

# The Euro's Three Crises

Brookings Papers on Economic Activity Spring 2012

March 12<sup>th</sup> 2012

Jay C. Shambaugh

McDonough School of Business, Georgetown University  
and NBER

**abstract:** The euro area faces three interlocking crises that together challenge the viability of the currency union. There is a banking crisis – where banks are undercapitalized and have faced liquidity problems. There is a sovereign debt crisis – where a number of countries have faced rising bond yields and challenges funding themselves. Lastly, there is a growth crisis – with both a low overall level of growth in the euro area and an unequal distribution across countries. Crucially, these crises connect to one another. Bailouts of banks have contributed to the sovereign debt problems, but banks are also at risk due to their holdings of sovereign bonds that may face default. Weak growth contributes to the potential insolvency of the sovereigns, but also, the austerity inspired by the debt crisis is constraining growth. Finally, a weakened banking sector holds back growth while a weak economy undermines the banks. This paper details the three crises, their interconnections, and possible policy solutions. Unless policy responses take into account the interdependent nature of the problems, partial solutions will likely be incomplete or even counterproductive.

## I. Introduction<sup>1</sup>:

The prospect of a breakup of the euro is increasingly viewed as possible. The online betting market intrade currently suggests the probability that a country currently using the euro will leave the euro area by the end of 2013 is roughly 40% and these odds peaked at over 65% as recently as November 2011 (see figure 1). Recently, the head of the European Central Bank (ECB) has acknowledged the possibility of some country ceasing to use the euro. He did so critically, arguing leaving the euro would have serious negative consequences, but this is a shift in rhetoric from simply calling a break-up an absurd notion.<sup>2</sup> In short, the euro area is not merely in a period of slow growth attempting to recover from a financial crisis; it is in a full-fledged crisis at present. In fact, this paper will argue the euro area is really in three crises. All three are difficult to solve, but crucially, all are interdependent, such that a solution to one crisis will prove undone by the others unless all three are resolved.

The euro area is currently involved in a banking crisis, where banks face a capital shortfall, interbank liquidity is restrained, and future losses are uncertain. It faces a sovereign debt crisis, where at least one country (Greece) will not pay its debts in full, and bondholders are displaying increasing concern about other sovereigns. It also, though, faces a macroeconomic crisis, where slow growth and relative uncompetitiveness in the periphery add to the burden of some of the indebted nations. This last crisis is one primarily about the level and distribution of growth within the euro area. Current account deficits in peripheral economies leading into the crisis were a symptom of credit booms and a growing disparity in competitiveness within the euro area. These gaps grew over a decade and will be very hard to reverse quickly with no changes in exchange rates across member states possible, helping hold back growth in the periphery.

---

<sup>1</sup> I thank the editors and discussants for extremely helpful feedback at early stages of the paper. I also thank Maury Obstfeld, Olivier Blanchard, and Philip Lane as well as the political economy working lunch at Georgetown for comments. Disclosure: I am a part-time visiting scholar at the IMF, but the views expressed should in no way be attributed to the IMF.

<sup>2</sup> See for example, "Draghi warns on eurozone break-up" *Financial Times*, 12-18-2011. The next week, though, Draghi made clear he believed the euro was permanent, "I have no doubt whatsoever about the strength of the euro, about its permanence, about its irreversibility. Let's not forget, this was a key word at the time of the Maastricht treaty. The one currency is irreversible." Again, though, the very need for the head of the ECB to discuss the permanence of the euro in front of the European Parliament shows the stresses on the system.

The crises are interlinked as the sovereign debt holdings of the banks suggest that if the stressed sovereigns (this paper will use the acronym GIPSI to refer to Greece, Ireland, Portugal, Spain, and Italy) cannot pay their debts, the banking system is insolvent. At the same time, though, attempts at austerity due to sovereign stress are slowing growth. Without growth – especially in the stressed sovereigns – it is likely that the sovereign debt crisis will persist. To complete the circle, continued troubles for the banks could bankrupt certain sovereigns who would struggle under the weight of supporting their banks, and a broken credit channel can be a constraint on growth. (Figure 2 shows the circular nature of the three crises).

The creation of the euro meant that boundaries that used to keep problems in one country have been erased. It also meant, though, that some of the tools available to solve problems at the national level are gone. In some cases, the tools to solve the issues at the supranational level have either not been developed or have not been used. This puts extreme stress on individual countries facing a shock and puts others at risk as they have less capacity to insulate themselves. When the global financial crisis was initially under way, some observers argued that the euro area was weathering the storm relatively well, and in fact, if anything, the euro was more stable now than before as countries had seen the damage that can accrue facing a financial crisis as a small open economy with an independent currency.<sup>3</sup> In the next two years of the crisis, though, Europe and the euro in particular have moved to center stage of the crisis.<sup>4</sup>

Many of the policy approaches have been limited to particular symptoms of individual crises: nation states bailing out a banking system, austerity to balance budgets, massive liquidity allowing banks to buy more sovereign debt. Often though, these policies have the potential to make matters worse. In particular, the growth crisis has often received insufficient attention (especially the question of short run growth). Recent liquidity provision by the ECB may be an important step towards a broader solution, but a more comprehensive solution is needed.

---

<sup>3</sup> See for example the introduction and some essays in Alesina and Giavazzi (2010).

<sup>4</sup> Google searches for “financial crisis” spiked rapidly in September 2008, and these searches continued to dominate “euro crisis” for 2 more years. In May of 2010, though, the first hints of trouble are reflected in a surge of euro crisis searches, and by the end of 2011, there were roughly the same number of searches for “euro crisis” as “financial crisis”.

The challenges in responding to these three crises reflect difficulties of having a monetary union of somewhat disparate economies without political and economic institutions to manage various shocks. The euro area lacks sufficient institutions to deal with banking problems at the supranational level (that is, at the level of the entire euro area instead of at the national level). It lacks a unified debt market and as such, investors who want to hold euro area debt to must pick and choose amongst various national debt issues, making a possible default of one of the nation states more consequential than a default by a state or province within a country. Most importantly, it lacks the ability to manage shocks that hit different parts of the euro area economy differently. This last feature – the lack of shock absorbers to handle asymmetric shocks – is not a new revelation. It has been a persistent concern of economists who have questioned whether the euro area is really what economists would call an “optimal currency area,” an area that should logically have one currency. Institutional change that fixes at least the first two problems (the last is much more difficult) are likely to be more helpful to the functioning of the currency union than a fiscal compact that simply places limits on deficits.

In this paper, I describe the three crises affecting the euro area and their relationships with a particular emphasis on the way in which the macroeconomic growth and competitiveness challenges may undermine any efforts that focus on the liquidity concerns of the banks and sovereigns. The lack of tools for adjustment at the national level, and the difficulty and high cost of adjustment via “internal devaluation” make any solution that ignores the growth and competitiveness problem doomed to fail. The paper will not provide a blow by blow of every event in the last two years. They are too numerous and ever changing. Instead, it will try to lay out a general framework for evaluating the current crises.

Given its importance to the world economy, the current crisis in the euro area has attracted a great deal of attention in academic, policy, and media circles. For example, Roubini (2011a, 2011b) has written in various outlets how the euro project is unlikely to survive, often emphasizing the problems of long run external imbalances and the need for growth in the periphery. Wolf (2011, 2012) and Krugman(2012a, 2012b) have also emphasized problems with austerity, the need for growth to escape the crisis, and the importance of current account imbalances across countries. The euro-nomics group (2011) (academics from various euro nations providing policy advice) have dubbed the connection between banks and sovereigns the diabolical loop. Eichengreen (2012) highlights the joint

nature of the banking and sovereign crises and notes the connection from austerity to growth. This paper will try to add to this rapidly growing and changing literature by providing evidence as to how the three crises are interlinked and the special policy challenges this generates.

## **II. The Three Crises**

### **a. The Banking Crisis in the Euro Area**

#### **i. Euro Area Banks**

The banking system in the euro area – and in the EU more broadly – is both large and global. Total assets of the banking system as a share of the overall economy were over 300% in the euro area in 2007 and under 100% in the United States. Data comparability is not perfect, and some have argued that a proper figure would show the two systems to be closer to the same size.<sup>5</sup> The large size of the banking system, relative to other parts of the financial system, highlights another important fact: firms in the euro area relies more on the banking system for financing than American firms (who are more likely to use capital markets directly), making the health of the banking system particularly important in Europe. Furthermore, the largest individual banks in the U.S. and Europe are roughly the same size, and thus the largest euro-area banks are roughly the same share of euro area GDP as the U.S. banks are of U.S. GDP, but this implies the largest euro area banks are a much larger share of any individual national economy in the euro area. ING bank in the Netherlands is smaller than a number of U.S. banks, but given that the Netherlands economy is roughly 5% the size of the U.S. economy, it is huge relative to its home economy. In fact, ING has more assets than the entire GDP of its host country; no U.S. bank has more than 1/8<sup>th</sup>. It is massive relative to the economy of the government that would be responsible to help it in times of distress.

In addition to being large as a share of GDP, these banks are highly global in their orientation (see McGuire and von Peter 2009 or Shin 2012). The global and trans-European nature of the banks is part of why they can be so large as a share of GDP, but also makes the national supervision and backing of the banks all the more problematic.

---

<sup>5</sup> U.S. data are for commercial banks and thus do not include money market funds, commercial paper markets, and other non-bank parts of the U.S. financial system. As this “shadow banking” system is larger in the United States than in Europe, this can make a fair comparison of EU and U.S. banking systems difficult.

## ii. The Nature of Bank Crises

Banks typically fund themselves with short term liabilities, demand deposits being the ultimate short term liability as they can be withdrawn at any time. Banks take these funds and invest them by making loans or holding securities. Thus, they are constructed in a way that leaves them vulnerable to a bank run, where depositors or other providers of short term funds withdraw deposits or refuse to roll over short term credit. If a bank has lost money on loans or investments, it may become insolvent – where it owes more money to depositors and other creditors than its assets are worth. Because information is imperfect, depositors or other creditors have difficulty knowing if a bank is in fact solvent. If they fear a problem, they may try to withdraw their funds before the bank defaults. If too many short term creditors withdraw funds at once, even a healthy bank may have trouble meeting the demand for funds as many of its assets are loans or other securities that are hard to liquidate quickly.<sup>6</sup> Far from being a flaw in the design of the banking system, this is part of the nature of banks: providing a liquidity service and channeling funds from savers who may want access to their money to borrowers who need funds over longer horizons.<sup>7</sup>

Thus, problems in a banking sector can either be those of liquidity – where solvent banks cannot get funds – or of solvency – where banks simply do not have assets of enough value to pay off creditors. The dividing line can blur, though, if due to liquidity pressure, a bank is forced to sell assets for “fire sale” prices or borrow at crippling high rates to replace funds that had been provided more cheaply until the crisis. In these cases, an institution that was illiquid may become insolvent. In a liquidity crisis, a central bank can stand in as a “lender of last resort” providing funds that the market is unwilling or unable to provide. If a bank becomes truly insolvent, it may need to wound down with losses that must be taken, either by the equity investors of a bank, the creditors, taxpayers, or some combination. If instead, there is simply a threat of insolvency, it may be that an injection of capital could guarantee solvency by providing the bank a bigger cushion against losses. This still imposes

---

<sup>6</sup> While a classic bank run by depositors is in many ways forestalled by deposit insurance, other sources of funds – such as repurchase agreements – are still vulnerable to bank run like behavior.

<sup>7</sup> See Diamond and Dybvig (1983) for the classic treatment of the problem of a bank run and the structure of the banking system.

losses on equity holders (as their share of owning the bank is diluted) and possibly costs to taxpayers (if the injection comes from public funds).

Despite the uptick in global banking activity, bank supervision and resolution of banking solvency problems is still primarily a national activity – even in the euro area where funds can flow freely in the same currency across borders. The creation of the European Banking Authority has centralized some functions, but supervision and especially fiscal support is still at the national level. The provision of liquidity, though, is a central bank activity as only the central bank can instantly create as much liquidity as needed. In theory, this leaves the role of liquidity provision to banks to the ECB – a euro area wide institution – but the ECB has no statutory responsibility to serve as the lender of last resort. It can act as one but is not formally charged with the responsibility (Obstfeld, 1998).

### **iii. The Bank Crisis of 2007-??**

In 2007, liquidity problems surfaced in both the United States and in Europe. U.S. house prices had started to decline and assets that were tied to U.S. mortgages became questionable in value. It became increasingly difficult for banks to borrow as there was uncertainty regarding the quality of their assets.<sup>8</sup> One indicator of the difficulty of banks finding funds can be seen in a basic indicator of financial stress, the difference between the rate banks charge one another for short term funds in comparison to a “safe” overnight rate. Figure 3 shows this spread for the euro banking market. One sees an increase in the summer of 2007, followed by another increase in the spring of 2008 after Bear Sterns collapsed, followed by an extreme spike in the fall of 2008 after the failure of Lehman Brothers. The pattern is similar for U.S. or UK banking markets.

Central banks stepped in to solve these problems in a number of ways. First, they cut the interest rates they charged banks to borrow, second, many central banks dramatically increased the amount of assets they held on their own balance sheet and the volume of loans they made to the banking sector. Finally, due to the particular difficulties of non-U.S. banks that needed dollar funds (because they had borrowed short term in dollars and held illiquid U.S. assets), central banks arranged

---

<sup>8</sup> See Fender and Gyntleberg (2008) for a real time discussion of the progression of the liquidity crunch and Gorton (2008) for a description of how bank and non-bank funding problems led to a bank-run like crunch in liquidity. Housing bubbles also built in a number of EU countries as well, leaving some euro area banks exposed to their own real estate markets as well.

a number of “liquidity swaps” where the Federal Reserve provided funds in dollars to other central banks that then provided collateral to the Federal Reserve. This allowed the ECB and other non-U.S. central banks to provide funds in dollars directly to their banks that needed them.<sup>9</sup>

The initial response of the ECB differed somewhat from those of other major central banks. While the ECB eventually did cut rates like its counterparts, it did not cut rates in response to the initial funding problems in the summer of 2007 and in fact raised rates in July of 2008 before cutting them following Lehman’s collapse. It also did not dramatically increase the assets it was holding. That is, it did not dramatically increase the size of its own balance sheet in the first few years of the crisis. Early on, one might argue that given the focus on U.S. asset markets, this was understandable, but over time, as euro area banks continued to face problems, the ECB did not increase its balance sheet more until the end of 2011 (discussed later). Figure 4 shows comparative central bank responses of the Federal Reserve and ECB. The ECB increased the size of its balance sheet moderately at the peak of the crisis and then held at that level, with its assets rising by 39% between August 2008 and August 2011. That paled in comparison to the actions of the Federal Reserve, though; the Fed’s assets increased nearly 210% in that time. Despite the different responses, as can be seen in figure 3, the initial liquidity crush on banks did calm down. Rates charged in interbank markets returned to more normal levels.

The bank crisis was not settled, though. The losses that helped trigger liquidity problems also helped generate solvency problems. Euro area banks required a series of bailouts and guarantees and continue to struggle with undercapitalization. These issues and the way in which the bank crisis and problems in sovereign debt markets are linked are discussed in sections III.b. and III.c. below.

## **b. The Sovereign Debt Crisis**

### **i. Recent pressure in sovereign debt markets**

The sovereign debt crisis in the euro area has gone through a number of acute phases where the yields on some euro area government bonds jumped to very high levels. In particular, market participants tend to focus on the difference (or spread) between the various countries’ bonds and those

---

<sup>9</sup> In this transaction, the Federal Reserve takes on no risk from other country’s banking system – just from the other central bank - and holds collateral from the other central bank and a guarantee to re-swap currency at the same exchange rate as well. See Obstfeld et al (2008) for early analysis.

of Germany's as an indicator of the stress in the sovereign debt market. Investors might demand a different interest rate on the bonds from two countries for two different reasons. First, if one currency is expected to strengthen against the other, then the asset in the strengthening currency will be worth more over time and investors would be willing to hold it even if it pays a lower interest rate. Alternatively, investors may worry that the government will default, that is, simply not repay its debt. If the chance of default differs between two countries, the country more likely to default will have to pay a higher interest rate to compensate investors for the risk.

