-day and longer-term monetary policy decisions, but the national central banks actually undertake the monetary operations. Indeed, refinancing operations are done simultaneously by all the national central banks in the euro system in combination with over 500 counterparty institutions, using a wide range of government securities (the list of acceptable collateral differs by country). The case for more efficient liquidity provision, via a more centralized process, is easy to make when one considers the complexity of the simultaneous operations that currently take place. Presumably the rationale for the current arrangement is based on the European principle of subsidiarity, which says decisions should be made at the lowest possible level of political authority. The current decentralized system for open-market operations in the euro zone can certainly be explained by politics, but not by economic efficiency.[6]

Quite apart from the logistics of European monetary policy, some critics feel that the objectives given to the European Central Bank are inappropriate. The ECB sets interest rates with a primary objective of controlling inflation, with no explicit objective for employment, growth, or exchange rate stability. However, empirical evidence suggests that the European Central Bank has been more concerned about employment than might be expected given its mandates. One gauge of the relative weights a central bank places on price stability versus economic growth is to calculate a "Taylor rule" regression (Taylor, 1993). In such a regression, the dependent variable is the target interest rate i_t^*, the two explanatory variables are the n-period-ahead annual expected inflation rate π_{t+n}^e, and the expected output gap $(y_t^e - \bar{y})$ (the difference between expected output and potential output, with a positive gap implying output above potential), and there is also a constant term.

Thus, the Taylor-rule interest rate satisfies the equation:

$$i_t^* = \alpha + \beta(\pi_{t+n}^e) + \gamma(y_t^e - \bar{y}).$$

In this regression, the parameter β on the expected inflation rate measures the central bank's preference for lower inflation; that is, if beta is greater than one, an increase in inflation causes the real interest rate to rise. The coefficient γ is the weight put on adjusting to cyclical variation in the economy. The Taylor rule does not prescribe specific weights for inflation and economic growth; instead, it provides a framework for measuring how the policy preferences of a certain central bank respond to inflation and output gaps.

A number of studies have found that Federal Reserve policy gives weight both to inflation and output in recent years. In comparison, the European Central Bank

[6] Alesina and Perotti (2004) discuss the difficulties for European Union centralization more broadly, which are typically viewed as encroachments upon national competencies.

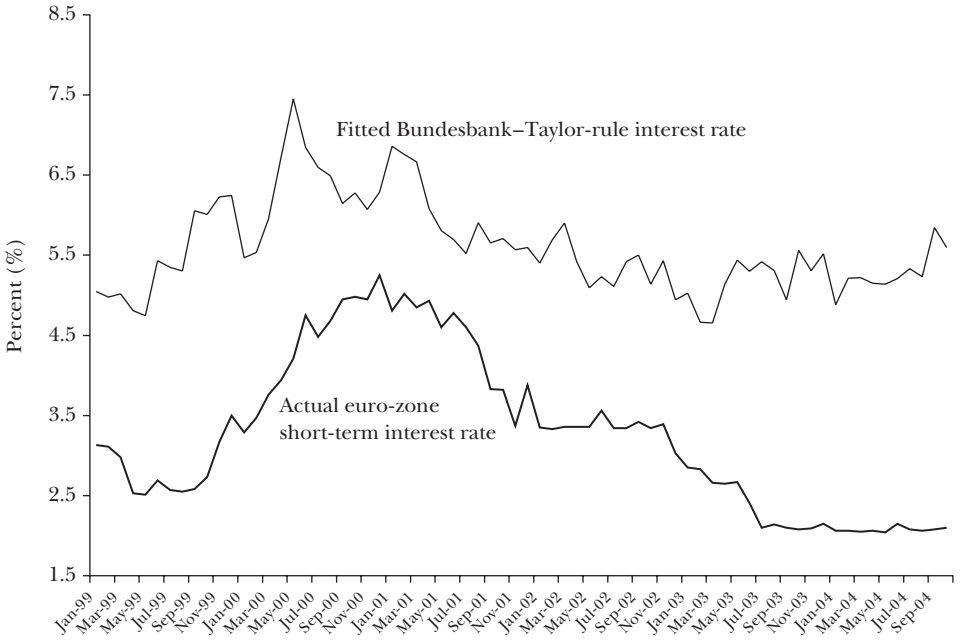
has actually maintained interest rates at lower levels than would have been prescribed by a Taylor rule weighted toward low inflation. One way to see this is to compare ECB interest-rate policy with the interest rates that the Bundesbank (which was revered for its inflation-fighting stance) would have set, had it taken over monetary policy for Europe. Figure 3 shows the fitted (target interest rate) values from a "Taylor rule" regression for the period since 1999 based on the weights on inflation and growth maintained by the German Bundesbank over the period 1985–98. The figure also includes the actual short-term, euro-zone interest rate that has been in place over the period 1999–2005.[7] The fitted Bundesbank Taylor-rule interest rate shown in Figure 3 consistently exceeds the actual euro-zone interest rate, suggesting that the ECB has either focused less on inflation (or focused more on the output gap) than the Bundesbank would have done.

