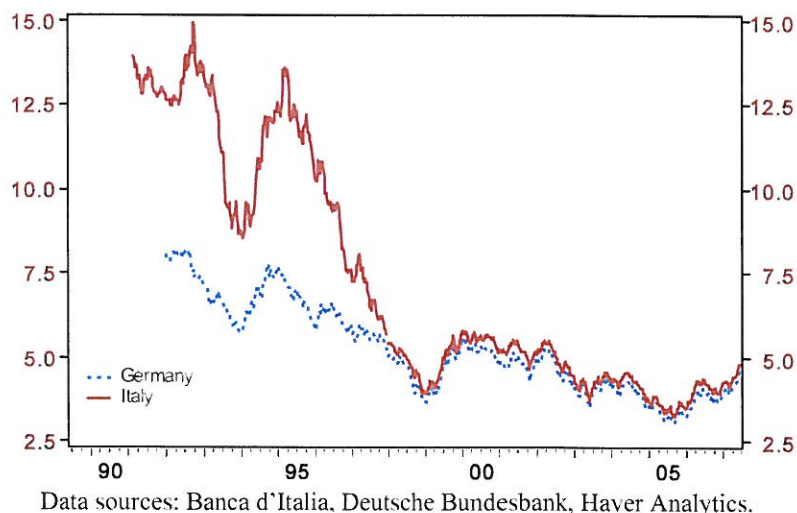


EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

As Arturo Rodrigo was riding the early morning Metro North train from Manhattan to Greenwich, Connecticut, in February 2011, euro zone debt markets dominated his thoughts. Rodrigo was old enough to remember the dramatic convergence in euro zone long-term rates that occurred in the late 1990s just prior to the advent of the euro. The long rates of Italy and many other euro zone countries decreased sharply, converging down to the much lower German rates (**Figure 1**). This unprecedented decrease in borrowing costs fueled borrowing binges in Athens, Madrid, Dublin, and many other euro zone cities.

Figure 1. Long-term bond yields (through mid-2007).

10-Year Benchmark Government Bond Yields: Italy and Germany
% p.a.



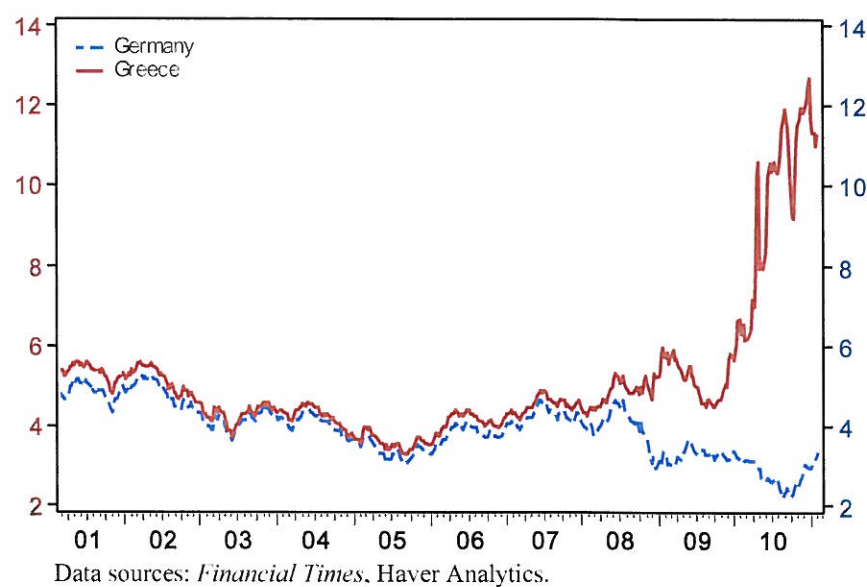
But the good times didn't last. When the global financial crisis took a turn for the worse in September 2008, long rates in Germany (the core of the euro zone) fell sharply, but periphery countries such as Greece, Spain, Italy, and Ireland saw their long rates surge (**Figure 2**). In mid-

This case was prepared by Frank Warnock, Paul M. Hammaker Associate Professor of Business Administration. It was written as a basis for class discussion rather than to illustrate effective or ineffective handling of an administrative situation. Copyright © 2011 by the University of Virginia Darden School Foundation, Charlottesville, VA. All rights reserved. To order copies, send an e-mail to sales@dardenbusinesspublishing.com. No part of this publication may be reproduced, stored in a retrieval system, used in a spreadsheet, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the permission of the Darden School Foundation. ♦

2009, there was hope that the worst was over, as periphery long rates declined a bit, but by late 2009, rates in Greece and other countries spiked upward once again. The “Great Convergence” that each periphery country had enjoyed when joining the euro zone had given way to the “Great Divergence,” and in the second half of 2010, the spread between Greek and German long rates fluctuated between 700 and 1,000 basis points. By way of comparison, between 2003 and 2006, this spread had averaged roughly 25 basis points.

Figure 2. Long-term bond yields (through February 11, 2011).

Greece and Germany: 10-Year Government Bond Yield
%



Rodrigo, a strategist at a hedge fund, had two decisions to make. First, what was the path of core (i.e., German) euro zone long-term interest rates likely to be over the next year? Was the dramatic decline in German long rates over the past two years an aberration that would soon be reversed, or was it part of the “new normal” that would persist for some time? Second, how would periphery long rates evolve relative to core rates? That is—the spread between long rates in the likes of Greece, Spain, and Ireland and those in Germany—how would they evolve over the next year? Was the dramatic divergence in euro zone long rates likely to persist or would the coming year see a reconvergence? Rodrigo knew many factors influenced long-term interest rates; he would have to use his entire toolkit to address this issue.¹ The evidence was in no way

¹ For a primer on models of interest rate determination as well as discussions on yield curves and the relationship between short and long rates, see Frank Warnock, “The Determinants of Interest Rates,” UVA-BP-0489 (Charlottesville, VA: Darden Business Publishing, 2006).

clear-cut. Some factors pointed toward lower German rates, some toward higher, some toward a widening of euro zone spreads (even a dissolution of the euro zone as we know it?), and some toward reconvergence. To form an opinion on the likely paths of euro zone long rates, Rodrigo would have to sort through mounds of information.

Background: The Advent of the Euro and the European Central Bank (ECB)

European integration began in earnest in 1957, when six countries (Germany, Belgium, Luxembourg, Italy, France, and the Netherlands) signed the Treaty of Rome, thus forming the European Union (EU), a customs union in which those countries agreed to remove tariffs on international trade among them and impose tariffs on trade with nonmember countries. Over the years, the group would be extended—the EU had 27 members by 2011—and the process of integration would deepen. Members formed the European Court of Justice in Luxembourg, an executive branch (the European Commission, or EC), and even a legislative branch (the European Parliament). But the EU's supranational powers were limited. For key decisions, it had to wait on the Council of Ministers, which brought together national politicians, or it was bound by unanimity clauses on a variety of issues. In fiscal matters, its powers were particularly limited; the EC's budget was about 1% of the GDP of its participating members, and it could not borrow or raise taxes at will.