Figure 5 shows interest rates on long term government debt over the last two decades. The influence of the euro is unmistakable. Prior to the introduction of the euro, interest rates across future euro members showed wide gaps. As the possibility of changes in currencies was removed and an assumption that no euro area country would default was built in, the spreads went to zero. As Greece joined the euro in 2001 (not 1999), its interest rate converged slightly later than the other members. Interest rate gaps did not reappear until the crisis. The first year of the crisis still had relatively low spreads (Figure 6 focuses on spreads in the recent period). In 2010, though, spreads began to grow, first for Greece, and then for a number of other countries. In many cases, a policy announcement by euro area policy makers has calmed markets and brought spreads down, but they have reappeared time and again.

Because a default means a country cannot pay back its borrowing, the sovereign debt crisis in the euro area is often viewed through the lens of fiscal profligacy. This tendency is heightened by the fact that the first country to experience pressure in the markets was Greece, and Greece's problems have centered around problems with spending and inaccurately reported government finances. In this conception, the root cause is irresponsible fiscal policy, all that is needed is to ratchet down deficits via austerity, and if budgets cannot be balanced immediately, some short term financing from other governments or the IMF may be needed. Section IIIa. considers the causes of the sovereign debt crisis in more detail and challenges this view of the sovereign debt crisis.

## **ii. The nature of debt sustainability**

The basic equation for debt sustainability is that:

$$(1) \Delta D_t = (R_t - g_t) * D_{t-1} + primary$$

Where  $D$  is the debt to GDP ratio,  $R$  is the nominal interest rate,  $g$  is the nominal growth rate, and  $primary$  represents the primary (non interest) budget deficit scaled to GDP. The intuition is that this year's debt scaled to GDP is the same as last year's (the debt we still owe) plus interest plus any new borrowing (or saving) beyond interest, minus the degree to which GDP (the denominator) grows to offset increases in the debt (the numerator). If the interest rate paid on the outstanding debt is greater than the growth rate of the economy, even if the primary (not including interest) portion of the budget is in balance, debt as a share of GDP will grow. Importantly, the converse holds. Even a country with a primary budget deficit of 2% of GDP could have a shrinking debt to GDP ratio if the growth rate of the economy exceeds the interest rate by a sufficient amount. The larger the stock of outstanding debt, the more important the interest rate and growth rate will be. A country with high debt (roughly 100% of GDP) that cuts its government spending will face an increasing debt to GDP ratio the following year if the multiplier on government spending is at least 1. A higher multiplier (or higher debt to GDP ratio) will generate an even bigger effect.<sup>10</sup>

In this sense, a sovereign debt crisis can act much like a bank crisis. A country that can fund itself with low interest rates is solvent, but the very same country forced to pay a higher interest rate is suddenly feared insolvent, even if its primary budget is in balance. Furthermore, though, low growth can doom an otherwise solvent country to insolvency.

### **c. The Euro Area Growth Crisis**

#### **i. The Current Slowdown and Gaps in Performance**

The euro area, along with most of the world emerged from recession in 2009. Growth started again, and at various points in time, the euro area appeared to be recovering from the financial crisis more quickly than the U.S. or Japan. Even as recovery for the area overall proceeded, though, there was evidence of a problem with the distribution of growth across the currency union. Euro area economic sentiment (a combination of consumer and business confidence reported by the European

---

<sup>10</sup> The precise impact will depend on the initial growth rate, the interest rate, and whether the interest rate in anyway responds to the budget cuts. If the cuts are permanent, and only have a growth impact in the first year, then over time the debt to GDP ratio will be improved by making cuts, but in the first year, they may not just lower growth, but even make the debt load worse. Cuts phased in over time can lead to a lower debt to GDP ratio despite the additional spending in the intervening years if the multiplier is lower later in the cycle when the economy is stronger.

Commission) demonstrates the issue clearly (see Figure 7). At the start of the crisis, sentiment in Germany dropped more than the average of Greece, Italy, Portugal, and Spain, and after the peak of the crisis, sentiment rebounded relatively uniformly across the entire currency area through 2009. While the euro area as a whole appeared to continue this steady improvement through 2010, with just a brief slowdown around the first sovereign debt scare in the spring of 2010, the area average masked wide disparity. German economic sentiment was rising and by September 2010 had in fact surpassed its pre-crisis peak. The Southern tier countries in the euro, though, remained stuck at a very low level of business and consumer confidence. By the early 2011, sentiment was falling everywhere.

This sluggish confidence is understandable given the performance of unemployment. By June 2010, the German unemployment rate was already below its pre-crisis level, and in a number of other northern tier countries, unemployment rates were falling steadily. The euro area average, though, remained stuck at 10% as the unemployment rates in the GIPSIs continued to climb long after the official recession had ended. By the 4<sup>th</sup> quarter of 2011, the euro area wide rate reached a new high as the unemployment rate kept rising in the GIPSIs, pulling the overall euro area unemployment rate to 10.7%. It is not clear that the unemployment rate in the periphery (which includes youth unemployment near 50% in some countries) is politically sustainable.

Weighed down by weak performance in the GIPSIs, the euro area on net is growing slowly – just 0.7% over the four quarters of 2011. The weighted average of growth in the GIPSI countries was roughly -1% over that time. The rest of the euro area grew roughly 1.5%. As the crisis worsened in the countries undergoing severe austerity, the overall euro area has likely slid back into recession. GDP contracted for the overall euro area in the 4<sup>th</sup> quarter by more than 1% at an annual rate. Contraction occurred not just in the GIPSI countries, but in Germany, the Netherlands, Belgium, and Austria as well. The IMF January 2012 forecast suggests the overall euro area will contract during the four quarters of 2012 with Spain and Italy shrinking by more than 2%. Thus, the euro area has in a sense two aspects of a growth crisis. First, the overall area is growing too slowly to reduce unemployment and support debt levels. Facing historically high unemployment and in the midst of a second recession within 3 years, the overall area needs faster growth. At the same time, though, the distribution of growth across the area is unbalanced with those economies facing pressure in bond

markets growing most slowly. As the previous section showed, this means these countries are quite likely to continue to struggle with their debt burden because they need growth to become solvent. Thus, regardless of what is done to meet their liquidity and funding needs and even if the banking system avoids collapse, without growth in the GIPSIs, the overall crisis cannot end.

ii. **Imbalances:**

This imbalance of growth is often described as a problem of current account imbalances within the euro area.<sup>11</sup> In that conception, the chief problem in the GIPSIs is their large current account deficits prior to the crisis and the buildup of overall debt (not just government debt), in particular debt owed to foreigners (the external debt). The current account deficit and growth crisis are clearly linked. The current account imbalances prior to the crisis signaled competitiveness problems in the periphery, and the present day current account deficits are a drag on demand. In addition, the capital inflows helped increase prices, reducing the competitiveness of the borrowing countries. Further, as prices increase in peripheral countries, this meant their real interest rates fell relative to other euro countries, leading to more borrowing.<sup>12</sup> Improved exports or reduced imports could increase GDP given how far the economies are from full employment. Further, the imbalances ahead of the crisis highlighted the buildup of debt that now requires painful deleveraging. Blanchard and Giavazzi (2002) argued the current account deficits (just growing at the time) may not be a problem within the euro area as they may simply represent poorer countries with higher expected growth rates increasing their consumption in a newly unified market. More recently, with ten more years of experience to monitor, Obstfeld (2012) has argued policymakers should remain wary of current account deficits even within a currency union (especially if national governments are responsible for national financial stabilization).

At the same time, while current account imbalances within a monetary union may be a symptom of problems, they are different than those in a standalone economy. A country with a current account deficit may face a liquidity problem if foreign investors refuse to continue lending (i.e. a sudden stop can occur), and domestic residents may pull capital out of the economy as well, with the

---

<sup>11</sup> See Wolf (2011, 2012), Krugman (2012b), and Avent (2011) for writings along these lines.

<sup>12</sup> See Lane (2006) for a discussion of the early impacts of the introduction of the euro across countries.

entire economy, not just the sovereign, facing a liquidity run. This generally results in a crash of the currency or a closing of international financial mobility.<sup>13</sup> In the euro area, payments crises cannot manifest as currency runs. Furthermore, money continues to flow to the borrowing countries via internal ECB channels.<sup>14</sup> Payments problems can still exist. If no one will lend to the banks or government, outside aid must be sought (as in Greece, Portugal, and Ireland), but a full-fledged currency crisis has not happened as there is no currency on which to run. Thus, in many ways, the acute part of the imbalances is the demand side. Given the deleveraging in the private sector and the austerity restrained fiscal policy, these countries desperately need improved current account balances to provide extra demand.

For the peripheral economies to increase their growth based on exports (or shift consumption towards domestic goods and away from imports), they need their relative prices to fall compared to other goods and services on world and euro area markets.<sup>15</sup> The within euro area comparisons are relevant for two reasons. First, due to high levels of trade within the euro area, a substantial percentage of GIPSI export markets are within the euro area. More importantly, the overall euro exchange rate will fluctuate based on the overall economy of the union. If all countries in the euro area were struggling with a lack of competitiveness on world markets, one would expect the euro to fall in value. Competitiveness is not something intrinsic to a society or an economy, it is about relative prices. An uncompetitive economy whose currency weakens can be suddenly competitive on world markets overnight. The overall euro exchange rate will be determined by the overall euro area, thus, a lack of competitiveness within the monetary union means a country will remain overvalued.

### **iii. Currency Area Theory and Asymmetric Shocks:**

---

<sup>13</sup> Insolvency for a country or entire economy, though, is more complex. One can generate an aggregate balance sheet for a country, but it is just that: aggregate. Asset holders are not responsible for debtors and there is no direct question of solvency. Further, many liabilities may be in the form of equity or FDI, not debt (where money must be repaid regardless of outcomes).

<sup>14</sup> There has been capital flight as bank deposits in some GIPSIs have declined substantially, but the within euro area central bank transfer system (TARGET2) has meant that banks within the GIPSIs still have enough liquidity as they borrow from the ECB via their national central bank. There has been some controversy over the importance of the TARGET2 system and the implications it has for credit risk at the surplus national central banks. See Sinn and Wollmershaeuser (2011) and ECB (2011) for two sides of this issue.

<sup>15</sup> Assuming that trade elasticities operate such that a fall in relative price is made up for with an increase in the volume of exports relative to imports. If the volume of trade is not responsive, making imports more expensive and exports less valuable could actually worsen the trade balance.

The problem of adjusting to asymmetric shocks within the euro area is not an issue that was unexpected. For more than fifty years, economists have studied the question of what constitutes a sensible currency union.<sup>16</sup> At the time of the creation of the euro, many economists (especially outside the euro area) worried that the lack of labor mobility and fiscal policy offsets within the euro area would mean that when different shocks hit different parts of the currency union, there would be no policy levers to offset the shocks.<sup>17</sup> Countries could no longer run their own monetary policy and exchange rates could not adjust, leaving the potential for one region to remain mired with high unemployment and another region to have a strong economy.<sup>18</sup> The hope was that before the area was truly tested by a severe shock, euro area labor flexibility and mobility would improve or cross country fiscal transfers would rise as euro area political institutions grew. Now however, countries are struggling with high unemployment and no policy lever to combat it. The only possible policy lever – fiscal spending to combat the recession – has been taken away by the pressure in the sovereign debt markets and the lack of cross country support beyond measures to forestall default (policies to increase labor market flexibility are discussed in section IIIa.).

Comparison to the United States is informative. The United States certainly has disparate shocks hit the economy. Much like Spain and Ireland, Nevada and Florida saw massive real estate booms followed by busts. The United States also has large differences in the economic nature of different regions. New York acts as a financial center, Hawaii a tourism center, the gaps across manufacturing concentration from the Midwest the Northeast are similar to the gaps from Germany to Greece. Still, despite similar circumstances, the United States has not seen persistence in labor market outcomes that have appeared in the euro area. In contrast to the euro area, unemployment rates are falling in the highest unemployment rate states in the United States at present, and the range of unemployment rates is falling not rising. The range of unemployment rates across U.S. states has fallen from 11 to 9.3 percentage points from its peak in mid-2010 to the end of 2011 (this is still roughly double the pre-crisis range). In contrast, the range of unemployment rates across euro area

---

<sup>16</sup> The classic reference is Mundell (1961)

<sup>17</sup> See Jonung and Drea (2009) for a review of U.S. economists' view of the euro area.

<sup>18</sup> See Obstfeld (1997) for the typical concerns voiced by some U.S. academics

countries has grown from 15.7 percentage points to 18.9 over the same time period (more than two and a half times the pre-crisis range).<sup>19</sup>

Labor mobility across regions can provide adjustment to shocks, as people move from areas without jobs towards areas with jobs. While the exact degree of labor mobility in the United States is a matter of debate, it is typically accepted that mobility across U.S. states and regions is higher than across countries of the euro area. Blanchard and Katz (1992) argue that unemployment rates tend to return to the national average in the United States after a shock not because employment improves or participation rates change, but rather because workers leave the state.<sup>20</sup> Obstfeld and Peri (1998) warned that even intra euro area country mobility (that is, within Italy or within Germany) is lower than in the United States, suggesting that even after currency union, the euro area would be left with little ability to adjust to shocks.

The United States also has a large degree of fiscal shock absorbers across regions – when an individual loses a job, their state is now sending less money to the Federal government, but receiving more back in transfers.<sup>21</sup> It is true that a fiscal cushion cannot last forever. If a country faces a need for adjustment (either due to a permanent shock or imbalances that built over time), it could cushion the shock with fiscal policy, but eventually, some mechanism must generate adjustment (see Blanchard (1998) for discussion). But, GIPSI countries are currently left with no cushion and no immediate path of adjustment.<sup>22</sup> As Obstfeld and Peri note, European countries and Canada are more likely to have permanent fiscal transfer flows where adjustment does not take place, but permanent streams of

---

<sup>19</sup> The comparison is not apples to apples as it uses 50 U.S. states and the 17 current euro area countries. But, splitting the U.S. into more regions should make the range of unemployment rates wider than it would be if one were to collapse the U.S. into a smaller number of regions. The comparison also highlights the fact that the range of unemployment rates in the euro area is considerably higher than in the United States.

<sup>20</sup> Decressin and Fatas (1995) also argue that migration absorbs shocks in the U.S. such that unemployment returns to normal. In Europe, though, they argue labor participation not migration changes after a shock. Rowthorn and Glyn (2006) argue there are estimation concerns with the original Blanchard and Katz results and that there is less evidence that unemployment rates across states converge after a shock. Feyrer, Sacerdote, and Stern (2007) provide a detailed analysis of the impact of shocks to the auto and steel industries and find similar results to those of Blanchard and Katz.

<sup>21</sup> See Sala-i-Martin and Sachs (1992) for a high estimate of the offset in the U.S. and Fatas (1998) for a more conservative estimate.

<sup>22</sup> Blanchard's (2007) consideration of Portugal is an important contribution as it highlights that these problems were often clear before the crisis took hold. Furthermore, the solutions were not easy then, with a stronger external environment and less sovereign debt pressure.

payments from one region to another cushion bad outcomes. The euro area does not have a large system of transfers across countries.

### **III. Connections across Crises and Incomplete Policy Approaches**

The discussion above demonstrates there are connections across these crises. The following sections highlight these linkages. Often, the linkages come from the policies used to combat the individual crises and these policies are discussed as well. The discussion also highlights the institutional holes left at the time the euro was created. The ECB was given a 2% inflation target and nothing else. The responsibility for supporting banks with liquidity was ambiguous and for supervising banks was absent. While labor was now in theory mobile, mobility was low and there was no other mechanism to offset shocks. The only institution added as part of the Maastricht treaty and its refinements was the Stability and Growth Pact which restricted countries' public budget deficits. A combination of politics and ideology meant that public sector borrowing and inflation were supposed to be controlled but private borrowing, banking system issues, unemployment, and other macroeconomic challenges were left unattended at the euro area level. The politics of such choices are beyond the scope of this paper, but the choices made at the creation of the euro have left great challenges for current policymakers.

