The Euro and the Geography of International Debt Flows

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Abstract

Greater financial integration between core and peripheral EMU members had an effect on both sets of countries. Lower interest rates allowed peripheral countries to run bigger deficits, which inflated their economies by allowing credit booms. Core EMU countries took on extra foreign leverage to expose themselves to the peripherals. The result has been asset-price bubbles and collapses in the periphery, area-wide banking crisis, and sovereign debt problems. We analyze the geography of international debt flows using multiple data sources and provide evidence that Core EMU countries increased their borrowing from outside of EMU and their lending to the EMU periphery.

JEL classification: F32, F34, F36

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1 Introduction

European Monetary Union had a large impact on financial flows within the EMU area. It is well documented that gross debt and equity flows between EMU members increased dramatically as a result of both the single currency and regulatory harmonization within the EU.[1] Individual EMU members began to record larger net financial inflows too in the form of current account deficits, but until the sovereign debt crisis in the EMU periphery, few observers regarded these as particularly problematic. Only recently has attention turned to the factors behind there current account deficits as well as the mode in which they were financed by EMU partners and by countries outside the single currency.[2] Evidence on these questions is still relatively limited, and studies of the euro's effect on portfolio positions has tended to focus on intra-EMU effects. Here we look more broadly and also consider the impact of EMU on the *global* pattern of gross international financial flows. It is important to understand the worldwide gross portfolio positions built up in the decade after 1999 because these set the stage for the euro area crisis.

One mechanism generating the big current account deficits of the European periphery could be as as follows: after EMU (and even in the immediately preceding years), compression of bond spreads in the euro area periphery encouraged excessive borrowing by these countries, domestic lending booms, and asset price inflation. We further argue that a substantial portion of the financial capital flowing into the European periphery was intermediated by the countries in the center (core) of the euro area, inflating both sides of the balance sheet of the large financial institutions in the euro area core. These gross positions took the form of debt instruments, often issued and held by banks. Thus, EMU contributed not only to the big net deficits of the peripheral countries, but to inflated gross foreign liability and asset positions for nonperipheral countries such as Belgium,

[1] See Lane (2006), Blank & Buch (2007), Lane & Milesi-Ferretti (2007), and Spiegel (2009a), for the evidence on increased gross flows within the euro area and De Santis et al. (2003), Coeurdacier & Martin (2009), De Santis & Gerard (2009), Spiegel (2009b), and Kalemli-Ozcan et al. (2010) for the mechanisms underlying this development.

[2] Trade imbalances of euro area members and their financing are discussed by Chen et al. (2013), who draw on the bilateral international investment position data documented in Waysand et al. (2010).

France, Germany, and the Netherlands — countries that all experienced systemic banking crises after 2007.[3]

Four main factors contributed to the suppression of bond yields in the European periphery after the introduction of the euro. First, the risk of investing in European periphery declined with the advent of the euro due to investor assumptions (perhaps erroneous) about future political risks, including the possibility of official bailouts. Second, transaction costs declined and currency risk disappeared for euro area investors investing in the periphery countries.[4] Third, the ECB's policy of applying an identical collateral haircut to all euro area sovereigns, notwithstanding their varied credit ratings, encouraged additional demand for periphery sovereign debt by euro area financial institutions (Buiter & Sibert, 2005), which were able to apply zero risk weights to these assets for computing regulatory capital.[5] Fourth, financial regulations in the EU were harmonized (Kalemli-Ozcan et al., 2010) and the euro infrastructure implied a more efficient payment system though its TARGET settlement mechanism. All four factors seem likely to have given core euro area financial institutions a perceived comparative advantage in terms of lending to the periphery, and this would also likely have affected financial flows from outside to both regions of the euro area. While the preceding consideration apply to debt flows, including bank loans, they seem less applicable to equity flows, especially portfolio flows, where the portfolio diversification motive is a major driver.

What makes our work different from the earlier studies of the effect of EMU on financial flows is that we distinguish between the core and the periphery of the euro area. In particular, we are looking at how EMU changed the pattern of external lending to different regions of EMU as well as between regions within EMU.

The paper begins by documenting the large increases between 1999 and 2007 in the net foreign

[3]See Laeven & Valencia (2013).