Another surge in European integration occurred with the Exchange Rate Mechanism (ERM), which started in 1979 and was a key component of the European Monetary System. In the ERM, members limited fluctuation of their currencies vis-à-vis one another. Indeed, to enter the ERM, a candidate country had to have limited exchange rate fluctuations vis-à-vis the core.

During the ERM period, European countries still had their own currencies. Yes, there was the European Currency Unit (ECU)—a GDP- and trade-weighted average of members' currencies—but it was more of an accounting item than an actual currency. Deutsche marks were still used in Germany, francs in France, and the national central banks still controlled monetary policies. This led to substantial strains on the system because countries' economic cycles were not in synch; some would want to tighten monetary policy when others would want to loosen. The classic example occurred in late 1992, when Germany, its economy overheating, tightened monetary policy at a time when many other members' economies were suffering and needed expansionary policy. Mundell's Trinity came into play in full force, and the leg of the trinity that many countries gave up was that of the fixed exchange rate (vis-à-vis Germany, the core of the ERM).

The ERM, a precursor of the European Monetary Union (EMU) and the euro, faced repeated stresses. The Maastricht Treaty, signed in 1992, contained a number of criteria—the so-called Maastricht criteria—that aimed to alleviate those stresses. To qualify for membership in the EMU, countries' central banks must have had complete independence from their central governments, inflation and interest rates had to be near the average of the group's best performers, fiscal deficits could not exceed 3% of GDP, and outstanding government debt could not exceed 60% of GDP.

The inflation prerequisite meant that there would be convergence in inflation rates between the candidate country and the low-inflation countries, especially Germany. In fact, in the years before EMU entry, many countries openly announced that they would no longer make independent decisions on monetary policy and would instead follow the German Bundesbank in every decision. The convergence in inflation would, all else equal, prompt long-term interest rates to converge. And, in the run-up to EMU membership, there was indeed a remarkable convergence in terms of inflation. In the case of Greece, for example, inflation was 10% in 1996, but two years before its entry, it was below 3%. Inflation convergence enabled a significant reduction in the interest rate spreads, with long-rate differentials between all prospective EMU members and Germany narrowing dramatically (see **Figure 1** for Italian convergence).

Later, one of the prequalifying criteria—the limit on fiscal deficits at 3% of GDP—was transformed through the “growth and stability” pact to become not just a prerequisite to membership but a permanent ongoing rule, with violators subject to censorship or fines.

With the EMU came the euro in 1999.² Countries in the union could no longer depreciate their currencies; they had given up both their currencies and their right to conduct monetary policy. The new currency was the euro, and all monetary policy decisions were made at the ECB. This eliminated one set of problems that plagued the ERM, but the EMU was cursed with another ERM problem: the inability or unwillingness of some governments to control their fiscal deficits. The growth and stability rule of a maximum fiscal deficit of 3% was quickly flouted by the two largest countries, Germany and France. This prompted a change in the rules’ wording; now member countries could not exceed 3% averaged over the business cycle. Neither Germany nor France were punished or fined for violating the deficit rule, paving the way for many other members to follow their lead. For 2007 data and forecasts of fiscal indicators for selected countries, see **Exhibit 1**.

The euro was launched at a rate of 1.16675 dollars per euro on January 1, 1999, when the currencies of 11 countries—Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain—ceased to exist.³ At that time, the 11 countries delegated monetary policy to the newly formed ECB in Frankfurt. The euro immediately became a major international currency, second only to the dollar. Along some economic and financial dimensions, the euro area countries were a close match for the United States. Their combined GDP in 1998 was (U.S. dollars) USD6.6 trillion, compared with USD8.5 trillion for the United States. Their share of international trade outside the euro area (19%) was slightly larger than that of the United States (17%). *Taken together*, bond markets in euro countries were only somewhat smaller than that of the United States, but their equity markets were much smaller than Wall Street. The euro area had one blemish that was impossible to hide: It suffered from

² The United Kingdom and Denmark, not willing to cede their monetary policies to the ECB, opted out of the EMU.

³ The euro did not exist as a physical currency until 2002 but traded on financial markets starting in 1999.

“eurosclerosis” or persistently high unemployment; at 10%, unemployment was far higher than U.S. levels.

The euro zone expanded in its first decade. Greece became the 12th member in 2001. Slovenia joined in 2007, Cyprus and Malta in 2008, Slovakia in 2009, and Estonia became the 17th member on January 1, 2011. Ten EU member states did not use the euro: Bulgaria, the Czech Republic, Denmark, Latvia, Lithuania, Hungary, Poland, Romania, Sweden, and the United Kingdom.

The First Signs of Divergence...and Then Some Reconvergence

Convergence of long-term rates within the euro zone occurred rather quickly. With a common monetary policy, a common currency, and the perceived fiscal straightjacket of the growth and stability pact, markets quickly pushed periphery long rates down to the core level (see **Figure 1** for the quick convergence of Italian to German long rates). For the first time in living memory, the periphery could borrow long term at rates previously available only to the core. One might have hoped that the periphery would have used this newfound access to cheap finance to invest in economically useful activities that would build and strengthen the productive capacity of their economies. Although some of that might have occurred, far too much of the cheap finance went into creating bubbles, such as in real estate.

Investors seemed fine with this state of the world until 2008. Indeed, it was only after the Lehman collapse that the spread between Greek and German long rates persistently exceeded 100 basis points (**Exhibit 2**, top panel). Even then, the divergence seemed quite natural. It could be argued that investors, having become lax in discriminating riskiness over the preceding few years, were in the midst of a much-needed reassessment of risks. A spread of 100+ basis points on Greek bonds did not seem exorbitant.

In early 2009, while risky assets all over the world were being hammered, the spread widened quite a bit, reaching almost 300 basis points. But then by mid-2009, Greek long rates moderated, and by September, the spread was back around 100 basis points (**Exhibit 2**, bottom panel). To be sure, these were not the pre-crisis razor-thin spreads that the periphery had come to enjoy, but in the aftermath of the global crisis, 100 basis points seemed perfectly reasonable. And the ECB had done its part to calm the markets. Not only had it driven its policy rate to near zero (**Exhibit 3**, top panel), but it also had substantially expanded its open market operations (**Exhibit 3**, bottom panel).

Divergence, with a Vengeance

But soon the relative calm of mid-2009 gave way to an explosion in spreads. From 120 basis points in September 2009, the spread reached 250 by end-2009, 500 by end-April 2010, and almost 1,000 basis points by mid-September 2010 (**Figure 2**). What happened?

