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Thinking ahead for Europe

What Germany should fear most is its own fear

An analysis of Target2 and current account imbalances

Paul De Grauwe and Yuemei Ji*

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Abstract

This paper analyzes two claims that have been made about the Target2 payment system. The first one is that this system has been used to support unsustainable current account deficits of Southern European countries. The second one is that the large accumulation of Target2 claims by the Bundesbank represents an unacceptable risk for Germany if the eurozone were to break up. We argue that these claims are unfounded. They also lead to unnecessary fears in Germany that make a solution of the eurozone crisis more difficult. Ultimately, this fear increases the risk of a break-up of the eurozone. Or to paraphrase Franklin Roosevelt, what Germany should fear most is simply its own fear.

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1. Introduction

Just two years ago few economists would have predicted that the intra-eurozone payment system, Target2, would be elevated to the centre of attention in the discussions about the eurozone crisis. This remarkable feat owes much to a series of publications by Sinn and Wollmershäuser, who revealed how large 'imbalances' have emerged in the Target2 payment system in recent years whereby some countries, in particular Germany, have become large creditors in the system, while others, mainly peripheral countries, have become large debtors (see Sinn & Wollmershäuser, 2012). These two authors have made two important claims:

- First, the target system has been used to support unsustainable current account deficits of Southern European countries. As a result, these countries have been allowed to escape the salutary discipline of the market, and have avoided taking the painful but necessary adjustment policies.
- Secondly, Germany and a few other Northern European countries have been dragged into this scheme and been forced to provide credit to the deficit countries. The financial claims on Southern European countries that Germany has accumulated through the Target system have created unacceptably large risks for Germany if the eurozone were to disintegrate.

These claims have been widely advertised in Germany and have contributed to creating a view in that country that the German taxpayer is likely to become the victim of a money machine that rewards the profligacy of Southern European countries. This view has led to strong negative emotions vis-à-vis the eurozone. It is therefore important to ask the question whether these claims are correct. It is our ambition to show that these claims are unfounded.

The structure of the paper is as follows. We first analyze the sources of the recent surge of the Target balances in the eurozone (sections 2 to 4). This will allow us to study whether it is true that this recent surge has allowed sustaining current account surpluses and deficits. In a second part (section 5) we analyze the risks for Germany of the existence of this country's large outstanding Target2 claims.

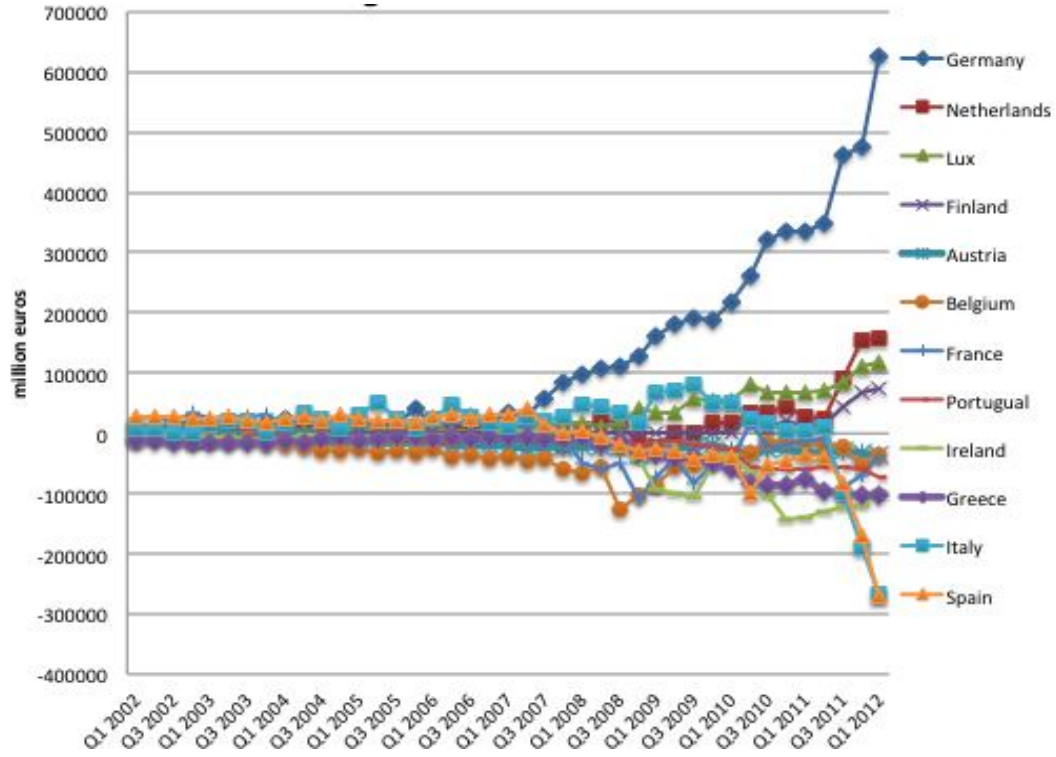
2. Target2 and current accounts: Description of the data

By definition a country can accumulate target claims as a result of current account surpluses and/or capital inflows, very much like a central bank in a fixed exchange rate system acquires international reserves as a result of current account surpluses and/or capital inflows. Conversely, countries that accumulate Target2 liabilities must have a combination of

current account deficits and/or capital outflows. In this section we present the data illustrating the sudden emergence of Target2 imbalances and compare these with the current account developments. For descriptions of the mechanics of the Target2 system, see Bindseil & König (2011), Dullien & Shieritz (2012) and Sinn & Wollmershäuser (2012).

Figure 1 shows the target claims and liabilities of the eurozone countries. We observe the explosion of these claims (especially in Germany) and liabilities since 2008. How do these target claims and liabilities compare with current accounts of the eurozone countries? In order to make such a comparison, it should be pointed out that the Target2 claims and liabilities are stocks, while the current accounts are flows. We therefore compare the changes in the claims and liabilities with the current account data.[1] In addition we group together the countries with Target claims (called creditors) and the countries with Target liabilities (called debtors). This aggregation allows us to see the broad contours of a possible relationship between Target imbalances and current accounts. (In section 3 where we perform a statistical analysis we will return to the individual country data.)

Figure 1. Target2 claims and liabilities in the eurozone



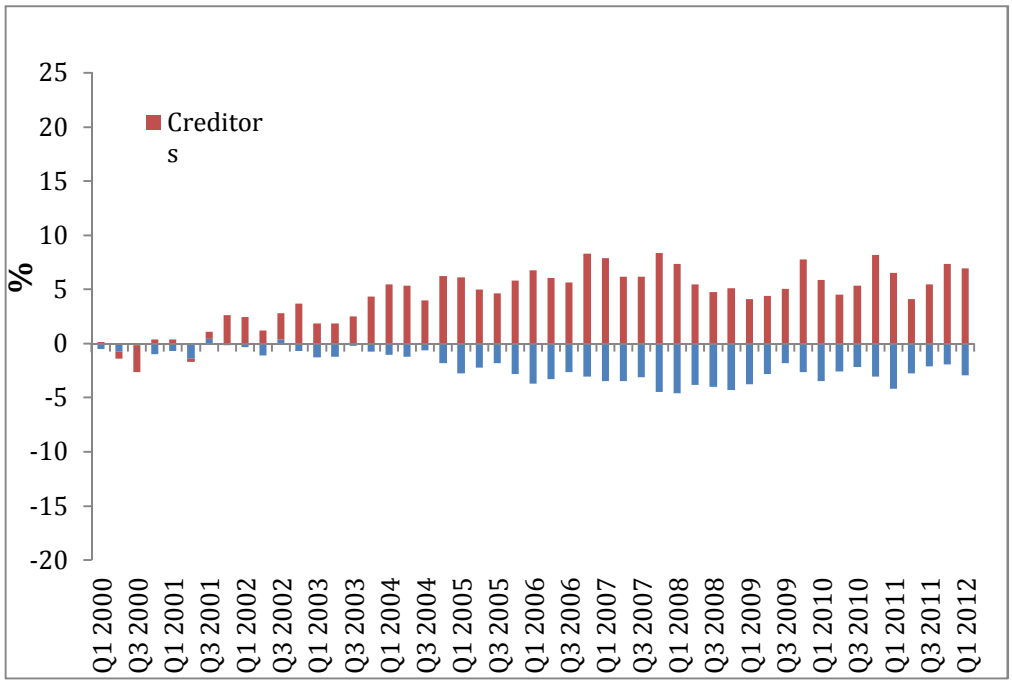
Note: As explained by an ECB report in October 2011, the Target is measured as "net claims on the Eurosystem" minus the difference between "currency issued" (which represents an NCB's share in banknote issuance based on its share in the ECB's capital) and "currency put in circulation" (which is the actual amount of banknotes issued by an NCB).

