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ADOPTION OF THE EURO:
MARKET SIGNALS AND THEIR CONSEQUENCES

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ABSTRACT

This thesis will argue that when Greece joined the European Monetary Union two signals were sent to investors, which led them to lend to Greece at lower interest rates than the market fundamentals warranted. The first signal suggested that Greece's economy was no longer dysfunctional and that it was strong enough to be tightly integrated with the advanced economies of countries like Germany. A second signal suggested that due to the high level of integration among EMU countries, the governments of other EMU nations would be required to aid Greece in times of crisis in order to protect their own economies. Thus, investors believed that there was an implicit guarantee on Greek debt. Taken together, these two signals provided a rationale for investors to lend with little restraint to Greece.

Access to cheap credit supported the profligate spending of multiple Greek governments, which allowed necessary reforms to be postponed. However, without meaningful reforms, the Greek economy was ill-prepared to face the global financial crisis. As events unfolded, it became clear that there was in fact an EMU-backed guarantee on Greek debt. The loans that Greece received to avoid defaulting made this guarantee explicit, so it is no longer tenable to argue that EMU governments will be allowed to fail. Given this, it is prudent for the EMU to develop a permanent bailout mechanism.

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Chapter 1

Introduction

In mid-April 2010 European businesses across the Continent were severely disrupted by the eruption of the Icelandic volcano Eyjafjallajokull. This natural disaster, however, would soon be eclipsed by the tectonic shifts occurring within the European Monetary Union (EMU). The EMU consists of the seventeen members (including Estonia as of January 1, 2011) of the European Union (EU) who have relinquished their domestic currencies in order to create a monetary union under the euro. The creation of the euro was intended to further economic integration within the EU and to help foster an ever-closer political union among member states (Delors, 1989). While this appeared to be occurring during the early 2000's, recent events have called into question the long term viability of the euro.

In May 2010, the Greek government became the first country within the EMU to require emergency loans from other EMU member states in order to stave off a sovereign default (Cadman, 2010). While the funds that Greece received from other EMU countries were interest-bearing loans and not a direct fiscal transfer between member states, the aid did amount to a bailout for the Greek government. This appears to contradict the laws that are found in the Maastricht treaty (which created the Euro) and the current Lisbon treaty, which both explicitly state that a member state's government cannot receive a bailout.

During the negotiations for the creation of the euro, policy makers were adamant about including a "no bail-out clause" into the Treaty. The relevant legislation within the Lisbon treaty states:

The Union shall not be liable for or assume the commitments of central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of any Member State, without prejudice to mutual financial guarantees for the joint execution of a specific project. A Member State shall not be liable for or assume the commitments of central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of another Member State, without prejudice to mutual financial guarantees for the joint execution of a specific project. (Treaty of Lisbon, 2007).

There were, therefore, no contingency plans in place to bailout a government because a government was never supposed to be in a position where it would need one.

How then did this situation arise and why did it come as such a surprise to both politicians and investors? Surely, the global recession that started in late 2007 greatly increased the strain on governments the world over, but why did only a few eurozone countries such as Greece, Portugal and Ireland see such a tremendous rise in their borrowing costs when other eurozone countries like Germany remained relatively unaffected? This paper will seek to better understand how Greece's borrowing cost could fall for nearly a decade only to skyrocket almost overnight.

Specifically, this paper will argue that the convergence in the spread of interest rates of historically risky countries over benchmark countries was not based solely on market fundamentals. Instead, large-scale institutional investors were driven by two market phenomenon which led them to lower the interest rates they demanded from euro zone governments below what the market fundamentals justified. The first phenomenon that will be discussed is the market signal that entry into the euro zone sends to investors. It will be argued that due to the strict criteria required to join the EMU, investors used entry into the euro zone as a means to determine the creditworthiness of a country without investing a great deal of time and money examining the risks themselves. Given that information is expensive to collect, it was

rational for investors to use EMU membership as an “informational shortcut.” Investors did not do due diligence for Greece, especially in the years following their admission into the EMU.

The second phenomenon, which helps to drive the first, is that investors priced in a governmental guarantee on their loans that would limit their losses. Institutional investors, primarily in Germany and France, but in other countries as well, allowed themselves to become highly exposed to risks within Greece, since the risk was transferred to other EMU governments. Due to the level of interconnectedness, stronger EMU governments could not allow Greece to fail, because a crisis in Greece could spread quickly throughout the entire EMU and threaten to destabilize the entire region. Additionally, given their size and importance to their domestic economies, institutional investors could justify their excessive risk-taking with the assumption that their governments would act as a backstop and minimize their losses.

Combined these two influences resulted in investors lending to governments and individuals in the periphery at rates that did not factor in all of the risks. Since information on government borrowing costs can be easily determined by looking at government bond yields, while information on private borrowing costs is harder to collect, this paper will focus on public interest rates. Greece was selected to show the impact of the two forces listed above because while the private sector in many periphery countries borrowed excessively due to the skewed interest rates, the public sector in Greece that borrowed the most recklessly of any periphery government.

The remainder of this paper will examine this explanation in much greater detail. Chapter II will discuss the requirements and rules of the EMU as well as present stylized facts about the conditions within Greece prior to their joining of the EMU. Chapter III will then discuss the relationship between the convergence of long-term government interest rates and the

EMU. The primary argument presented here will utilize standard theory on bond pricing as well as incorporate ideas from signaling literature. Chapter IV will cover the moral hazard created by an implicit guarantee on Greek government. A summary of the findings as well as a few modest suggestions to improve the EMU will be offered in Chapter V.

Chapter 2

Pre-European Monetary Union

World peace cannot be safeguarded without the making of creative efforts proportionate to the dangers which threaten it. The contribution which an organized and living Europe can bring to civilization is indispensable to the maintenance of peaceful relations. In taking upon herself for more than 20 years the role of champion of a united Europe, France has always had as her essential aim the service of peace. A united Europe was not achieved and we had war. Europe will not be made all at once, or according to a single plan. It will be built through concrete achievements which first create a de facto solidarity.

~Robert Schuman, French Foreign Minister, 1950
(Europa, 2011)

The quote above is from the opening lines of the speech that would set in motion the creation of the European Coal and Steel Community, the precursor of the European Union. As Schuman hoped, European countries have moved closer together both economically and politically over the last sixty years through concrete achievements. While there has been a continual trend towards greater integration, it tends to happen sporadically and with lulls in between major advances that allow for both preparation and implementation (Dinan, 2010).

The creation of the euro can be viewed as following this pattern. While the idea of a common currency had been discussed for some time, it was not until 1991, with the signing of the Maastricht Treaty, that the idea began to translate into actual policy (Marsh, 2009). The treaty laid out specific convergence criteria in four areas that any member state who wished to join the currency union had to reach. The criteria are as follows:

1. Price stability: the inflation rate of a given Member state must not exceed by more than 1.5% that of the three best performing Member states in terms of price stability.
2. Government finance:
 - a. The annual government deficit must not exceed 3% of GDP.
 - b. Government debt must not exceed 60% of GDP.

3. Exchange rate: Applicant countries must not devalue their currency; this was made obsolete with the switch to the euro for countries in the euro zone. Moreover, the Member state must have participated in the exchange-rate mechanism under the European Monetary system (EMS) for two consecutive years before the examination, without severe tensions.
4. Long-term interest rates: they must not be more than 2% higher than those of the three best performing Member states in terms of price stability.(NISES, 2010)

While the specific targets are somewhat arbitrary in nature, they do lay out concrete numbers that must be followed (DeGrauwe, 2007). As the prospective members worked to reach the various constraints laid out in the treaty, the governments also began to hand over power to the newly created European Central bank (ECB) that would eventually set the monetary policy for all member states. On January 1, 1999 the euro began being used by banks for accounting purposes; however, it was not until January 1, 2002 that people could begin using euro bills and coins (ECB). The initial members of the EMU included: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain. Greece was not accepted into the EMU until 2001.

History of Greece

In order to better understand the impact that the EMU had on Greece, it will be useful to discuss the conditions within the country in the time period shortly before its acceptance as a member. Greece joined the European Communities (EC, precursor to the European Union) in 1981 seeking closer integration with the West in the midst of the Cold War. In order to achieve membership many of the underlying problems of the Greek economy were overlooked. As Reinhart and Rogoff note, for instance, Greece has spent over half of the last two centuries in default (2008, p. 29); the country also had over 14.3 percent annual inflation at the time of entry

in to the EC (Bosworth and Kollintzas, 2001, p. 38). In spite of the economics problems, however, there was a desire amongst European politicians to strengthen democracy in Eastern Europe and limit the U.S.S.R.'s influence in the region. Since the military junta in Greece had fallen in 1974 and democracy was still in its infancy, European politicians pushed for Greece's entry into the Community to ensure stability within the region. Greece hardly made the ideal economic candidate, but politics outweighed economics and Greece was allowed into the Community.

The Greek economy had been growing at a fairly rapid pace since 1971, but after 1980 its growth rate decreased greatly. According to Bosworth and Kollintzas, the Greek economy only grew at an average of 1.5 percent annually from the years 1971-1995 (2001, p. 1), though this number would have been even lower if it was not for the average annual growth rate of 4.6 percent in the period 1970-80 (i.e., prior to entry into the EC). The Greek economy did not experience significant growth after joining the Community, but did experienced even higher levels of inflation.