#### **a. Growth and the Sovereign Debt Crisis**

Examining which countries are currently facing pressure in sovereign debt markets demonstrates the importance of adequate growth and macroeconomic fundamentals. Panel A of Figure 8 shows the 2010 level of debt compared to the 2011:Q4 spread of the 10 year bond rate relative to Germany for the 12 countries that were in the euro area from 2002 on. As can be seen, in general, higher debt countries face higher spreads, but the relationship is in no way perfect. Spain has a lower debt to GDP level than Germany, France, or Austria, and yet pays a substantially higher rate on its debt. One could instead look at the deficit in 2010, to see if it is the change not the level that has markets worried. Here, the relationship again looks broadly sensible.<sup>23</sup> Still, both the level of debt and the current deficit may simply be related to the depth of the shock countries faced or the amount of

---

<sup>23</sup> Ireland's outlier level of deficit is generated by the huge costs associated with its bank bailout.

private sector liabilities they absorbed during the crisis. Thus, one may instead prefer to look at the development of public finances prior to the crisis to see if fiscally irresponsible governments are the ones being punished by markets. This is also the appropriate test to see if a failure of euro area institutions to reign in poor fiscal behavior in the first decade of the currency union was the problem (and consequently if a new fiscal pact limiting deficits is likely to prevent future problems). Looking at panel C, the idea that profligate governments took advantage of low rates to behave irresponsibly, and they are now being punished seems to fall apart. The relationship is not statistically significant. Prior to the crisis, Spain and Ireland were both cutting public debt as a share of GDP. Portugal was certainly running up an increasing level of public debt, but France and Germany stand 2<sup>nd</sup> and 3<sup>rd</sup> in the increase in public debt and currently have very low bond yields.

Instead, one might look to the depth of the shock itself to consider the fear markets have for certain countries ability to repay. Panel D shows the current level of unemployment across countries relative to the spread on sovereigns. The relationship has the same significance and explanatory power as the level of debt in 2010. Again, though, causality could run in either direction. It may be that countries currently being challenged by markets have had to tighten budgets so much that the unemployment rate has responded to the austerity, but the picture using unemployment rates from the end of 2009 is quite similar, suggesting the depth of the shock may be a determinant of current bond spreads.

A different picture is found by looking not at fiscal deficits prior to the crisis but current account deficits. The current account deficit represents the trade deficit, but it also represents the net borrowing by all participants in the economy from the rest of the world (if a country buys more than it sells it must borrow the money from elsewhere.) If in a crisis many private sector debts wind up becoming public debts (due to bank bailouts or other aid to the economy), one would expect that large borrowing prior to the crisis anywhere in the economy will lead to problems with sovereign repayment today because previous private borrowing may increase current fiscal risk. This, though, suggests that the problem is with total borrowing in the economy, and borrowing from outside the economy in particular, not with government borrowing per se. Alternatively, one could view the large current account deficits as a representation that a country's goods and services are mispriced on world

markets. In this case, one might assume that countries with large current account deficits prior to the crisis have large spreads because investors fear their ability to grow enough to repay the debt. Panel E shows a nearly perfect relationship between the current account in 2007 and the spread over German debt paid today. Those *countries* that were borrowing (as opposed to *governments* borrowing) are currently under attack (2007 is not a fluke, the picture is nearly identical if one looks at the sum of current accounts over the period of 2001-7).

Figure F looks at the change in prices from 2001 to 2007. Again, there is a fairly strong relationship across current spreads and pre-crisis loss of competitiveness. Thus, one concern in sovereign debt markets may be that some countries simply face very bad growth dynamics in the near future. They have borrowed too much in the private sector and are not cost competitive with the rest of the currency union. The slow growth is seen in the high levels of unemployment and suggests that without a very low interest rate, their debt burden is likely to grow.<sup>24</sup> With only 12 countries under study, one cannot separate the possibility that the problem the current account demonstrates is a loss of competitiveness as opposed to simply a preference for borrowing, they are both imbedded in the current account. Given the small sample, it is difficult to meaningfully test different potential causes of the increased spreads in a multivariate regression framework, but the current account in 2007 appears to be the variable most closely connected to current spreads as it has high statistical significance, the most explanatory power, and is the variable that retains significance if other variables are included in a regression together.<sup>25</sup> The pictures in Figure 8 suggest that the current sovereign debt crisis may have as much to do with growth and problems in the private sector as they do with fiscally irresponsible governments.

### **Policy Response: Internal Devaluation:**

---

<sup>24</sup> The next section will deal more directly with changes in cost competitiveness within a currency union.

<sup>25</sup> If one includes debt in 2010 (or 2007) and the current account in 2007 in a regression on the spread over Germany, one finds that the coefficient on debt levels is not significantly different from zero while the coefficient on the current account is statistically significantly different from zero at the 99% level. The simple regression with two explanatory variables explains roughly 80% of the variation in spreads. Dropping the debt level variable only reduces the explanatory power to 0.76. Including the spread over Germany in 1993 to see if some countries have simply never been trusted by the market does not reduce the explanatory power of the 2007 current account. Attinasi *et al* (2009) examine the initial widening of spreads and find both banking bailouts and projected deficits are related to rising spreads. They use the current budget deficit forecast which is affected by economic conditions and do not examine the current account or pre-crisis fiscal balance.

As noted, the growth crisis requires some sort of demand shift towards the GIPSI countries. But, the euro area has surrendered the classic means of adjusting to shocks across countries – an exchange rate change – without other means of adjustment. Recent emphasis has been put on the need for deficit countries to have an “internal devaluation” that is, to have the price of their goods and services fall relative to other countries without a nominal depreciation.<sup>26</sup> This can occur if wages and local prices fall while the exchange rate remains constant. Both theory and evidence, though, suggests that this may be a difficult road for the euro area.

Internal devaluation or revaluation should be more complicated and difficult than a simple change in the exchange rate. This is the original argument in favor of flexible exchange rates running back to Friedman (1953). Why change thousands of wage and price contracts when one can simply change the exchange rate? An internal devaluation presents a further problem. Economic theory – especially that of a Keynesian or New Keynesian bent – gives an explanation of why an internal revaluation should be easier than an internal devaluation. It is often more difficult and costly to change prices down than it is up. In particular, wages are difficult to adjust downward, a result long understood in economics (see Akerlof et al (1996) for a discussion and Barattieri et al (2010) for recent evidence on wage rigidity and downward inflexibility). Thus, unless prices are rising quickly in a countries’ trading partners’ economies, it may be slow and costly for an internal devaluation to occur.

One can evaluate the possibility of an internal devaluation in a number of ways.<sup>27</sup> First, we can examine how often countries experience a real exchange rate depreciation (relative prices getting cheaper on world markets) without a nominal depreciation (the currency getting cheaper on world markets). Shambaugh (2012) uses BIS narrow trade weighted exchange rate indices for a sample of 26 mostly advanced countries stretching back to 1964.<sup>28</sup> Defining an internal devaluation as a 3% change

---

<sup>26</sup> See for example, Aslund (2010). See Roubini (2011) for skepticism of the viability of such a path.

<sup>27</sup> These results draw from Shambaugh (2012)

<sup>28</sup> Looking at much wider indices introduces potential problems. Even in a geometric index, a hyperinflation can generate an outsized weight in the calculations. Thus, broad trade weighted indices that include countries that went through hyperinflations may generate gaps from the nominal to real exchange rate index for any partner country if the price level and exchange rate do not move in perfect lock step month to month or year to year in the hyperinflation countries. Also, these indices use consumer prices to generate real exchange rates. One could use export prices, but if a country is a price taker in export markets, even if its prices rise, its export prices may not. Instead, less cost effective firms may simply stop

(continued)

in 1 year, a 5% change over 3 years, or a 7% change over 5 years, the paper finds that roughly half of the countries in the sample experience an internal devaluation.<sup>29</sup> Nearly all, though, happen in eras of generalized higher inflation before 1991 (see Table 1).<sup>30</sup> When world prices are rising 10% a year, a country can have a substantial real depreciation by simply having lower (but still positive) inflation compared to its trading partners. Prices and wages do not need to fall to become substantially cheaper on world markets. Internal revaluations, where prices increase faster than in trading partners, are roughly twice as common as internal devaluations.

Since 1990, there are broadly only three examples of an internal devaluation: Hong Kong in the early 2000s (when a drop in demand for Hong Kong goods and services following the merger with China led to a fall in prices while the nominal exchange rate was pegged to the U.S. dollar), Japan in the late 1990s and early 2000s (when deflation meant Japanese prices were falling, but the exchange rate was relatively constant or depreciating slowly) and Ireland during the current crisis (when wages and prices fell, and the euro was relatively constant in value). In the different categories of 1, 3, and 5 year devaluations, sometimes one of these episodes shows up more than once (3 of the 3 year periods are part of the sustained shift in Japan) making the actual count greater than 3, and in some cases, one of these episodes does not qualify (no single year in Japan's deflation reaches a 3% real depreciation, the 3 episodes are in Hong Kong twice and once in Ireland), but no episode shows up outside of these three. Latvia is not in the sample, but its current experience would certainly qualify as its real exchange rate depreciated 7% in 2010 from 2009 while the nominal exchange rate depreciated just 3%. Due to an appreciation in 2009, Latvia's real exchange rate is now just slightly below its 2008 level.<sup>31</sup>

In contrast, real depreciations associated with changes in the nominal exchange rate are common before and after 1990. As the table shows, there are over 250 episodes of a real depreciation

---

exporting reducing quantity rather than raising prices for the country as a whole. For this reason and for comparability to U.S. city prices, this paper uses consumer price based measures.

<sup>29</sup> Technically, the requirement is that the real exchange rate depreciate 3%, that it depreciate 3 percentage points more than the nominal exchange rate, and that the nominal exchange rate not depreciate substantially. Thus, a 3% real depreciation with a 2% nominal depreciation would not count (the gap is too small). A 15% real depreciation with a 12% nominal depreciation would also not count as the bulk of the adjustment is coming from the nominal exchange rate.

<sup>30</sup> After 1990, advanced country inflation remains below 5% a year. One can also shift the date back to 1986 with little change in the results as inflation was below 5% for most of the period 1986-90.

<sup>31</sup> Other Baltic nations pursued policies aimed at exchange rate stability and price adjustment, but none had sufficient changes in prices to be considered an internal devaluation.

if one does not constrain the depreciation to be an internal one – 10 times the number seen if the depreciation must come only via prices. Similarly, there are over 100 at the 3 year horizon and over 90 at the 5 year horizon. At all three horizons, depreciations after 1990 are plentiful. This is not to suggest that all these changes in the real exchange rate are needed or desired, simply that it is a much more common phenomenon.

It may be that a nominal depreciation is simply a path of least resistance compared to an internal devaluation, and internal devaluations are still quite feasible. That is, in many cases where a nominal depreciation generated a real depreciation, perhaps a real depreciation would have occurred even if the exchange rate were fixed. One can turn to within currency union price evidence to see whether there are substantial relative price adjustments. Again, the evidence is not encouraging for countries hoping to pursue this strategy.

Shambaugh (2012) uses price data for 27 U.S. metro areas from 1961 to 2010 (not all regions are available at the beginning of the sample) to see if metro areas can have falling prices relative to the rest of the U.S. currency union.<sup>32</sup> Using the same standards for an internal devaluation, but comparing each metro area to the median inflation rate for the nation, Table 1 shows that in the U.S., internal devaluations do take place prior to 1991, albeit rarely. With 2 exceptions, though, they do not happen at all after the U.S. moved to a lower inflation period post 1990.<sup>33</sup> U.S. inflation averaged over 5% from 1968 to 1990 but averaged 2.5% from 1991 to 2010. There were also no internal devaluations in the period 1961-8 when inflation averaged just 1.7%. Just as nominal devaluations may be a path of least resistance, labor mobility in the U.S. may take place before internal devaluation is needed.

Finally, one can look at relative prices within the euro area since its launch, again comparing inflation in each country to the median. Since its inception in 1999, only Ireland's experience post 2008 has qualified as a substantial internal devaluation. An interesting omission is Germany's experience in the 2000s. Much discussion of current imbalances focuses on Germany's dramatic shift from slow growth and balanced trade in 1999 to better economic performance and a sizable trade

---

<sup>32</sup> See Obstfeld and Peri (1998) for a review of the literature on inter-regional price variability. This section differs by focusing on the frequency of internal devaluation as opposed to the general level of variability.

<sup>33</sup> The two cases are Denver over the 3 years ending in 2004 and Honolulu over the 5 years ending in 1999

surplus by 2006. Examining panel F of figure 7, one sees Germany did have the lowest inflation in the euro area from 2001 to 2007, suggesting its relative prices were falling. But, many other countries are clustered relatively close to Germany. Figure 9 shows the price levels of the GIPSIs, Germany, France, and the euro area (ex Germany) inflation rate since the euro's inception. Certainly the GIPSIs – especially Greece and Spain – have lost competitiveness relative to the euro area and Germany in particular. But, Germany has gained only a modest amount against the euro area overall.<sup>34</sup> Its principal gains are against the outliers. This, in a sense, is the corollary of all the other results. Internal devaluations tend to only be successful against the backdrop of higher inflation elsewhere.

These results suggest that a rapid substantial shift in relative prices via wage or price compression is unlikely. Some GIPSI countries have lost considerable cost competitiveness in the last decade. Greek prices rose roughly 30% since 1999 relative to Germany (20% compared to the euro area ex-Germany). Spain's prices rose by 20% and 10% respectively. To regain competitiveness at a rate of 5% over 3 years would require a decade of internal devaluation in Greece. Further, the three countries that have had internal devaluations in a low inflation setting (as well as the internal devaluation of Latvia, who is not in the data set) have tended to be in the midst of severe recession / depression. Unemployment rates increase substantially over prior levels, and nominal GDP stays flat or declines for a number of years; this is not true on average for internal devaluations prior to 1991. One should not attribute the cause of the economic weakness to the internal devaluation; the important point is that these devaluations tend not to happen absent severe economic contractions with unemployment substantially above trend.<sup>35</sup>

It should be noted that an internal devaluation comes with one further challenge. If wages and prices fall, this means even if there is real GDP growth, nominal GDP could fall. Thus, the denominator in the debt to GDP ratio does not grow. The fact that Japan's nominal GDP is the same in 2010 as it was in 1992 (despite real GDP growth of 16% over that period) is one reason that its debt to

---

<sup>34</sup> There were some three year periods where Germany gained 3% against the median and some 5 year periods where it gained 5%, but never more. The total gain from 1999 to 2011 was 8%. Finland is the only other country in the euro area to meet the 5% in 5 years hurdle.

<sup>35</sup> The current account in Latvia and Ireland have returned to zero, but it is unclear if one should credit the more competitive relative prices or the massive decline in imports as consumption is down substantially in both countries. See Darvis (2011).

GDP ratio has climbed so much. Thus, even if the GIPSI countries restart real growth via internal devaluation, it is not until they restart nominal growth that it will help their debt sustainability. The IMF's end of 2011 report on Greece is not overly optimistic about the pace of Greek internal devaluation, calling for 1% a year for 10 years. Such a pace seems reasonable based on past evidence unless faster inflation happens in the rest of Europe, but also suggests Greece will not regain competitiveness for many years and will likely not have substantial nominal GDP growth for a number of years, implying continued strains on solvency.

In many ways, these results are simply an extension of Mussa (1986). Mussa found that in floating exchange rate environments, real and nominal exchange rates tended to track one another closely. The results presented here suggest two corollaries. First, deviations where real exchange rates depreciate absent a nominal depreciation are extremely rare in a low inflation environment. Second, those deviations tend to be accompanied by extreme economic dislocation. Blanchard and Muet (1993) also note that while attempts to bring down inflation can stop real appreciations against trading partners in a fixed exchange rate regime, generating substantially lower inflation to create a real devaluation can be quite difficult and nominal exchange rate changes appear much lower cost.