The European Central Bank must implement policies for the entire euro area, despite differences among countries in preferred policies and differing sensitivities to policy changes. In the mid-1990s, before the euro became established, short-term interest rates varied substantially across the euro-zone countries; after 1999, short-term interest rates in these countries became virtually identical. Unsurprisingly, the unusually low interest rates set by the ECB in the early years were criticized as inappropriate for regions of Europe with possible bubbles in their property values, and the relatively high recent interest rates have been criticized as hampering economic growth for some of the larger countries. But some complaints of this sort are inevitable when a common monetary policy is imposed on a large zone comprised of different regional economies. Further, after only a few years of the euro, it requires heroic assumptions to attribute growth differentials across euro-zone countries directly to ECB policies.

Although the existence of the euro means that nominal exchange rates are fixed within Europe, differences in inflation across countries can still affect real exchange rates. For example, Germany's low domestic inflation has made the country's exports relatively cheap, while higher rates of domestic inflation in Greece and Spain make their exports relatively expensive. Lane (this issue) documents the dispersion and persistence of inflation differentials among the euro-zone countries. Labor market rigidities in Europe aggravate real divergences by failing to allow wages to adjust to local circumstances. Duval and Elmeskov (2005) provide evidence that European structural reforms of labor and product markets have

[7] The parameter values for β and γ are from Faust, Rogers, and Wright (2001) who estimate $\beta = 1.31$, $\gamma = 0.18$, and an interest rate smoothing parameter (reflecting that current-period interest rates depend on the interest rate in the previous period and the target interest rate) of .91 for the Bundesbank over the period 1985–98. The data used in the regression that underlies Figure 3 are from the European Central Bank, Datastream, and Eurostat. The interest rate is the Frankfurt call money "day to day" interest rate, inflation is the yearly growth rate of the harmonized index of European Union (EU) consumer prices, and the output gap is measured by the percent deviation of log EU industrial production from a quadratic trend. An alternative approach, taken in Gerdesmeier, Mongelli, and Roffia (2005), is to directly estimate the Taylor-rule parameters for the ECB. They find evidence that the ECB places weight on both inflation and economic growth.

Figure 3
Comparison of Fitted "Taylor Rule" Interest Rates (Based on Bundesbank Preferences) and Actual Euro-Zone Interest Rates



Source: Author calculations, Datastream, Eurostat, and ECB.
Notes: "Fitted Bundesbank–Taylor-rule interest rate" is the interest rate that would have existed if the ECB had followed the Bundesbank's monetary policy regime (1985–98). Fitted values are based on regression estimates using Bundesbank weights on inflation and growth from Faust, Rogers, and Wright (2001). The actual short-term interest rate is the Frankfurt call money "day-to-day" interest rate, which is virtually identical to other euro-zone short-term interest rates.

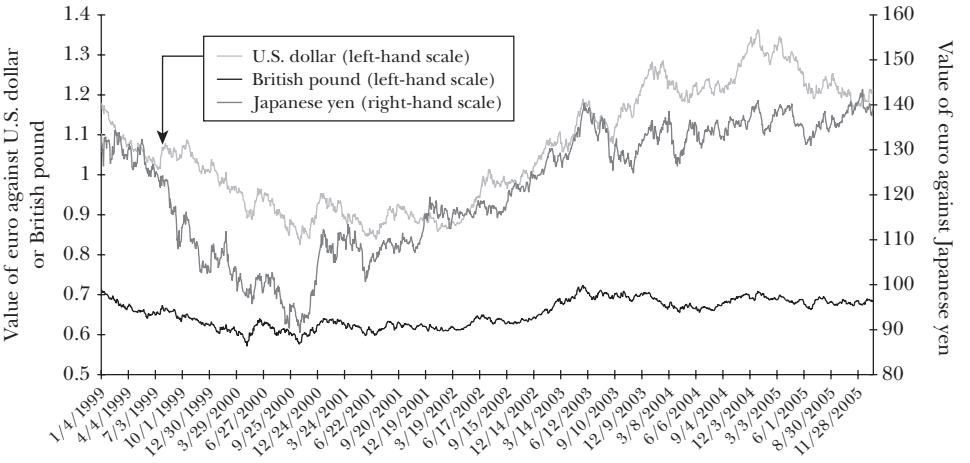
slowed rather than increased in recent years. The fiscal prudence criteria discussed earlier, if adhered to, make things worse by limiting the ability of governments to use national fiscal policy to counteract recessions that affect one member state more than the others.