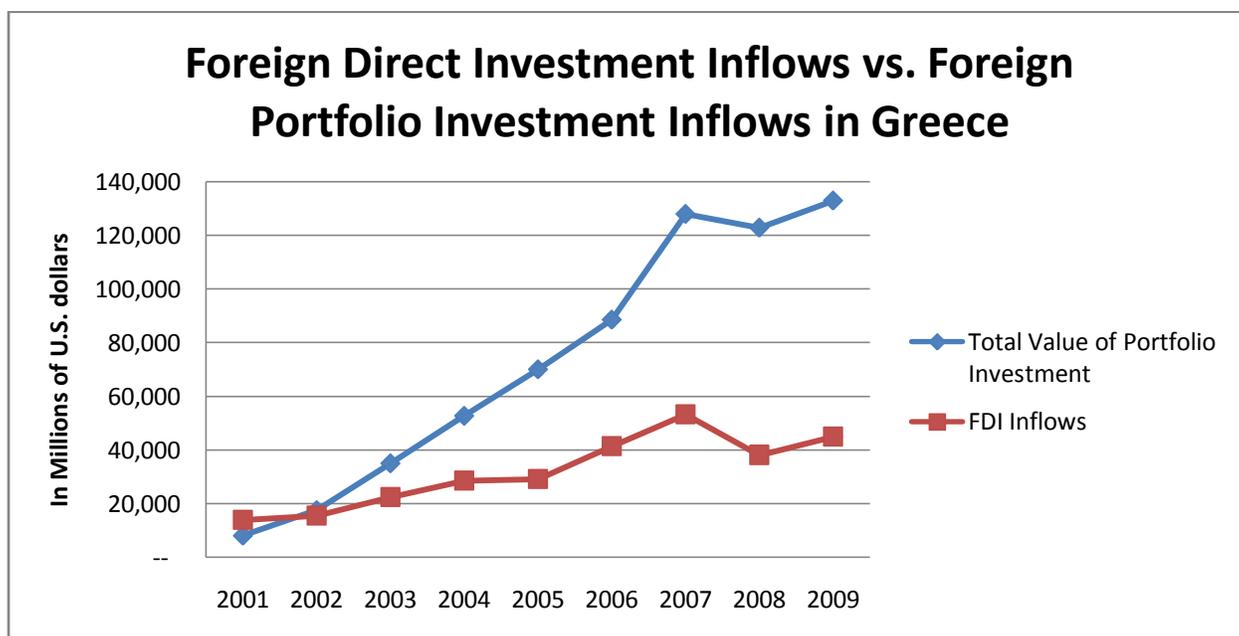
In the period from 1980 to 1995, Greece experienced an average level of inflation of 17.3 percent. Its highest level occurred directly after it entered into the EC, reaching an average of 20.7 percent in the period 1980-1985 (Bosworth and Kollintzas, 2001, p. 38). Inflation was eventually reined in to a reasonable level in the late 1990s and since 1998 the annual rate of inflation has not risen above 4.5 percent (Eurostat). The high inflation during this period acted as a drag on the economy and poor government policies made foreign capital holders reluctant to invest in Greece (Leitao, 2010; Pantelidis and Nikolopoulos, 2008).

Generally, when a country is accepted into the EU there is a rise in foreign direct investment (FDI) in the country, arguably because of the signaling mechanism that will be

discussed in Section III. This did not occur in Greece. In the five years after Greece joined the European Community, FDI inflows actually fell from 1.5 percent of GDP to approximately 1.3 percent and only rebounded in the 1990's (Bosworth and Kollintzas, p.19). In comparison, Spain, Portugal and Ireland each enjoyed a three-fold increase in their foreign direct investment in the five-year period following their individual ascensions.

Entry into the eurozone also did not lead to a rise in FDI to Greece. As a proportion of gross domestic product, FDI in Greece hovered around eleven percent for the early 2000's but did spike in 2007 to 17 percent (UNCTAD, 2010). Even though entry into the eurozone did not significantly increase foreign direct investment to Greece, the country did experience a large increase in foreign portfolio investment (FPI) (see Figure 1). The distinction between the two is derived from the amount of control the investor has over the asset as well as the length of time the investor expects to own the asset. The Organization for Economic Cooperation and Development gives the following definition of FDI:

Figure 1-Source: IMF and UNCTAD



Foreign direct investment reflects the objective of obtaining a lasting interest by a resident entity in one economy (“direct investor”) in an entity resident in an economy other than that of the investor (“direct investment enterprise”). The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence on the management of the enterprise (OECD, 1999, p.7).

FPI in comparison is defined as a shorter-term investment where the foreign investor does not actually control and manage the asset (Goldstein and Razin, 2006). Investments that fall into this category would be assets such as stocks, bonds and currencies. These types of assets tend to be more liquid than those acquired through FDI which implies that it is relatively easier for a portfolio investor to exit an investment (Albuquerque, 2003). The focus of the second part of this paper is to understand what drove this dramatic increase in FPI into government bonds not only in Greece, but in all the periphery countries of the eurozone. Before examining the causes, however, it is beneficial to continue highlighting the underlying economic weaknesses that should have led foreign investors to limit and not increase their investments in Greece.

Entry into the EC did not lead to an improvement in Greece’s trade balance but rather increased Greece’s current account deficit. In the period leading up to entry in 1981, Greece experienced a large expansion in net exports. According to figures provided by the OECD, the percentage of GDP related to trade in goods and services rose from 13.6 percent in 1970 to 27.7 percent in 1981. This staggering growth was brought about by a surge in the amount of goods both imported and exported. In this period Greece’s imports grew from 2 billion USD to 8.2 billion USD, an increase of 310 percent. The amount of exports grew by an even larger

percentage: rising from .6 billion USD in 1970 to 4.2 billion USD in 1981 (OECD, 2010). This is an increase of 600 percent.

While such a growth rate was unlikely to continue forever, it was expected that entry into the single market of the EC would help Greece continue this trend, since it would no longer face the trade barriers imposed by its European neighbors. In absolute terms, both the value of imports and exports did continue to increase, but as a percentage of overall GDP, there was a decline. It was not until 1999 that the percentage of GDP in terms of trade in goods and services rose again to 27 percent. Throughout the 1980's and most of the 1990's the percentage hovered between 20 and 25 percent (OECD,2010b).

Reliable data is not available for trade in services for these seventeen years, but for trade in goods the current account deficit grew during this time. In 1982 the deficit in goods stood at 5.7 billion USD. By 1999 this deficit had increased to 18.8 billion USD. By comparison other countries experienced modest to large increases over the same time period in the percentage of GDP in terms of trade in goods and services. Portugal joined the EC in 1986 when 28.7 percent of its GDP was related to trade; by 1999 this number had increased to 33 percent while its deficit in trade for goods rose from 2.3 billion USD to 15.3 billion USD (OECD, 2009). Ireland, the country that arguably gained the most from EU membership until recently, experienced an even larger growth in the percentage of GDP related to trade.

In the period that Greece's percentage of GDP related to trade leveled off around 25 percent, Ireland's expanded from 52.5 percent of GDP to 82.1 percent, which is even more noteworthy when considering that upon entry to the EC in 1973 this figure stood at 38.9 percent. Additionally, Ireland went from a deficit of 1.9 billion USD in trade of goods to a surplus of 24 billion USD (OECD, 2009). Clearly the growth trajectories of Greece and Ireland were very

different, which at the time of entry into the eurozone should have suggested that the Greek economy had some underlying weaknesses.

Even with the increase in the intra-EU trade, trade has not become significantly more important to Greece over time. As of 2007, only France and the United Kingdom in the EU had a smaller proportion of their GDP based on trade than Greece (OECD, 2009). These two countries, however, are significantly larger than Greece and in general are expected to have less of their GDP dependent upon external trade (Husted and Melvin, 2007, p. 6). The more significant figure is the average for all European Union countries, 40 percent of GDP as opposed to 28.3 percent for Greece. This lack of market exposure coupled with high government debt should have signaled to investors that Greece was fundamentally weak. Instead, investors ignored these cues and rather than decrease their exposure to the Greek market, they increased it.

One possible source of investor confidence in Greece is that the government did begin to implement some meaningful reforms in the years preceding their entry into the EMU. In order to join the eurozone, Greece had to implement an austerity program, because its finances did not meet the standards that were agreed upon in the Maastricht Treaty. As present above, the primary requirements focused on limiting inflation, general government debt, and budget deficits.

Changes in government policies between 1998 and 2000 allowed Greece to lower its average rate of inflation to two percent and lower its government deficit to below the three percent requirement for admission into the eurozone (Eurostat, 2010). “Although the government debt ratio, at 104.4%, was still well above the reference value of 60%, it had dropped by 6.9 percentage points since 1996” and the Commission and the European Central Bank viewed this as a significant enough process to allow for accession (Banque de France, 2006, p. 1).

Greece also appeared to rein in its deficit spending in the run-up and immediately after joining the EMU in 2001. The country still faced persistent current account deficits, such as 7.3 percent of GDP in 2001 and 5.9 percent in 2004, but deficit government spending was below the three percent requirement in the years 2001 to 2004 (OECD, 2009).