The important implication for euro area policy is that to increase the odds of a successful internal devaluation (both the odds it happens and the odds it is not accompanied by massive long term economic dislocation), it would be very helpful for the GIPSIs to be trying to improve competitiveness against a group of countries that are running faster than 2% inflation. The ECB is committed to its 2% inflation target. At the very least, the important implication is that if inflation is close to zero in the GIPSIs, it must be allowed to run faster than 2-3% in the core countries (so the overall average is 2%). The GIPSI countries are roughly one third of euro area GDP, so if their inflation rate is 1%, the rest of the euro area inflation rate would have to be 2.5% to achieve a 2% target, leaving a gap of only 1.5% a year. If the GIPSIs had inflation of 0%, the rest of the union could have 3% inflation and still hit the target. A likely easier way to achieve the 3% spread, though, would be 1% inflation in the GIPSI countries and 4% in the rest of the area, but that would lead to inflation of 3% in the euro area overall. While such an outcome would violate the ECB's goal of 2% inflation in the short term, faster inflation

would likely help facilitate relative price changes, as well as faster nominal GDP growth throughout the euro area and a likely depreciation of the euro overall.

### **Policy Response: Structural Growth Policies**

Internal devaluation is not the only route of adjustment countries are being encouraged to take to restore growth. Countries could take a number of steps (often referred to as structural reforms) to try to increase growth. This might include deregulating product or retail markets, streamlining rules for investment or starting businesses, policies aimed at improving innovation, or removing barriers to entry in various services professions. Any step that increased growth could help achieve debt sustainability and lower unemployment. Policies to make labor markets more flexible might help either increase productivity or lower wages leading to lower production costs. There are a number of concerns, though. Such reforms are not typically rapid in their implementation. More so, if the economies are struggling from a lack of demand – with household balance sheets stressed and sovereigns that cannot spend – improving potential output will not lift the economies from their current recession. It may help in the long run, but not at present. This does not mean such reforms should be ignored, they are likely good policy, but they may not be sufficient to deliver these economies from their current slumps.<sup>36</sup> Reforms such as these have been an important part of the aid packages thus far. They obviously have not, though, delivered rapid near term growth in the face of budget cuts and tax increases.

The evidence on the impact of reforms in the short-term is limited. In a series of studies, researchers at the OECD suggest that over a long horizon, countries with poor structural policies could raise potential GDP (see OECD (2012) for discussion). The results suggest, though, that the impact in the near term is likely to be limited. Policies that spend money to reduce labor market problems (active labor market policies) may lower unemployment, but are unlikely to be pursued in the face of austerity. Further, many policies that remove labor market rigidities appear to have limited impact in the first few years. Policies that limit unemployment insurance generosity may lower unemployment

---

<sup>36</sup> A cautionary note is that in the summer of 2010, Greece was enthusiastically praised for its rapid implementation of structural reforms (see *Financial Times*, “Greece praised for swift structural reforms” 8-5-2010). Its unemployment rate has continued climbing and economy continued contracting since then.

rates in some settings, but the impact appears to be negative when the economy is weak (likely due to negative impact on demand). Finally, product market reforms may increase the labor force over time, and again increase potential GDP, but in the face of constrained demand and high unemployment, increasing the labor force participation rate is unlikely to be helpful in the short run. Thus, structural reforms would likely help over time and should be pursued as part of long run packages, but evidence is not encouraging that they can be a route to a near term resolution to the growth crisis.

#### **b. The Sovereign Debt Crisis Impact on Banks**

As the crisis has worn on, the initial concern of exposure to bad assets based on U.S. mortgages has broadened. In particular, for euro area banks, a crucial question has become their exposure to the bonds of their own governments (exposure to local real estate markets is also an issue in countries that had large real estate bubbles like Ireland and Spain). European banks hold large amounts of euro area sovereign debt on their balance sheets.<sup>37</sup> Based on data from the stress tests of 91 significant banks (discussed later)<sup>38</sup>, Greek commercial banks hold roughly 25% of GDP in the form of Greek government bonds. Spanish banks hold local sovereign debt equivalent to roughly 20% of GDP while Italian and Portuguese banks hold closer to 10% of GDP in domestic government bonds. Further, banks in the euro area hold considerable volumes of bonds of other European sovereigns such that the total exposure to stressed sovereigns is even higher. The banks in other euro area countries also face sizable exposure with the banks in France and Germany holding roughly 5% of GDP worth of assets in the sovereign debt of the GIPSI countries. The IMF estimates that the in the largest Greek banks, Greek sovereign debt holdings are over 100% of the core tier 1 capital (the equity and retained earnings of the bank which is essentially the cushion banks have to face losses before liabilities exceed

---

<sup>37</sup> The reasons for these holdings are beyond the scope of this paper. Some may be due to pressure from governments that encourages banks to buy their debt. In other cases, it may be a response to regulatory incentives where highly rated government debt counted as essentially riskless and hence did not require large capital buffers in regulatory frameworks that risk weighted assets for the purposes of capital requirements. See euro-nomics 2011 for discussion.

<sup>38</sup> See <http://www.piie.com/realtime/?p=1711> for a spreadsheet that compiles the sovereign debt holdings of the 91 tested banks by country from the July 2011 stress tests. This is an underestimate of the total holdings of the banking system as it only adds up the holdings of the major banks, not the entire system. Based on information in December 2011, it appears some banks had shed sovereign debt exposure by the end of the third quarter of 2011. Conversely, since the Long Term Refinancing Operations in December and February (discussed below), there is evidence that euro area banks have increased their holdings (see “Sovereign Bond Market Gorges Itself on ECB Christmas Present” Wall Street Journal 12-20-2011) making a precise estimate at this point difficult until new official figures are released.

assets) and are over 500% for some banks (IMF 2011). The OECD recently calculated that the holdings of Belgian, Italian, and Spanish debt was well over 100% of the core tier 1 capital in Italy, Spain, and Belgium, and over 50% in France and Germany (OECD 2011). If the value of some of these assets are set to zero, it would effectively wipe out the capital of these banks and make them insolvent. While it may be unlikely that the sovereign debt becomes worth nothing, the threat of a significant markdown of these assets is a large part of why euro area banks have faced funding problems in recent months. Acharya et al (2011) demonstrate that the cost of insuring bank bonds varies with the cost of insuring the sovereign debt that those banks hold. That is, the risk of sovereign default is directly translated to the risk of bank default in the market.<sup>39</sup>

### **Policy Response: Stress tests**

One way to resolve the uncertainty over banks' balance sheets that can lead to liquidity pressure is to subject them to rigorous "stress tests" that are designed to explore their solvency under a wide variety of assumptions. European authorities have performed a number of "stress tests" that are supposed to illuminate the condition of banks. A difficulty for the European authorities, though, is that the test the market is most interested in is the scenario that the authorities have promised to avoid – an unruly default by a sovereign. Furthermore, U.S. stress tests helped in part because they resolved uncertainty but also in part because there was a committed public capital backstop in case of capital shortfalls. But, in the euro area tests, any backstop was at the national level meaning a bank that could go bankrupt due to a failure of its sovereign was relying on that same sovereign for a capital backstop (and that sovereign was unable to print its own currency). This complication – as well as other implementation problems – has meant that the question of bank insolvency has not been ruled out. Furthermore, most recent tests suggest the banking system needs in excess of 100 billion euros more in capital. In this scenario, liquidity problems for the banks have logically continued to fester.

### **Policy Response: Liquidity Provision**

---

<sup>39</sup>Demirguc-Kunt and Huizinga (2010) suggest another reason for the co-movement. As sovereigns become more stressed, the market may fear that large financial institutions are too big for the weakened state to save in the event of a crisis, and thus the banks are viewed as more risky.

In response to additional funding problems at banks in the fall of 2011, the ECB has provided liquidity. The ECB provided nearly 500 billion euros of long term credit (for up to 3 year terms) at low rates to ease banks' funding crunch as part of a Long Term Refinancing Operation (or LTRO) in December. A second LTRO on February 29<sup>th</sup> provided over 500 billion euros more. In some cases, the liquidity is simply replacing other shorter term liquidity that is expiring, but the net effect is still substantial. As seen in figure 3, banks had increasingly faced pressure on their ability to secure funds during the fall of 2011. The interbank spreads were widening again, not to post-Lehman panic levels, but still enough to signal distress in funding markets. The surge in liquidity from the central bank seems to have at least provisionally calmed this problem as the spreads are heading back down.

An important aspect of this policy is that the ECB did not merely increase liquidity by buying assets to expand its balance sheet, nor did it lend to banks on a short run basis. Instead, it loaned to banks for terms up to three years. In doing so, the ECB filled a liquidity need of the banks, but relative to a policy of purchasing assets from the market, it has left any credit risk on the balance sheets of banks.<sup>40</sup> The ECB's policy with regard to direct purchase of sovereign debt has slowly shifted, and it now holds over 200 billion euros of sovereign debt purchased under the Securities Market Program. In May of 2010, the ECB began the program under which it purchased public and private debt securities in secondary markets. The program built slowly, and by the end of 2010, the ECB held just over 70 billion euros of assets. This sharply contrasts with the Federal Reserve's purchase of over one trillion dollars of mortgaged backed securities by early 2010. The Federal Reserve went much farther to take assets out of the market that the private sector viewed with possible suspicion. The ECB maintains that the purpose of the program is simply to smooth troubled markets and ensure that the monetary policy transmission mechanism is functional.<sup>41</sup>

Furthermore, if the LTRO was used to fund more sovereign debt purchases, this means that while the LTRO may have been a crucial solution to a liquidity problem for banks, it has also meant that the connection of banks and sovereigns has merely been strengthened as banks hold even more

---

<sup>40</sup> The ECB does not itself avoid the risk. If a Spanish default meant that the ECB collateral was suddenly worthless, technically, the Spanish bank having posted the collateral is responsible, but in that case, it is almost certainly bankrupt as well.

<sup>41</sup> See ECB press release 5/14/2010

sovereign debt. In that sense, the LTRO is notably different from the quantitative easing policies followed by the Federal Reserve where the Fed purchased assets outright rather than help fund banks' ability to purchase them.

### **c. The impact of the Bank Crisis on the Sovereign Debt Crisis**

In addition to the initial liquidity crunch many banks faced solvency problems, and national governments across the euro area stepped in to provide funds or guarantees for their banks. Unlike the liquidity concerns which have been a supranational issue, countered by the ECB at times in coordination with the other global central banks, solvency concerns have been treated as a local matter. The European Commission and the ECB helped play a coordinating role as various EU nations grappled with banking solvency issues, but the plans – and most importantly their funding – came from the member states.

#### **Policy Response: National Bank Support:**

As documented in ECB (2009), nearly every euro area country took some steps to stabilize their banking system which involved fiscal resources. These included the direct injection of capital into the banks (in 10 of 15 euro area members) and state guarantee of bank liabilities (12 out of 15), as well as loans to the banking sector, acquisition of bad assets, nationalization of some firms, and individual rescues. The tools used varied, but the national nature of the response did not.

By mid-2010, total commitments (ranging from capital injections to liability guarantees) ranged from roughly 20% to 300% of GDP across euro area countries (ECB, 2010). Based on IMF estimates (IMF 2011a), total direct support to the financial sector by mid-2011 (not including liability guarantees that may or may not cost money in the future) are roughly 6% of GDP in countries like Greece and Belgium, 13-14% in the Netherlands and Germany, and as high as 40% in Ireland. Some of this money will be repaid, but in some cases, the costs could go higher. The Anglo Irish bank bailout alone has cost the Irish Government roughly 25 billion euros. By mid-2011, the government had already contributed over 40 billion euros in capital to the banks and was planning nearly substantially more (see Acharya et al (2011) and Lane (2011) for discussion). Eventually, it became clear Ireland would not be able to find the funding itself and the EU provided an 85 billion euro loan in the fall of 2010 (sovereign bailouts will be discussed in the next section). Still, despite the loan, it is Ireland that is

directly responsible for paying the bank bailout. Ireland's leaders have called on the wider EU to share the burden, arguing that the banking system is euro area wide and both borrowing and lending countries should shoulder responsibility for troubled institutions.<sup>42</sup>

The reliance on the specific government where the bank is located to fund the bailout stands in contrast to policy within the United States, where the specific state location is not the determinant of who bears costs. Both bank support (for example through the FDIC or in the case of capital injections through TARP) and bank regulation takes place at the national level (which in the U.S. is the currency union level). One can imagine that if the state of Washington had to bear the fiscal burden when Washington Mutual collapsed with nearly \$200 billion in deposits, there is no way its fiscal resources could have borne the cost. In that instance, the FDIC was able to broker a deal with JP Morgan and avoid any fiscal cost, but again, if left to the state level, it seems quite possible that such an arrangement would have been difficult. In the EU setup, a currency union wide fund may have loaned Washington the financing if necessary, but state taxpayers would be responsible for whatever funding they provided. The mutualization of bank losses across states can only reasonably be achieved, of course, if there is area wide supervision and area wide funding of resources such as the FDIC. Banks in Europe were operating across borders, and with the same currency and same lender of last resort, but with different supervision and without any mutual bank support across countries.

The cost of the bailouts has had a serious impact on sovereign's ability to repay their own debt. This issue has already attracted detailed research on how sovereign and bank debt are related. When the rescue packages were put in place, the cost of insuring a bond against default went down sharply for banks as they were now perceived as being more safe (Esing and Lemke (2011) and Archnaya et al (2011)). In addition, the extent to which the cost of insuring sovereign debt was correlated with general perceptions of financial risk in the economy went up as the state was now responsible for financial losses in many countries (Esing and Lemke (2011)).

#### **d. The Impact of the Sovereign Debt Crisis on Growth**

---

<sup>42</sup> See Lane (2012) and O'Rourke (2011) for discussion of the terms of the Irish bailout and ways in which it has left Ireland with an extensive burden.

The sovereign debt crisis makes low growth a more acute issue. Low growth with low debt may be sustainable over a much longer period of time than when debt levels are high. But, the primary impact of the sovereign debt crisis on the growth crisis comes directly from the policy response to the sovereign debt stress: austerity.

### **Policy Response: Austerity:**

The policy response to the sovereign debt crisis has been twofold: austerity and bailouts. First, it has been national, with countries cutting budgets to limit current and future deficit projections in an attempt to raise market confidence and lower interest rates. In some cases, the countries appeared to have little choice on their own. If the market would not lend, they could not borrow more and thus had to cut deficits.<sup>43</sup> Still, the early returns suggest that standard economic theory has held all too well. Contractionary fiscal policy is just that, contractionary. The countries undergoing steep fiscal tightening have faced very slow growth. Greece cut its primary deficit by more than 5% of GDP in 2010-2011 while its economy was contracting 10%. Thus, the contraction more than wiped out the near term savings with respect to debt to GDP measures. Thus, by trying to solve the fiscal crisis, policymakers could be making not only the growth crisis worse, but even may be making the sovereign crisis worse.<sup>44</sup>

Figure 10 shows GDP and government spending in the euro area over the last 3 years.<sup>45</sup> Countries making cuts are shrinking rapidly, enough to cause debt to GDP to rise even with budget cuts. Obviously, these countries may be growing slowly for other reasons, but the evidence of the impact of austerity runs deeper. Recent analysis by the IMF showed that austerity tended to generate GDP contractions (IMF 2010). Further, the UK, which was not undergoing the same kind of stress in funding markets and arguably had more choice about whether to engage in austerity, is also struggling with slowing growth and rising unemployment.

---

<sup>43</sup> It should be noted, though, that some countries – Italy in some projections and Greece quite likely starting in 2012 or 2013 – are running primary surpluses or balance. Thus, all the new borrowing is to pay off old loans coming due and to make interest payments. These countries do not need access to global capital markets to fund current operations.

<sup>44</sup> Recent analysis by the IMF has emphasized that if austerity is too large and slows growth too much, markets have responded by further doubting sovereign's ability to repay (see Cottarelli 2012)

<sup>45</sup> Krugman (2012a) uses a similar figure.