An EC report summarized this quite nicely:

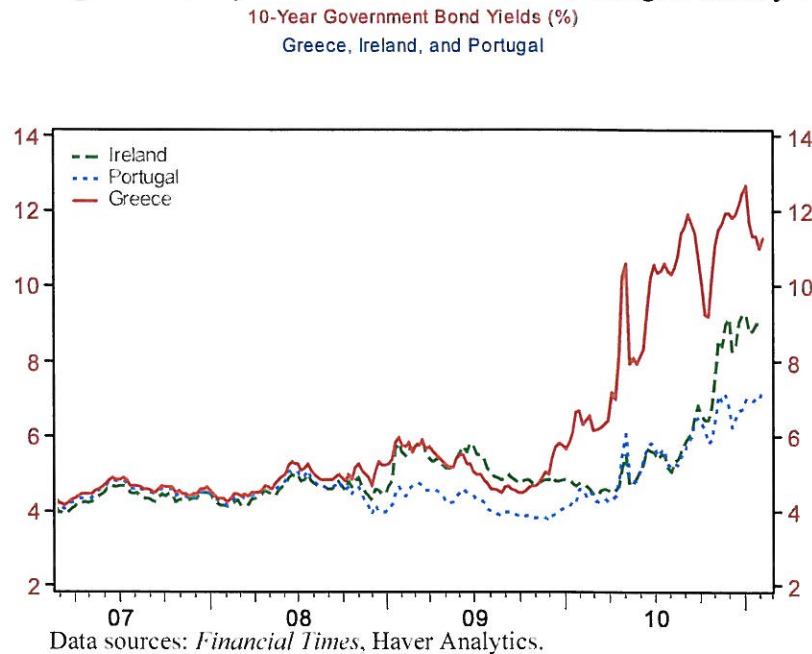
On 2 and 21 October 2009, the Greek authorities transmitted two different sets of complete Excessive Deficit Procedure (EDP) notification tables to Eurostat, covering the government deficit and debt data for 2005–2008, and a forecast for 2009. In the October 21 notification, the Greek government deficit for 2008 was revised from 5.0% of GDP (the ratio reported by Greece, and published and validated by Eurostat in April 2009) to 7.7% of GDP. At the same time, the Greek authorities also revised the planned deficit ratio for 2009 from 3.7% of GDP (the figure reported in spring) to 12.5% of GDP, reflecting a number of factors (the impact of the economic crisis, budgetary slippages in an electoral year, and accounting decisions).

Revisions of this magnitude in the estimated past government deficit ratios have been extremely rare in other EU Member States but have taken place for Greece on several occasions. These most recent revisions are an illustration of the lack of quality of the Greek fiscal statistics (and of macroeconomic statistics in general)...⁴

EU members were shocked and angered, and the bond markets quickly punished the Greek government. There were whispers that Greece would be expelled from the euro zone: Didn't the growth and stability pact dictate that budget deficits must be less than 3% of GDP? A quick response to that could be: Sure, but weren't the Germans and French the first to break that rule and were they ever penalized even a single euro? The fate of the euro zone hung in the balance. And the bond markets punished not just Greece but much of the euro zone periphery (**Figure 3**).

⁴ *Report on Greek Government Deficit and Debt Statistics* (Brussels: European Commission, January 2010), 3 http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/COM_2010_REPORT_GREEK/EN/COM_2010_REPORT_GREEK-EN.PDF (accessed February 23, 2011).

Figure 3. Long-term bond yields in the GIP countries (through February 11, 2011).



Clearly not all periphery countries had fudged debt and deficit figures as Greece had done. But faith in the entire EMU was wavering. In the first half of 2010, the euro fell from USD1.50 per euro to USD1.20 (**Exhibit 4**), and the euro zone, which attracted enormous foreign investment in its bonds just a short while earlier, was rapidly seeing those bond inflows disappear (**Exhibit 5**). Basic economic indicators (**Exhibit 6**) were fine for some countries (notably, Germany) but alarming for others.

Was the entire union teetering? The answer, according to French President Nicolas Sarkozy, was an emphatic no:

It is an absolute general mobilization: we have decided to give the euro zone a veritable economic government. Today we have an attack on the whole of the euro zone. This is a systemic crisis: the response must be systemic. When the markets open on Monday morning we will be ready to defend the euro.⁵

The EU would make sure there would not be any defaults. It would come to the rescue of the euro. In May 2010 a (euros) EUR110 billion bailout facility for Greece was announced, along with promises of EUR750 billion for the entire euro zone. There were a few separate facilities. Some would be controlled by the EC, the executive branch of the EU, and would allow

⁵ Ambrose Evans-Pritchard, "Europe Prepares Nuclear Response to Save Monetary Union," *Daily Telegraph*, February 19, 2010.

the EC to borrow against its budget, which was guaranteed by all EU members. Another, larger portion was guaranteed by individual euro zone countries. A third component, about EUR250 billion, came from the International Monetary Fund (IMF). Around the same time, the ECB also announced it would buy troubled government bonds and accept downgraded Greek bonds as collateral.

Bringing in the IMF was particularly painful. The Germans (and French) had the most to gain from a Greek bailout (or, at least, they would lose the most if Greece failed) because their banks had the most exposure to Greek debt. Based on BIS (Bank for International Settlements) and IMF data, German exposure to Greek banks amounted to 1.1% of German GDP. Better for Germany to bail out Greece, which was relatively small, than its own banking system. The German economy could handle a 1.1% write-off. But if the crisis spread, Germany would be in trouble because its exposure to Irish and Spanish banks was much greater at roughly 10% of German GDP.

But the Germans argued that, technically, the treaty establishing the EMU did not allow one country to make a fiscal transfer to another; there was in effect a no-bailout clause in the union, so Greece had to turn to the IMF. Later (much later), this stance was necessarily altered, but for now, it was left to the IMF to descend on Greece, bringing with it its prescription of fiscal tightening. The fiscal adjustment was designed to get the overall government deficit below 3% of GDP by 2014 and to start lowering the debt-to-GDP ratio from 2013 onward. The fiscal measures included a significant reduction of public-sector wages and pensions (pensions and public-sector wages together were roughly 75% of the all noninterest public spending); pressure to increase tax revenue by improving tax collection and increasing the value-added tax; and an emphasis on additional reforms that would drive down costs, increase productivity, and make Greece more competitive.⁶

The euro zone was in tatters. In quick succession, hardworking Germans who had recently seen a great reduction in their benefits had to bail out early-retiring sun-worshipping Greeks, the IMF swept in on a member state like it was some emerging market, and the vaunted independence of the ECB disappeared when it stepped in to shore up wayward countries' dysfunctional bond markets. Greeks, unhappy with the prospect of austerity measures, took to the streets, and, in some cases, these protests resulted in violence.

But the various bailouts in spring 2010 seemed to work. Spreads tightened. The sovereign bond markets calmed down. Yields on long-term periphery bonds plunged.

Or, to be precise, it seemed to work for a while.

⁶ For more information on the IMF's plan for Greece, see "Frequently Asked Questions: Greece," International Monetary Fund, <http://www.imf.org/external/np/exr/faq/greecefaqs.htm> (accessed February 24, 2011).