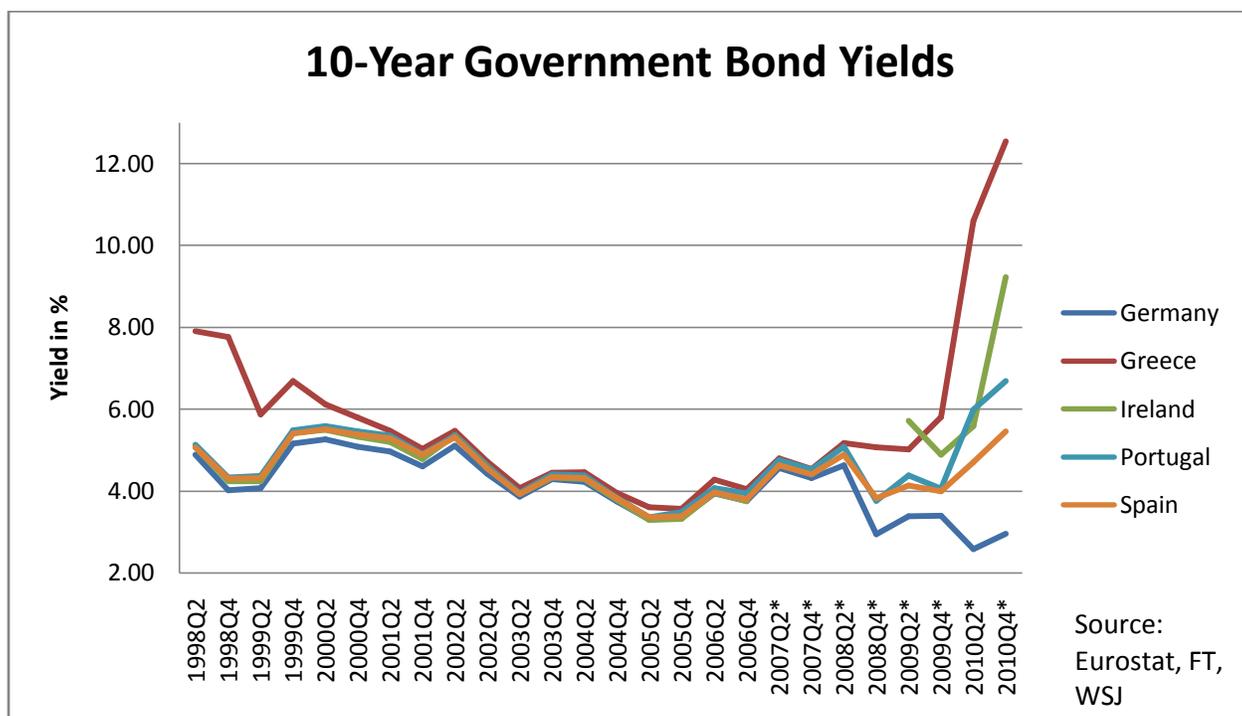
This tremendous turnaround in government behavior, however, turned out to be based on fraudulent statistics provided by the Greek government. In 2004, the Commission discovered that government deficit had in fact been over the three percent threshold at the time of entry and that the data provided since entry was manipulated in favor of Greece. The revised data shows that in the year 2000, Greece had a budget deficit of 3.7 percent and between 2001 and 2004 the deficit ranged from 4.4 percent of GDP to 7.4 percent (OECD, 2009).

The Commission gave Greece one year to cut spending, but by the beginning of 2005 it was clear that Greece would not reduce the deficit enough. The Commission pressed the Council to take a hard line against Greece and force compliance by the end of 2005, but after negotiations in ECOFIN (Council of Finance Ministers from EMU countries), Greece would not have to rein in its deficits until the end of 2006 (Chang, 2005, p. 27). This leniency is an excellent example of how politicized the enforcement of the Stability and Growth Pact is and the underlying weakness of the Pact.

Speaking at the time of the Council's announcement, the European Central Bank's president Mr. Trichet stated, "The Governing Council also takes the view that the extension of the deadline, from 2005 to 2006, for correcting the excessive deficit pushes the room for interpretation of the rules and procedures to the limit. It is now indispensable for Greece to take effective action to correct its severe fiscal imbalances" (ECB, 2005). Given the rather lax response by EU officials, Greece did not take significant steps to cut spending.

Greece had even less incentive to reform its finances, due to the overall market conditions of the time period allowing it to borrow money at rates significantly lower than historical standards. The early 2000's were characterized as a period of high liquidity and easy credit, which allowed Greek officials to finance their debts relatively cheaply (see Figure 2).

Figure 2



In the years 1998 and 1999 the spreads between Greek and German government bonds were 390 and 180 basis points, respectively. In 2000 the spread dropped to 84 basis points and by 2002 the spread was only 22 basis points (OECD, 2009). With weak oversight from officials in Brussels and accommodating market conditions, Greece continued to deviate from the guidelines imposed by the Stability and Growth Pact.

The market conditions changed rapidly, however, in 2007 with the collapse of the financial markets in the United States and throughout the world. With credit markets freezing,

the global economy entered into the most severe recession since the Great Depression. The Greek economy was not spared. Tax revenue, which was already relatively low when compared with other EU members, deteriorated rapidly as Greek business faced adverse conditions. This further complicated Greece's problems with tax collection, because even before the crisis, tax evasion was a significant problem in Greece (DG for Econ, 2008 p. 1). A report from the Director-General found that while "tax revenues have been growing in nominal terms at about 7% per year [over the past decade], nominal GDP grew at an average rate of 8¼%," which when compared to other member states suggests a large amount of tax evasion. With a steep fall in revenue, the government deficit greatly increased as the automatic stabilizers throughout the economy were activated. The deficit grew to five percent of GDP in 2008 and the most recently revised figures show a deficit of 13.6 percent for 2010 (IMF, 2010).

The persistent use of deficit spending has greatly increased the national debt. As of 2009, Greece's debt was the equivalent of 115 percent of GDP and this is expected to reach at least 150 percent of GDP in the coming years (Eurostat). With the rapid increase in debt and the collapse of the credit markets, Greece began facing higher interest rates on government bonds. Rates on 10-year government bonds steadily rose from around four percent to over nine percent. This is particularly problematic for Greece, because around 80 percent of Greek debt is held by non-residents. According to economists Boone and Johnson; "Every 1 percentage point rise in interest rates means Greece needs to send an additional 1.2 percent of GDP abroad to those bondholders" (2010).

In an effort to restore confidence in the market, the government began to pass austerity measures to calm the fears of investors. In early 2010 the government froze the wages of government employees, increased the value-added tax, and imposed a one-time tax levy on

business to raise funds (IMF, 2010). All of these efforts proved ineffective and the borrowing cost of the Greek government continued to rise until the market was effectively closed to financing the government's deficit spending. Without access to financing to roll over their old debt or the ability to issue new debt, the Greek government was facing the prospect of default. This did not happen, because the other members of the eurozone and the International Monetary Fund agreed to transfer funds to Greece so that it could continue to finance its debt. As this section has discussed, the Greek economy has long experienced problems that should have increased the level of risk associated with lending to the Greek government. This level of risk, however, did not appear to be present, or at least significant, in the run up to the crisis. The causes of this will be discussed in Chapters III and IV.

Chapter 3

Role of Signaling

Standard Determinates of Interest Rate Spreads

As was discussed in the previous section, the Greek government experienced a tremendous decline in the interest rate spread of its long-term government bonds over German bonds. Some of this decline can be explained by economic reforms implemented to meet the conversion criteria, such as Greece's efforts to rein in inflation, but it is unclear whether reforms can explain all of the reduction. The literature relating to this question has been inconclusive. Cote and Graham found that "the convergence of national long-term government bond yields in the euro zone cannot be attributed primarily to the introduction of the common currency itself," but rather to more integrated financial markets and the implementation of sound fiscal and monetary policy (2004, p. 2). International risk-related factors appear to play a role for countries with high debt to GDP ratios (Codogno et al., 2003), while developments specifically in Germany's bond market were found to impact the rates of other EMU members (Orloski and Lommatzch, 2005).

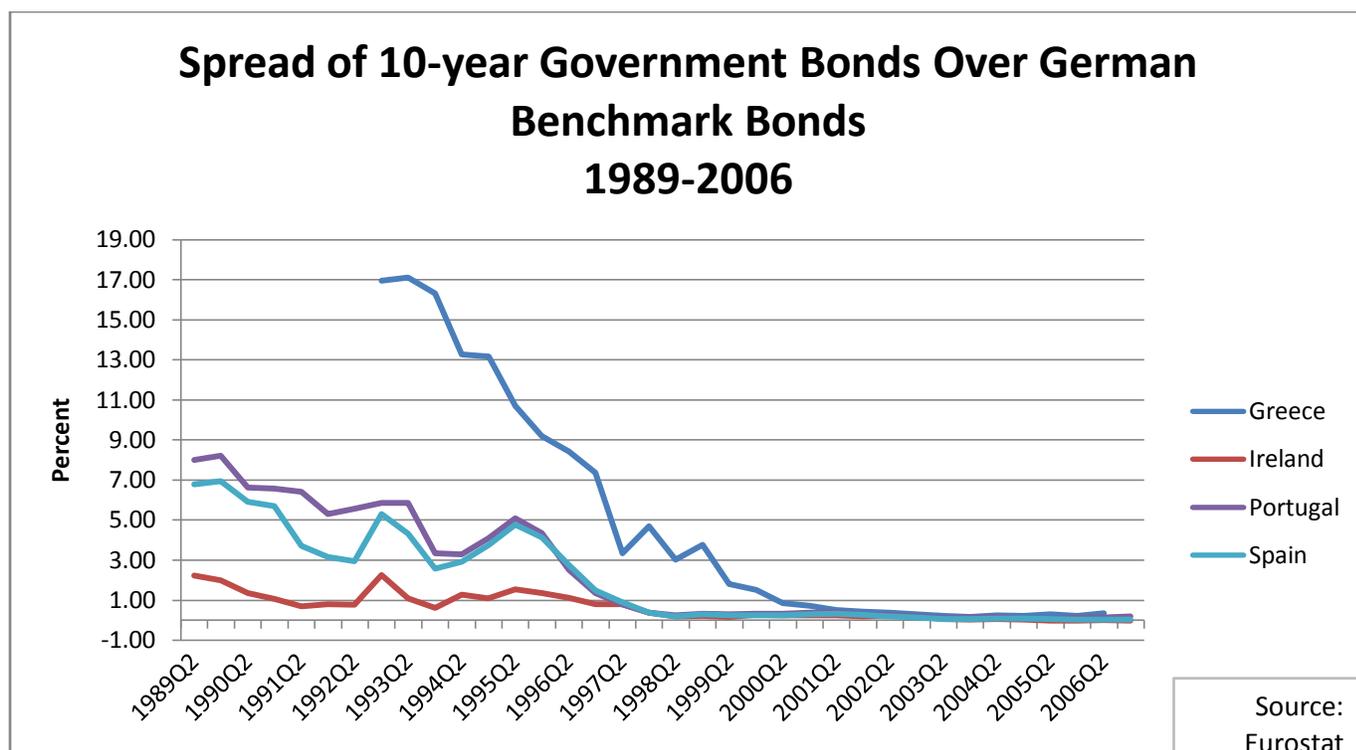
Most of these factors can be explained through broad categories of risk. Prior to the EMU, there were four major determinants of yield differentials within the EU: exchange rate risk, different tax treatments on capital movement, liquidity risk and lastly default risk (Codogno et al., 2003). After members relinquished control of their currencies, exchange rate risk was no

longer a factor; additionally, the EU harmonized taxation policies, eliminating this risk factor as well. Therefore, the only determinants remaining in the EMU are liquidity and default risk.