[4]Hale & Spiegel (2012) show that the decline in transaction costs and currency risk due to the advent of the euro increased international bond issuance in euro relative to dollar.

[5]For documentation of the carry trade behavior after 2007, see Acharya & Steffen (2013).

liabilities of the five euro area periphery countries, Greece, Italy, Ireland, Portugal, and Spain (the "GIIPS"), vis-à-vis the rest of the euro area (the "Core"). As is well known, increasing current account deficits of these heavily borrowing countries were accompanied by a marked suppression in their government bond spreads relative to the Core. We then describe and analyze the geography of capital flows and their evolution during the pre-crisis EMU period up to 2007.

We exploit multiple data sets in our analysis, including data on debt asset positions from CPIS, on bank claims from the bilateral BIS data, as well as the Loan Analytics data on syndicated bank loans extended by individual banks to all types of borrowers. We analyze the patterns of cross-border financial flows in the cross-section setting as well as in the panel with country pair fixed effects.

We find strong evidence of the increase in the financial flows, both through debt markets and through bank lending, from core EMU countries to the EMU periphery. We also find that financial flows from financial centers to core EMU countries increased, but predominantly due to increased bank lending and not portfolio debt flows. In addition, we look at evidence from the syndicated loan market that is broadly consistent with the core EMU lenders having a comparative advantage in lending to the GIIPS. The concentration of peripheral risks on core EMU lenders' balance sheets helped to set the stage for the diabolical loop between banks and sovereigns that has been at the heart of the euro crisis.

The paper is organized as follows. In section 2 we give a simplified stylized model of how the introduction of the euro could have altered the geography of global debt flows. Next, in section 3 we describe the data that we use. In section 4 we describe general trends in the data and also explore the empirical regularities through regression analysis. Section 5 concludes.

2 Trading costs and asset flow diversion

To illustrate potential general equilibrium effects following a reduction in peripheral euro zone borrowing costs, we give an example of a stylized mechanism the essence of which might drive changes in the global geography of international debt flows.

We can think of the world as consisting of three regions — the Core euro area countries (C), the Peripheral euro area countries (P), and the rest of the world (R). Because the C and the R regions include large financial centers with large trading volumes, transaction costs of investing between these two regions were always low. If we assume these costs were zero and the capital can flow freely between the regions, they will face the same global interest rate r.

The transaction costs of lending from C and R to the P region, however, were high prior to the EMU because these countries were less integrated into the global capital markets. Thus, borrowers in P faced a higher interest rate when borrowing from the outside of the region than the interest rate prevailing between C and R region. We can denote this difference as τ. Figure 1 illustrates global imbalances prior to EMU. Given the prevailing interest rates prior to the EMU, global imbalances were moderate, with the P region facing a higher interest rate, $r + \tau$.

Assume that with the introduction of the euro, transaction costs for Core EMU to lend to the EMU periphery declined, but remained unchanged (or at least declined by less) for the rest of the world. Thus, Core EMU countries, and their banks, could benefit from intermediating financial flows from outside of EMU to the periphery. As illustrated in Figure 2, this led to an increase in the interest rate and current account surpluses in both the C and R regions which together were financing the higher current account deficits in P. Because transaction costs for R to invest in P are higher than for C, financial institutions in C borrow from R to lend to P. All lending from R to P must pass through C, which contributes an increase in both the *gross* foreign liabilities and assets of C that can be as high as R's current account surplus.

Of course, other outcomes are possible. For example, it could be that the cost peripheral borrowing falls enough for EMU and outside creditors alike that lending of outside creditor to the GIIPS rises nonetheless.[6] Even though it seems plausible that a number of the financial market changes caused by the EMU affected intra-EMU transaction costs and costs of external trades somewhat differently, the effect of EMU on external flows to the core and the periphery is an empirical matter.

Some aspects of aggregate data on financial flows are broadly consistent with the mechanism described on Figures 1 and 2. Figure 3 shows that EMU led to the compression of government bond spreads between the Core and Periphery from 1999 to 2008. Figure 4 shows that net foreign liabilities of GIIPS were increasing mostly vis-à-vis Core EMU, while Figure 5 shows that net foreign assets of Core were mostly vis-à-vis GIIPS and were closely matched by the liabilities of Core vis-à-vis the rest of the world. (See also Chen et al. (2013).) However, the overall picture one derives from gross asset position data is more complex than our simple example.