In the early fall, the Fed was signaling that it would hold nothing back in its efforts to shore up the U.S. economy with a second round of quantitative easing (QE2), but the ECB was taking a more hawkish stance. And the markets noticed; two-year U.S. interest rates continued to trend downward, but two-year rates on core euro zone government bonds (those AAA-rated) began to increase (**Exhibit 7**). Yes, the ECB had set up its Securities Markets Programme (SMP) in May 2010, when the ECB Governing Council announced it would conduct interventions in euro zone public and private debt securities markets to ensure depth and liquidity in those market segments that were dysfunctional. Although purchases were substantial in May and June (**Exhibit 8**), they were very small in subsequent months. The ECB was signaling that although it did step into sovereign bond markets in the spring, going forward, it would focus on reestablishing its independence. A tightening of monetary policy was likely—German inflation was getting uncomfortably high—and the ECB was seemingly saying: “Let us not again have to intervene in dysfunctional sovereign bond markets.”

Some wondered if, in the fall of 2010, this hawkish stance by the ECB might come back to bite it. Sure, economic growth had picked up in many euro zone countries, but forward-looking survey indicators suggested a coming rough patch. And the debt crisis was not yet over. Although risk assets around the world rallied in September, at the same time, Irish and Portuguese spreads widened to record levels. Was this a time for the ECB to be complacent? Ireland, which had notable problems to be sure, was held up as a role model to other euro zone periphery countries, given that during the debt crisis it promptly and aggressively slashed public-sector wages (by 30%!) and reined in government spending, all in an effort to prevent a Greek-like surge in borrowing costs. The problems in Ireland (and Greece and Portugal) had not yet spilled over into other euro zone countries, but one had to wonder: Now that Ireland had been rewarded for its fiscal austerity with a dramatic surge in borrowing costs, what would other periphery countries take away from the Irish experience? And if the markets continued to move against Ireland, would an IMF bailout of Ireland be far behind? Would the ECB be forced to step up its backstop facilities and expand the SMP?

Sure enough, things turned for the worse. Rates surged in the periphery. Ireland sank. The IMF came in yet again. The ECB’s SMP activities were increased, yet again.

This time it was Ireland at the center of the storm. Ireland had not fudged its debt and deficit statistics like Greece had. Its banks were not heavily involved in mortgage-backed securities markets like many German banks were. No—its crisis was of the plain vanilla variety. Ireland, which a decade earlier had prospects so bright it was dubbed the Celtic Tiger, engaged in a debt-fueled construction boom. Irish banks obtained cheap funding in international (euro zone) markets and lent into the boom. The boom quickly morphed into a bust when real estate prices began to slide, Irish banks’ access to short-term funding markets closed, the Irish government guaranteed the debts of two large banks, and suddenly, the former Celtic Tiger—which entered the crisis with a budget more or less in balance and very little public debt—had a dizzying

amount of debts (almost all from its saving of the bad banks) and deficits that seemed impossible to manage.⁷ See **Exhibit 1** for pre- and midcrisis fiscal indicators.

Late in November 2010, the EU announced an EUR85 billion package to bail out Ireland, as the IMF descended on yet another euro zone country. Markets were not impressed. Not only did Irish bond prices plummet on the news, so did those of Portugal, Spain, Italy, and Belgium. European stock markets plummeted, and the euro sank vis-à-vis the U.S. dollar. Investors worried that the Irish government would not be able to impose enough pain on its residents to turn around its fiscal nightmare. Or investors worried that the government's austerity measures would be so successful that Ireland would have tepid economic growth, implying that the country would not grow fast enough to service its now enormous (and costly) debt burden. Investors also (correctly) ascertained that the nature of the Greek and Irish bailouts, in which senior creditors were left whole and the people of those countries would have to shoulder (for years!) the entire burden of their financial sectors' bad behavior, was unlikely to be replicated in other countries if more bailouts were necessary. The funds Europe was committing to the problem were too little, and other European debt markets too large (Italy had the third-largest sovereign bond market in the world?!). Were the crisis to spread further, at some point, bondholders would have to take a hit. At some point, there would be a default, a restructuring. In that world, rational investors would naturally demand higher bond rates. If credit risk is suddenly a real concern, bond rates must increase.

The ECB and the Euro Zone

The crisis was a blow to both the ECB and the euro zone.

The ECB in Frankfurt, like the Federal Reserve in Washington, lost some (much?) of its vaunted independence from governments and politics. The Fed started down that path in fall 2008, when it bailed out many U.S. financial institutions. At that point, it became inextricably linked to the U.S. government and politics. The ECB resisted a bit longer, waiting until May 2010 to really step into the fray. It quickly signaled it wanted to get out of the business of shoring up dysfunctional bond markets, but later in the year, it was again forced to bail out member governments by buying their bonds when no one else wanted them.

Market participants had to wonder whether a backdoor bailout through higher inflation was next to emerge from the ECB's toolkit. In mid-February 2011, this seemed more likely, as

⁷ For a wonderful assessment of the Irish case from an economics perspective, see Central Bank of Ireland Governor Patrick Honohan's speech to the Ireland Japan Chamber of Commerce, "Fast-Growth Economies: Sustainable and Unsustainable Examples from Europe and Asia," August 19, 2010, Tokyo, Japan, <http://www.financialregulator.ie/press-area/speeches/Documents/19%20August%202010%20-%20Speech%20-%20Address%20by%20Governor%20Patrick%20Honohan%20to%20Ireland%20Japan%20Chamber%20of%20Commerce,%20Tokyo.pdf>.

ECB President Jean-Claude Trichet's presumed successor—the very hawkish head of the German Bundesbank, Axel Weber—awkwardly and abruptly resigned, eliminating him from contention to be the next ECB head. Trichet was due to step down in fall 2011. Would his successor be as hawkish as he or Weber or was the periphery about to get the backdoor bailout of higher inflation?

The ECB took a hit and so did the euro. In January 2011, even as the euro zone admitted its 17th member (Estonia), talks of the demise of the euro zone increased in frequency. Would Greece and other periphery countries leave the euro zone? Doing so would allow them to resort to the normal way of solving debt problems: a quick depreciation of their currencies. While in the euro zone, Greece (and others) could not depreciate vis-à-vis other euro zone countries, their major trading partners. From 2000 to 2010, the periphery lost competitiveness compared with the core (**Exhibit 9**).⁸ The easiest way to regain that competitiveness was to depreciate their currency, impossible while retaining membership in the euro zone but possible if they seceded from the union. Of course, there would be substantial costs associated with secession but some benefits too.

But discussions focused not just on whether a periphery country might leave the union. Might Germany and a few other countries secede and form a “strong euro” zone?