Furthermore, a simple attempt to uncover which countries are cutting government spending helps focus on austerity motivated cuts (not simply total change in government spending which could be affected by a shrinking economy). There is no correlation between debt levels prior to the crisis and the change in government spending over the crisis – though this may explain cuts in Greece and Italy. Interestingly, a very good predictor of current austerity is the level of the interest rate on long term debt in 1993 (the first year of data in Eurostat). That is, if markets were distrustful of a country long ago, those same countries are currently being forced to undergo austerity as markets seem reluctant once again to lend to them.<sup>46</sup> Using the interest rate on long term debt in 1993 to proxy for market distrust that is not connected to current macroeconomic outcomes and the size of bank assets to GDP prior to the crisis to proxy for potential bank bailout costs, I try to isolate the reductions in government spending that are not linked to current performance in the economy. In both a simple bivariate OLS regression (column 1) or the IV regression (column 2), the coefficient on the change in government spending is quite close to 1 and zero can be rejected at the 99% confidence level; the coefficient in the IV regression is slightly higher (but not statistically significantly different) than the OLS coefficient (see table 2).<sup>47</sup> Thus, it appears the results of prior studies carry through to the current crisis: austerity comes with significant reductions to growth.

### **Policy Response: Bailouts:**

The supranational aspect of the policy response has been to try to remove market pressure by making loans to countries after they announced budget consolidation plans. An emergency European

---

<sup>46</sup> To include newer entrants to the euro that do not have long term interest rate data going back to the early 1990s, one can instead use the spread against Germany in the first year of data available. For the newer entrants, this is always at least 5 years prior to the country joining the euro.

<sup>47</sup> Luxembourg is an extreme outlier on bank assets to GDP, so it is dropped from the regression. This leaves only 11 countries. Alternatively, one can use only the interest rate in 1993 as an instrument (dropping bank assets to GDP in 2007) and keep Luxembourg in the regression to find similar results. One can also include debt to GDP in 2007 as a third instrument and find similar results (column 3). Including newer entrants (by changing from the interest rate in 1993 to the spread over Germany in its first year with an interest rate in Eurostat) generates nearly identical results and increases the sample size to 15, column 6, (Estonia and Cyprus lack necessary data). In all of these cases, the coefficient on the change in government spending is statistically significantly different from zero at the 95% confidence level and is between .9 and 1.2. The 1993 interest rate or spread over Germany are not significantly different from zero if included directly in the regression. The results also hold if one includes inflation from 2001-7 or the change in debt from 2001-7 as independent variables in the regression. That is, current cuts to government spending appear to have a negative impact on growth even when one controls for loss of competitiveness prior to the crisis or excess spending prior to the crisis. Given that there are only 15 observations, one should not overemphasize the statistical properties of these tests. If both Ireland and Greece are excluded from the regressions, there is no statistical significance.

Financial Stabilization Fund (EFSF) was created, but this has been somewhat limited in size and scope. The limits are emblematic of the political difficulties that a lack of EU wide institutions can present. The politics of shared burdens or of injecting capital into banks are often difficult, and trying to get 17 nations to all agree and have parliaments ratify a change is immensely difficult.

Whatever the reason for its limits, the EFSF has acted only to stave off insolvency of the sovereigns. Thus far, the EFSF in concert with the IMF has provided funds to Greece, Ireland, and Portugal to prevent disorderly default. Subsequently, the “troika” (the IMF, the European Commission, and the ECB) have acknowledged that Greece will be unable to pay all its debts and have crafted a restructuring of the debt that imposes losses on the private sector holders of Greece’s debt. The programs surrounding the bailouts have involved a wide array of austerity measures and structural reforms. A typical IMF program often comes when an exchange rate devaluation has taken place (or will take place). In those cases, acute competitiveness problems may have been solved via exchange rate changes (at least temporarily). Further, the central bank of the country in question is often asked to take what is viewed as more appropriate policy. These programs have not asked for changes to ECB policy, nor have they solved acute competitiveness problems in the short run.

The EFSF has also not mutualized bank losses in a way that would break the sovereign / bank link.<sup>48</sup> As noted, the EFSF was unable / unwilling to provide capital directly to Ireland’s banks, instead it provided loans to Ireland who then provided funds to its banks. Thus, with the exception of limited aid, regaining solvency is still a national matter.

Unlike the supranational response to the liquidity problems of banks – which at times has been quite strong – the response to liquidity problems for the sovereign has been partial and inconsistent. The EFSF has provided funds, but it is too small to be a lender of last resort (which must have the funds or ability to create funds to clearly demonstrate an ability to lend without limit such that the market withdraws liquidity pressure and the crisis is averted). The ECB has bought bonds to drive rates down, but it has been adamant that it will not act as a lender of last resort to sovereigns and is

---

<sup>48</sup> In a recent speech by Christine Lagarde (Lagarde 2012), the IMF has suggested that some method to mutualize bank losses would be helpful, but that is not the current policy of the EFSF.

merely smoothing the market to aid in the transmission of monetary policy.<sup>49</sup> Instead, the focus has been to use a combination of austerity and the EFSF to deal with the solvency crisis and hope that by proving solvency, the liquidity problems will ease.<sup>50</sup>

Thus, the approach is only sensible if the problem is solvency problems caused by fiscal profligacy. That is, by the primary deficit. If the problem, instead, is either due to interest rates rising too high or growth being too slow, different solutions are likely warranted. If the problem is a self-fulfilling problem where liquidity shortages lead to interest rate increases leading to solvency problems, the current policy has not been appropriate. The amount of money provided has always been finite.

Furthermore, when spreads spiked again in November of 2011, the most significant response came via the LTRO (discussed above). While explicitly targeted to the liquidity problems of banks, the increase in liquidity on longer terms made it profitable for banks to borrow cheaply from the ECB and the purchase relatively short duration bonds that will be redeemed before the loan is due. Some policy makers were explicit that they viewed this as a way to provide liquidity to the sovereigns.<sup>51</sup> The impact of the LTRO on yields is unmistakable. Yields on 2 year bonds fell from 6-7% to under 3% for both Spain and Italy. The 10 year yields also fell, but by much less (between 100 and 200 basis points). This process was still finite, and ad hoc in the sense that it did not directly provide liquidity to the sovereigns or purchase sovereign debt directly (and hence at risk that the market will question if sufficient funds are available). Yields on Portuguese and Greek debt did not show the same direct responsiveness as questions of solvency continue to dominate (Portuguese 2 year yields are down from late 2011, but the path has not been as smooth as in Spain and Italy).

---

<sup>49</sup> See the original order to begin the purchase of sovereign debt (the securities market program) in addition to numerous interviews with current ECB President Mario Draghi who has said that ECB purchases are “neither eternal, nor infinite,” (see *Financial Times*, “Mario Draghi: Charged to save the euro,” 12-18-2011). While the ECB has bought debt in secondary markets, it is restricted in its ability provide funds directly to sovereigns.

<sup>50</sup> It should be noted that a lender of last resort can engender a moral hazard problem where actors are not fully responsible for their actions. If the ECB bought sovereign debt regardless of country action, the market signal would be removed and sovereigns could borrow with impunity. Typically, regarding a banking system, the lender of last resort has some supervisory power to prevent such actions, but the ECB has no such authority. Thus, it may fear that any actions to lower interest rates will be undone by increases in the primary deficit.

<sup>51</sup> The act of taking out loans from the ECB to purchase sovereign debt was dubbed “the Sarkozy trade” after French President Sarkozy noted how the LTRO may support sovereign debt prices given the very attractive profit opportunity for banks. See for example *Wall Street Journal* 12-20-2011.

### **e. The Impact of the Banking Crisis on Growth**

A weak banking sector is a continual drag on growth. If banks will not lend, it is one more factor that will prevent the euro area economy from rebounding. The economics literature has long recognized the importance of the financial system for allocating capital towards productive uses and allowing firms and consumers to borrow. A rapid cut in the availability of credit will reduce both consumption and investment. Also, a weak banking sector can make any attempts at using monetary policy to stimulate the economy more difficult as it compromises the credit channel of monetary policy transmission.

#### **Policy Response: Increasing Capital Requirements**

In late 2011, the European Banking Authority increased capital requirements for banks to 9%. Higher capital means the banks have a better cushion to withstand losses. A larger cushion should also make it easier for banks to borrow money as creditors have less fear of insolvency by the bank. However, banks can increase their capital ratio in one of two ways. They can raise capital in private markets or they can sell off assets and pay off debt. The latter channel means banks are less willing to lend and less willing to buy risky assets as they are trying to deleverage. This suggests a contraction of credit to the broader economy and likely acts as a brake on growth.

The evidence from loans to the nonfinancial sector at the end of 2011 is not encouraging. Loans to individuals and firms fell in November and December 2011 as banks struggled with both funding availability and needs to improve their capital ratio (they bounced back following the LTRO, see figure 11). A weakening economy would also suggest a decrease in the demand for loans, so the decline in loans may not simply be due to a supply constraint. Lenders surveys, though, show a tightening of credit standards for loans to non-financial corporations, consistent with banks being the driver of the reduction of credit. Also, there is evidence of foreign banks tightening loan standards in the United States relative to U.S. banks at the end of 2011 – more likely a function of funding availability and attempts to deleverage as opposed to loan demand.<sup>52</sup> Given the funding problems at

---

<sup>52</sup> The Senior Loan Officer Survey for January shows that foreign banks were tightening lending standards in the United States while U.S. banks were not. Furthermore, half of U.S. banks that compete with euro banks said they had experienced increased business due to a decline in competition from the euro area banks during the recent crisis.

banks, it may be that increasing capital ratios was the only choice, but without robust measures to inject capital (without stressing sovereigns further) this policy may be acting as a further impediment to growth. The small bounce back in loans following the LTRO is an encouraging sign that the LTRO may be helping prevent the banking system from choking off growth.

#### **f. Slow Growth's Impact on Banks**

There are two key channels through which a weak economy can damage banks. The most simple is that a weak economy means more firms and households find themselves unable to repay their loans leading to more losses for banks. Similarly, asset prices typically decline in a weak economy, likely damaging banks' portfolios. Also, though, growth operates via the sovereign bond linkage. As discussed, weak growth can generate problems for sovereign solvency, which as discussed above, can damage the solvency of banks.

Policy responses to the growth crisis are unlikely to harm banks. Structural reforms that raise potential growth, internal devaluations, or other routes to eventual growth would all eventually be good for banks. The issue is whether growth can rebound sufficiently quickly in order to help the banks.

#### **IV. Policy Discussion:**

Thus, many of the main policies pursued thus far aid with symptoms of one crisis, but often only temporarily or at the expense of another crisis. Austerity can cut deficits, but at the expense of growth. Locally funded bank bailouts can aid bank solvency, but at the expense of sovereign solvency. Increased bank capital requirements can calm bank solvency fears, but at the expense of lending and growth. EFSF bailouts have staved off disorderly defaults, but have done little to solve the fundamental issues. Finally, the LTRO can aid bank liquidity problems, but if used to buy sovereign debt (and help sovereign liquidity) the cost is further strengthening the bank sovereign connection. Structural growth policies are likely part of a medium run solution, but it seems overly optimistic to expect them to provide near term help.

The following sections suggest a series of policies that may work together as a more unified package addressing the entire set of crises.

### **a. Fiscal devaluation for competitiveness reallocation**

Rather than wait for internal devaluation to reallocate demand, the same impact as a shift in relative prices could be accomplished via tax changes. Tax law changes can mimic the outcomes that a depreciation (or tariff and subsidy) would generate; this is sometimes referred to as a fiscal devaluation. Rather than hoping for wages to fall, governments could reduce taxes on labor. If they reduce payroll taxes on employers, they directly reduce unit labor costs. If they reduce payroll taxes on employees, they may help employees to accept a lower wage (or lower wage growth). At the same time, governments can increase taxes on consumption, both to balance the budget effect of the payroll tax cut and to discourage imports.

This policy option has received a fair bit of attention thus far in the crisis. Cavallo and Cottani (2010) proposed it as a solution to Greece's competitiveness problems and Reis (2010) made specific proposals for Portugal. Franco (2010) provides a more formal discussion for the case of Portugal, and Farhi et al (2011) demonstrate in a general model that such a policy combination can generate economic outcomes similar to an exchange rate devaluation. The IMF considered empirical evidence of the possible efficacy of fiscal devaluation (IMF 2011) and concluded that fiscal devaluations can have significant effects. Fiscal devaluation has been a widely debated part of the Portuguese adjustment plan, but as of now has not been pursued.<sup>53</sup> Also, French President Sarkozy has advocated similar changes, but they have not yet been pursued. The policies have been used to some extent in the past; Germany undertook a similar blend of policies in the previous decade, as did Denmark in the late 1980's. In some cases, the required changes in VAT rates might be too large to fully offset recent loss of competitiveness – especially as increasing the VAT rate may encourage citizens to shop in other locations. Still, even if fiscal devaluation cannot entirely solve competitiveness imbalances, it could make immediate headway.

If these policies were followed in the GIPSI countries in a coordinated fashion and the reverse policies were pursued in surplus countries like Germany, there could be a rebalancing of demand

---

<sup>53</sup> See the weblog *The Portuguese Economy* for extensive discussion of the use of fiscal devaluation in the Portuguese plan.

across the euro area.<sup>54</sup> This would aid with growth, but would not make either of the other crises worse. Furthermore, because it would operate quickly, it could be viewed as a complement to policies aimed at generating more growth in the long run.

### **b. Monetary Policy**

Rather than aiming at long run growth (structural policies) or slow attempts to reallocate demand (internal devaluation), policies could be used to spur growth overall. In particular, the ECB could take further steps to spur growth. As noted earlier, the ECB was far less aggressive than the Federal Reserve (or the Bank of England) in expanding its balance sheet in the first years of the crisis. Furthermore, in the spring of 2011, the ECB raised interest rates out of fear of inflation. As those fears were proven to be unwarranted and the economy has worsened, those interest rate hikes have been reversed, but the ECB could try to do more to stimulate the economy. It has started by extending the LTRO, and as the far right side of figure 3 demonstrates, the ECB balance sheet is now growing rapidly. Thus, the ECB appears to now be embarking on this course of more aggressive monetary policy. It could continue by increasing its asset purchases to reduce the total volume of sovereign debt the market must bear and to lower long term interest rates in an attempt to spur growth. In addition to lowering the interest rate, such a policy would likely depreciate the euro.

Also, by lifting its inflation target – or even allowing some flexibility over the horizon it assesses price stability – it might not only facilitate internal relative price shifts (as noted above) but might also lift nominal GDP growth rates (important for debt sustainability) and help the private sector deleverage. Ken Rogoff (2008) has advocated a burst of faster inflation in advanced countries to help deleverage, and Olivier Blanchard (2010) has advocated faster inflation targets to reduce the likelihood central banks encounter the zero lower bound on interest rates.<sup>55</sup> Shambaugh's (2012) findings on the difficulty of relative price shifts in a currency union with low inflation provides another reason for a

---

<sup>54</sup> It should be noted that while a fiscal devaluation will mimic the relative price shift, such a shift would not be apparent in comparisons of price levels. The reason is that consumption taxes (or value-added taxes) increase the measured price level. Because they are imposed on imports and refunded to exports, they can help dampen consumption and spur exports as a relative price shift would, but they do not lower the measured price level in the economy.

<sup>55</sup> See Bernanke (2010) and Kohn (2010) for arguments why raising the inflation target may be problematic.

higher inflation target in a currency union that lacks other shock absorbers to offset asymmetric shocks.