In the remainder of the paper, after describing our data, we will provide more direct evidence on the effect of EMU on global financial flows.

3 Data

We use as many data sources as we can find that provide information on bilateral debt flows. We obtain bilateral portfolio positions on debt assets from: the CPIS data set provided by the IMF, bilateral bank claims on consolidated and locational bases from the BIS, and loan-level data on global syndicated lending from Dealogic's Loan Analytics. We supplement these data with bilateral trade data from IMF DOTS, interest rate data from IMF IFS, and bank balance-sheet data from Bankscope.

For our empirical analysis, we divide the world into four regions. Two regions are GIIPS and

[6] Coeurdacier & Martin (2009) argue that for some asset classes EMU resulted in significant transaction cost savings for investors in countries outside and inside EMU alike.

the rest of the euro area, which we label Core (Austria, Belgium, Finland, France, Germany, Netherlands, Luxembourg).[7] We separate the rest of the world into two groups. The first group includes the rest of the EU and large financial centers (Fin): Canada, Denmark, Japan, Sweden, Switzerland, UK, and US. The second group consists of all remaining countries (ROW).

The CPIS database provides gross portfolio equity and debt positions by country-pair for 1997 and 2001-2011. For the purpose of this paper, we focus on the data on debt positions. Unfortunately, information on currency breakdown is very limited, which prevents us from estimating valuation-adjusted flows. As a result, we use the data in gross positions in real U.S. dollars, which we compute by dividing nominal U.S. dollar positions by the U.S. CPI. Because of many gaps in the data, we compute the total for each country's positions vis-à-vis ROW by subtracting its positions vis-à-vis all countries from the other three regions from its position vis-à-vis the entire world. We do the same for ROW lending to each country. Because CPIS data for Luxembourg are particularly noisy, we exclude Luxembourg from the analysis of CPIS data.

The BIS has recently declassified its bilateral data on banking sector claims, both on locational and consolidated bases. Consolidated data are more appropriate for our analysis because we want to trace debt flows to the headquarters of each financial institution.[8] Consolidated data, however have two major shortcomings: first, complete bilateral data are unavailable for euro area countries, except Greece and Portugal, prior to 1999; second, the consolidated data do not include currency breakdown and so do not allow us to compute valuation-adjusted flows. BIS Locational statistics, on the other hand, have much more complete historical coverage and the BIS provides valuation-adjusted flows using the currency breakdown of claims. Therefore, we also investigate the locational data, even though it is not ideal.[9]

[7] We do not have Cyprus and Malta in our data set. Slovenia and the Slovak Republic are coded as the ROW, because they joined EMU in 2007 and 2009, respectively.

[8] For the importance of intra-institutional transfers, see Cetorelli & Goldberg (2011) and Bruno & Shin (2013).

[9] Among previous studies, Blank & Buch (2007) and Kalemli-Ozcan et al. (2010) use BIS locational data, while Spiegel (2009a) uses the consolidated data. The CPIS data, used, for example, by Lane (2006) are based on the residence principle, similar to the BIS locational banking statistics.

We use all BIS reporting countries and for symmetry, we limit the vis-à-vis countries to the same set of BIS reporting countries. We use both data sets and analyze stocks and changes in stocks of total cross-border claims on all sectors. We deflate all data, reported in U.S. dollars, by the U.S. CPI.

We complement these data sources with individual tranche-level data on syndicated international and domestic bank loans from Dealogic's Loan Analytics database (also known as Loanware). We classify the nationality of each loan based on the nationality of lender parent and borrower parent, i.e. on consolidated basis. Since the loans are syndicated, they have many lenders, frequently from different countries. We split each tranche into individual records so that there is only one borrower and one lender per record. As individual participation amounts are not provided for each lender, we divided the total tranche amount by the total number of lenders. We divide all the amounts by the U.S. CPI. For some of the analysis, we aggregate all loan tranches for each lender parent, borrower parent, and year to match the structure of the data to that of the CPIS and BIS data sets.

Some banks appear as both borrower and lender parents in Loan Analytics. We isolate 51 banks (global large banks and banks included in EBA stress tests that are active on the syndicated loan market), which account for about 84 percent of total syndicated lending. Of these banks, 23 are in the Core EMU. This allows bank-level analysis of borrowing and lending patterns.