Default risk is the perceived likelihood of a country not being able to repay its debts, either partially or completely. In this case investors will lose a portion, if not all, of the money they lent. “Liquidity depends not only on the depth and efficiency of the market where a security is traded, but also on other characteristics, such as the possibility to strip bonds and trade coupons and principals separately” (Favero et al., 2000, p.27). Liquidity risk mainly affects smaller member states that do not have a large demand for their debt. Limited demand for a country’s bonds could make it difficult for investors holding those bonds to find other individuals who would be willing to buy them. Given the uncertainty of whether they will be able to sell their holdings quickly investors will demand a higher premium from the government.

Of the two remaining risks, it appears that the default risk is the stronger of the two forces in determining interest rates (Cote and Graham, 2004; Codogno et al., 2003; Bernoth et al., 2006). When one considers these results with the fact that there were persistent yield differentials between German bonds and periphery country bonds, it becomes apparent that investors must have believed that countries like Greece and Portugal were still riskier than Germany even after they entered the EMU. However, while there was a differential between various government bonds, the differential became extremely low by historical standards (Figure 3).

Figure 3



If liquidity risk is not very consequential, then this indicates that the appearance of default risk decreased dramatically even as government fiscal positions remained relatively unchanged. Manganelli and Wolswijk argue that part of the lower perceived risk during the early part of the decade was in fact driven by lower short-term interest rates (2009). They demonstrate that lower short-term rates lead to riskier behavior as investors seek higher returns on their investment and also that “lower interest rates are associated with lower degrees of risk aversion” (p. 225).

This short-term analysis stands in contrast, although not necessarily in contradiction, to the general findings of the longer term analysis conducted by Reinhart and Rogoff. They found that it is typically difficult for a country to rapidly improve its perceived creditworthiness (2009). They do mention, however, that the process of building international trust can be accelerated by

the “pull of an outside political anchor” (p.30). Both Manganelli and Wolswijk and Reinhart and Rogoff therefore seem to suggest that there are factors other than pure economic fundamentals driving bond yield differentials. Manganelli and Wolswijk’s work will be discussed in greater detail in Chapter IV, but the idea of an outside political anchor will now be explored.

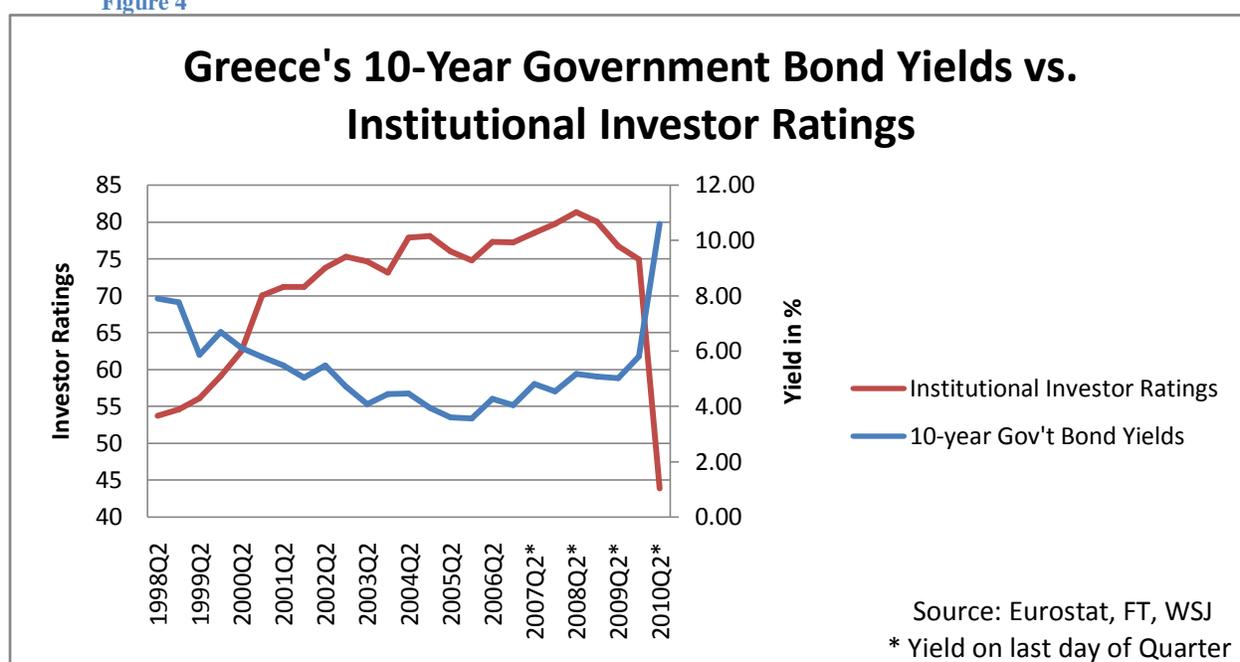
Signals Sent by Joining the EMU

The rationale behind a country attaching itself to an outside political body is that a country can gain credibility (Featherstone et al., 2002). An institution, such as the European Union, has a multitude of strict rules that result in penalties if not followed. Given that these rules are public in nature and a country’s compliance or lack thereof is also public, outsiders can use this information to make generalized assessments of a country. This is encapsulated in the notion that institutions can serve as “informational shortcuts” by signaling to investors the type of the country joining the institution (Mosley, 2003, p. 34). It has been demonstrated that accession into the EU tends to lead to a reduction in the perceived default risk (Gray, 2009). What is perhaps surprising is that the reduction does not occur gradually over the time it takes to become a full member, but rather there tend to be sharp drops in interest rate premiums whenever a public announcement is made.

As in the case of the EU, countries see large decreases in their yields when the official negotiations begin, when it is pronounced that they may ascend into the Union, and finally when they become full members. While many of the major reforms take place in between these stages, it is not until the EU publicly gives its “seal of approval” that countries see a reduction in their borrowing costs (Gray, 2009). While ascension into the EU requires many political and

economic changes to meet all the governing laws laid out in the *acquis communautaire*, entry into the EMU primarily requires more strenuous economic standards. It therefore follows that acceptance into the EMU should provide an even clearer signal of government creditworthiness. Figure 4 demonstrates how rapidly investor confidence can change. The graph depicts the ratings on a scale of 0 to 100 given by institutional investors and professional risk analysts to the *Institutional Investor* magazine. A higher rating translates into a lower perceived default risk for a given country.

Figure 4



As can be seen, there is a dramatic increase in Greece's rating in the run-up to 2001 when the country officially joined the EMU. According to analysis done by Reinhart and Rogoff, an investor rating of 73 tends to mark the distinction between countries that have a higher level of perceived risk and advanced economies that have full access to credit markets (2009). As the figure depicts, Greece was able to move within this range upon entry and enjoyed a continuous

decline in borrowing costs until the outbreak of global financial crisis when interest rates began to rise globally.

Investor Methodology for Determining Risk

Such dramatic increases and decreases in Greece's ratings and bond yields over a relatively short period of time raise the question of what influences investors to make radical changes in their investment strategies. In order to understand the role that signals play in motivating investors, one first needs to understand the methodology that institutional investors and professional risk analysts use when providing their country credit assessments and making investment decisions. In the case of the *Institutional Investor*, each respondent determines what indicators to examine and what their respective weight should be, since there is no set standard to determine risk (Bouchet et al., 2003). As Bouchet et al. note, "the measurement of risk is ... closely related to its perception. And as perception varies across space and time, the measure of risk is a volatile issue" (2003, p. 221).

Mosley argues that the degree of a country's economic development strongly influences the perceptions of investors (Mosley, 2006). Through conducting surveys and interviews with individuals working for large investment firms, as well as collecting other available market data, Mosley demonstrated that investors in highly-developed countries focus on fewer risk indicators than investors in lesser-developed countries (2003). Mosley concludes that market forces (i.e., investor preferences that determine the interest rate governments must pay to finance their debts) constrain the actions of developed governments in a strong but narrow way. Market forces are strong in that moderate changes in a perceived risk indicator can lead to a dramatic increase or

decrease in government borrowing costs, but narrow in that investors' preferences are influenced by a very limited set of indicators.