A few years earlier, no one had discussed the potential breakup of the union. But in early 2011, serious people were doing serious analysis of just how such a breakup might work. The reason? The burdens that were being (and had yet to be) placed on citizens' backs were enormous. The *Economist* estimated that government debt levels in GIPS countries (Greece, Ireland, Portugal, and Spain) were, respectively, 140%, 97%, 83%, and 64% of GDP in 2010 and would increase to 165%, 125%, 100%, and 85% of GDP by 2015.⁹ With this level of debt—a far cry from the 60% level imposed (imposed?) by the growth and stability pact—and recalling that debt payments had become more costly (as interest rates in the periphery had spiked), substantial budget *surpluses* would be required just to stabilize the debt-to-GDP ratios. And the *Economist* also noted that about half of GIPS government debt was held by foreigners. High debt servicing costs incurred by GIPS countries would lead to severe austerity measures, and who benefits? To a large extent, foreign (German?) bondholders. How long would this be sustainable? As the *Bank Credit Analyst* put it: “[t]he ability of governments in Europe's periphery to justify to their

⁸ Note that in **Exhibit 9**, an increase is a real appreciation, and the indexes are set to equal 100 in 2005. As late as 2003, Germany was considered the sick man of Europe, with unit labor costs making it uncompetitive internationally. After 2003, measures to improve flexibility in its labor market, reduce pensions, and increase retirement age led to a surge in productivity that reduced unit labor costs and increased international competitiveness. In contrast, through much of the first decade of the 21st century, the periphery was losing competitiveness as wage increases outstripped any productivity gains.

⁹ “Bite the Bullet,” *Economist*, January 15, 2011.

electorate that they should continue to pay very high interest rates for their borrowing needs...is unlikely to last long.”¹⁰

From its inception, it was obvious that the euro zone was not, in the parlance of economics literature, an “optimal currency area.” Countries that formed a currency union faced substantial restrictions—no currency to devalue, no control of monetary policy—that were only workable if there was also substantial flexibility in other aspects (labor mobility being one, flexible prices another). Now it also became very obvious that monetary union without fiscal (political) union was fraught with a whole new set of problems. How would this play out?

The Decision

Arturo Rodrigo’s task was clear. To decide on the likeliest paths of long-term interest rates in both the core (Germany) and periphery (e.g., Greece, Ireland, Portugal), he would have to take a stance not only on the likely path of traditional ECB monetary policy but also on the likelihood of further extraordinary ECB measures. He would have to understand why rates were at their current levels and what was already priced into the market. He also had to sift through other more traditional data such as inflation, productivity, and fiscal policies. He then had to form a view on the many possible scenarios going forward in order to make two informed calls—periphery long-term rates up, down, or sideways, and core long-term rates up, down, or sideways—and identify possible risks that could blow his prognostications out of the water.

¹⁰ “The European End-Game,” *Bank Credit Analyst* 62, no. 8 (February 2011).

Exhibit 1

EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

Fiscal Data for Selected Years and Countries
(as a percentage of GDP)

	Budget Balance			Interest Payments			Government Debt Level		
	2007	2010	2012	2007	2010	2012	2007	2010	2012
Belgium	-0.4%	-4.9%	-3.6%	3.7%	3.3%	3.6%	88.0%	102.5%	105.2%
France	-2.7%	-7.4%	-4.8%	2.5%	2.1%	2.3%	70.0%	92.4%	100.2%
Germany	0.3%	-4.0%	-2.1%	2.4%	2.2%	2.3%	65.3%	79.9%	82.0%
Greece	-5.4%	-8.3%	-6.5%	4.2%	5.3%	5.6%	104.6%	129.2%	142.2%
Iceland	5.4%	-6.3%	0.6%	-0.9%	3.4%	3.2%	53.3%	124.9%	111.3%
Ireland	0.0%	-32.3%	-7.4%	0.9%	5.5%	5.7%	28.9%	104.9%	115.6%
Italy	-1.5%	-5.0%	-3.1%	4.7%	4.3%	4.9%	112.7%	131.3%	133.0%
Netherlands	0.2%	-5.8%	-3.1%	1.6%	1.4%	1.8%	52.0%	74.6%	79.5%
Portugal	-2.8%	-7.3%	-4.4%	2.9%	2.9%	3.9%	68.8%	92.9%	100.6%
Spain	1.9%	-9.2%	-4.4%	1.1%	1.6%	1.8%	42.3%	72.2%	79.6%
Euro area	-0.6%	-6.3%	-3.5%	2.6%	2.5%	2.8%	70.9%	91.6%	96.3%
Total OECD	-1.3%	-7.6%	-4.7%	1.7%	1.7%	2.0%	72.9%	96.9%	102.8%

Note: 2010 data are estimates and 2012 numbers are forecasts.

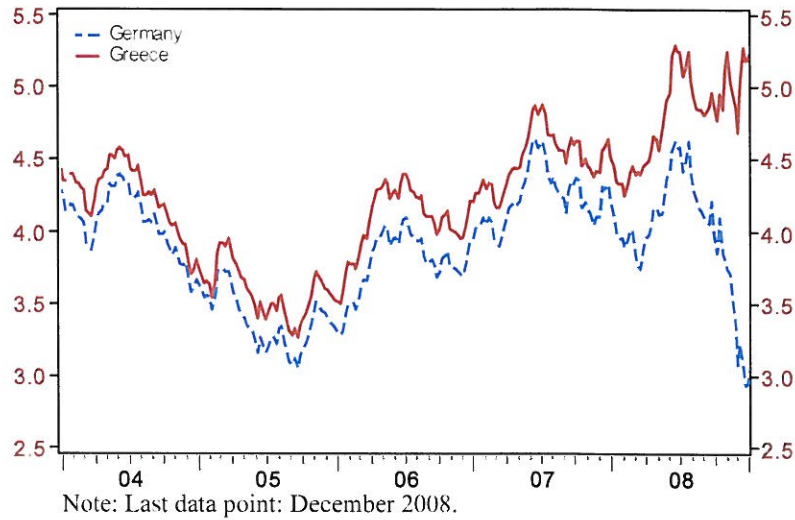
Data source: Organisation for Economic Co-Operation and Development (OECD).