4 Geography of international debt flows

We first present our analysis of country-pair level data to evaluate the effect of EMU on patterns of global financial flows. We then discuss some evidence supporting the hypothesis of a comparative advantage of CORE lending to GIIPS after 1999.

4.1 Bilateral lending dynamics

We first examine how the geographical composition of international lending and borrowing changed over time. Figure 6 shows portfolio debt holding and banking claims using CPIS and consolidated BIS data, respectively, across four regions: financial centers (FIN), core Euro area (CORE), GIIPS, and the rest of the world (ROW). These claims are shown in the beginning of the EMU period on the left-hand-side of the chart, and as a change from the beginning of the EMU period until the end of 2007 on the right-hand side of the chart. The thickness of the lines reflects holdings, measured in the USD, of each regions vis-à-vis another, scaled by global gross positions in the USD for the charts on the left-hand side and by changes in global gross positions in real USD for the charts on the right-hand side. In interpreting these charts we view the stocks of claims at the beginning of EMU period as reflection of flows that occurred prior to the EMU.

The top panel is focusing on portfolio debt holdings. We observe an increase in portfolio debt claims of CORE on GIIPS and other CORE countries after the euro was introduced that is substantially larger than the amount of claims accumulated prior to EMU. We can also see a smaller increase in the portfolio debt claims of FIN on GIIPS relative to the accumulation of these claims prior to the EMU period.[10] These observations are consistent with some comparative advantage of CORE in lending to GIIPS.

The bottom panel shows the claims of the banking system. Here we see very clearly a large increase in flows from FIN to CORE relative to what we observed prior to EMU. We also see an increase in banking flows from CORE to GIIPS. In addition, we find that there is a decline in bank flows from CORE to FIN after the euro was introduced, showing that not only did CORE banks increase their borrowing from financial centers, they also reduced their lending to financial centers in order to divert the funds toward the GIIPS. In terms of the net foreign asset positions shown in Figure 5, both of these factors contribute to the negative NFA positions of CORE vis-à-vis

[10]There are no outflows from ROW, because the data are not available.

countries outside the euro area. Lending from financial centers to the GIIPS also goes up after 1999, indicating an overall increase in the attractiveness of GIIPS assets even for countries outside of EMU. Other data suggest that much of this lending went to the housing boom countries, Spain and Ireland.

To see whether the regional patterns are driven by specific countries, we turn to Figure 7. Top panel of Figure 7 is based on the CPIS data, middle panel on BIS consolidated data and bottom panel on BIS locational data. We compute the share of total lending to GIIPS by individual Core countries in each country's total lending (left column), and the share of Core in total borrowing by each country from GIIPS in each country's total borrowing (right column). We find that there was an increase in lending to GIIPS through the bond market between 1997 and 2007 for all Core countries, but especially for France, while the increase in bank lending was more pronounced for both France and Germany, with France experiencing an increase earlier during the EMU period than Germany. We also observe a sharp increase in the share of CORE in market borrowing by all GIIPS countries in the first few years of the EMU period. We don't see a clear increase in the share of Core banks in total borrowing by GIIPS, with the exception of Greece, and to a lesser extent, Portugal. Locational BIS data show broadly similar patterns to those we observe with consolidated statistics.

To formalize the analysis of Figures 6-7, we present estimates for a set of cross-sectional regressions based on the gravity framework that has been used by Portes & Rey (2005), Lane (2006), Coeurdacier & Martin (2009) and other authors. For each country pair we compute a change in the log of real USD claims between 1997 and 2007 for CPIS data and 1999 and 2007 for BIS consolidated data. For the BIS locational data, we sum up the valuation-adjusted flows in 1999-2007 in real USD and control for the stocks of claims in 1999. The results are presented in Table 1, with top panel showing regression results for CPIS data, the middle panel showing the results for the BIS consolindated data, and bottom panel showing results for the BIS locational data. We focus

on region pairs that drew our attention in analyzing Figure 7.

In column (1) we include indicators for region pairs: CORE lending to FIN and to GIIPS, and FIN lending to CORE and to GIIPS, with the omitted category being lending between all other region pairs. We find that in terms of portfolio debt flows as well as bank flow there was an increase in lending from CORE to GIIPS and, with the exception of the BIS locational data, a decline in lending from CORE to FIN. In addition, we find an increase in bank lending from FIN to both CORE and GIIPS.