Mosley finds that in developed countries, the factor that investors respond to most strongly is a change in the rate of inflation. Increases in the rate of inflation will typically cause the interest rates on government bonds to increase and the country's currency to depreciate (2003, p. 90). Additionally, the balance of a developed country's government budget (i.e., surplus or deficits) and the partisanship of the government in power also have an impact on interest rates, albeit a weaker one. The party association of the government matters, since left-leaning governments are more inclined to pursue inflationary fiscal policies. Left-leaning governments therefore tend to face higher borrowing costs than right-leaning governments (Mosley, 2003).

In lesser developed countries, by comparison, market forces are found by Mosley to be both strong and broad (Mosley, 2006). Investors in these countries are found to respond to changes in the large macro-indicators (e.g., inflation rate and absolute size of the public debt) that were important in developed countries, but also to a variety of smaller indicators as well. Investors, for example, tend to deemphasize the composition of government expenditures in developed countries while examining developing country budgets closely. Investors can find information in a country's budget on the tax collecting capabilities and spending priorities of a developing country government, which could give clues to the long-term financial stability of a country. This type of additional information seems to be required for investors to be willing to invest in a developing country.

Mosley's argument that investors in developing countries examine more risk factors than they do when investing in developed countries is borne out in a survey conducted by the

Institutional Investor in 2007. The survey provided ten broad risk indicators and asked its professional respondents to rank the indicators on their level of importance on a scale from 1 to 10, with 10 being the most important. The results are shown for three different regions in Table 1 with the raw average provided on the far right of every column and the factor's ranking shown on the left, with 1 being the most important (*Institutional Investor*, 2007).

Table 1- Source Institutional Investor, 2007

2007	Western Europe		Eastern Europe		Sub-Saharan Africa	
GDP Growth	(1)	7.6	(4)	6.1	(9)	4.6
Government Fiscal Policy	(2)	7.5	(3)	6.8	(8)	4.7
Balance of Payments/ Current Account	(3)	6.8	(1)	7.6	(2)	6
Banking/ Financial Stability	(4)	6.5	(4)	6.1	(10)	4.2
Export Profile	(5)	5.7	(7)	5	(7)	4.9
Debt Profile	(6)	5.4	(2)	7.2	(1)	7.8
Governance	(7)	5.1	(6)	5.6	(2)	6
National Security	(8)	4.2	(8)	4.7	(4)	5.8
Political System	(9)	3.7	(9)	3.3	(4)	5.8
Relationship with Multilaterals	(10)	2.5	(10)	2.6	(6)	5.1

The results for Western Europe, Eastern Europe, and sub-Saharan Africa were selected, since countries within these regions tend to have developed economies, transitioning economies, and developing economies, respectively. In the case of Western Europe, investors are primarily focused on a country's GDP growth as well as government fiscal policies (i.e., is inflationary spending occurring?) and current account balances. This reflects the fact that the main concern of investors is the rate of return they will receive. Investors are relatively unconcerned with the profile of a country's debt, which implies that in developed countries there is relatively little fear of losing their investment through default.

This stands in contrast to the relative importance of factors for countries in Eastern Europe and sub-Saharan Africa, where the debt profile of a country (e.g., foreign exchange reserves, debt service ratio, absolute level of debt) plays a much more prominent role in determining risk. The largest concern for an investor in sub-Saharan Africa, according to *Institutional Investor*, is the debt profile of a country, while it is the second-largest concern for Eastern Europe. The data indicates that investors in these regions are relatively more concerned with default risk than investors in developed countries. The lesser developed a country is the more non-growth related variables matter to investors. For example, a change of government in Germany will most likely not result in a drastic change in economic policy, but a regime change in a developing country can result in changes that could significantly increase the risk of an investor getting repaid.

The *Institutional Investor* survey also supports Mosley's argument in another important way; in addition to showing that the relative importance of a given risk indicator differs depending the level of economic development in a country, the survey also shows that the number of risk variables investors examine also varies with the level of economic development in a country. Upon examination of the average score for each of the ten relevant indicators that investors consider, one finds that there is a greater degree of variation in the scores for Western Europe than in the other two regions. For example, in the developed Western Europe region the range between the highest and lowest score is 5.1, while for the developing sub-Saharan range is only 2.7. This implies that the relative significance of the least important indicator in Western Europe is less meaningful than the least important indicator in sub-Saharan Africa.

To better observe the variation within the scores for each region the standard deviation was taken of the scores of the ten indicators in each of the three regions. This analysis found a

positive correlation between the amount of variation from the mean of the average scores and the level of development (see Table 2). This suggests that there is a higher degree of parity in the importance of each indicator in the lesser developed regions of the world. Put another way, investors lending in lesser-developed countries spread their attention over more indicators, while investors in developed countries tend to focus on only a few factors and discount others.

Table 2-Standard Deviation of Investors' Responses when Ranking 10 Risk Indicators

2007	Western Europe	Eastern Europe	Sub-Saharan Africa
Range Between highest and Lowest Scores	5.1	5.0	2.7
Standard Deviation of Institutional Investor Responses	1.674648	1.628223	1.034354

Given that investors examine a larger variety of indicators in developing countries, investors must employ more resources. Information is costly to collect so the more information investors need to gather about a country the more resources they must expend (Ferejohn, 1991). For every additional piece of information an investor collects for one country, it is one less piece of information that the investor can collect for another. This can be particularly problematic if investors want to diversify their portfolios, since they must either limit the investments they consider or reduce their due diligence.

Profit-maximizing investors will want to only collect the minimum amount of information needed to feel that their investment decisions are sound (i.e., collect information up to the point where the marginal cost of collecting another piece of information equals the marginal benefit derived from that piece of information) (Mosely, 2003). With this knowledge, a government has an incentive to reduce the amount of information that is deemed necessary to

distinguish itself as a safe investment, since this would reduce the costs to investors and induce them to lend more.

In this situation, governments of lesser developed countries must bear a cost in order to distinguish themselves as a “good” type (i.e. low credit risks) and not as a “bad” type (i.e., high risk of default) (Mosley, 2003). In order to prove that they are a good type, governments must often implement reforms designed to appease investors. However, since investors are unsure of a government’s type, “credible policy reform will require going overboard: the government will have to go much further than it would have chosen to in the absence of the credibility problem” (Rodrik, 1989, p. 758). Having to implement more reforms than they desire is a cost that lesser developed governments must endure if they want sustained access to foreign capital. Investors assume that developed countries are and will remain stable; governments in lesser-developed countries must continually prove this (Bouchet, 2003).

The analysis above suggests that investors use the level of economic development as an informational shortcut (Bardhan et al. 2006). By informational shortcuts, it is meant that there are certain types information that investors can use in lieu of multiple pieces of information. If one indicator is viewed as a near perfect-substitute for the sum of many different indicators, then investors can save a great deal of resources if they only follow the one indicator. Mosley’s work demonstrates that economic develop acts a shortcut for creditworthiness that allows for investors to ignore a large variety of indicators that would need to be examined to ensure that a country is truly creditworthy. This means that governments can gain a certain degree of policy freedom and lower interest rates if they can convince investors that they have transitioned from a developing to a developed country. This important in understanding the events that occurred in Greece, which we will turn to now.

Specific Impacts on Greece

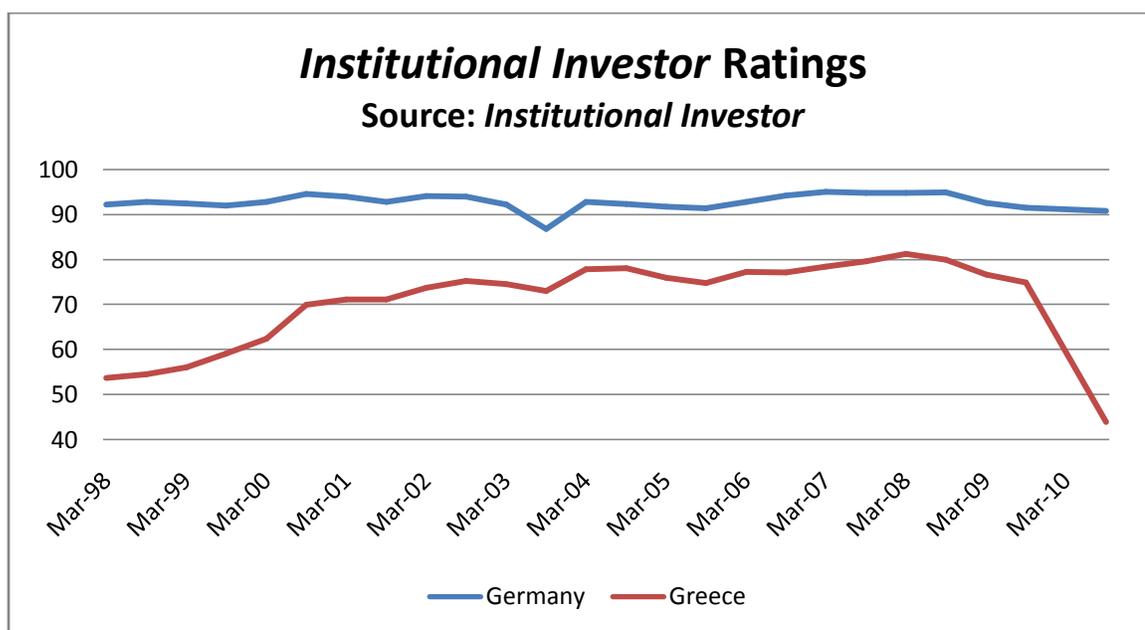
With this general understanding of how investors determine risk, and how the nature of risk assessment creates incentives for investors to search for informational shortcuts, I will now return to the recent bond market developments in Greece and argue that the European Monetary Union acted as an informational shortcut for investors by signaling that Greece had a stable, developed economy. As discussed in Chapter I, Greece had a long history of poor economic performance and defaulted often by international standards. This was reflected in the high yields on Greek government bonds for much of the Twentieth century. However, as indicated in Figure 4 on page 20, investor confidence in Greece began to increase rapidly beginning in 1998 as the country prepared to apply for the European Monetary Union. Optimists at the time argued that the gains in the country's credibility could be directly tied to the governmental reforms aimed at reducing the power of special interest groups in the economy, however:

Pessimists say Simitis [the Greek Prime Minister] cobbled together a facade of fiscal balance based on gentlemen's agreements with the powerful public sector unions, one-time privatization receipts and a tax dragnet developed with the help of advisers from the U.S. Internal Revenue Service. "We suddenly realized an important visitor was coming, so we swept all the country's rubbish under the rug," says Christos Konstas, an economics columnist for the Athens daily, *Exousia*. (Mellow, 1999, p. 107)

As the recent crisis made painfully clear, the pessimists were largely correct; the reforms that the government did enact to enter the EMU did not drastically improve economic performance. Even before the crisis, however, there were multiple indicators of weakness that should have given investors pause: in addition to the factors presented in Chapter I, the underfunded public pension system and the increases in public goods provision at the expense of the private sector are visible signs of economic weakness (Katsimi and Moutos, 2010; Kandell, 2002).