European Exchange Rate Policy

The main economic rationale for a single European currency was to deepen economic integration among its members by reducing the costs of cross-border commerce, encouraging cross-border mergers, improving price transparency, increasing competition, and eliminating exchange rate risk. Before monetary union, the focus was on the rates at which the pre-existing national currencies would be turned into euros. After January 1, 1999, the focus quickly changed to the value of the euro relative to other non-European currencies, especially the U.S. dollar.

Figure 4 shows the bilateral euro nominal rates relative to the U.S. dollar, the British pound, and the Japanese yen over the period 1999 through 2005. On the

Figure 4
Euro against Major Currencies



Source: Datastream.

day it was launched, the euro was worth $1.17. The value of the euro then steadily declined over the first year, and by late January 2000 the euro fell below dollar parity, an insignificant threshold in terms of economics, but one that evoked strong reactions from European politicians. This general pattern—a weakening of the exchange-rate value of the euro after 1999 followed by a strengthening—holds even if we use a more rigorous method for calculating the real exchange rate, comparing the euro to a trade-weighted average of currencies of the euro area's main trading partners and deflating the currencies by the consumer or producer price index. Thus, exports to outside the euro zone became relatively cheaper right after 1999, but have become relatively more expensive since then.

As the exchange rate value of the euro declined after 1999, there was much speculation in the financial press over whether the European Central Bank would intervene. Although the European Central Bank is wholly in charge of monetary policy, the Maastricht Treaty puts national finance ministers in charge of exchange rate policy for the euro. In Article 111 finance ministers are given authority to "formulate general orientations and formal agreements for the Euro" as long as such arrangements do not impede the ECB's price stability mandate. Intervention operations, which involve purchases or sales of euros in the foreign exchange market with the goal of influencing its relative value, are also addressed under "External Operations" in Article 23 of the Maastricht Treaty for the ECB and the national central banks. The United States has a similar jurisdictional split, with the U.S. Treasury having legal authority to decide dollar exchange rate intervention policy, though in practice the Federal Reserve is generally an equal partner in

intervention decisions. Euro interventions may be carried out either directly by the ECB or by the national central banks acting on behalf of the ECB.[8]

Eventually, the European Central Bank did intervene in the currency market on September 22 and on November 3, 6, and 9, 2000, to strengthen the euro against the dollar. The first ECB operation was coordinated with the U.S. Federal Reserve and the Bank of Japan, along with other central banks. While the dollar magnitudes were released by all the other central banks, the magnitudes of the ECB operations have never been made publicly available. The ECB operations came as the euro was at its weakest against the dollar, and the operations coincided with a substantial (although relatively short-lived) strengthening of the euro. After the initial obsession with dollar parity and an "undervalued" euro in the early years, the more current concern is that the euro is "overvalued," hampering economic growth for export-oriented European countries.

The evidence on whether the introduction of the euro increased intra-European trade is controversial. Baldwin (2006) reviews the literature and finds that the consensus estimate is that the euro boosted intra-euro-zone trade by 5 to 10 percent. While trade within the euro zone as a percentage of total trade for the euro-zone countries has remained relatively stable at just above 50 percent since the mid-1990s, intra-euro-zone trade as a percentage of GDP rose steadily from 25 percent in the mid-1990s to just over 40 percent by 2004. However, countries in the European Union but outside the euro zone (like Britain, Denmark, and Sweden) also experienced significant increases in euro-zone trade after 1999. Moreover, trade within the euro zone is likely to have been influenced by the dismantling of trade barriers within Europe and the initial weakening of the euro after its introduction, making it difficult to pin down how the move to the single currency, specifically, contributed to trade patterns.