Data source: Datastream (IMF's International Financial Statistics) and authors' own calculations.

Figures 2 and 3 present the results. In Figure 2 we present the current account surpluses and deficits (as a percent of GDP) of the eurozone countries, grouped into creditor and debtor countries. In Figure 3 the changes in the Target2 claims and liabilities (as a percent of GDP) of these two groups of countries are shown. The comparison of the two figures is instructive.

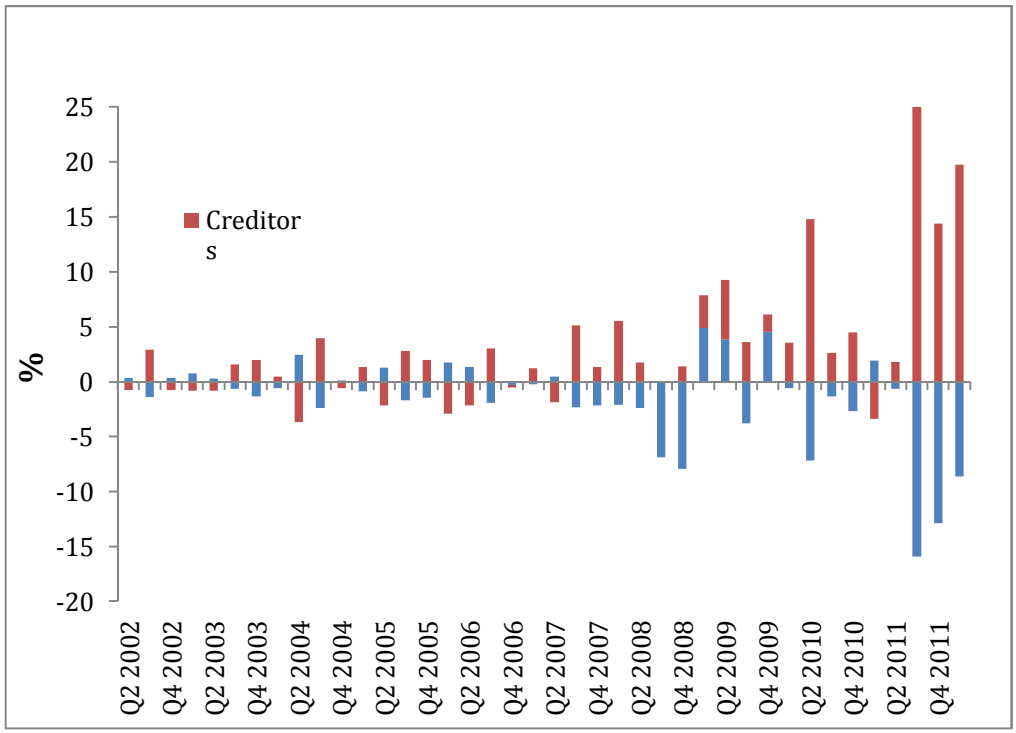
[1] In the next section we will compare the claims and liabilities with the *accumulated* current account surpluses and deficits. The latter express the net foreign claims (liabilities) of a country and are thus comparable to the Target claims and liabilities.

Figure 2. Current account surplus/deficit GDP ratio



Data source: Datastream and authors' own calculations.

Figure 3. Change in Target2 as a % of GDP



Note for Figures 2 and 3: The current accounts and Target2 changes are quarterly data; they are therefore divided by the corresponding GDP of that quarter.

Data source: Datastream and authors' own calculations.

We find, first, that the time profile of the current account imbalances and the Target2 imbalances are very different. While the former peak around 2008, the Target2 imbalances tend to peak at the very end of the period, i.e. after 2010. Note in particular that the current account deficits of the debtor countries declined from 4% of GDP in 2008 to 2.7% in 2011. Second, the volatility of the target imbalances is much higher than the volatility of the current account balances. The surges in the Target imbalances after 2010 are multiples of the current account imbalances. This suggests that the short-term movements of the Target imbalances are dominated by speculative capital movements.

Thus doubts can be expressed about the claim that the Target imbalances have been used to support unsustainable current account deficits. These Target imbalances became extraordinarily high when the current account imbalances were declining significantly.

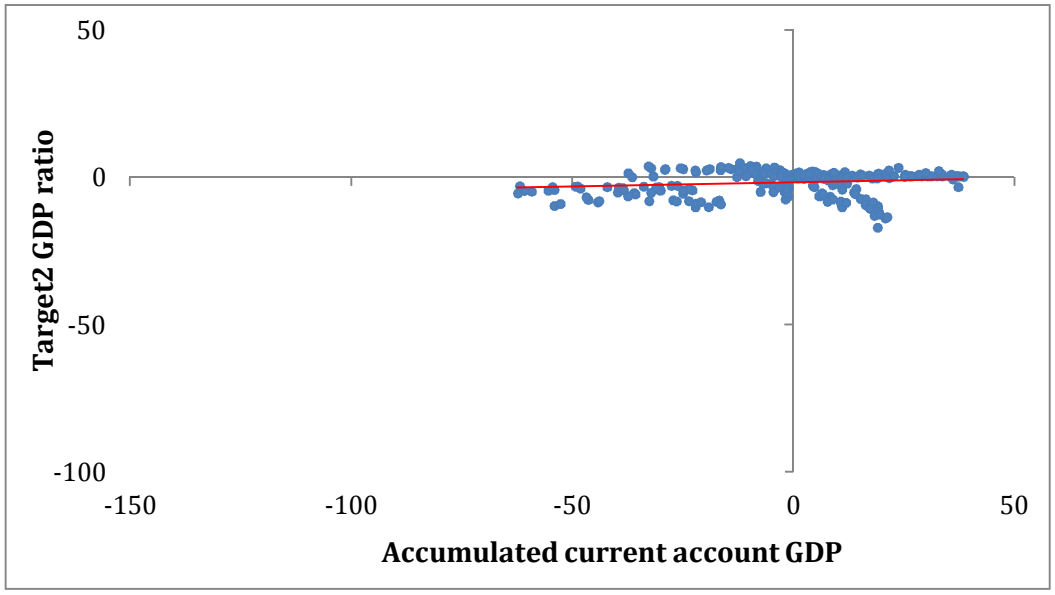
Since this analysis is based on aggregate data that might hide individual countries' differences, we pursue it in the next section where we perform an econometric exercise explaining the target claims and liabilities at the level of each individual country.

3. The causes of Target2 imbalances: Current account and capital flows

In this and the following sections we systematically analyze the influence of current accounts and capital flows on the build-up of Target claims and liabilities at the individual country level. As the Target claims and liabilities are stocks, we first compare these with the accumulated current accounts of each country. It will be remembered that these accumulated current account balances express the net claims and liabilities of individual countries vis-à-vis the rest of the world.

In Figure 4, we show the accumulated current account positions and target balances of eurozone countries before the start of the financial crisis in 2008. On the vertical axis we present the net Target2 claims (liabilities) of these countries; on the horizontal axis the accumulated current account positions. The observations are located very close to the horizontal axis, suggesting that there is no relation between cumulative current account positions and Target balances in normal times. Things change significantly after 2008.

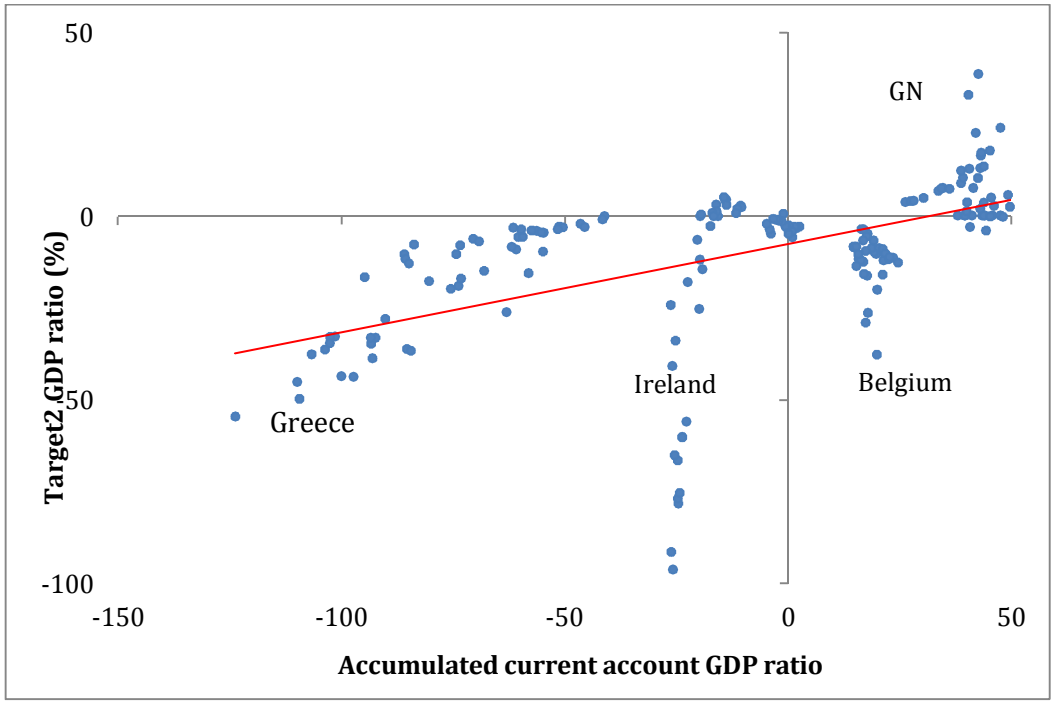
Figure 4. Target2 GDP and accumulated current account GDP – pre-crisis



Data source: Datastream and authors' own calculations.