Real world outcomes, therefore, suggest that the perception of Greece’s credit risk was grossly inaccurate during much of the last decade. As Figure 5 shows, raters for the *Institutional Investor* continued to improve Greece’s credit risk rating. While not eliminating the gap between the ratings of Germany and Greece, Greece’s status did improve enough to be considered a developed country (Reinhart and Rogoff, 2009). While the classification system of Reinhart and Rogoff is somewhat arbitrary, it is important to note that Greece reached “developed” country status shortly after adopting the euro.

Figure 5- Credit Rating- Germany vs. Greece



As the discussion of risk assessment should have made clear, investors have different means of determining the credit risk a developed country poses versus that of a lesser developed country. The general framework used in this paper suggests investors in developed countries are more inclined to use macroeconomic indicators as informational shortcuts rather than examining nuanced factors like pension liabilities. This appears to be largely consistent with the experiences of Greece, whose reported (albeit at times fraudulent) macro figures, such as the size

of the deficit and rate of inflation during the early 2000's, were largely comparable with other members of the EMU (ECB). Although there was underlying weakness, investors continued to express their confidence in Greece's overall economic prospects by charging the government low interest rates.

Given that a close examination of the economic fundamentals would not support the rapid positive change in the perceptions of Greece's creditworthiness, it appears that investors did not do their due diligence, but rather used Greece's entry into the EMU as an informational shortcut. This is plausible given the clear signal that entry into the EMU transmits. The fact that not every country is allowed to join the EMU indicates that there are certain conditions (i.e., the Maastricht criteria) that must be met to join this rarified group. Since investors have accepted these conditions as credible indications of a government's type, EMU membership is a meaningful signal (Mosley, 2003).

By joining the EMU, governments signal their current acceptance of the Maastricht criteria, as well as their future commitment to adhere to the rules. By entering into a treaty agreement that has enforceable penalties if broken, governments remove some of the uncertainty about their future actions (Martin, 2005). This reduces the perceived risk of lending to governments and allows for investors to use informational shortcuts, since regardless of what policy mix governments implement they still must (purportedly) hew to the Maastricht criteria.

An additional attribute of acceptance into the EMU is that investors do not have to collect the information for the vetting process. Instead, these costs are borne by the EU Commission and the ECB, who are required by law to vet the countries applying for membership (EU Commission, 2010). The Commission and ECB have an incentive to do their due diligence,

since the acceptance of a country that could not handle the constraints of the monetary union could threaten the stability of the entire union.

Since these institutions make their assessments publicly known through their convergence reports and other statements, investors have an incentive to free-ride. Given the choice between spending time and money collecting their own data or reviewing a readily available, comprehensive report provided by a credible source, the utility-maximizing investors will choose the latter. Gray makes a similar point while discussing the impact of the negotiations to join the European Union:

Thus, even in an environment where bond traders have equal access to a wide variety of information—including preexisting policy reform and earlier progress in negotiations with the EU—the closure of negotiating chapters in the EU serves as a credible and public piece of information that facilitates information processing by individual economic agents... Rational actors who have equal access to the same set of private, noisy information could still reach different conclusions. But because of its relative clarity and the public nature of its announcements, the EU seal of approval coordinates those expectations. (Gray, 2009, p. 936)

Investors were acting rationally when they used Greece's entry into the EMU as an informational shortcut, because they assumed that Greece had been fully vetted. If governmental technocrats declare that Greece's economy is advanced enough to bind itself with the economies of developed nations like Germany, France and Luxemburg, why should private investors not start viewing Greece as a developed economy?

The crisis has clearly demonstrated, however, that countries like Greece were allowed to join the EMU even though their economies were unable to handle the rigors of the monetary union. Obviously some if not all of the blame for this can be attributed to Greece lying to EU governing bodies about its economic performance. However, should the ECB and Commission also be viewed as negligent in their duties and if so does this weaken the argument that EMU

membership acts as a legitimate signal to investors? To answer this question one must recall that while the EU began through economic integration, the driving force behind the integration were political aspirations. Political considerations still play a prominent role in the EU when drafting policies, even when the resulting policies are in conflict with economic fundamentals (Dinan, 2010).

In the case of the EMU, this manifested itself in the key decision-making body of the EU. While it is true that the Commission and the ECB are tasked with reviewing how well an applicant country meets the Maastricht convergence criteria, it is the EU Council that formally decides if a country will be admitted into the EMU (Dinan, 2010). The Council is comprised of the heads of State from each EU member state and works on consensus. While they are required to take into consideration the findings of the Commission and the ECB, the heads of State are not bound by their findings. Because of this, the Council has considerable leeway to pursue the political goals.

When the Commission issued its Convergence Report in 2000, it found that Greece met most of the convergence requirements, although the debt to GDP ratio was significantly higher than the reference value (ECB, 2000). The Council could have used this for justification to withhold Greece's membership, but as one investor put it: "Admission is ultimately decided by the EU heads of state, and I doubt they would stab one of their own in the back for a few decimal points" (Mellow, 1999, p. 107). He was proven correct.

Astute investors with even limited knowledge of how the EU functions would have known that a country's acceptance into the EMU would be based both on economic fundamentals and on politics. While this certainly reduces the credibility of the signal that EMU membership sends to investors, the signal is still significant. The ECB and Commission

maintain a certain degree of creditability when determining which countries are eligible for EMU membership because they were designed to be non-political institutions (Dinan, 2010). The reports they publish and make freely available still serve as an important indicator to investors. Additionally, since a member of the EMU is faced with the enforceable rules of the Stability and Growth pact (i.e., the key components of the Maastricht criteria), membership still signals likely future behavior.

EMU membership sent a credible signal to investors that Greece should be viewed as a developed country. Once this threshold was crossed investors were inclined to stop reviewing the fundamentals of the Greek economy as they had done previously, since they could use EMU membership as an informational shortcut. The credibility that the EMU granted to Greece reduced the default risk premium that investors demanded which gave the country access to lower interest rates.

Summary of Signaling

This section of the paper has argued that due to the nature of risk assessment, investors have an incentive to find the least amount of information that will still allow them to make sound investments. One way to accomplish this is through the use of informational shortcuts; however the use of these can increase an investor's risk exposure if the shortcut is not based on sound information. The consequences of this are highlighted by the developments in the Greek government bond market. Investors used Greece's acceptance into the EMU as an informational shortcut to determine that Greece should be viewed as a developed country. This distinction resulted in a steep decline in the interest rates on government bonds as investors became less

concerned with the potential default risk. Unfortunately, the assessment provided by the Commission and ECB was based on incorrect data, which meant that the informational shortcut investors were using was also incorrect. As a result of this the risk premium on Greece was too low for an extended period of time. When the financial crisis struck, investors soon realized that Greece's economy and debt situation were significantly worse than thought. As investors pulled their money out or demanded high interest rates, the government ran out of financing and had to be bailed out by other EU governments and the IMF.

Chapter 4

The Role of an Implicit Guarantee

While the previous section provided a plausible explanation for why events unfolded the way they did, this chapter offers a further explanation for why investors would feel comfortable not doing their full due diligence when contemplating investing in Greek government debt. It will be argued that investors did not need to charge a significant default premium on Greek debt, because the probability of a Greek default was minimal. Investors faced little risk due to an implicit guarantee given by other EMU governments on Greek debt. Even if the Greek government could not finance its debts, other EMU governments would feel compelled to do so in order to defend their economies and the viability of the euro.

Framework of Analysis

The framework that will be used in this section is an adaptation by Arghyrou and Kontonikas of Obstfeld and Krugman's currency crisis models (2010). Arghyrou and Kontonikas argue that the Greece crisis can be viewed as a currency crisis in disguise because "systemic risk [...] in the absence of currency markets is diverted into the markets for sovereign bonds" (2010, p. 3). Before the creation of the euro, if a country with a pegged currency conducted an unsustainable fiscal policy or had weak economic fundamentals, then their currency would face downward market pressures. One poignant example of this is the collapse the European exchange-rate mechanism (ERM) in 1992-93 (Buiters et al., 1998). The ERM, which was the precursor to the

EMU, created a band within which currencies could fluctuate against the Deutsche Mark. When conditions in Germany required the Bundesbank (Germany's central bank) to raise interest rates, some of the member countries, particularly the UK whose economy was in a recession, were placed in a difficult situation. They had the choice of either leaving the currency band and risk a steep depreciation in the value of their currency or to defend their currency by raising interest rates, but further weaken their domestic economy.