Exhibit 2

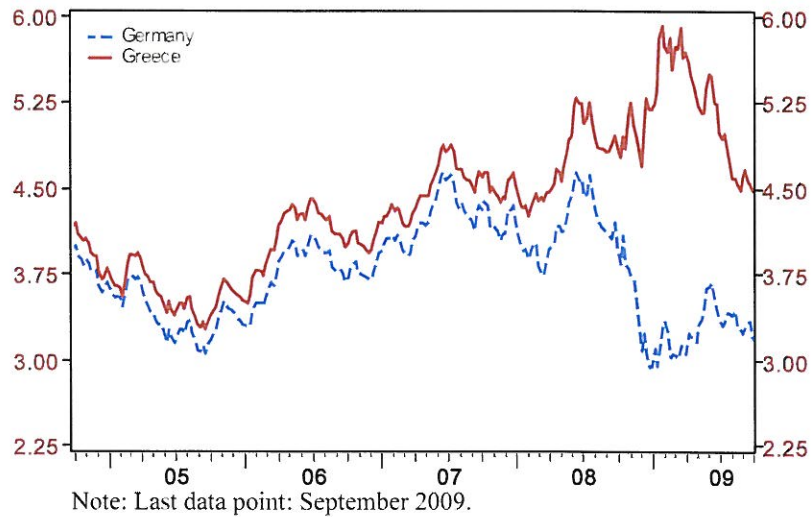
EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

Long-Term Bond Yields (through end-2008 and September 2009)

10-Year Government Bond Yields: Greece and Germany
%



10-Year Government Bond Yields: Greece and Germany
%

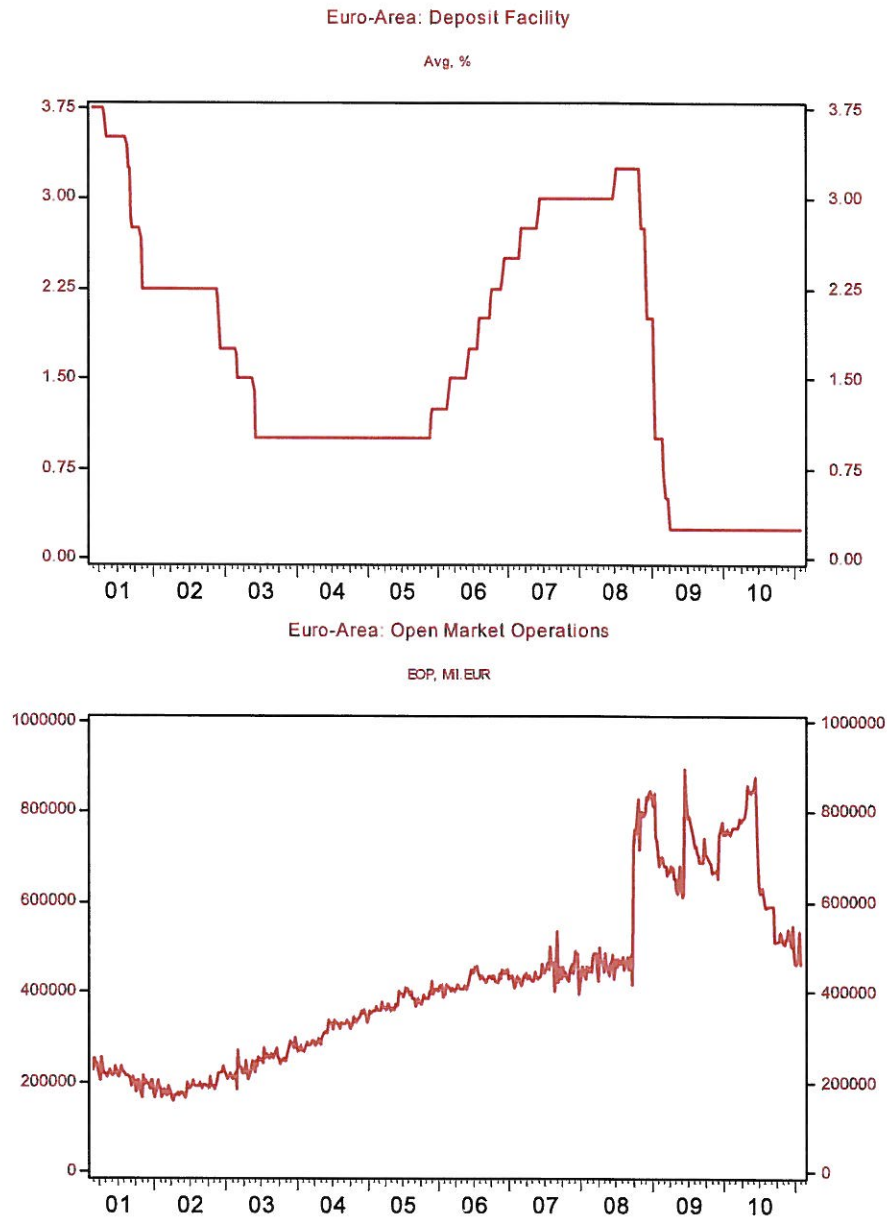


Data sources: *Financial Times*, Haver Analytics.

Exhibit 3

EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

Euro Zone Monetary Policy

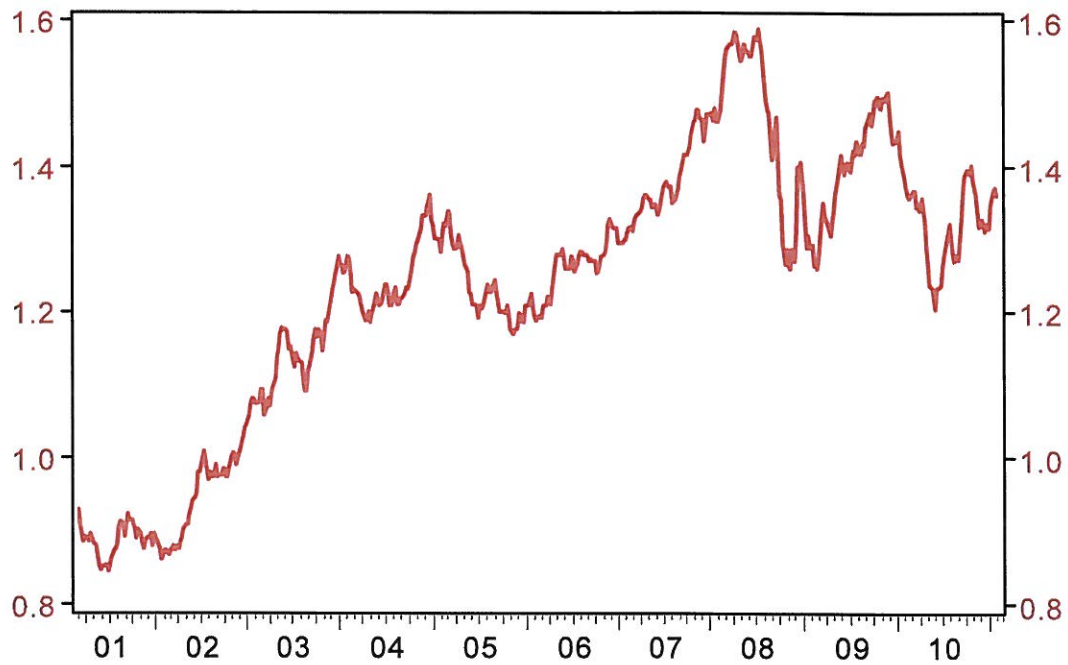


Data sources: European Central Bank, Haver Analytics.

Exhibit 4

EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

Dollar/Euro Exchange Rate



Notes: Weekly data. Last data point: Week ended February 11, 2011.