We observe from Figure 5 that after that year Target balances surge (negatively or positively). Part of these surges seems to be related to changes in the cumulative current account positions (in the case of Greece, and to a certain degree in Germany and the Netherlands). More importantly we observe surges (both positive and negative) that appear to be unrelated to changes in current account positions. This is spectacularly the case for Ireland, Belgium (negative surges) and Germany (positive surge). The case of Belgium is interesting as the large increases in Target2 liabilities coincided with a build-up of current account surpluses. This suggests that while the current account positions may have affected the target balances after 2008, most of the action appears to have come from another source. We identify this to be speculative capital movements triggered by fear and panic.

Figure 5. Target2 GDP and accumulated current account GDP – post-crisis



Note: GN indicates Germany and the Netherlands.
Data source: Datastream and authors' own calculations.

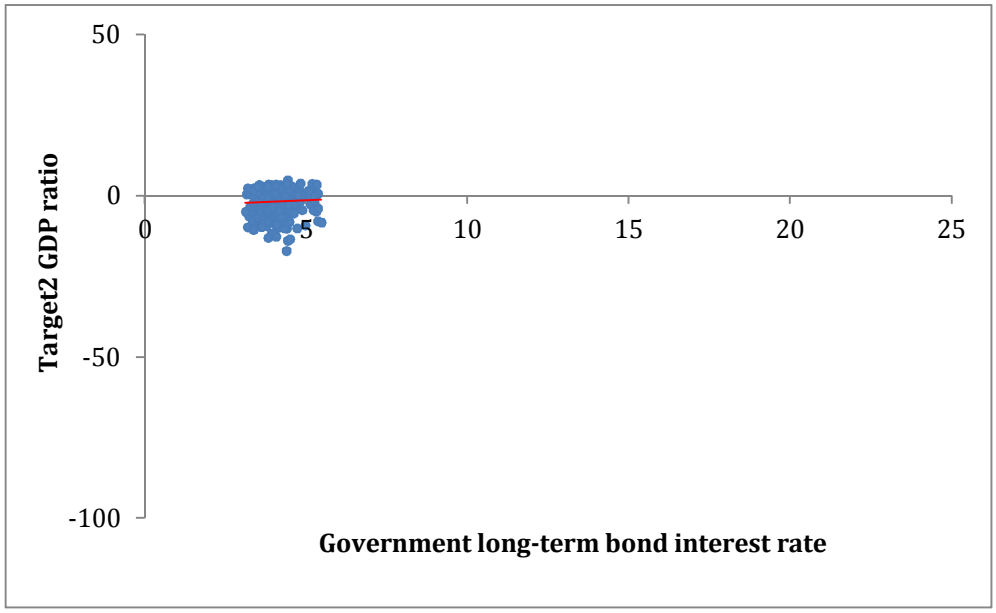
How to test this hypothesis? When sovereign bond markets in the eurozone are gripped by fear and panic (as they have since 2008), bondholders sell the bonds of countries they distrust and buy the bonds deemed safe. This has the effect of raising the government bond yields of the countries that are distrusted and lowers the bond yields of the safe countries. Thus the movements of the government bond yields can be used as indicators of movements of fear and panic (see De Grauwe & Ji, 2012). When such speculative movements arise, we are likely to observe imbalances in Target2. Sovereign debt crises tend to spill over into debt crises in general. Thus, for example when Spain was hit by a sovereign debt crisis, private Spanish debtors were also caught by the crisis, i.e. foreign creditors, say Germans, stopped rolling over their loans to Spanish financial institutions. These then turned to the Bank of Spain for funding, and the German creditors unloaded their claims onto the Bundesbank. Thus in times of fear and panic both the spreads between the debtor and the creditor countries increase and the Target imbalances surge. In Appendix A we present a theoretical model that analyzes the link between the spreads and the Target2 balances.

This insight suggests a procedure to test whether the Target2 balances are related to speculative capital flows. The way we will do this is to regress the Target2 imbalances on the government bond yields, which act as indicators of speculative stress. We expect that

countries that experience a surge in these yields (e.g. Ireland, Greece, Portugal, Spain and Italy) also accumulate large Target2 liabilities, while countries that experience a decline in these yields accumulate large Target2 claims (Finland, Germany and the Netherlands). We will of course have to control for other variables, in particular the current account position, when performing these regressions.

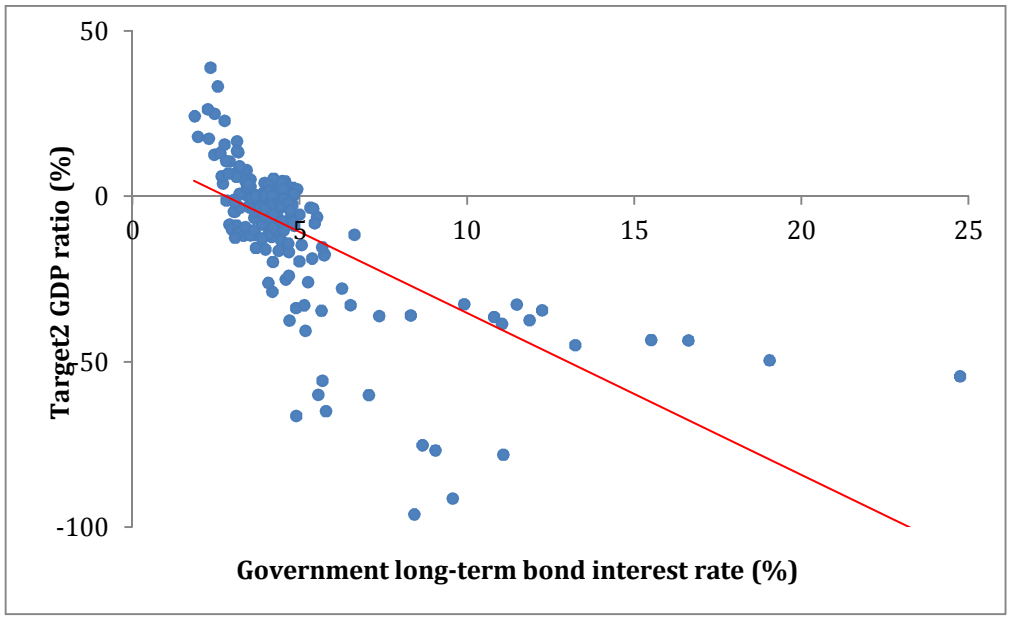
Before implementing the regression strategy it is useful to look at some more data (Figures 6 and 7). In Figure 6 we present the Target2 balances (vertical axis) and the long-term government bond yield prior to 2008. We do not observe any clear relationship between these two variables. Figure 7 shows the same data for the period after 2008. We now observe a strong negative relationship, i.e. high government bond yields are associated with large Target2 liabilities, and low government bond yields with large Target2 claims.

Figure 6. Pre-crisis Target2 and bond interest rates



Data source: Datastream and authors' own calculations.

Figure 7. Post-crisis Target2 and bond interest rates



Data source: Datastream and authors' own calculations.

4. Statistical implementation

The previous analysis allows us to specify an econometric equation explaining the Target balances by the accumulated current account positions and our indicator of speculative stress, the government bond yield. In addition we introduce a number of control variables. These are macroeconomic fundamentals that can affect the target balances.

We then obtain the following equation:

$$T_{it} = \alpha CAS_{it} + \beta Interest_{it} + \gamma f_{it} + Country_i + c + \varepsilon_{it}$$

where T_{it} is the target balance of country i in quarter t (as a percent of GDP), CAS_{it} is the accumulated current account surplus (as a percent of GDP), $Interest_{it}$ is the 10-year government bond yield of country i in quarter t and f_{it} is a vector of fundamental variables that we use as control variables. They include the debt-to-GDP ratio, the real effective exchange rate and the growth rate of the economy. $Country_i$ is the fixed country effect, c is the constant term and ε_{it} is the error term.