Investors and speculators realized that this situation was untenable and began attacking currencies that they believed were overvalued. In this situation, investors who doubted the credibility of a government had both the bond market and foreign exchange market to vote their confidence in the country. With the creation of the euro, investors lost the ability to affect the exchange rate of any one country, but the underlying factors that would dictate changes in the exchange rate persist. Arghyrou and Krontonikas' insight is that in the absence of currency adjustments, the bond markets serves as the primary conduits through which market judgment flows. However, since the underlying shifts in market sentiment in Greece are related to similar shifts that occur in the foreign exchange market, research related to currency crises is beneficial to examine.

Of particular relevance is the work of Obstfeld and Krugman who have modeled how both self-fulfilling features and moral hazard can play a role in currency crises (Obstfeld, 1996; Krugman, 1979, 1998). Obstfeld and Krugman argue that there is a cost that a government must endure when maintaining a pegged currency (e.g., limits on fiscal policy) so the government will only maintain a peg if the benefit they receive from a stable currency exceeds the cost. In the context of Greece, this can be thought of as the cost of staying in the EMU, which limits the policy choices of the government. The Greek government will only work to meet the guidelines

of the EMU until the cost of doing so become too onerous, at which point they will abandon the EMU.

In terms of currency crisis literature, this situation parallels the position investors find themselves in when they do not know if the government is committed to defending the peg and do not know the extent of reserves. Through a series of games, Obstfeld demonstrates how a currency crisis can become self-fulfilling if enough investors believe that the government will defend the currency. Even if a government begins with sufficient reserves, it may not be able to combat the combined efforts of investors who want to exit their investment before suffering a loss (1996). The tremendous rise in Greece's long-term borrowing costs in 2009 can be partially attributed to this mechanism. Since investors were no longer certain that Greece would be able to repay their debts, they began selling off their bond holdings and did not buy more bonds when the government tried to roll-over its debts.

Krugman further refines the currency crisis model by including the possibility of either implicit or explicit guarantees. Since investors cannot truly know or predict the resolve and resources of a government, there is typically uncertainty at the beginning of a crisis. Krugman demonstrates that in a situation where investors do not know what a government will do, investors should assume the government would not defend the status quo. This would force the government to reveal its true intentions by either mustering the resources to defend its currency or allowing its currency depreciate. This is the preferred option for investors because the cost of dumping a currency and discovering that the government will in fact defend the currency is much lower than the cost associated with holding a currency that ends up collapsing (Krugman, 1979). Thus in the case of Greece, investors were acting rationally when they began

pulling their money out Greek debt, even as the Greek government took initial measures to reassure investors that it would remain within the EMU.

This situation changes dramatically if there is a credible guarantee in place that reassures investors that they will not lose money, even in a time of crisis. If investors believe that they have little exposure to risk, then during a time of crisis they will not feel the need to hedge their investments like they would if there was no guarantee in place. A guarantee removes the incentive to leave an investment fast, because an investor will receive her money back even if she is one of the last people to lay claims to her guaranteed investment. Therefore, a credible guarantee serves as the panacea that limits the self-fulfilling nature of currency crises. If, however, a guarantee loses its credibility (e.g., investors believe that the government either cannot or will not uphold the guarantee) then investors have a strong incentive to dump their holdings. In losing credibility, the government reveals its type and investors have no reason to believe that the government will be able to stem the crisis.

Arghyrou and Tsoukalas argue that this is exactly what occurred in Greece. Even though there was no explicit governmental guarantee in place, the markets priced in an implicit guarantee into the premiums on Greek debt. Although there was a no-bailout clause incorporated into the governing treaties, market participants viewed this rule as non-credible. The literature on this assertion before the crisis was inconclusive. Schuknecht et al. found in 2009 that no-bailout clause appeared to be credible, although it should be noted that these scholars work for the ECB, which may be a potential source of bias. Mangenlli and Wolswijk suggest that the clause may lack credibility, but did not produce conclusive evidence (2007). Blankart and Klaiber, using a series of case studies, came to the conclusion that the no-bailout

clause lacks credibility because the level of integration between member states increases the risk of contagion (2006).

While there is little empirical evidence to support that investors were pricing in a guarantee, Chapter 3 of this paper and the course of events suggest that investors were in fact under-pricing the risks they were facing. With the benefit of hindsight, one can readily identify why investors were anticipating a bailout. As Blankart and Klaiber noted, the purpose of the EMU was to further integrate Europe, which necessarily meant that countries become more exposed to events in other member countries. While the rules included in the Stability and Growth Pact were aimed at minimizing the need for fiscal transfers between countries, there was no mechanism in place to help distressed countries. A rational investor could have predicted that due to the high levels of interconnectedness, problems in one country would likely spread to another without some sort of government intervention. In order to stabilize the EMU as a whole the member countries would have to come together and help a distressed member and in doing so, help the investors with assets in that country. This coupled with the fact that Germany and other creditworthy countries were committed to the success of the euro for political reasons, gave investors the belief that there was an implicit guarantee within EMU countries.

This helped to create a situation in Greece where investors based their investment decisions on what Krugman refers to as Pangloss values: “the values that variables would take on if it turns out that we live in what is [from the investor’s point of view] the best of all possible worlds” (Krugman, 1998, p. 6). Since investors in government bonds could be fairly certain that other governments would not allow the Greek government to default and that Greece was actively trying to remaining in the EMU, investors did not have to factor in the downside risk of their investments. Instead of calculating the expected values of their investments which include

the potential gains and losses, investors could use the Pangloss values that only included the gains (Arghyrou and Kontonikas 2010). In the best case scenario, Greece would implement the necessary reforms required to have its economy converge with Germany's and in the worst-case scenario, Germany and the other EMU countries would provide funds to Greece to stave off bankruptcy. Either way the investors win.

Under these conditions, it was rational for investors to lend more money at lower interest rates than the economic fundamentals deemed prudent. This led to a steep increase in foreign portfolio investment before the crisis as investors lent ever greater amounts of capital (see Figure 1 on page 8). The influx of capital made Greece ever more reliant to foreign investors and as of the third quarter in 2009, a full 84 percent of all Greek bonds were held abroad and foreigners owned 75 percent of Greece's total debt (Benassy-Quere and Boone, 2010).

It is noteworthy that the majority of this debt was held by residents and institutions in other euro area countries (see Figure 6) (Economist, 2010). As of the December 2010, German banks held 16,191 billion euro of Greek government debt, which means that German banks held more Greek debt than they did French debt (Bundesbank, 2011). Only the Spanish and Italian governments owed German Banks more. In addition to German investors, investors in France also purchased a significant amount of Greek debt, which should have left them highly vulnerable to the deteriorating conditions within Greece. However, although no banker has publicly admitted as much, it is reasonable to assume, investors realized

Figure 6-Foreign Owners of Greek debt
Source: The Economist 2010

What's in the vaults?			
Foreign-bank holdings of Greek government bonds €bn			
	% of total	Low estimate	High estimate
France	24.9	27	52
Germany	14.3	15	30
Rest of euro area	18.8	20	39
Total euro area	58.0	62	121
Switzerland	21.1	22	44
Britain	4.1	4	8
US	5.4	6	11
Rest of world	11.4	12	23
Total	100	106	207

Sources: Bank for International Settlements;
Bank of Greece; *The Economist*

that the more French and German banks piled into Greece the safer the bankers felt (Mishkin et al., 2006).

The German government would likely not fret about one of its major banks having lower quarterly profits because some of its investments in another country soured. If losses are minimal and contained to a few actors who are not systemically important, then the government has little incentive to provide aid to the bank. If, however, the many large banks face liquidity or solvency problems due to significant losses in their investments, then a government would be inclined to protect the rest of society by aiding the banks. Banks and other large investors transferred the risk they were taking to the government, while reaping all the benefits.

This situation created an environment that benefited the Greek government who could continue to spend at unsustainable levels and it also helped institutional investors throughout the world, particularly in the euro area, to earn slightly above average returns on “safe” assets. The losers in this environment are the governments, and therefore tax payers, in other euro area countries that were forced to bail-out Greece to save not only the euro, but also their own economies.

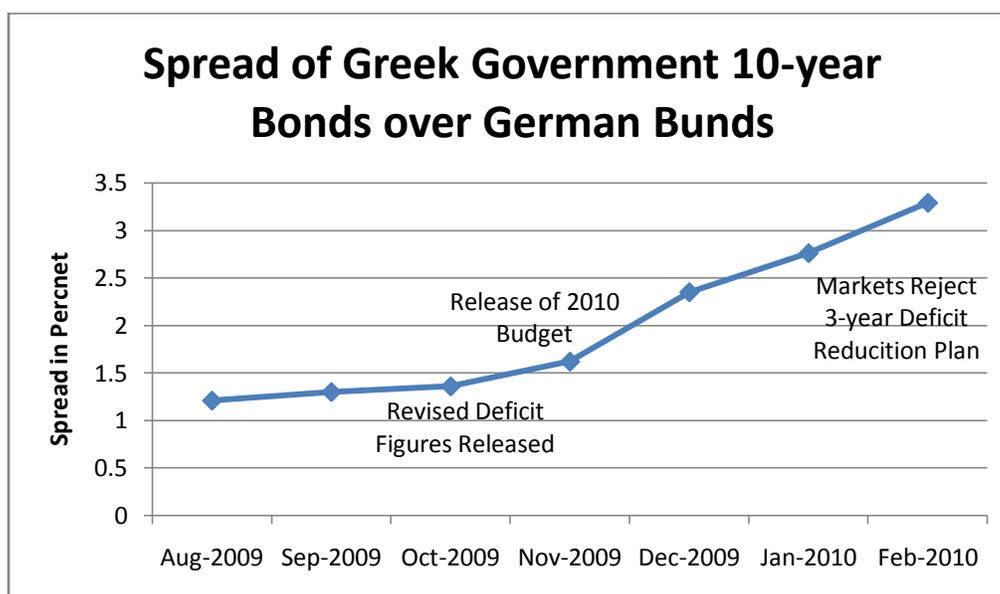
Course of events in Greece

With this framework in mind, I will discuss the timing of the events leading up to EMU/IMF sponsored bailout. In 2009, it was discovered after a change in administrations that there had been significantly underreporting of the government deficit figures (Katsimi and Moutos, 2010). Data provided by the Greek government to the Commission suggested that the budget deficit would 5.1 percent of GDP, however, the actual deficit was 12.7 percent, for a gap

of 7.6 percent. Although the spread between Greece's 10-year government bond and the benchmark German Bund did begin to increase after the revised deficit figures were released, the major increase did not occur until the Greece government released its budget for 2010 in November of 2009 (see Figure 7) (Arghyrou and Kontonikas, 2010).