The rest of the columns present our effort to understand these changes: in column (2) we include region fixed effects for both lenders and borrowers, in column (3) we include lender and borrower country fixed effects, columns (4)-(6) repeat the regressions in columns (1)-(3) but controlling for trade flows. We have experimented with including other gravity measures as well as trade agreements as controls, but did not find that they entered significantly or affected our results.

We find that the above results for portfolio debt flows are indeed country-pair-specific in that they do not change when we control for region or country fixed effects. In addition, once we control for overall changes for each region or country, we find that there was actually a relative decline in portfolio lending from FIN to both CORE and GIIPS. We also find that the decline of bank lending from CORE to FIN is not explained by overall regional or country patterns, while an increase in bank lending from CORE to GIIPS, from FIN to CORE and to GIIPS is fully explained by either region or country fixed effects. That is, an increase in bank lending from FIN to CORE was not higher than an increase in total lending by FIN and total borrowing by CORE through bank lending. Finally, we find that controlling for trade does not alter any of these claims.

We next turn to the country-pair by year panel data analysis, similar to the approach taken by Blank & Buch (2007) and Spiegel (2009b). We test whether the flows for the pairs of regions that we discuss have changed substantially after 1999. To do so, we interact indicators of region pairs with an indicator of the pre-crisis EMU time period. We estimate regressions with country-pair

and year fixed effects so that our identification comes from changes within country pairs. We also control for the total amount lent and total amount borrowed by each country in each year. Because consolidated BIS data for EMU countries are not available prior to 1999 (except for Portugal and Greece), our analysis is limited to CPIS data and BIS locational data. We supplement this analysis with syndicated loan issuance aggregated from the loan-level data using the Loan Analytics data set.

The results are presented in Table 2. We find that, following the introduction of the euro, claims of CORE on GIIPS have increased both through portfolio debt holdings and through banks. We also see an increase in syndicated lending of CORE to GIIPS. Similarly to the cross-section regressions, we find that lending from financial centers to CORE increased only through bank lending, but not through portfolio debt. We also see that direct lending of financial centers to GIIPS has declined in the bond market but increased through bank lending, although by a smaller amount than their bank lending to CORE.

To summarize the results of Tables 1 and 2, we find that during the pre-crisis EMU period there was an increase in debt flows from Core EMU to GIIPS and that increase occurred on debt markets as well as through bank lending. This increase was financed by a decline in lending of CORE to FIN, especially on on the bond market, and by an increase in borrowing by CORE from banks in financial centers.

4.2 Additional evidence

We suggested several reasons why the core EMU lenders might have had a comparative advantage over financial centers in lending to the GIIPS. This comparative advantage could have led to a reorientation of global capital flows beyond an increase in CORE lending to GIIPS. not only greater lending from the CORE to the GIIPS, but also to more lending from the financial centers to the CORE and possibly less lending

Our first piece of evidence comes from the syndicated loan data. Since syndicated loans to sovereigns did not have the same collateral advantages as sovereign bonds, to gain from carry trade banks switched from loans to GIIPS sovereigns to lending to them through debt market. Indeed we observe a sharp decline in syndicated bank lending from CORE to GIIPS sovereigns at the start of EMU period, as shown on Figure 8. While overall syndicated lending from CORE banks to GIIPS increased throughout this time period, lending to sovereigns dropped to nearly zero (the chart includes non-sovereign public borrowers).

The only source of systematic geographical composition of borrowing and lending of banks is Loan Analytics data base. Top banks appear as both lenders and borrowers int the data, allowing us to see whether the geography of their lending is affected by the geography of their borrowing. Even though syndicated lending from CORE to GIIPS is rather limited, we examine whether there is a correlation between banks' lending to GIIPS and these same banks' borrowing from financial centers. For at least some large banks we definitely see this link, as shown on Figure 9.