This specification of the econometric model leads to a statistical problem. It appears that the variables are non-stationary (see Table A1 in Appendix B where we report the relevant tests for unit roots). This necessitates estimating the model in first differences. We obtain the following equation.

$$\Delta T_{it} = \Delta CAS_{it} + \Delta Interest_{it} + \Delta f_{it} + \Delta \varepsilon_{it}$$

Note that ΔCAS_{it} is the current account surplus or deficit (as % of GDP). The result of estimating this equation is shown in Table 1. It lends itself to the following interpretation. We observe that the government bond yield exhibits a strong and significant correlation with the target balances. Thus, countries that experience increases in their government bond yields also accumulate target liabilities, while countries that experience declines in their government bond yields accumulate target claims. This confirms out hypothesis that the build-up of target imbalances is associated with speculative movements.

We perform a Chow test using regression (2) in Table 1 to check for a structural break. We find that one cannot reject that there is a structural break between pre- and post-crisis periods in the sample. Therefore, we run two regressions separately and the results are shown in columns (3) and (4). We note that the relationship between target imbalances and government bond yields is significant only since 2008, i.e. speculative surges in the bond yields are associated with increases in target liabilities of countries that are put under pressure; countries experiencing declines in their government bond yields accumulate claims in Target2. By contrast, prior to the crisis there is no such relationship between target imbalances and bond yields.

We also observe that the current account has no significant correlation with the target balances. Among the fundamentals only the growth rate has a significant relationship with the target balances, i.e. an increase in the growth rate tends to be associated with an increase in the Target claims.

Table 1. First difference regression on Target2 GDP ratio

	(1)	(2)	(3)	(4)
	All	All	Pre-crisis	Post-crisis
Δ(interest rate)	-2.2349**	0.2557	0.2222	-2.7675**
	(0.9406)	(0.2255)	(0.2027)	(1.2130)
Δ(debt GDP ratio)	-0.1065	-0.0881	0.1307	-0.1985
	(0.0993)	(0.0934)	(0.0989)	(0.1229)
Δ(accumulated current account GDP ratio)	0.1010	0.0813	0.1458**	0.0598
	(0.0803)	(0.0736)	(0.0631)	(0.0864)
Δ(real effective exchange rate)	0.1245	0.0576	0.0340	0.3020
	(0.1055)	(0.0800)	(0.0850)	(0.1770)
Δ(growth rate)	0.3059**	-0.0279	0.0217	0.4170**
	(0.1091)	(0.0486)	(0.0658)	(0.1845)
Δ(interest rate)*crisis		-2.9161**		
		(1.3079)		
Δ(debt GDP ratio)*crisis		-0.0302		
		(0.0341)		
Δ(accumulated current account GDP)*crisis		0.0002		
		(0.0225)		
Δ(real effective exchange rate)*crisis		0.1980		
		(0.1235)		
Δ(growth rate)*crisis		0.4878**		
		(0.1736)		
Δcrisis		-7.0342		
		(9.9636)		
Cointegration	No		Yes	Yes
Observations	440	440	253	187
R^2	0.099	0.121	0.064	0.135

Cluster at country level and robust standard errors are shown in the brackets.
* p < 0.1, ** p < 0.05, *** p < 0.01.
Notes: 1. Chow test from regression (2) shows F (6, 429) = 1.79 and Prob>F = 0.0994. At 10% significance level, we cannot reject "there is no structural break between pre- and post-crisis periods in the sample. 2. The cointegration tests are shown in Table A2 in Appendix B.

Thus, the results reported in this and the previous section contradicts the claim that the Target system has been a mechanism that has allowed the financing of unsustainable current account deficits of Southern countries. We found that during the crisis these Target imbalances and capital movements were the joint results of movements of fear and panic in the eurozone. They were not mainly related to current account movements.

To check the robustness of our results, we also ran another regression by replacing the "accumulated current account GDP ratio" with "accumulated trade imbalance GDP ratio". The former considers the current account of each country vis-à-vis the rest of the world, while the latter measures trade imbalances (differences between exports and imports) vis-à-vis the other eurozone members. Figure A5 (in Appendix C) shows the accumulated trade imbalance as a percent of GDP of each eurozone country. The surplus countries are the Netherlands, Ireland, Belgium and Germany and the deficit countries are France, Austria, Luxemburg, Greece and Portugal. Table 2 shows the empirical results. Consistent with the previous regressions, we find no significant relationship between target imbalances and bond yields prior to the crisis, but since 2008 this relationship becomes significantly negative.

However, we do not find any significant relationship between the target imbalances and the accumulated trade imbalances.

Table 2. First difference regression on Target2 GDP ratio(robustness check with trade imbalance variable)

	(1) All	(2) All	(3) Pre-crisis	(4) Post-crisis
Δ (interest rate)	-2.3671**	0.2477	0.2133	-2.8975**
	(1.0172)	(0.2527)	(0.1986)	(1.2705)
Δ (debt GDP ratio)	-0.1064	-0.0853	0.1082	-0.1921*
	(0.0877)	(0.0853)	(0.0905)	(0.1058)
Δ (accumulated trade imbalance GDP ratio)	-0.0250	-0.0271	0.1240	-0.0584
	(0.1442)	(0.1221)	(0.0710)	(0.1611)
Δ (real effective exchange rate)	0.1229	0.0657	-0.0022	0.2960*
	(0.0999)	(0.0811)	(0.0755)	(0.1558)
Δ (growth rate)	0.3161***	-0.0237	0.0286	0.4255**
	(0.0996)	(0.0345)	(0.0616)	(0.1727)
Δ (crisis*interest rate)		-3.0359**		
		(1.3000)		
Δ (crisis*debt GDP ratio)		-0.0326		
		(0.0417)		
Δ (crisis*accumulated trade imbalance GDP)		0.0004		
		(0.0262)		
Δ (crisis*real effective exchange rate)		0.1869		
		(0.1115)		
Δ (crisis*growth rate)		0.4930**		
		(0.1795)		
Δcrisis		-5.3593		
		(10.0878)		
Cointegration	Yes		Yes	Yes
Observations	440	440	253	187
R^2	0.096	0.119	0.070	0.136

Cluster at country level and robust standard errors are shown in the brackets.
* p < 0.1, ** p < 0.05, *** p < 0.01.
Notes: 1. Chow test from regression (2) shows F (6, 429) = 1.9 and Prob>F = 0.0794. At 10% significance level, we cannot reject "there is no structural break between pre- and post-crisis periods in the sample. 2. The cointegration tests are shown in Table A3 in Appendix B.

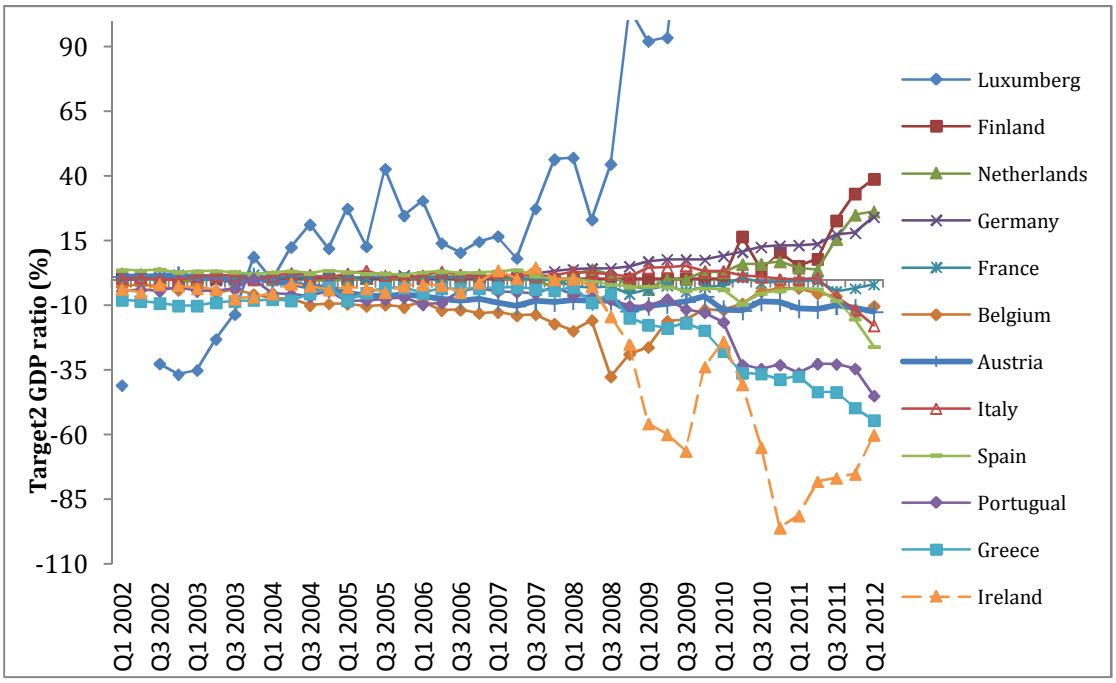
5. Do Target imbalances create risks for Germany?