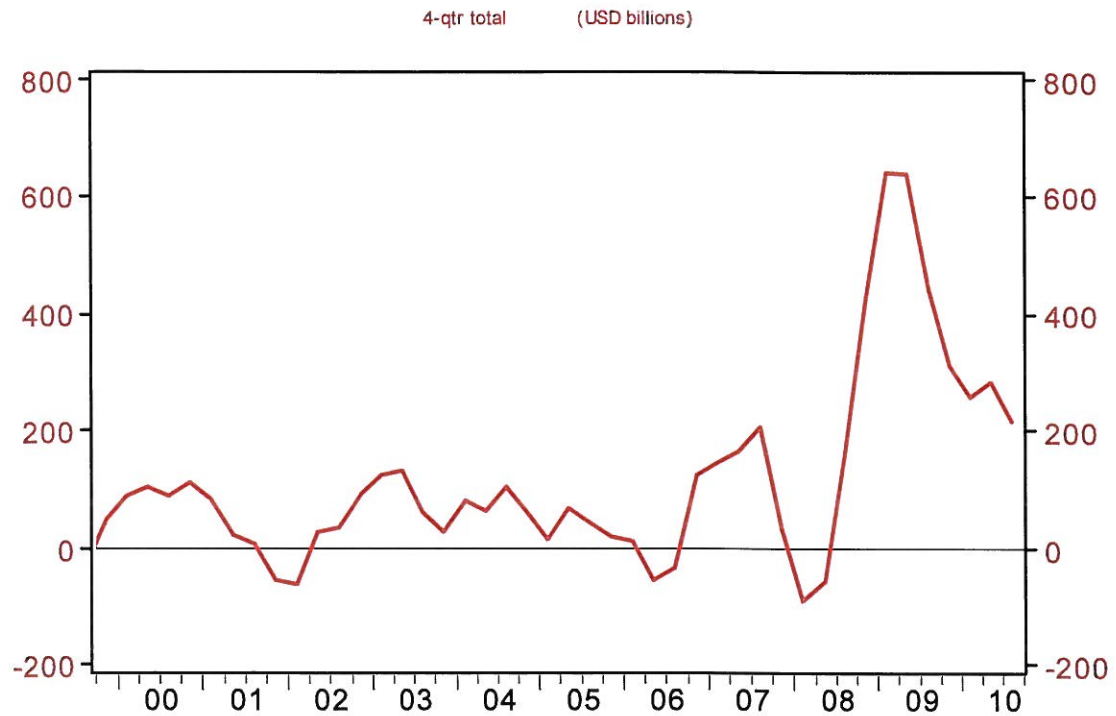
Data sources: Federal Reserve Board, Haver Analytics.

Exhibit 5

EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

Euro Zone Bond Inflows

Debt Instruments: Net inflows into the euro area



Note: Last data point: 2010 Q3.

Data sources: International Monetary Fund, Haver Analytics.

Exhibit 6

EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

Selected Data for Selected Years and Countries

	Real GDP			Non-Residential Fixed Capital Formation				Inflation			Current Account Balance
	2010	2011	2012	2009	2010	2011	2012	2010	2011	2012	2008
Belgium	2.1%	1.8%	1.8%	-7.5%	-1.0%	2.9%	4.5%	2.1%	1.6%	1.8%	-2.5%
France	1.6%	1.6%	2.0%	-8.5%	-1.8%	4.1%	6.3%	1.6%	1.1%	1.1%	-2.3%
Germany	3.5%	2.5%	2.2%	-16.1%	6.0%	3.7%	3.6%	1.0%	1.2%	1.4%	6.7%
Greece	-3.9%	-2.7%	0.5%	-13.3%	-18.2%	-10.2%	-1.1%	4.7%	2.5%	0.7%	-14.5%
Iceland	-3.6%	1.5%	2.6%	-55.0%	-3.1%	17.7%	23.6%	5.3%	1.8%	1.6%	-44.2%
Ireland	-0.3%	1.5%	2.5%	-34.1%	-6.5%	15.6%	3.8%	-1.6%	0.9%	1.2%	-5.3%
Italy	1.0%	1.3%	1.6%	-17.6%	6.0%	3.2%	3.6%	1.5%	1.4%	1.4%	-3.4%
Netherlands	1.7%	1.7%	1.8%	-18.2%	-2.4%	3.4%	6.7%	0.8%	1.4%	1.4%	4.8%
Portugal	1.5%	-0.2%	1.8%	-	-	-	-	1.4%	2.3%	1.3%	-12.1%
Spain	-0.2%	0.9%	1.8%	-18.5%	-2.7%	4.8%	5.2%	1.5%	0.9%	0.3%	-9.6%
Euro area	1.7%	1.7%	2.0%	-14.9%	0.7%	3.7%	4.7%	1.5%	1.3%	1.2%	-
Total OECD	2.8%	2.3%	2.8%	-15.4%	3.7%	6.9%	6.9%	-	-	-	-

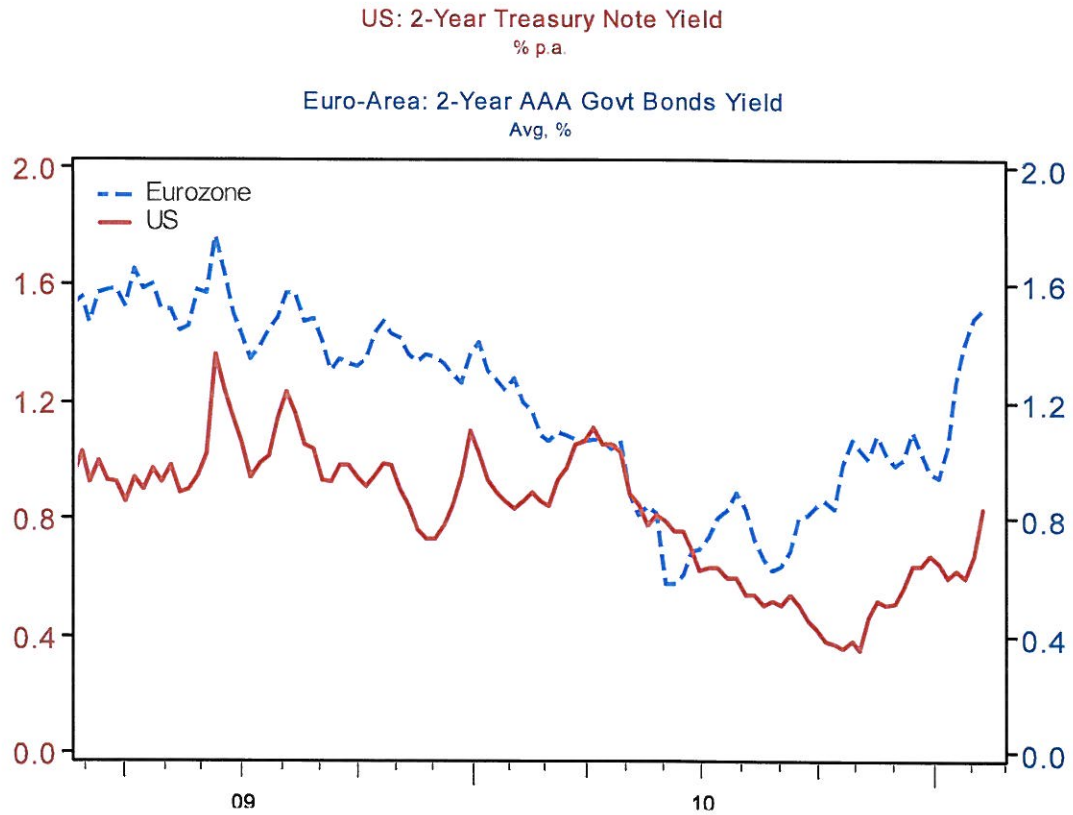
Notes: Real GDP and non-residential fixed capital formation are annual growth rates. Current account balance is expressed as a percentage of GDP, 2010 data are estimates, and 2011 and 2012 numbers are forecasts.