The Global Role of the Euro

In the early, heady days after the signing of the Maastricht Treaty, there were suggestions that once monetary union was solidly in place, the euro might rival or even surpass the dollar as the world's international reserve currency. To date, there is little evidence that the global role of the dollar has been usurped. The popularity of the dollar in world markets supposedly led Charles De Gaulle to lament "America's exorbitant privilege" allowing it to live beyond its means unconstrained by the periodic shortages of foreign exchange that less-privileged nations must endure. Another benefit the U.S. economy receives from the global popularity of the dollar is seignorage, which arises from the difference between the face value of U.S. notes

[8] Interventions may also take place among the non-euro-zone countries within the framework of the Exchange Rate Mechanism. Currently seven European countries participate in the Exchange Rate Mechanism (known as ERM II): Denmark (since January 4, 1999); Estonia, Lithuania, and Slovenia (since June 28, 2004); and Cyprus, Latvia, and Malta (since May 2, 2005). The other countries that entered the European Union on May 1, 2004, are expected to join ERM II as a precondition to joining the euro-zone. New countries cannot formally opt out of the euro. If they pass the Maastricht tests, they are supposed to join the euro-zone—though Sweden has stayed out without a treaty-sanctioned opt-out.

and the cost of producing and distributing them. Rogoff (1998) estimates that during the first half of the 1990s, U.S. seignorage averaged 0.41 percent of GDP, or more than $30 billion per year. Although the European Union has never formally stated any global goals for the euro, Wyplosz (1997, p. 15) suggests this is one of "understated motivations of EMU."

The role of the euro as a reserve currency in central bank and private portfolios is still evolving. A number of Asian central banks as well as the Russian central bank have suggested that they will diversify out of dollars and into euros, though there is little evidence that this has yet occurred. Data on the currency composition of official foreign exchange reserves (COFER) is available from the IMF at ⟨http://www.imf.org/external/np/sta/cofer/eng/cofer.pdf⟩. The share of the euro in official foreign exchange reserves went from 14.7 percent of total reserves in 2001 (compared to 76.3 percent for the U.S. dollar) to 16.2 percent in 2005—and even this small change was mainly due to the appreciation of the euro relative to the dollar. The dollar remains the dominant intervention currency for non-U.S. central banks, though the euro is increasingly being used in Europe's neighboring countries.

Foreign exchange trading in euros as a percentage of global trade has not increased compared to the share of the combined European currencies that existed prior to the euro. Data on different currencies in the foreign exchange market are available from the Bank of International Settlements's Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity at ⟨http://www.bis.org/triennial.htm⟩. In 1998, the U.S. dollar was present 43.7 percent of the time at one end of a transaction in the foreign exchange market while the European currencies were present 26.3 percent of the time. In 2004, the share of the dollar was largely unchanged at 44.4 percent, while the share of the euro was lower at 18.6 percent. Table 1 shows the breakdown of currency usage for the U.S. dollar, the euro, the Japanese yen, and the U.K. pound in foreign exchange markets from 1989 through 2004. (The "euro" data prior to 2001 is derived from summing the entries for the euro-zone legacy currencies.) There was a marked increase in European currency usage in the run-up to monetary union, but once the euro was launched, usage actually fell by almost 10 percent and has remained virtually unchanged since 2001. The initial fall in usage after the euro launch can be explained by the elimination of intra-euro-zone currency transactions and portfolio rebalancing by the euro-zone central banks (who no longer needed to hold reserves in the legacy currencies), but the fact remains that euro usage has not increased since its introduction.

The greatest increase in the use of euros has come in the stock of international debt denominated in euros—for example, debt issued in euros by countries not in the euro zone—which rose from below 20 percent at the end of 1998 to just above 30 percent at the beginning of 2003. Most of the non-euro-zone countries that issue euro-denominated bonds, lend in euros, and create euro deposits are neighbors of the euro zone; for example, U.K. residents own almost 40 percent of all nonresident euro-denominated deposits. Lenders and borrowers in Asia, Latin America,

Table 1
Currency Distribution of Foreign Exchange Market Turnover
(entries show the percentage share of average daily turnover in April of the relevant year)

	Year	*U.S. dollar*	*Euro*[a]	*Japanese yen*	*British pound*
Pre-euro	1989	45.0	16.5	13.5	7.5
	1992	41.0	27.6	11.7	6.8
	1995	41.7	29.9	12.1	4.7
	1998	43.7	26.3	10.1	5.5
Post-euro	2001	45.2	18.8	11.4	6.6
	2004	44.4	18.6	10.2	8.5

Source: BIS Triennial Central Bank Survey, 2004.
[a]The launch of the euro was in 1999 so the "euro" data prior to 2001 is derived from summing the entries for the euro-zone legacy currencies.

and the Middle East continue primarily to use the U.S. dollar and the share of euros in cross-border lending and deposit activity conducted outside the euro zone is small, around 5 to 6 percent (European Central Bank, 2005).