Our answer to this question is: no. The large accumulation of claims by Germany has created the fear that if the eurozone were to collapse, Germany would bear a large cost because the accumulated claims on the debtor countries of the eurozone would lose much of their value. This fear has become an important political factor in Germany.

Before analyzing the nature of the risks underlying Target claims, it is important to relate these claims (and the liabilities) to each country's GDP. This is done in Figure 8. It now appears that of the four countries with Target claims (Luxembourg, Finland, the Netherlands and Germany) Germany has the lowest level as a percent of GDP (24%). Luxembourg's claim represents a whopping 278% of GDP (Finland: 40%, the Netherlands: 25%). Thus, if there are any risks, they are larger for the other creditor countries than for Germany. In this section we will argue that the fear of large potential losses for the creditor countries is vastly exaggerated.

Our analysis of the risks that arise from accumulated Target claims proceeds in two steps. In the first step we make a distinction between the risks emerging from holding net foreign claims and target claims; in the second step, we analyze the risks that will emerge if the eurozone were to break down.

Figure 8. Target claims and liabilities as a percent of GDP



Data source: Datastream and authors' own calculations. The values of Luxembourg after 2009 Q2 exceed 100%, so they are not included in the graphs.

5.1 There is a difference between total foreign claims and Target claims of countries

It is important to understand that if a country like Germany has net financial claims against the rest of the world, this can only occur because Germany has accumulated current account surpluses in the past. In addition, in any one year these net foreign claims can only increase if there is a current account surplus that year.

If we apply these insights to the position of Germany in the eurozone, one can say that if Germany has net claims on the rest of the eurozone it must be that Germany has accumulated current account surpluses against these countries in the past. There is no other way Germany can accumulate financial claims on the rest of the eurozone.

These observations lead to the following insights. First, it is true that by holding large foreign claims, a country can take a risk. This risk will materialize when some of the foreign debtors default on their debt.

Second, the Target2 claims of Germany are not a good indicator of this risk. Put differently, when in 2010 the Target2 claims started to increase dramatically, this did not change the risk Germany was facing. As we have made clear, the Target liabilities have increased mainly as a result of speculative flows. The latter do not change the net claims of Germany on the rest of the eurozone – only the composition of these claims and liabilities.

Let us take an example to make this point clear. Suppose Spanish holders of euro deposits in Spanish banks feared an exit of Spain from the eurozone and decided to hold their euro deposits in a German bank. The result of this speculative flow is two-fold.

- First, it sets in motion the Target2 payment system. The transfer of deposits from a Spanish to a German bank has the effect that the Banco de España (which makes the transfer) increases its Target2 liabilities in the Eurosystem, while the Bundesbank (which receives the transfer) increases its Target2 claims in the Eurosystem.
- Second, the German bank (which acquires a reserve position at the Bundesbank) has an outstanding liability vis-à-vis a Spanish resident (a deposit). As a result, the net foreign claims of Germany are not affected by this speculative flow. The higher Target2 claim of the Bundesbank is offset by a higher liability of a German bank vis-à-vis a foreigner. Thus the increase in the Target2 claims of the Bundesbank should not be interpreted as an increase of foreign claims of Germany , and thus as an increase of risk from higher foreign exposure.

Using the Target claims as a measure of risk incurred by the German population is therefore erroneous. As we have seen earlier, after 2010, the Target claims of Germany (and other Northern countries) increased dramatically and much more than the current account surpluses during this period. This increase in Target2 claims cannot be interpreted as an increase in the foreign exposure (net foreign claims) of Germany, except to the extent that they were the result of current account surpluses. What changed dramatically is the nature of these claims. Prior to 2010, these claims were mainly claims held by private German agents (mainly financial institutions). Similarly the liabilities of the peripheral countries were held by private agents (financial institutions). The eurozone crisis led to a dramatic shift. As a result of the breakdown of the interbank market, a large part of these private claims and liabilities were transformed into (public) Target claims and liabilities (Buiter et al., 2011), without however changing the total net foreign claims and liabilities of these countries. Thus, the explosion of the Target claims of Germany since 2010 cannot be interpreted as an explosion of the risk of foreign exposure for Germany. This risk increased moderately in this period because Germany continued to accumulate current account surpluses. It could have decided to reduce its current account surpluses but did not do so. As a result, the increase in the risk of foreign exposure was entirely the country's own decision. It cannot be blamed on the Target system.

One could argue, however, that because of the higher Bundesbank Target claims, it is the German taxpayer that now bears a higher risk. But this is also erroneous, which leads us to the second part of our answer.

5.2 The Bundesbank can shift potential losses on its Target claims to non-residents

The idea that there are risks for German taxpayers that arise from the Target claims of the Bundesbank is based on a misunderstanding of what central banking is about. When the Bundesbank acquires claims (assets), it issues liabilities. The latter are called money base, and have the characteristics of legal tender. The mistake is to believe that the value of the money base (the central bank's liabilities) is determined by the value of the assets held by the central bank. This is the underlying assumption of the assertion that if the eurozone were to collapse the value of the Bundesbank's claims would decline leading to a loss for the German taxpayer. This, however, is an erroneous conclusion. The value of the money base is exclusively determined by its purchasing power in terms of goods and services. This value is independent of the value of the assets held by the central bank. In fact in the fiat money system we live in, the central bank could literally destroy the assets without any effect on the value of the money base. In order to stabilize the value of the money base, the central bank should keep the right supply of money base, i.e. a supply that will maintain price stability. That is all that is needed. This condition is independent of the value of the assets held by the central bank (see also Whelan, 2012, on this).

The failure to understand the basics of central banking in a fiat money system is influenced by the fact that many economists still use the gold standard or a fixed exchange rate regime as the benchmark model of central banks. In these regimes the central bank promises to convert its liabilities into gold (in the gold standard model) or into foreign exchange (in the fixed exchange rate system) at a fixed price. Clearly such a promise can only be maintained if the relevant assets are on the balance sheet of the central bank. The ECB (and most central banks of large developed countries), however, has made no such promise. The value of its liabilities therefore is not dependent on the value of the assets it holds.

Another way to put this is as follows. When the central bank acquires assets, mainly government bonds, it issues new liabilities. The latter take the place of the government bonds in the portfolios of private agents. It is as if the government debt has disappeared. It has been replaced by central bank debt. The central bank could literally put the government bonds in the shredding machine. This would not affect the value of the central bank debt as the central bank has made no promise to redeem its debt (money base) into government bonds. And as long as the central bank maintains price stability, agents will willingly hold the new debt (money base) issued by the central bank.

Thus, when the central bank acquires government debt (or any type of debt), it changes the nature of the debt. It monetizes the previous debt. The value of the new debt will then uniquely be determined by its purchasing power value, and thus by the capacity of the central bank to keep the issue of this new debt under control. If it manages to do this, its debt (money base) will not devalue. If it does not manage, its debt will decline in value and holders of that debt will lose wealth. In this whole process the value of the assets held by the central bank is irrelevant.

Let us apply these principles to a scenario of a break-up of the eurozone. If the eurozone ends, central banks will have to convert the outstanding euros into the new national currency. Let us consider here the problem of the Bundesbank since, as many German economists now fear, this conversion will lead to large losses for the Bundesbank and thus for the German taxpayer. This fear is misplaced. Suppose the Bundesbank announces that it will convert euro banknotes into new German marks at the rate of 1 to 2 (1 euro for 2 German marks, which was the conversion rate at the start of the eurozone). It can do this perfectly, regardless of what is on its balance sheet. The only risk is that many non-residents may try to convert their euro banknotes in Germany, profiting from a conversion rate that is more attractive than the one on offer in their own countries. This risk could create a situation in which the Bundesbank is forced to convert so many euros into marks that the amount of marks in circulation after the conversion is too large to maintain price stability in Germany. In fact this is the only risk the Bundesbank faces, i.e. it may be put in a situation that it loses control over the issue of German marks. If that happens, inflation would set in and German residents would suffer losses.

The Bundesbank, however, can avoid this risk by restricting the conversion of euros into marks to German residents. In doing so, it can be sure that the amount of marks created as a result of the conversion is such as to keep prices in Germany stable. Under those conditions, German taxpayers will not suffer one pfennig of losses.