### **c. ECB liquidity for sovereigns**

As part of its attempt to increase liquidity, the ECB could shift its policies with regards to the purchase of sovereign debt in secondary markets. Rather than explicitly trying to argue it will not serve as a lender of last resort, it could announce that for countries in good fiscal standing or that are following an EFSF / IMF package, the ECB will keep long term interest rates within a reasonable range. This might require large scale buying of bonds, but this would complement the policy of expansionary monetary policy discussed above. Legal restraints have already been pushed with the decision to purchase over 200 billion euros of sovereign debt. The question now is how much to buy and with what communication policy. The ECB could maximize its bond buying rather than undercutting it by making clear its goals for lower long run bond yields. This policy – in contrast to a policy which only provides liquidity to banks – could also conceivably help reduce the bank/sovereign linkage by having more of the sovereign debt on the ECB's balance sheet directly as opposed to as collateral posted by a bank.<sup>56</sup>

### **d. EFSF capital for banks to break the sovereign bank link**

Area wide policies to help recapitalize banks (perhaps using the EFSF funds) might take pressure off the currently stressed sovereigns by removing the question of whether they will need to extend further bailouts as well as by restarting lending in the euro area countries. Such a policy might entail moral hazard for national regulators if the funds were simply given to banks. However, if the process were to take equity positions in banks, this would mean that if a country's banking system were to become insolvent or risk insolvency, Europe wide sponsored capital injections would mean the banking system was increasingly owned by euro area governments as a whole. The punishment for mismanaging national banks would be that they would cease to be national banks.<sup>57</sup> By recapitalizing

---

<sup>56</sup> The seniority given to ECB holdings of Greek debt during the handling of Greece's debt workout raises complications. If the market now sees ECB purchases as shrinking the pool of bondholders who would bear the losses in a default, purchases could conceivably become counterproductive.

<sup>57</sup> The process could also be used to buy out the stakes of stressed sovereigns (like Ireland) thereby reducing their debt to GDP ratios immediately.

the banks (rather than encouraging them to deleverage to reach capital ratios) this process should support growth. In addition, though, it does not put pressure on the stressed sovereigns.

**e. Fiscal expansion in countries that can afford it**

Finally, rather than simply reallocate demand across the euro area or lift supply in the GIPSIs, fiscal policies could be followed that would lift overall demand in the euro area. The EU and euro area do not have substantial area wide fiscal policies. Thus, the only fiscal policy option would be for non-stressed sovereigns to provide fiscal stimulus – and certainly at the very least to slow their current scheduled fiscal contractions. The IMF has repeatedly called for a measured exit from fiscal stimulus for those countries not under sovereign stress to avoid negative spillovers from too many countries contracting at once. Increased fiscal support in the core countries could increase demand in these countries and hopefully have positive spillovers to their neighbors. Such policies would obviously not be as well targeted as a system that has fiscal offsets across countries, but it could be helpful.

**f. How the policies fit together: treating the whole patient**

None of these policies is a silver bullet, but given that the euro area as a whole is likely headed into recession at present, it seems critical to take any action possible to lift growth across the euro area – fiscal, bank recapitalization, and monetary. Furthermore, though, these policies do not undercut one another. ECB liquidity support for sovereigns can be part of monetary expansion. It also frees up funds at the EFSF to allow bank recapitalization. The fiscal devaluation and fiscal stimulus in non-stressed countries can help lift the level and improve the distribution of growth which should help both the sovereign debt and bank crises, and steps to lower interest rates for the sovereigns and continue liquidity support to the banks should help as well. The euro area is in a difficult position, but there are policy options that can move the currency union towards a better outcome.

**V. Institutional changes**

Finally, while it is beyond the scope of this already wide-ranging paper to describe in detail institutional redesign for the euro area, there are some implications that fall directly from the discussion above. First, it is not clear at all that a fiscal union focused on limiting deficit spending by individual countries (such as the compact being currently pursued) will improve outcomes in the euro area. The problems do not appear to be at root fiscal for a number of countries currently under stress.

Further, constraining fiscal policy limits the one way to cushion temporary asymmetric shocks or cushion adjustment to permanent ones. It is not clear that the oft-heard phrase “a currency union requires a fiscal union” rings true. Rather, it does appear that a currency union requires a financial union. This would involve two key changes.

First, to break the link from bank problems to sovereign stress, a euro-area wide deposit insurance mechanism could be designed. Any safety net for a financial system requires offsetting regulation to combat moral hazard, and this regulation would logically need to sit at the same level as the bank insurance. Thus, either the ECB or a euro area wide regulator would need to take a key role in bank supervision. This structure – along with a commitment that any bank bailout or recapitalization must take place at the euro area wide level – would remove the possibility of banks overwhelming sovereigns. In addition, it might remove the temptation of local regulators to allow banks to take on too much risk or to force them to hold too much local sovereign debt.

To break the link from the sovereigns to the banks, though, another innovation is needed. The euro area lacks a common risk free bond. This means that both the banks and the ECB must use different nations’ sovereign debt to stand in for a true risk free asset. The comparison to the United States is instructive. The Federal Reserve does not hold the debt of California or Illinois; it holds U.S. Government debt, and state debt is not considered a risk free asset. Thus, fiscal stress by states or municipalities does not threaten the Fed’s monetary policy or the national banking system. Two potential policies have received extensive attention to fill this gap. One is to allow “red bonds” and “blue bonds” where the blue bonds would be mutually guaranteed by the entire euro area and would be allowed in the amount of 60% of national GDP. Thus, a country with 75% of GDP in debt would have issued 60% of its GDP in blue bonds which would be ultra safe and low yielding (and could be held by banks as a safe asset and used by the ECB for monetary policy transactions) while the remaining 15% of GDP of debt would be in “red” bonds that are riskier, higher yielding, and could default without broad repercussions for the rest of the euro area.<sup>58</sup> The alternative proposal is to create a debt agency that would buy up sovereign debt and issue its own debt in two tranches, a safe tranche and a risky one.

---

<sup>58</sup> See Delpla and von Witzacker (2010) for details.

This proposal could achieve the same goal of creating a risk free bond and also use GDP shares to determine how much of a country's debt to buy. It might avoid some of the legal necessities of mutually guaranteeing debt (Euronomics 2011). In either case, the influence of sovereign debt on banks could be greatly reduced and the exposure of the overall euro area to sovereign stress in a small country might be lessened, as banks and the ECB could hold the blue bonds or safer ESBies leaving the other bonds as an explicitly risky class of assets.

## **VI. Conclusion**

The euro area is in a set of overlapping crises that could threaten the currency union. Banks are struggling, sovereigns are under strain, and a vision for how to generate enough growth in the periphery seems clouded. This is not to say the euro area is necessarily doomed. As Eichengreen (2010) notes, exit costs are extremely high and as many have noted, the euro has always been a political, not purely economic project. Time and again, when it has been threatened, leaders have come through with just enough to keep it going. Five years ago, hundreds of billions in ECB bond purchases, hundreds of billions in TARGET2 balances, common stress tests and capital rules, and a nearly half trillion euro emergency bailout fund would all have been unthinkable. It is possible that coordinated shifts in payroll and consumption taxes could aid the painful process of internal devaluation. The EFSF could be used to capitalize banks and to help break the sovereign / bank link. Fiscal support in core countries could help spur growth. Finally, the ECB could provide liquidity to sovereigns and increase nominal GDP growth as well as allow slightly faster inflation to facilitate deleveraging and relative price adjustments across regions. All these steps, especially if taken together in an attempt to treat the three crises holistically could substantially improve outcomes. At the same time, institutional reforms to create a true financial union and a common risk free asset could help both solve the current problems and reduce the connections of these crises in the future. Of course, politics, ideology, or additional economic shocks could all hinder improvement. The euro area is highly vulnerable and without debt policy may continue in crisis for a considerable amount of time.

## REFERENCES

- Acharya, Viral, Itamar Dreschsler, and Pilipp Schnabl, 2001, "A Pyrrhic Victory? – Bank Bailouts and Sovereign Credit Risk," NBER Working Paper no. 17136, June 2011.
- Akerlof, George A., William T. Dickens, George L. Perry, Robert J. Gordon, N. Gregory Mankiw, "The Macroeconomics of Low Inflation," *Brookings Papers on Economic Activity*, Vol. 1996, No. 1 (1996), pp. 1-76.
- Alesina, Alberto and Francesco Giavazzi, 2010, "Introduction," in Alesina and Givazzi ed. *Europe and the Euro*, University of Chicago Press, 2010.
- Åslund, Anders, (2010), "New Europe's Surprising Resilience," *Project Syndicate* 12-16-2010, <http://www.project-syndicate.org/commentary/aslund25/English>
- Attinasi, Maria-Grazia, Cristina Checherita-Westphal and Christiane Nickel, "What explains the surge in euro area sovereign spreads during the financial crisis of 2007-09?" *Public Finance and Management* (2010), Volume 10, Number 4, pp. 595-645.
- Avent, Ryan (2011), "Who killed the euro zone?" Free Exchange blog, *The Economist*, <http://www.economist.com/blogs/freeexchange/2011/11/euro-crisis-21>
- Barattieri, Allesandro, Susanto Basu, and Peter Gottschalk (2010) "Some Evidence on the Importance of Sticky Wages," NBER Working Paper no. 16130, June 2010.
- Bernanke, Ben, 2010 "The Economic Outlook and Monetary Policy" August 27, 2010. <http://www.federalreserve.gov/newsevents/speech/bernanke20100827a.htm>
- Blanchard, Olivier, 1998, "Discussion of 'Assymetric Shocks'," *Economic Policy*, vol 13, no 26, pp 248-250.
- Blanchard, Olivier, 2007, "Adjustment within the euro. The difficult case of Portugal," *Portuguese Economic Journal* 6:1-21.
- Blanchard, Olivier, Giovanni Dell'Ariccia, and Paolo Mauro, 2010, "Rethinking Macroeconomic Policy," *IMF Staff Position Note*, February 12, 2010.
- Blanchard, Olivier, and Francesco Giavazzi, 2002. "Current Account Deficits in the Euro Area: The End of the Feldstein Horioka Puzzle?" *Brookings Papers on Economic Activity*, vol. 33(2), pages 147-210.
- Blanchard, Olivier, and Lawrence Katz, 1992. "Regional Evolutions," *Brookings Papers on Economic Activity*, vol. 23(1), pages 1-76.

Blanchard, Olivier and Alain Muet, 1993, "Competitiveness through Disinflation: An Assessment of the French Macroeconomic Strategy," *Economic Policy*, Vol. 8, No. 16 (Apr., 1993), pp. 11-56.

Cavallo, Domingo and Joaquin Cottani, 2010, "For Greece, a "fiscal devaluation" is a better solution than a "temporary holiday" from the Eurozone," VoxEU 2/22/2010.  
<http://www.voxeu.org/index.php?q=node/4666>

Cottarelli, Carlo, 2012, "Fiscal adjustment: Too much of a good thing?" VoxEU 2/8/2012.  
<http://www.voxeu.org/index.php?q=node/7604>

Darvis, Zsolt, 2011, "A tale of three countries: recovery after banking crises," *Bruegel Policy Contribution*, Issue 2011/19, December 2011

Decressin, Jorg, and Antonio Fatas, 1995, "Regional labor market dynamics in Europe," *European Economic Review*, vol. 39(9), pages 1627-1655, December.

Delpla, Jacques and Jakob von Weizsäcker, 2010, "The Blue Bond Proposal," *Bruegel Policy Brief*, Issue 2010 03, May 2010.

Demirgüç-Kunt, Asli, Harry Huizinga (2010), "Are Banks Too Big to Fail or Too Big to Save?" World Bank Policy Research Working Paper no. 5360, July 2010.

ECB, 2009, "National Rescue Measures in Response to the Current Financial Crisis," Legal Working Paper Series no 8, July 2009.

ECB, 2010, "Extraordinary Measures in Extraordinary Times, Public Measures in Support of the Financial Sector in the EU and the United States," *ECB Occasional Paper* no. 117, July 2010.

ECB, 2011, "TARGET2 balances of national central banks in the euro area," *ECB Monthly Economic Bulletin*, October 2011.

Eichengreen, Barry, 2010, "The Breakup of the Euro Area" in *Europe and the Euro*

Eichengreen, Barry, 2012, "Europe's Vicious Spirals," *Project Syndicate*, January 11, 2012.

Esing, Jacob, and Wolfgang Lemke 2011, "The Janus-headed salvation: Sovereign and bank credit risk premia during 2008-2009" *Economic Letters* 110, p 28-31.

Euro-nomics group, 2011, "European Safe Bonds (ESBies)", September 2011.

Farhi, Emmanuel, Gita Gopinath, and Oleg Itskhoki, "Fiscal Devaluations," NBER Working Paper no. 17662, December 2011.

Fatás, Antonio, 1998. "Does EMU need a fiscal federation?" *Economic Policy*, vol. 13(26), pages 163-203.

Fender, Ingo, and Jacob Gyntelberg, 2008, "Overview: Global Financial Crisis Spurs Unprecedented Policy Actions," *BIS Quarterly Review*, December 2008

Feyrer, James, Bruce Sacerdote, and Ariel Stern, 2007, "Did the Rust Belt Become Shiny? A Study of Cities and Counties That Lost Steel and Auto Jobs in the 1980s," *Brookings-Wharton Papers on Urban Affairs*, 2007.

Franco, Francesco, 2010, "Improving competitiveness through fiscal devaluation, the case of Portugal," working paper.

Friedman, Milton, (1953) "The Case for Flexible Exchange Rates,"

Gorton, Gary, 2008. "The panic of 2007," *Proceedings – Payments System Research Conferences*, Federal Reserve Bank of Kansas City, pages 131-262.

IMF 2010 "Will it Hurt? Macroeconomic Effects of Fiscal Consolidation," *World Economic Outlook*, October 2010.

IMF, 2011a, "Addressing Fiscal Challenges to Reduce Economic Risks," *IMF Fiscal Monitor*, September 2011.

IMF 2011 (4<sup>th</sup> review of the Greek economy as part of the bailout. December 2011)

Jonung, Lars and EoinDrea, "The euro: It can't happen. It's a bad idea. It won't last. US economists on the EMU, 1989 – 2002" *European Economy, Economic Papers* 395| December 2009

Kohn, Donald, 2010, "The Federal Reserve's Policy Actions during the Financial Crisis and Lessons for the Future," May 13, 2010,  
<http://www.federalreserve.gov/newsevents/speech/kohn20100513a.htm>.

Krugman, Paul, 2012a, "Austerity and Growth," The Conscience of a Liberal blog, *New York Times*, 2-18-2012, <http://krugman.blogs.nytimes.com/2012/02/18/austerity-and-growth/>

Krugman, Paul, 2012b, "European Crisis Realities," The Conscience of a Liberal blog, *New York Times*, 2-25-2012, <http://krugman.blogs.nytimes.com/2012/02/25/european-crisis-realities/>

Lagarde, Christine, 2012, "Global Challenges in 2012," available at:  
<http://www.imf.org/external/np/speeches/2012/012312.htm>

- Lane, Philip, 2006, "The Real Effects of European Monetary Union," *Journal of Economic Perspectives* 20, 47-66, Fall 2006.
- Lane, Philip, 2011, "The Irish Crisis," CEPR Discussion Paper No. DP8287
- Mundell, Robert, 1961, "A Theory of Optimum Currency Areas" *The American Economic Review*, Vol. 51, No. 4. (Sep., 1961), pp. 657-665
- Mussa, Michael (1986), "Nominal Exchange Rate Regimes and the Behavior of Real Exchange Rates: Evidence and Implications", *Carnegie-Rochester Conference Series on Public Policy* 25 (1): 117–214.
- Obstfeld, Maurice, 1997. "Europe's gamble," *Brookings Papers on Economic Activity*, vol. 28(2), pages 241-317
- Obstfeld, M., 1998. "EMU: Ready or Not?," *Princeton Essays in International Economics* 209, International Economics Section, Department of Economics Princeton University.
- Obstfeld, Maurice, 2012, "Does the Current Account Still Matter," NBER Working Paper no. 17877.
- Obstfeld, Maurice and Giovanni Peri, 1998, "Asymmetric Shocks, regional non-adjustment and fiscal policy" *Economic Policy*, vol 13, no 26, pp 205-248.
- Obstfeld, Maurice, Jay C. Shambaugh, and Alan M. Taylor, 2009. "Financial Instability, Reserves, and Central Bank Swap Lines in the Panic of 2008," *American Economic Review*, vol. 99(2), pages 480-86.
- OECD 2011 (December 2011 Economic Outlook)
- OECD, 2012, "Can Structural reforms kick-start the recovery? Lessons from 30 years of OECD reform," *Going For Growth*, 2012.
- O'Rourke, Kevin, 2011, "Ireland in crisis: a European problem that requires a European Solution," interview by Viv Davies for Vox, January 13, 2011.
- Reis, Ricardo, 2010, "Uma alternativa fiscal para responder à crise," <http://www1.ionline.pt/conteudo/59994-uma-alternativa-fiscal-responder--crise>
- Rogoff, Kenneth, 2008, "Inflation is Now the Lesser Evil," *Project Syndicate*, 12-2-2008.
- Roubini, Nouriel, 2011a, "The Eurozone's Last Stand," *Project Syndicate*, 7-18-2011
- Roubini, Nouriel, 2011b, "Down with the Eurozone," *Project Syndicate*, 11-11-2011

Sachs, Jeffrey and Xavier Sala-i-Martin (1992), "Fiscal Federalism and Optimum Currency Areas: Evidence from Europe and the United States," in Matthew Canzoneri et al eds. *Establishing a Central Bank: Issues in Europe and Lessons from the U.S.*, Cambridge University Press, Cambridge.