To test whether this link between Core EMU banks' borrowing from financial centers and their lending to GIIPS is a more widespread phenomenon, we isolate 51 banks–either large global banks or banks included in EBA stress tests–that are active on the syndicated loan market. These banks account for about 84 percent of total syndicated lending. Of these banks, 23 are in the Core EMU. For these banks, we collect information on syndicated lending to them from different region as well as their own participation in syndicated lending by region. We then estimate the regression of the amount lent to GIIPS as a function of the amount borrowed from different regions, and allow for the effect to change after the introduction of the euro. The results are reported in Table 3. In column 1 the sample is limited to financial center banks, in column 2 to core EMU banks, and in column 3 to periphery banks. In all regressions we control for the total amount lent and borrowed through the syndicated loan market by each bank, as well as for bank and year fixed effects.

The results in Table 3 show that, controlling for total borrowing and lending by each bank in

each year, only for Core banks is there an increased link between their borrowing from financial centers and their lending to GIIPS during the pre-crisis EMU period. We do not find such a link for banks from other regions. In addition, we find that financial center banks, but not Core banks, seem to have been intermediating flows from ROW to GIIPS. This finding is expected in that the ROW lenders are likely to be facing even larger transaction costs in lending directly to GIIPS than do the financial center banks.

Finally, using Loan Analytics data we also confirm that financial center lenders found GIIPS borrowers relatively less attractive after the introduction of the euro. To do so, we estimate linear probability regressions of the probability of having at least one bank from FIN in the syndicate for all loans, for loans in which at last one bank is from CORE, for all loans to GIIPS, for loans to GIIPS in which at least one bank in the syndicate is from CORE, and for all loans to CORE. As controls we included deal amounts and year fixed effects.[11]

Figure 10 shows a plot of the estimated fixed effects from these regressions. We find that while there was not much change in the regional composition of loan syndicates in the deals extended to other regions, there was a sharp drop during the EMU period in the probability of a financial center bank participating in lending to GIIPS, whether or not a CORE bank is also in a syndicate.[12] There are two interpretations of these results, either FIN banks became less interested in originating loans to GIIPS after 1999, or banks originating loans to GIIPS were not inviting FIN banks to participate after 1999. Both of these are consistent with our mechanism: in the former case it indicates lowered interest in FIN lending directly to GIIPS, in the latter it is consistent with the view that lending to GIIPS became perceived as less risky, thus requiring less diversification. The second, however, is less likely because there was no systematic change in the number of banks per syndicate in lending to GIIPS.[13]

[11] In the interest of space, we do not report the regressions themselves.

[12] These dynamics is not explained by the increased number of deals to GIIPS, which did not occur until 2004.

[13] Here we only observe the syndicate composition at the time of loan origination. As Ivashina & Scharfstein (2010) stress, composition of loan syndicates can change during the life of a loan.

5 Conclusion

Current account deficits of peripheral euro area countries reflected an accumulation of problems that have led to instability in the euro area. In this paper we analyze how the patterns of international debt flows facilitated the accumulation of these imbalances. Not only did peripheral countries borrow too much, but in addition, financial institutions in the core of the euro area expanded their balance sheets to facilitate peripheral deficits, thereby increasing their own fragility. This pattern set the stage for the diabolical feedback loop between banks and sovereigns that has been such a powerful driver of the euro area's recent crisis.