A similar restriction will also have to be applied to bank deposits held by non-residents in the German banking system. There is no doubt that prior to the collapse of the eurozone large speculative movements into deposits in German banks will be triggered. A conversion of these euro deposits into new German mark deposits would lead to an excessive increase in the German mark money stock and would risk creating inflation in Germany. A restricted conversion, however, can ensure that this does not happen, thereby shielding German taxpayers from losses induced by the conversion.

Somebody, however, will lose in such a conversion. Indeed, those who will lose are not German taxpayers but the citizens of countries in the periphery. The reason is that the central banks of these countries are likely to apply a devalued conversion rate, i.e. they are likely to give back a lower amount of national currencies for one euro than the one applied at the start of the eurozone. And even if the central banks were to use the same conversion rate as the one prevailing at the start of the eurozone, it is likely that the new national currencies of these countries would depreciate sharply in the foreign exchange markets, leading to large losses for its holders.

Thus, at conversion time, "justice will prevail". The peripheral countries that have issued too much government debt in the past will be punished, i.e. their citizens will bear a loss of wealth resulting from a depreciated currency. The virtuous German taxpayer, however, does not have to share in this loss, provided the Bundesbank controls the conversion from euros to German marks and restricts this to German residents. The latter will inherit a stable new currency that will take the place of the old euro, which incidentally was also very stable in terms of purchasing power. By restricting the conversion of euros to German residents in this way, the Bundesbank can ensure that the losses that will occur as a result of excessive issue of debt in peripheral countries will also be borne by the residents of these countries, and not by the German taxpayer. Put differently, this restricted conversion is equivalent to pushing the devalued claims from the Bundesbank balance sheet back unto the balance sheets of the central banks of the debtor countries.

Under those conditions, German taxpayers have no reason to fear the large losses that some German economists have gravely warned would be their fate if the eurozone were to come to an end (see also Whelan, 2012, on this point).

It is surprising that these simple principles are not widely understood. This lack of understanding of how modern monetary systems work has created an environment in which irrational fears could emerge. The problem is that these fears have become powerful political forces that make it difficult for governments to find rational solutions to the euro crisis.

6. Conclusion

The accumulation of large imbalances in the eurozone payment system (Target2) is a dramatic indicator of the loss of confidence in the euro. Hans-Werner Sinn and Timo Wollmershäuser are to be credited with drawing our attention to this development.

That said, however, the first conclusion we reach in this paper is that two claims made by these authors are without merit. The first claim is that the Target payment system has been used to support unsustainable current account deficits of Southern European countries, which have allowed them to escape the discipline of the market, and have avoided taking the painful but necessary adjustment policies. We find no evidence for this claim. The build-up of the Target claims and liabilities is almost completely unrelated to the current account developments. This build-up started at the moment when the current account deficits of the peripheral countries tended to decline. The recent surge in the claims and liabilities can better be seen as the outcome of speculative fever that led investors to shift their portfolios away from what was perceived as risky assets into less risky assets.

We also criticized a second claim made by Sinn & Wollmershäuser (2012), i.e. that as a result of Target2, Germany has been forced to provide credit to the deficit countries, and as a result has been pushed into a situation in which it had to take on unacceptably large risks that will lead to large losses for the German population if the eurozone were to disintegrate.

This claim has received much attention in the German media and has contributed to creating fears of imminent disaster. The claim, however, is completely unfounded. First, the

accumulation of a net foreign asset position of Germany is indeed a source of risk. But this accumulation could only occur because Germany accumulated current account surpluses. Since these surpluses are the result of policy choices of that country, it can be said that Germany has chosen to take these risks. Therefore Germans should stop complaining about these risks.

Our second conclusion is that the net foreign asset position of Germany and its ensuing risk have little to do with the Target claims of that country. These have increased significantly without increasing the net foreign asset position of that country. As a result, these Target claims are a bad indicator of the risks Germany faces.

Third and most importantly, the fear that Germany would lose much wealth because of the accumulated Target claims if the eurozone were to collapse is based on a fundamental misunderstanding of the nature of money and central banking. We argued that the only risk faced by Germany is that if the eurozone were to collapse and the Bundesbank began to convert euros into new German marks, it be mis-led into issuing too many marks, thereby creating inflation. This risk, however, can be eliminated by restricting the conversion of euros into marks exclusively for German residents. In so doing, the Bundesbank will force the peripheral countries that have issued too much debt to pay the price of this policy by accepting devalued national currencies.

Although the fear that Germany would incur large potential losses as a result of the accumulation of Target2 claims is unfounded, it has assumed the aura of reality in Germany. It has led to the view that any financial assistance will lead to losses for Germany, and given rise to great resistance towards providing financial assistance to peripheral countries. As a result, this fear also influences political attitudes and makes it difficult for the German government to take a more lenient attitude vis-à-vis peripheral countries. Ultimately, this fear increases the risk of a breakdown of the eurozone. Or to paraphrase Franklin Roosevelt, what Germany has to fear most is its own fear.

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APPENDICES

APPENDIX A. The workings of the money markets under Target2

In this annex, we develop a simple two-country model that illustrates the effects of the Target2 payment system on the money markets in a monetary union. As will be made clear, the model could as well be used for a fixed exchange rate system. This was done in De Grauwe (2009).

We start by defining the demand and the supply for money in the two countries, called country A and country B.[2]

In country A, we obtain:

$$\text{money demand: } M_{DA} = P_A L_A(Y_A, r_A) \quad (1)$$

$$\text{money supply: } M_{SA} = R_A + D_A + T_A \quad (2)$$

where P_A price level of country A, Y_A output, r_A, interest rate , R_A international reserves, D_A credit to the domestic sector and T_A is the net claim in the Target2 system. The latter can be positive or negative. If it is negative, we say that country A has a liability in the payment system. In this two-country model this is then a liability vis-à-vis country B. Thus in general when country A has a claim, i.e. $T_A > 0$, country B must have a liability of equal size, i.e. $T_A = - T_B$

Equilibrium in the money market of country A implies

$$M_{DA} = M_{SA} \quad (3)$$

In country B, we obtain:

$$\text{money demand: } M_{BD} = P_B L_B(Y_B, r_B) \quad (4)$$

$$\text{money supply: } M_{SB} = R_B + D_B + T_B \quad (5)$$

where the variables are defined in the same way as in country A.

Equilibrium in the money market of country B implies

[2] Note that we do not make a distinction between money base and money stock. Put differently, we assume that the money multiplier is equal to 1. This makes the analysis simpler without changing its essential features.

$$M_{DB} = M_{SB} \qquad (6)$$

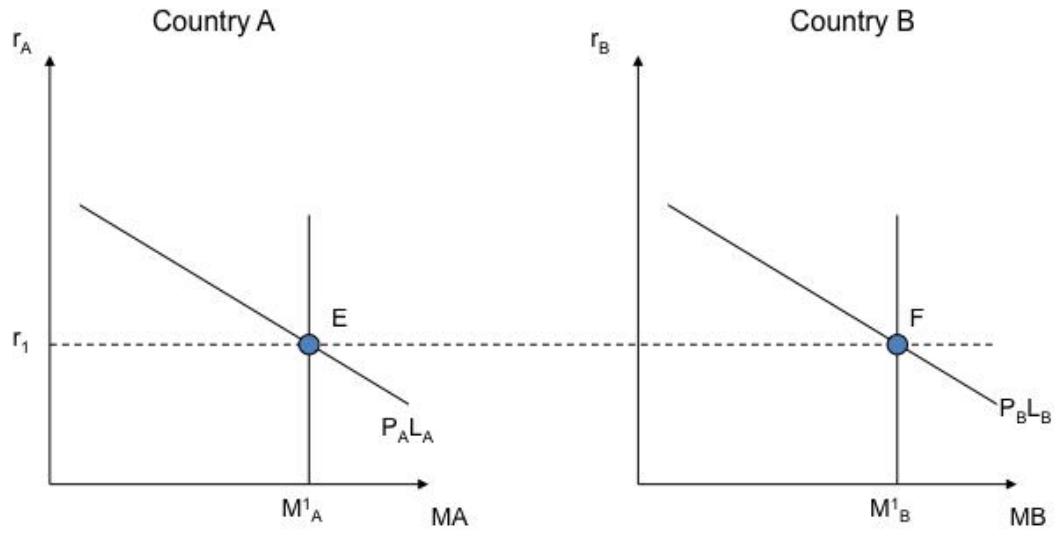
Note that in the further analysis the variables R_A and R_B will not play a role. These variables typically play an important role in fixed exchange rate systems, as the central banks buy and sell foreign exchange so as to keep the exchange rate fixed. In this monetary union version of the model, the Target claims and liabilities take over the role played by the international reserve variables of the fixed exchange rate model.