Upon examination, investors found the proposed budget did not address the underlying causes, but rather opted for one-off tax increases to close the deficit (Watts, 2009). Additional deficit reduction plans were further rebuffed by the market participants in January of 2010 as "too optimistic," and the spread between Greek and German bonds widened further (Hope and Oakley, 2010). This increased the risk of investing in Greek debt as bond investors lost their

Figure 7- Source: OECD



confidence in the Greek government.

The higher interest rates that investors began demanding, however, made it even more difficult for the Greek government to balance its debts. This led to a vicious cycle of non-credible policy action resulting in rising interest rates, making government plans even less

credible. This path of events is consistent with a sovereign debt model produced by Feenstra and Taylor, which suggests that the break-even condition for a lender is as following:

$$p * (1 + r_L) = (1 + r)$$

Where p represents the probability of repayment, $(1 + r_L)$ represents the lender's revenue if repaid, and $(1 + r)$ represents the lender's costs (2008, p. 513). If one assumes that the lender's costs remains constant, then a decrease in the probability of repayment requires an increase in r_L (the interest rate for the borrower). The Greek government's non-credible policy action decreased the probability that investors would be paid, which made investors demand even higher interest rates to compensate.

This cycle, however, should have been kept in check if the implicit guarantee was still deemed credible. Investors holding Greek debt should have been reassured by the implicit guarantee on their investments and should not have felt the need to sell off their bonds quickly. This did not happen, however, since like the Greek government the other euro area governments did not respond decisively at the onset of the crisis.

It is impossible to know how markets would have responded to an immediate bailout provided by Germany and the other EMU member states, but theory suggests it would have limited the unrest in the market. Instead of offering support, German and other EU politicians stated throughout the beginning of 2010 that it would follow the EU constitution and not bailout Greece. Angela Merkel, the German chancellor went as far to say in an interview on March 1, 2010 that, "there is absolutely no question of it [a Greek bailout]... We have a [European] treaty under which there is no possibility of paying to bailout states in difficulty" (Illmer, 2010). Statements such as this raised the prospect that investors had miscalculated what the EMU's response would be in a crisis and that the perceived fiscal guarantee on Greece's debts was not

actually in place. This created a great deal of uncertainty, which left investors wondering how risky Greek debt truly was. As Vincent Chaigneau, head of foreign exchange and interest rate strategy at Société Générale, put it at the time, “The markets want to be reassured that IMF and bilateral EU loans will flow towards Greece, but it seems that talks will take two to three weeks, until after the German elections. And the market doesn’t like that – it wants clarity.” (Sakoui, 2010).

As with a currency crisis, once a government’s commitment to the peg is deemed non-credible and investors begin to believe that the government lacks the reserves to defend its position, investors have an incentive to sell their holding as quickly as possible before their value declines. In the case of Greece, investors went from believing that Greece had the backing of other EMU governments to believing that neither Greece nor the EMU governments were willing to bear the costs to keep Greece from defaulting. This increased the likelihood of investors losing money, so they began selling their positions and pushing up interest rates.

Summary of the Collapse of the Implicit Guarantee

This chapter has argued that due to the nature of the European Monetary Union, investors could have anticipated receiving a bailout and therefore were willing to lend to Greece at lower interest rates. Since increasing levels of economic integration between a group of countries makes each individual country more exposed to events in the other member countries, each country has an incentive to maintain order throughout the system. Investors in Greece could reasonably believe that since Germany, France and the other stable countries were tying their economies to Greece’s that these countries would protect Greece out of their own self-interest.

This is particularly true since many of the systemically important financial institutions in other EMU countries were exposed to tremendous level of downside risk. Operating under these assumptions, investors were willing to invest in Greece at subsidized rates, because they would not have to bear the burden if conditions in Greece deteriorated; the other EMU governments would. This creates moral hazard that explains why the spread between long-term Greek government debt and German government debt fell.

The trend of falling interest rates stopped, however, in 2007 and then began to increase in 2009 as the global financial crisis made liquidity scarce and investors began to examine Greece more critically. Once they determined that Greece was on an unsustainable path, investors began to look for reassurances that there was an implicit guarantee on Greek debt. Initial indications, especially from Berlin, however, suggested that the EMU would not bailout Greece, which implied that bond investors could face losses. The loss of confidence in the EMU allowed for the situation to spiral out of control and pushed interest rates of Greek government debt to unsustainable levels.

The problems in Greece led investors to question the ability of other weak periphery countries such as Spain, Portugal and Ireland to pay their debts. As investors initially anticipated, once the fear of contagion was realized, EMU governments did band together to provide financial aid to Greece, but by then it was too late. Without knowing if a guarantee was in place, investors began to scrutinize Greece's economy to understand the true risks of investing in the country. Even with financial support from other EMU governments, a consensus developed that Greece is likely to default on its debts at some point in the relatively near future. Thus, the moral hazard created by the implicit guarantee was removed during the crisis, but has now been replaced by an explicit guarantee of EMU rescue fund. Unfortunately for Greece, even this does

not appear to be enough to induce investors to lend at sufficiently low interest rates, which would allow Greece back into the bond market.

Chapter 5

Conclusion

This thesis has argued that Greece's adoption of the euro created an environment where investors were willing to charge artificially low interest rates to the Greek government. When Greece joined the European Monetary Union two signals were sent to investors: first that Greece's economy was developed enough to be tightly integrated with the advanced economies of countries like Germany; and second that because it is integrated with them, the other EMU countries would be required to aid Greece in times of crisis in order to protect their own economies. When taken together, these two signals provided a rationale for investors to lend with little restraint to Greece.

If the first signal is correct, then Greece's economy should eventually converge to the standard set by Germany, so there would be little chance that Greece will default. However, it makes no difference, if the first signal is incorrect, since the second signal implies there is a guarantee on Greek debt. Even if Greece never converged with Germany and became unable to support its debt burden, investors would not lose money, since governments would be compelled to support Greece. Thus, for investors, it only matters if the second signal is incorrect. If in a time of crisis other EMU countries did not rescue Greece, then investors would be exposed to the full amount of risk associated with their investments.

The events of the last decade seem to suggest that the first signal was in fact incorrect, while the second signal was accurate. Greece's economy did not converge with the core countries in the EMU, but the other EMU countries did offer funding to keep Greece from going

bankrupt. While aid eventually did come, the reluctant response of the other EMU countries at the outset of the crisis opened up the possibility that Greece would in fact not be bailed out. This decreased the probability that investors would not be paid back in full so they began charging higher interest rates to protect themselves. The higher interest rates led to a self-fulfilling prophecy where investors began to doubt the Greek government's ability to pay so they raised interest rates, which then made it even more difficult for the government to finance its debts.

While some have argued against creating a permanent bailout facility for members of the European Monetary Union, the findings of this thesis suggest that there is a need for one. Critics argue that a bailout facility would create a moral hazard problem since countries would know that there are dedicated funds to support them if they find themselves in trouble (Haufler et al., 2011). Opponents argue that the only way to ensure that governments and investors are not acting under perverse incentives is to make it be known that governments can indeed default on their debts.

In an ideal world this might work, but in the current system this is not a credible threat. The economies of the EMU members are far too interconnected to allow any economy, even the smallest to fail. The costs to the system as a whole are too high if a country defaults, so a bailout will occur whether there is a bailout facility in place or not. Given this, recent efforts by European leaders to create a bailout facility called the European Stability Mechanism appear to be promising. While the details of the fund are still being worked out, its existence should lead to a speedier resolution of the crisis.

Unfortunately for Greece, this rescue fund will be of little use. In order to receive bailout funds, Greece had to accept a rigorous reform program administered by the IMF. While the reforms should help improve Greece's competitiveness in the long-run, the austerity required to

achieve this will be painful for the citizens of Greece to endure. The current Greek government appears committed to reforming the economy, but there have been numerous public protests against the austerity measures. It is not outside the realm of possibility that Greece may still partially default on its obligations. If the Greeks lose their will to reform or the reforms take too long to produce meaningful economic growth, the cost of defaulting may become less than cost of fulfilling their obligations.

The situation in Greece will likely remain bleak for many years to come. While the cost of remaining in the euro may have risen, the benefit of increased cooperation between the various governments is still present. European leaders appear to be committed to the success of the euro, which mean that they are also committed to the success of Greece. Recent events may have strained relationships, but the goal of an ever closer union still lives on. This should give hope to the people of Greece; they cannot and will not be abandoned by their European partners.

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