Shin, Hyun Song, 2012, "Global Banking Glut and Loan Risk Premium," 2011 Mundell Fleming Lecture.

Sinn, Hans-Werner and Timo Wollmershaeuser (2011), "Target Loans, Current Account Balances and Capital Flows: The ECB's Rescue Facility," NBER Working Paper 17626, November 2011.

Wolf, Martin, 2012, "The pain in Spain will test the euro," *Financial Times*, 3-6-2012.

Wolf, Martin, 2011, "Merkozy failed to save the Eurozone," *Financial Times*, 12-6-2011.

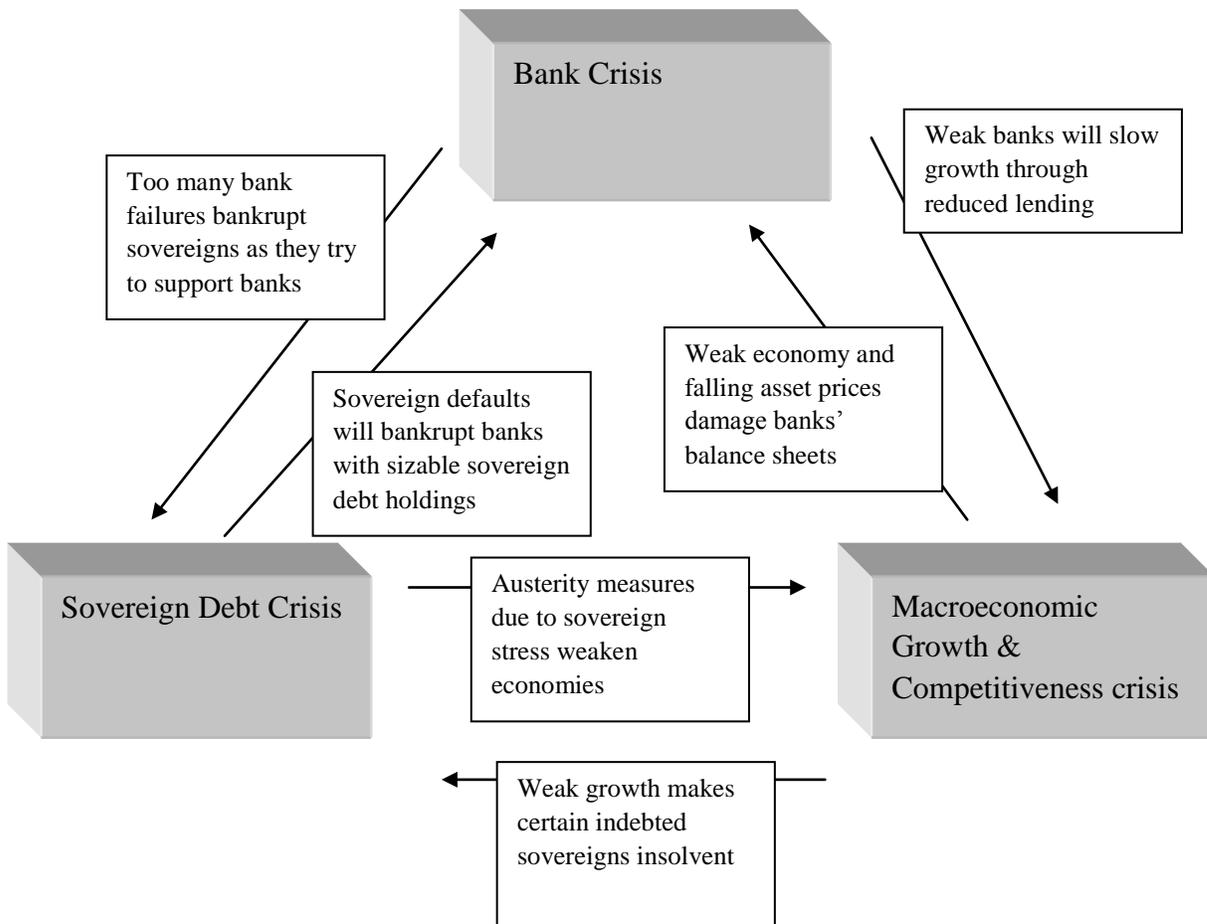
*Wall Street Journal* 12-20-2011, "Sovereign Bond Market Gorges Itself on ECB Christmas Present"

**Figure 1: In trade prices that a country will depart the euro by the end of 2013.**

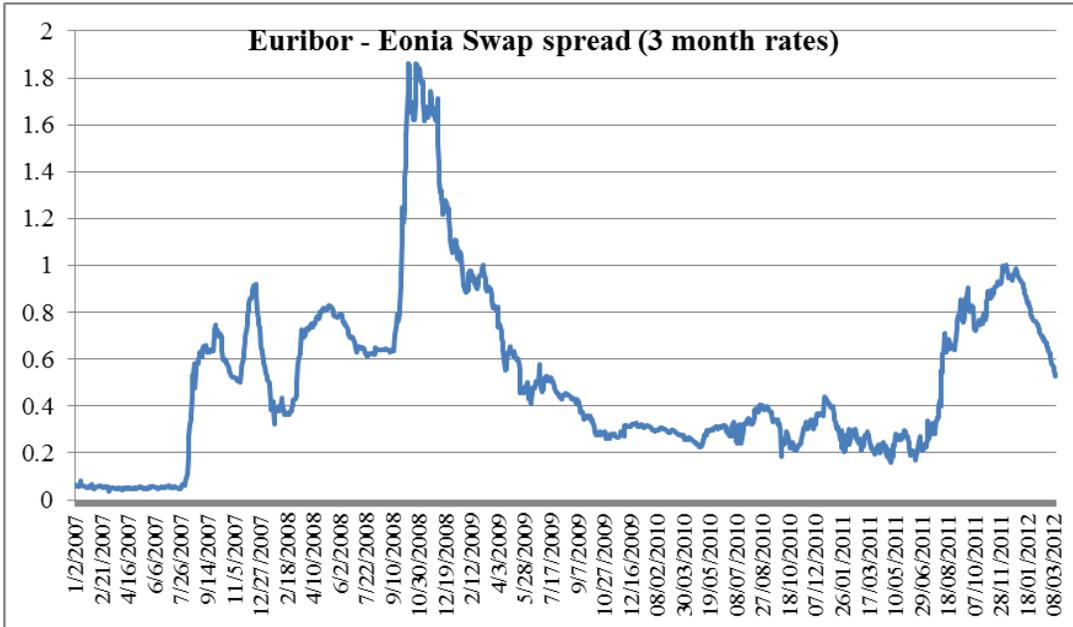


Source: [http://www.intrade.com/jsp/intrade/common/c\\_cd.jsp?conDetailID=713736&z=1327521644792#](http://www.intrade.com/jsp/intrade/common/c_cd.jsp?conDetailID=713736&z=1327521644792#).

**Figure 2: The Euro's Three Crises**

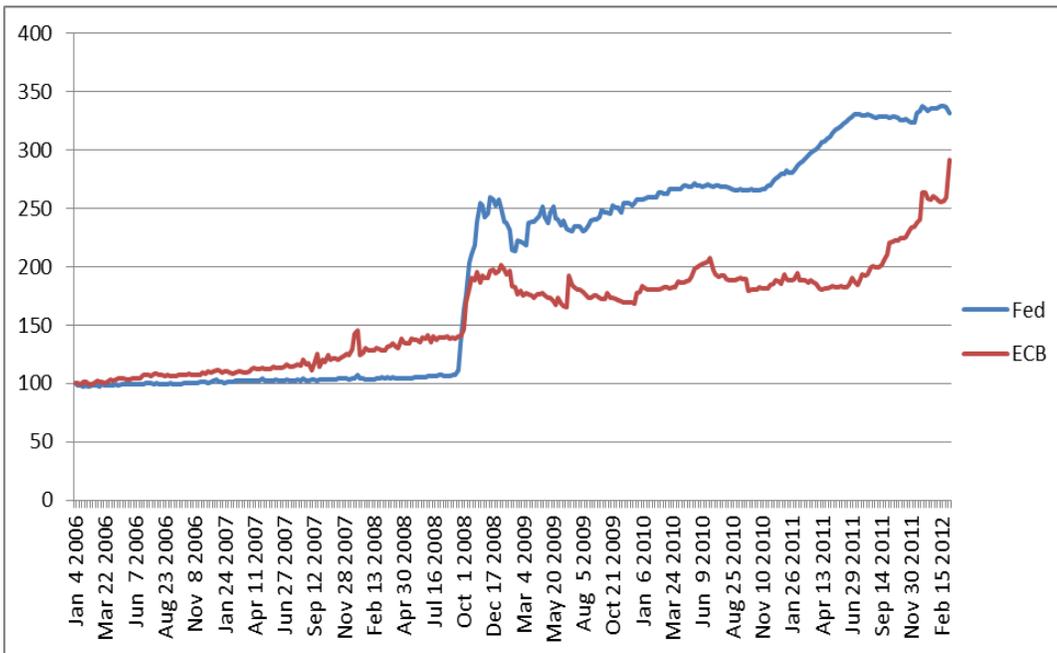


**Figure 3: Stress in interbank markets during the crisis**



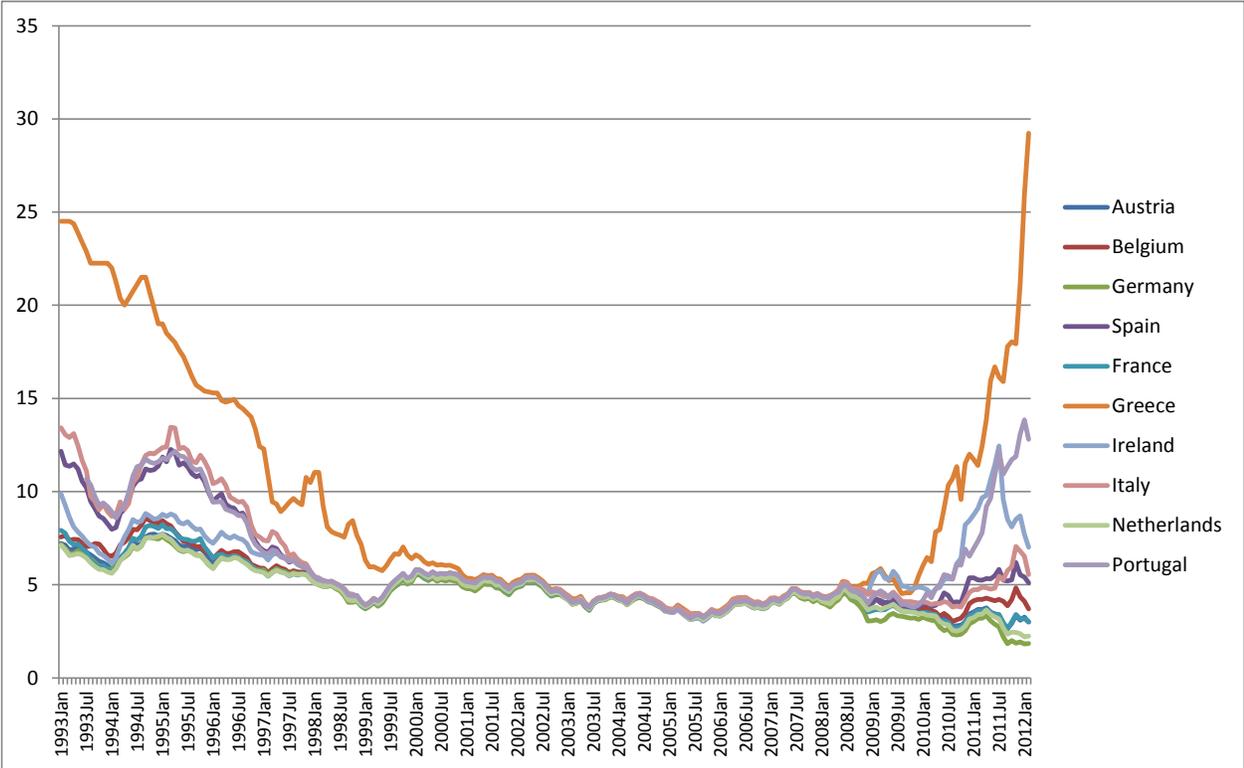
Source: European Banking Federation

**Figure 4: Expansion of Federal Reserve and ECB Balance Sheets**



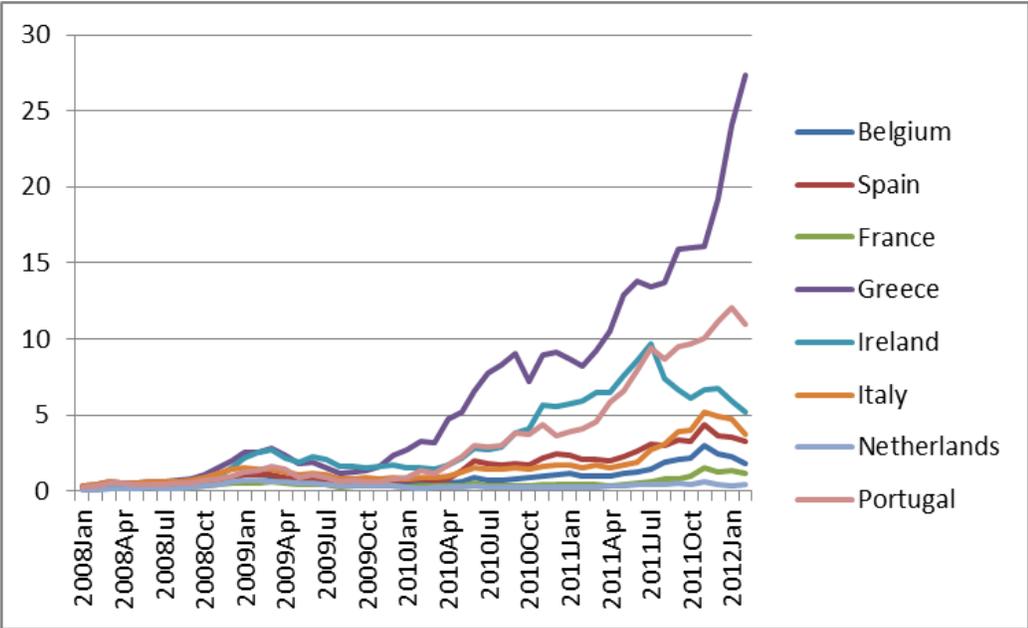
Source: ECB and Federal Reserve.