Data source: OECD.

Exhibit 7

EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

Two-Year Interest Rates in United States and Euro Zone



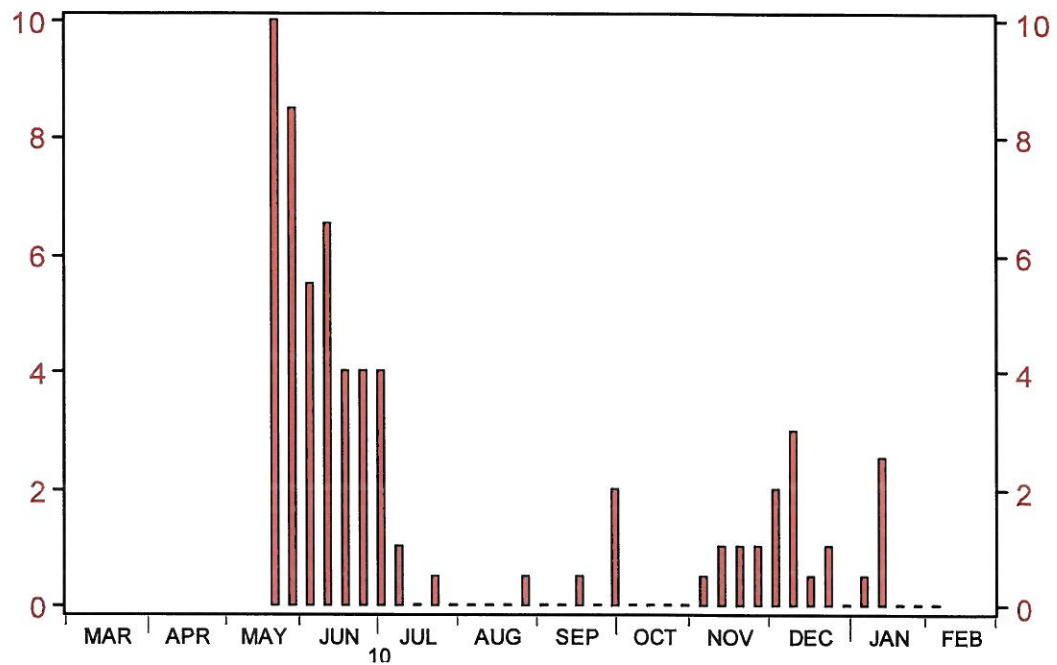
Notes: Weekly data. Last data point: Week ended February 11, 2011.

Data sources: Federal Reserve Board, European Central Bank, Haver Analytics.

Exhibit 8

EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

ECB Securities Markets Programme Purchases in Dysfunctional Bond Markets
(in billions of euros)



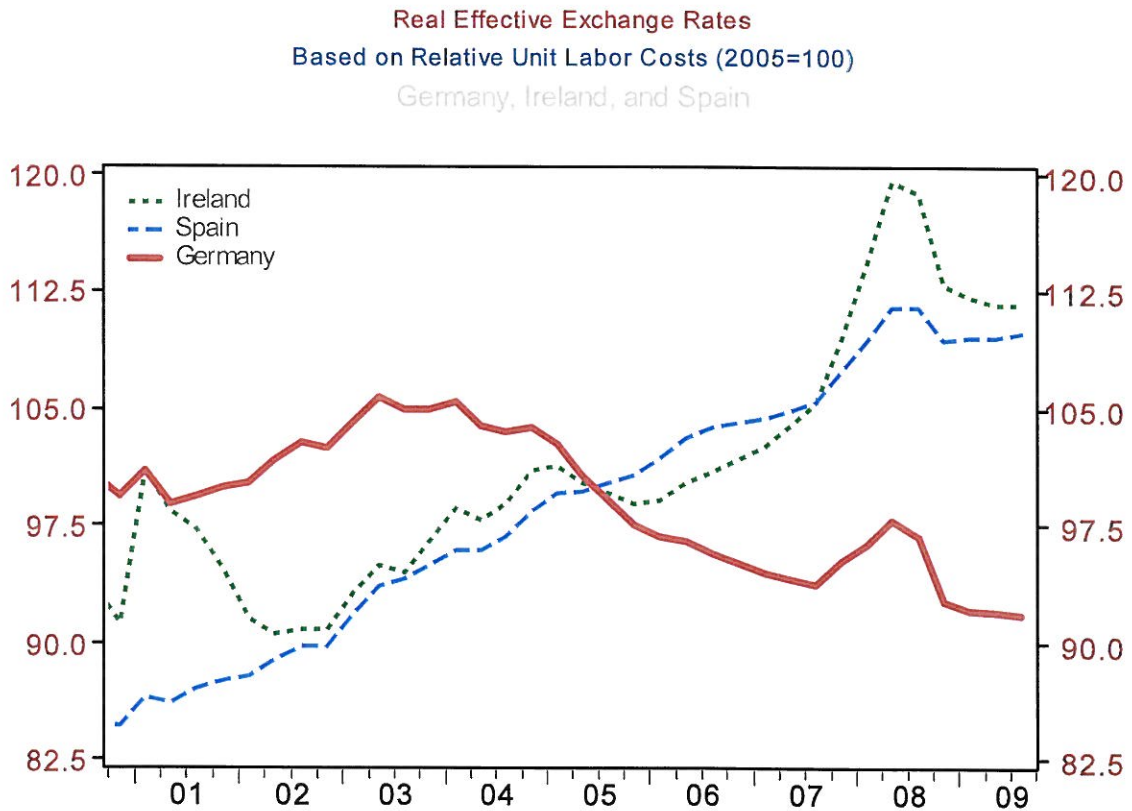
Last data point: Week ended February 4, 2011.

Data sources: European Central Bank, Haver Analytics.

Exhibit 9

EURO ZONE CONVERGENCE, DIVERGENCE...AND THEN WHAT?

Real Trade-Weighted Exchange Rates



Data sources: International Monetary Fund, Haver Analytics.