One of the main rationales for the Stability and Growth Pact discussed earlier was that because financial markets would not differentiate between countries' public debts once they were all denominated in euros, rules were required to prevent countries from taking on excessive fiscal deficits (Feldstein, 2005). Yields on long-term government bonds issued by euro-zone governments did indeed converge dramatically with the establishment of European monetary union. Interestingly however, even though there have been widespread violations of the Stability and Growth Pact, there is little evidence that countries are being penalized by financial markets (or, for that matter, by the European Union). Only Portugal has been formally warned regarding its fiscal prudence violations, and that warning was followed by a compromise which allowed Portugal more time to reduce its deficit before a sanctions procedure would be put in place.

The most recent enlargement of the European Union, with its promise of additional euro-zone members in the future, may bode well for the global role of the euro. In a recent study, Chinn and Frankel (2005) provide two scenarios under which the euro could become more dominant. The first scenario occurs if the United Kingdom and enough other European countries join the euro zone so that it becomes larger than the U.S. economy. However, there is little reason to believe that currency usage necessarily rises in proportion to GDP. After all, the GDP of the United States and the United Kingdom were about the same in 1870, but it took another 80 years or so before the U.S. dollar displaced the British pound sterling as the dominant international currency. A case can also be made that the global prominence of the euro could decline with the addition of the accession countries, most of which are significantly poorer than the current members of the euro zone. The second scenario arises if confidence in the value of the U.S. dollar falls, and there is a flight to the euro as an alternative.

A final factor that is hindering an increased global role for the euro is the continued hesitation on the part of euro-zone countries themselves to embrace their newly created currency. Leaders of a number of euro-zone countries including Germany, France, and Italy have at one time or another hinted that an exit strategy might be needed under certain economic conditions. (In the case of an exit by Italy, it is not clear whether this would increase or decrease the prominence of the euro.) Even if these murmurings are intended only for internal political consumption, they leave the rest of the world with a nagging sense of doubt about the longevity of Euroland.

The Test is Yet to Come

The introduction of the euro and the establishment of the European Central Bank as the monetary authority of Europe have gone smoothly. But doubts about the wisdom of economic and monetary integration persist across Europe. The slim margins by which the Maastricht Treaty passed in 1993, and the wide margin by which the proposed European Constitution failed in 2005, are reminders that Europeans remain wary of giving up their national sovereignty. This wariness also influences the ability of the European Central Bank to take over monetary policy efficiently and limits the ability of the euro to become a true rival of the dollar in global financial markets.

The concept of economic and monetary union was sold to Europeans as the means by which they could achieve political and economic stability. There are a number of potential challenges to this vision of stability which Europe (and the European Central Bank) may soon face. Germany and France spearheaded the march to union, but they are now the euro-zone laggards in terms of economic growth, often described in the press as "the sick men of Europe." At the same time, countries like Ireland (the Celtic Tiger), Spain, and Greece continue to sustain relatively high rates of economic growth. If Germany or France go into recession and badly need monetary stimulus, how will the European Central Bank balance their needs against the rest of the euro zone? What if the dollar sinks under the weight of the U.S. current account deficit, causing the euro to rise? How will the European Central Bank react to the inevitable demands for expansionary monetary policy that will come from European exporters in this scenario? If Europeans are already evidencing wariness about the monetary union during a time when economic stability has largely been maintained, how will they react to instability?

The true test of the influence of the European Central Bank and the longevity of the euro has yet to come. The U.S. Federal Reserve has proved itself able to calm financial markets and keep the U.S. economy on track even in the face of dramatic financial market turbulence: the 1987 stock market crash, the collapse of Long-Term Capital Management in 1998, and the aftermath of the terrorist attacks of September 11, 2001. It is less clear what role the European Central Bank would play if a European bank were to suffer a major collapse, or if one country or region

within Europe were to go into financial crisis. At least right now, it seems likely that individual country governments would want to take center stage, leaving the European Central Bank and other European institutions on the sidelines.

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