**Figure 5 Euro Area Sovereign Debt Yields (10 year bonds)**



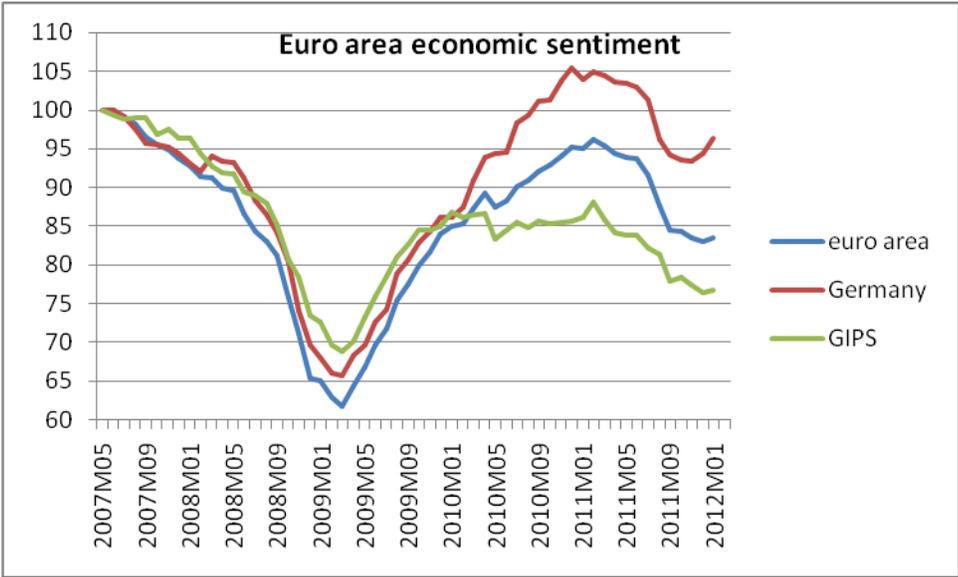
Source: Eurostat

**Figure 6: Spreads over German Bonds (long term bonds)**



Source: Eurostat

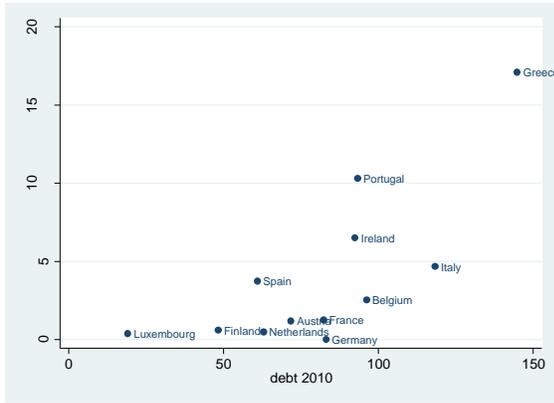
**Figure 7: Euro Area Economic Sentiment**



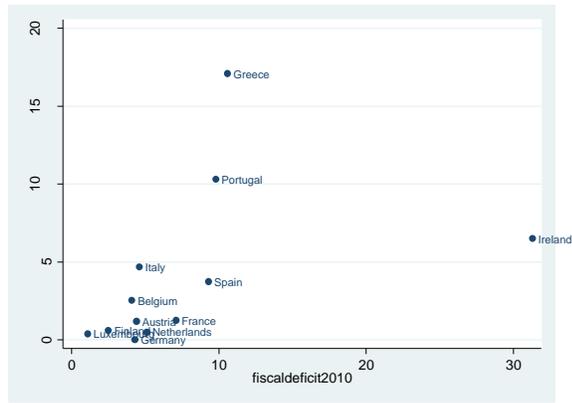
Source: European Commission

Note: sentiment data for Ireland is not consistently available, thus GIPS includes Greece, Italy, Portugal, and Spain. Index set to 100 in May 2007, the pre-crisis peak.

**Figure 8: Spreads of 10 year bond yields compared to various economic indicators**



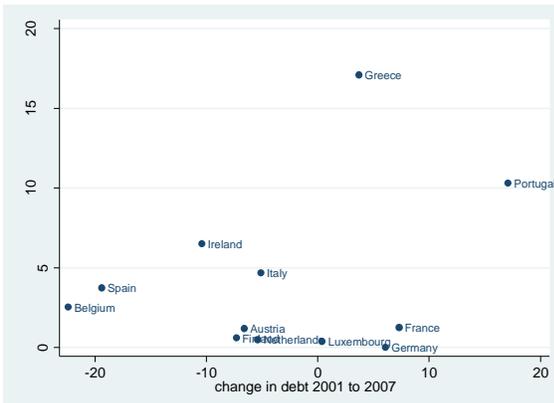
A



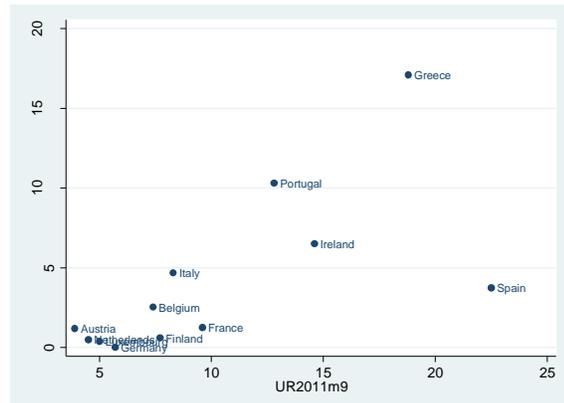
B

Slope: .12\*\* (.03),  $R^2 = .55$

Slope: .27 (.18),  $R^2 = .18$ . without Ireland: Slope: .22+ (.11),  $R^2 = .31$



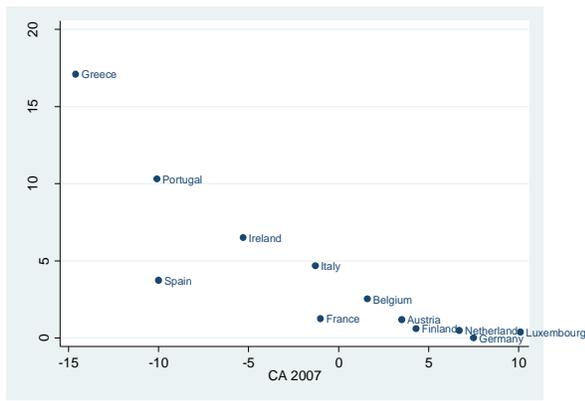
C



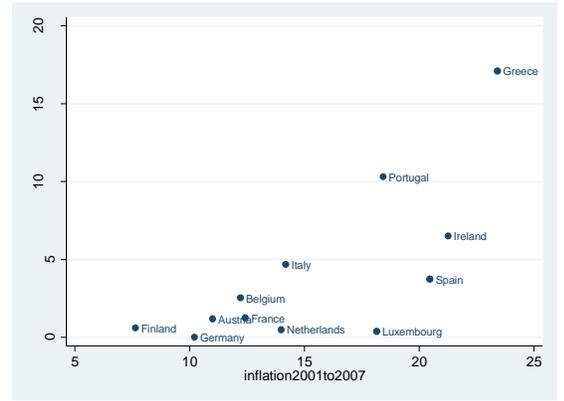
D

Slope: .13 (.13),  $R^2 = .08$

Slope: .33+ (.16),  $R^2 = .32$ . without Spain: Slope: 1.04\*\* (.16),  $R^2 = .82$



E



F

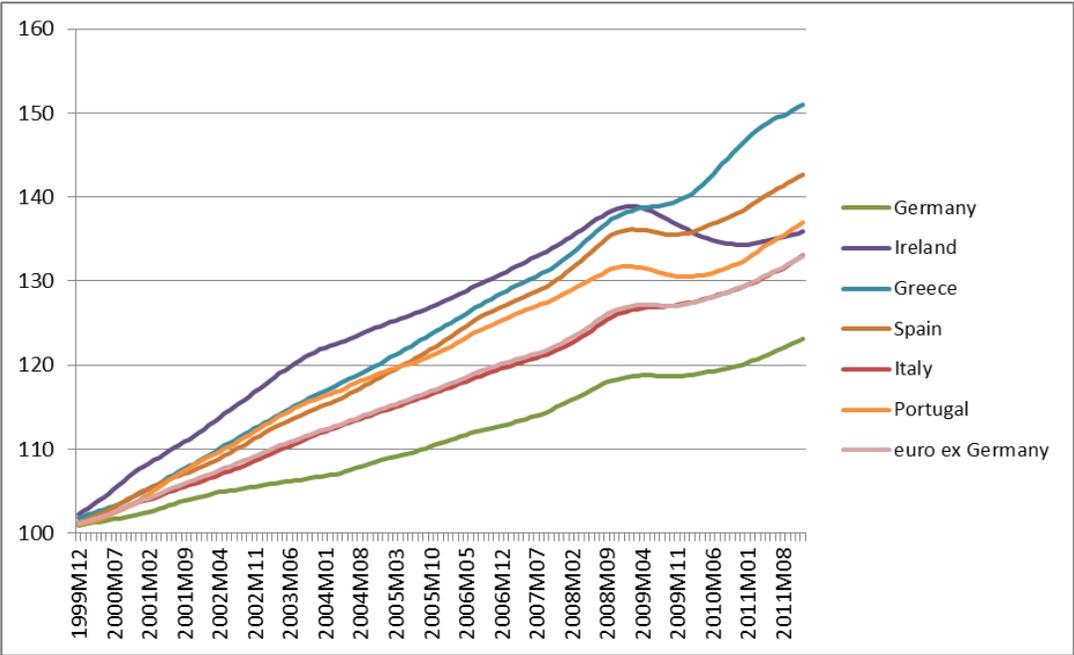
Slope: -.56\*\* (.11),  $R^2 = .74$ . without Spain: Slope: -.66\*\* (.08),  $R^2 = .87$

Slope: .76\*\* (.22),  $R^2 = .53$

Note: All regressions simple OLS, constant is included. \*\* signifies coefficient is statistically significantly different from zero at the 99% confidence level, \* at the 95% level, + at the 90% level.

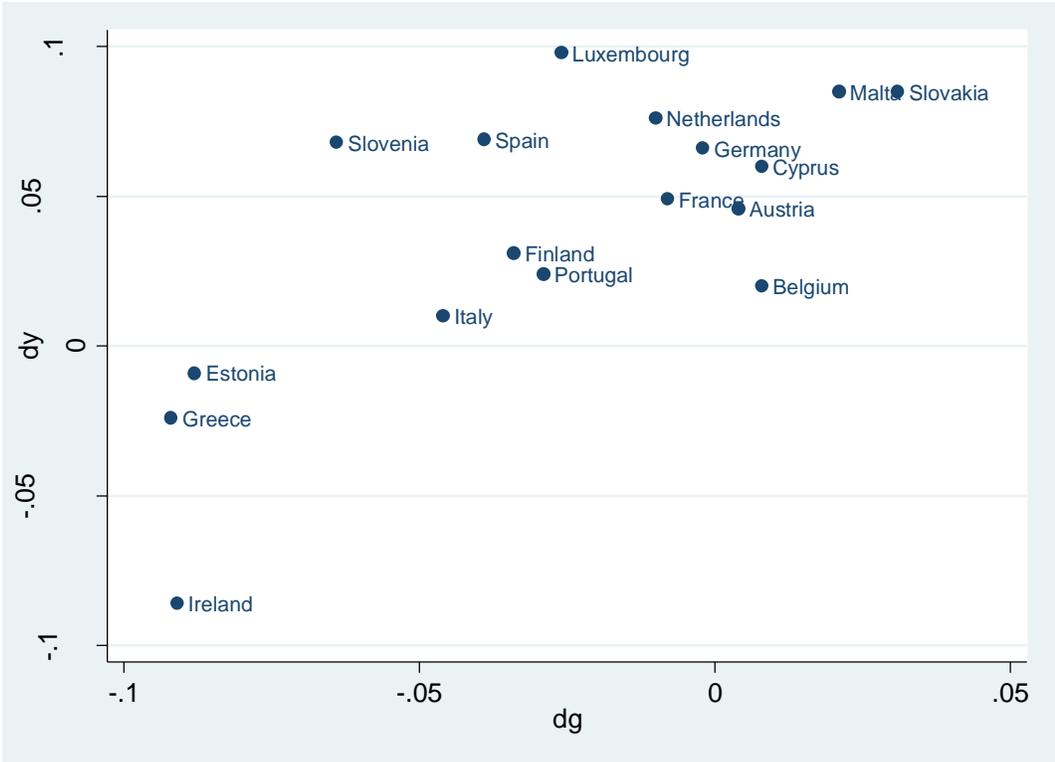
Source: Eurostat

**Figure 9: Euro Area Price Levels 1999-2011**  
 (rolling 12 month averages of HICP indexed to 1999=100)



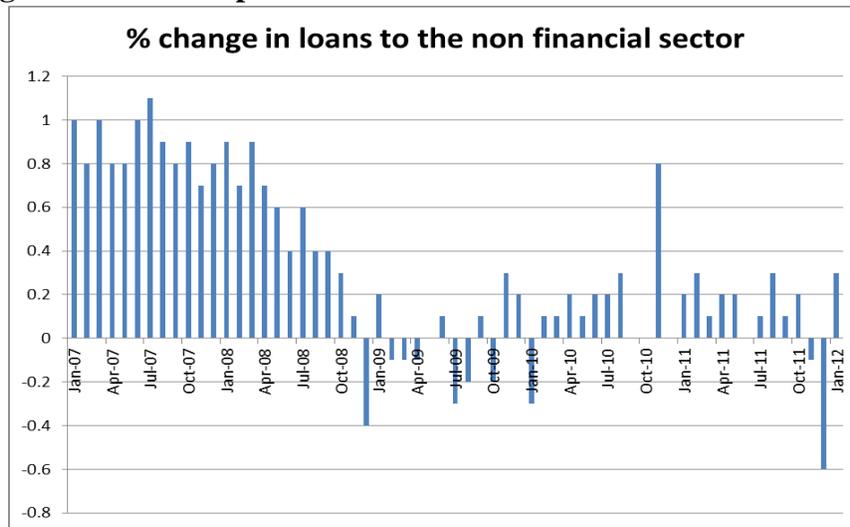
Source: Eurostat

**Figure 10: Change in Government Spending (dg) and Change in GDP 2008:Q1 to 2011:Q1**



Source: Eurostat

**Figure 11: Change in loans to the private sector:**



Source: ECB Monetary Statistics

**Table 1: Devaluations**

<u>Cross Country</u>		Horizon		
		<u>1 year</u>	<u>3 year</u>	<u>5 year</u>
internal	total	25	26	17
	post 1990	3	6	3
all	total	255	136	90
	post 1990	114	57	44
<u>Within Currency Unions</u>				
U. S. total		7	11	11
U.S. post 1990		0	1	1
euro area total		1	1	1

*Note: 1 year devaluation requires 3% change, 3 year requires 5% change, and 5 year requires 7% change. See text for details.*

Source: BIS exchange rates, BLS prices, Eurostat prices, author's calculations

**Table 2: GDP growth and austerity**

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
% change in G	1.06**			1.04			0.97**
	0.28			0.56			0.27
% change in G IV		1.19**	1.06**		0.80**	0.95**	
		0.29	0.28		0.19	0.35	
bank assets/GDP				-0.012	-.014**		-.007+
				0.007	0.004		0.004
Debt2007/GDP				-0.0007	-.0006*		-0.0005
				0.004	0.0003		0.0003
Interest Rate 1993				0.002			0.0015
				0.005			0.0029
R-squared	0.61	0.60	0.61	0.84	0.84	0.53	0.61
observations	11	11	11	11	11	15	15
Instruments		IR93	IR93		IR93	first spread	
		BA/GDP	BA/GDP		BA/GDP	BA/GDP	
			D2007/GDP		D2007/GDP		

Note: Table shows the relationship between the change in GDP from 2008:Q1 to 2011:Q1 across euro area countries. Luxembourg is dropped due to being an outlier for bank assets/GDP. Bank assets/GDP is measured in 2007. Interest rate is the interest rate on 10 year bonds. "first spread" uses the spread over German 10 year bonds in the first year a country appears in Eurostat's long term bond data (to include new entrants). The F-stat for a regression of %change in G on the 3 instruments is over 13. See text for details.

Source: Eurostat, ECB.