Let us start from the situation before the sovereign debt crisis. This is a situation where only one interest rate prevails, i.e.

$$r_A = r_B \qquad (7)$$

We can now represent the equilibrium of this system graphically as follows (see Figure A1). The downward-sloping curves are the money demand curves. The money supply is represented by the vertical lines $M1_A$ and $M1_B$. Money market equilibrium in both countries is obtained where demand and supply intersect (points *E* and *F*). In addition, given the normal condition in the monetary union, the interest rates must be equal.

Figure A1. Equilibrium in the money markets



Let us now introduce a shock, which is the sovereign debt crisis. We assume that investors fear that the government of country A will have payment difficulties, which will have the following effects: as the government bonds of country A are sold, the interest rate on A-bonds increases; the reverse occurs with the government bonds of country B that are bought, leading to a decline in the interest rate of B-bonds. As a result, a spread will arise between the interest rates of A-bonds and B-bonds, reflecting the default risk implicit in holding A-bonds (we assume that B-bonds are free of default risk).

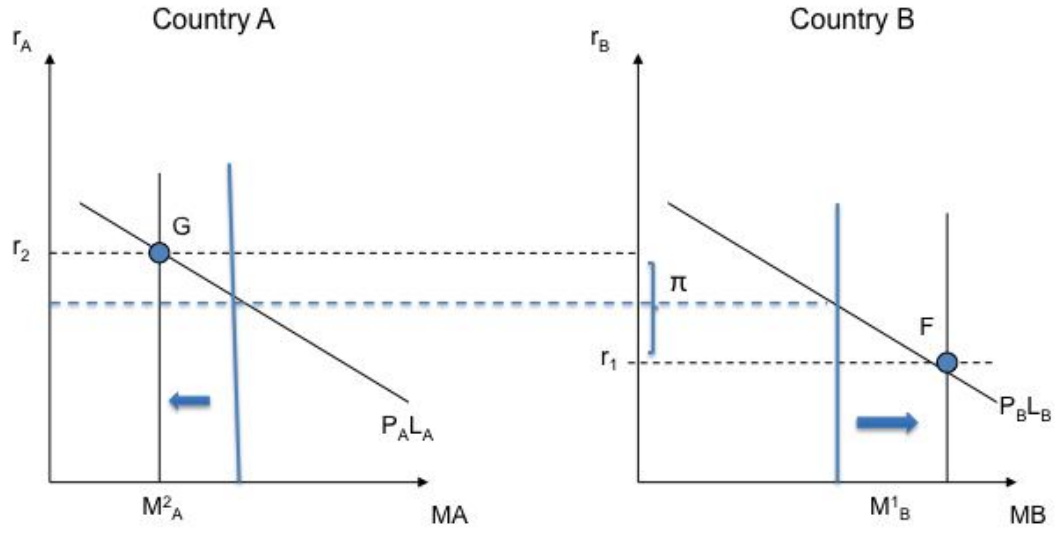
We obtain

$$r_A = r_B + \pi \qquad (8)$$

where π is the spread reflecting the default risk of A-bonds.

We analyze the effects of this shock in Figure A2. As a result of the sovereign debt shock, the interest rate is pushed up in country A, while it is pushed down in country B, so as to produce the spread π. There are many ways in which this shock can affect the money markets in the two countries, depending on how the monetary authorities react to this shock.[3] In Figure A2, we show a symmetric reaction.

Figure A2. Effect of sovereign debt shock in a symmetric system



The increase in the spread has two effects in country A. First, the higher interest rate leads to a reduction of the demand for money in country A. This is the demand effect. There is also a supply effect: deposit holders of country A order their banks to transfer their deposits to banks in country B. This triggers flows in the Target2 payment system. A-banks will draw on their reserves at central bank A, which will transfer these to central bank B. This will show as an increased liability of central bank A and an increased claim of central bank B in the Target system. Thus T_A in equation (2) declines and T_B in equation (5) increases. This has the effect of reducing the money supply in country A (shown by the leftward shift of the MA curve) and of increasing the money supply in country B (a rightward shift of the MB line). These shifts will be such that the spread π is maintained producing a higher interest rate in country A and a lower one in country B.

Thus, in this symmetric system, there will be a contraction of the money stock in country A and an expansion in country B. The total money stock, however, remains unchanged. Thus in such a system the changes in Target claims and liabilities offset each other and keep the money stock in the union unchanged.

We note an important phenomenon. An expectation that country A's government may experience payment difficulties has a double effect: it increases the interest rate in country A and it increases the Target liabilities of country A's central bank. The opposite occurs in country B where the interest rate declines and the central bank acquires more Target claims. The changes in both variables, interest rate and Target2 flows are therefore occurring simultaneously. It cannot be said that one causes the other.[4]

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[3] This has to do with the n-1 problem analyzed in De Grauwe (2009).

[4] In a recent paper Steinkamp & Westermann (2012) claimed that this is the case, i.e. that the Target claims and liabilities cause interest rates to change.

Note also that the mechanism we have described in Figure A2 is the same mechanism that occurs in a fixed exchange rate system when speculators expect a devaluation of currency A. In that case a spread in the interest rates of the two countries occurs reflecting the expected future devaluation. In addition, central bank A loses international reserves and central bank B accumulates international reserves. The monetary effects obtained under such a fixed exchange rate system are the same as those obtained here in a monetary union after a sovereign debt shock (see De Grauwe, 2009, chapter 6).

Figure A2 describes a symmetric monetary adjustment mechanism. It is unlikely that symmetry will prevail – very much like symmetry usually did not prevail in a fixed exchange rate system because the leader (hegemon) of the system would fix its money stock independently. There are two potential sources of asymmetry in the monetary union analyzed here. One arises from the liquidity problems experienced by the banks in country A; the other from the existence of a liquidity trap. Let us analyze these two features consecutively.

Asymmetry due to liquidity problems

We have seen that after the sovereign debt crisis there is an outflow of deposits from country A to country B. This shows up as an accumulation of Target2 liabilities of central bank A and of Target2 claims of central bank B. Underlying these movements, however, is the transfer of reserves held by banks in country A to the banks in country B. The effect of this transfer is that banks in country A experience a decline in their liquid reserves (these are deposits at the central bank). In fact if the deposit flows are large, the banks in country A will not have enough reserves to make the transfer possible. They will have to borrow reserves from central bank A. Let us take the extreme view and assume that banks in country A had no reserves at all to start with. In order to make the transfer of reserves to the banks in country B possible, central bank A will lend these to the banks in country A. It does this by extending a loan backed by collateral. In equation (2) D_A increases. We show the effects of this lending policy (which is also called 'sterilization policies') in Figure A3. We assume that the increase in D_A exactly offsets the decline in T_A. In that case the money stock in country A returns to its pre-crisis level. The effect of this on country B is now dramatic. Country B must accept that its money stock increases sufficiently so as to produce a drop in the interest rate that is high enough to keep the spread equal to π.

The net effect of this asymmetric system is that the money stock in the system as a whole increases. Thus, this asymmetry can potentially have an inflationary effect in the monetary union. This feature is at the core of the complaint that has been formulated by Sinn & Wollmershäuser (2012).[5]

Note also that the outcome described in Figure A3 assumes that the central bank of country B does not apply similar sterilization policies. It could do this by restricting credit to banks in country B, which as a result of the deposit flow have accumulated large amounts of reserves. But we can immediately see from Figure A3 that both countries cannot at the same time apply such sterilization policies. The latter would imply that the money supplies remain at their pre-crisis levels in both countries. Thus, the interest rates would be the same, but that is impossible because there exists a spread π between these interest rates. One of the two central banks must accept to follow the other.

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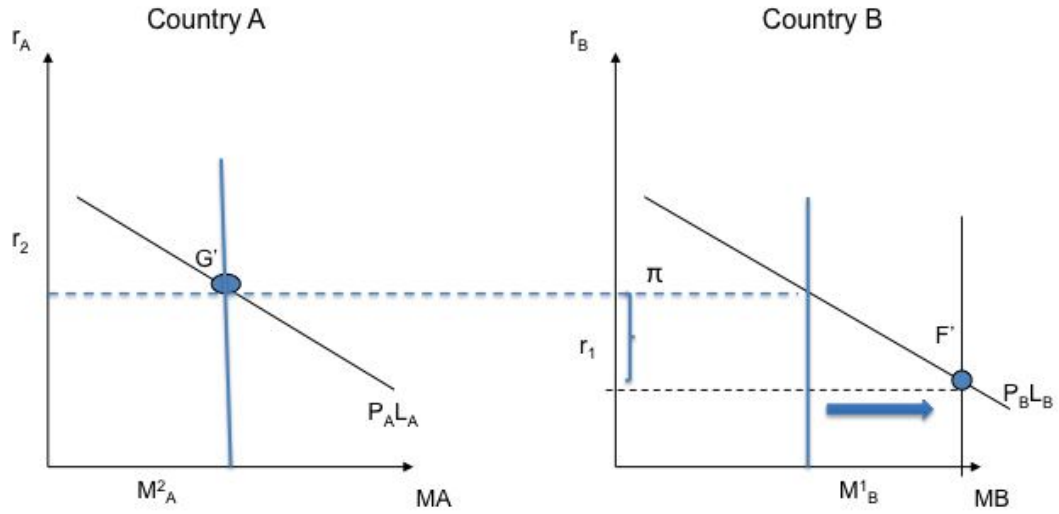
[5] In the European Monetary System it was the reverse. The Bundesbank (the central bank of country B) then independently set its money stock. Then when country A experienced a speculative crisis (investors expected a devaluation), the spread would appear as an increase in the interest rate and a monetary contraction in country A. Country B's (Germany) money stock and interest rate could then remain unchanged. There was a deflationary bias (see De Grauwe, 2009).

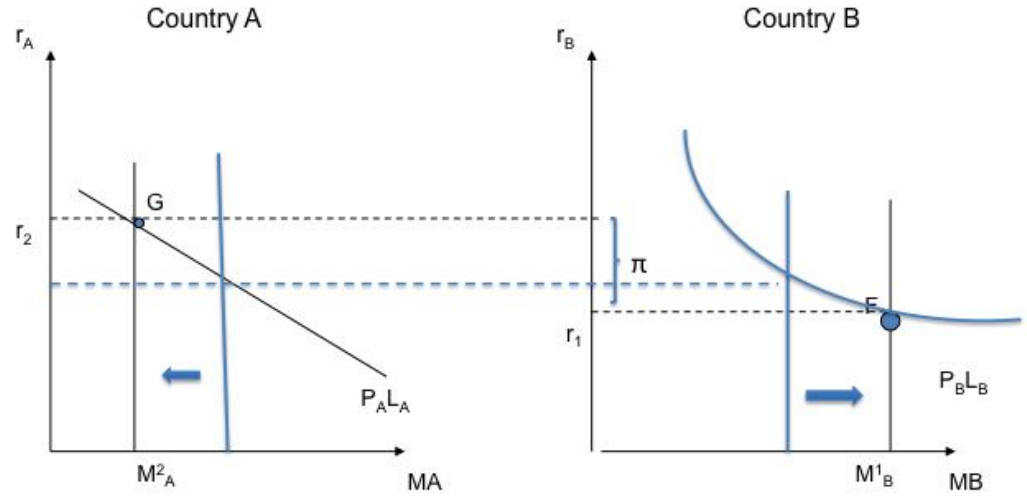
Figure A3. Effect of sovereign debt shock in an asymmetric system



Asymmetry due to liquidity trap

In the previous section we saw that the need to avoid a liquidity crisis in the banking system of country A leads to an asymmetric outcome, leading to a potentially inflationary risk. How serious is this threat? The answer has to do with a second potential source of asymmetry, i.e. the existence of a liquidity trap. In the scenario developed in the previous sections, we have seen that the as a result of the sovereign debt crisis in country A, the interest rate in country B is pushed downwards. There is a limit though to this downward movement. When the interest rate is low enough, further downward movements are prevented as a result of the liquidity trap. We show this case in Figure A4. We assume that the interest rate in country B has declined so much that it has reached the horizontal segment of the money demand curve. The figure illustrates what the effects then are of the sovereign debt crisis in country A. We now observe that the interest rate decline in country B is limited. As a result, the interest rate in country A must increase more than in the symmetric case. There is nothing the central bank of country A can do about this. Sterilization policies will not help to avoid the upward movement in the interest rate in country A. Note also that the inflationary effect in this system is mitigated as country A will have to accept a decline in its money stock.

Figure A4. Effect of sovereign debt shock with liquidity trap



APPENDIX B

Table A1. Unit root test (H_0 hypothesis: Panel contains unit root)

Variable	LLC test: p-value	Breitung test: p-value	IPS test: p-value
Target2 GDP ratio	1.0000	0.9999	1.0000
Debt GDP ratio	1.0000	0.9961	1.0000
Accumulated current account GDP ratio	1.0000	1.0000	1.0000
Interest rate	0.9998	0.6609	0.9971
Real effective exchange rate	0.0001	0.2787	0.0000
Growth rate	0.0000	0.0000	0.0000
Accumulated trade imbalance GDP ratio	1.0000	1.0000	1.0000
Δ(Target2 GDP ratio)	0.0000	0.0000	0.0000
Δ(Debt GDP ratio)	0.0000	0.0000	0.0000
Δ(Accumulated current account GDP ratio)	0.0000	0.0002	0.0000
Δ(Interest rate)	0.0000	0.0000	0.0000
Δ(Real effective exchange rate)	0.0000	0.0000	0.0000
Δ(Growth rate)	0.0000	0.0000	0.0000
Δ (Accumulated trade imbalance GDP ratio)	0.0000	0.0000	0.0000

Table A2. Cointegration test (H_0 hypothesis: no cointegration)

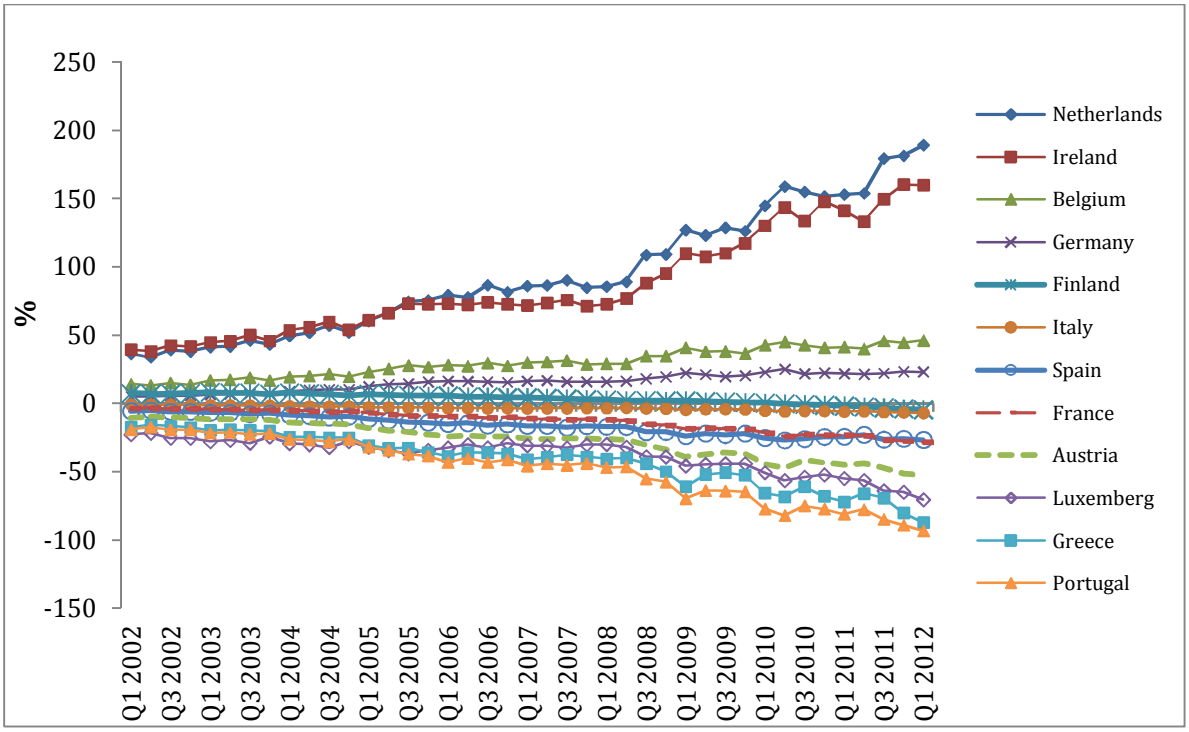
Level regression	**First-difference regression**		
Total sample	**Total sample**	**Pre-crisis sample**	**Post-crisis sample**
Cannot reject "no cointegration" (p-value = 0.4031)	Cannot reject "no cointegration" (p-value=0.1947)	Reject "no cointegration" (p-value=0.0000)	Reject "no cointegration" (p-alue=0.0373)

Table A3. Cointegration test (Trade imbalance regression, H0 hypothesis: no cointegration)

Level regression	**First-difference regression**		
Total sample	**Total sample**	**Pre-crisis sample**	**Post-crisis sample**
Cannot reject "no cointegration" (p-value = 0.4949)	Cannot reject "no cointegration" (p-value= 0.0250)	Reject "no cointegration" (p-value=0.0004)	Reject "no cointegration" (p-alue= 0.0815)

APPENDIX C

Figure A5. Trade imbalance GDP ratio in eurozone countries



Data sources: Datastream (IMF Direction of Trade data) and authors' own calculations.

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