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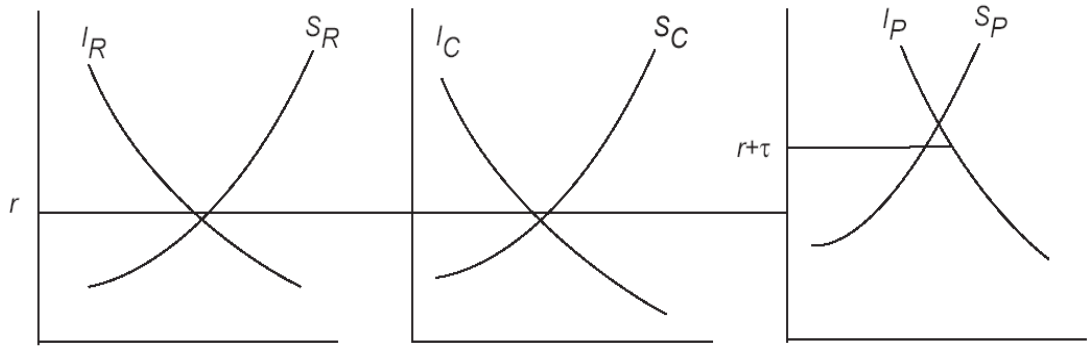
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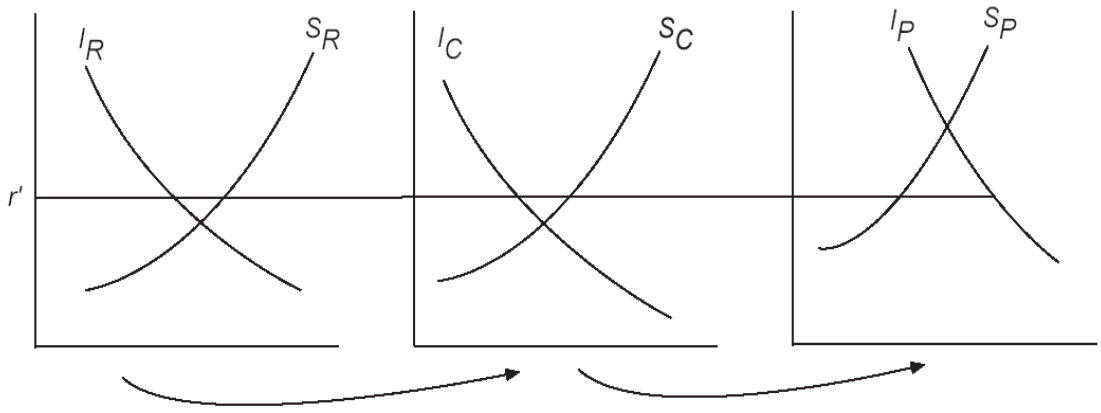
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Figure 1: Global imbalances before the Euro



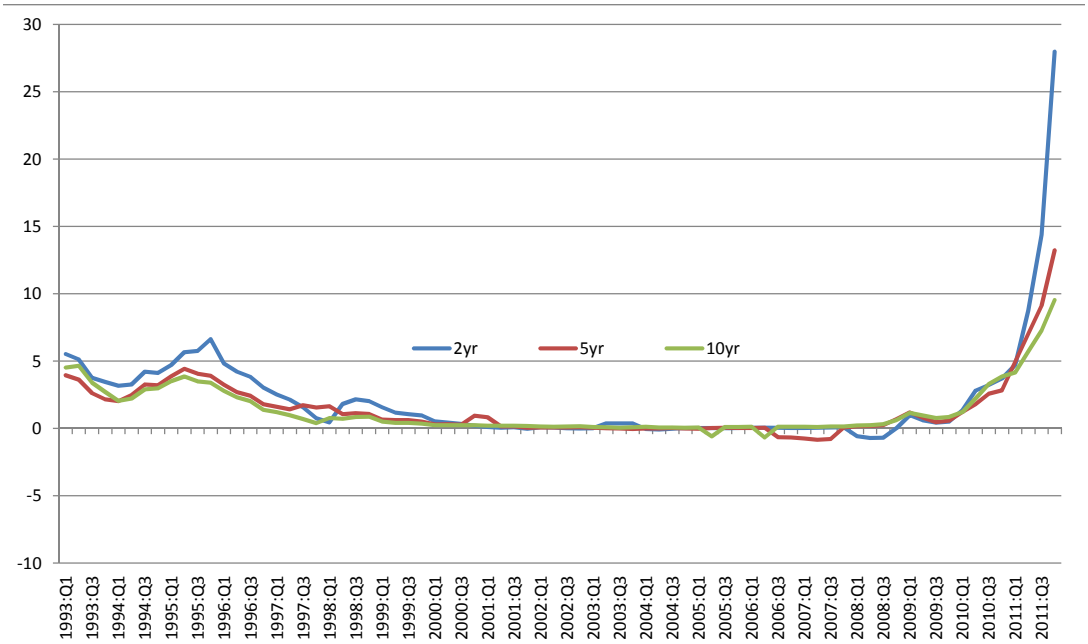
Before EMU, Rest of World *(R*) and Core euro zone countries (*C*) have very low mutual asset transaction costs, but both face a cost $\boldsymbol{\tau}$ of lending to the Peripheral euro zone (*P*). The cost $\boldsymbol{\tau}$ largely disappears for *C*, but less so for *R*, when the euro is introduced.

Figure 2: Global imbalances after the Euro



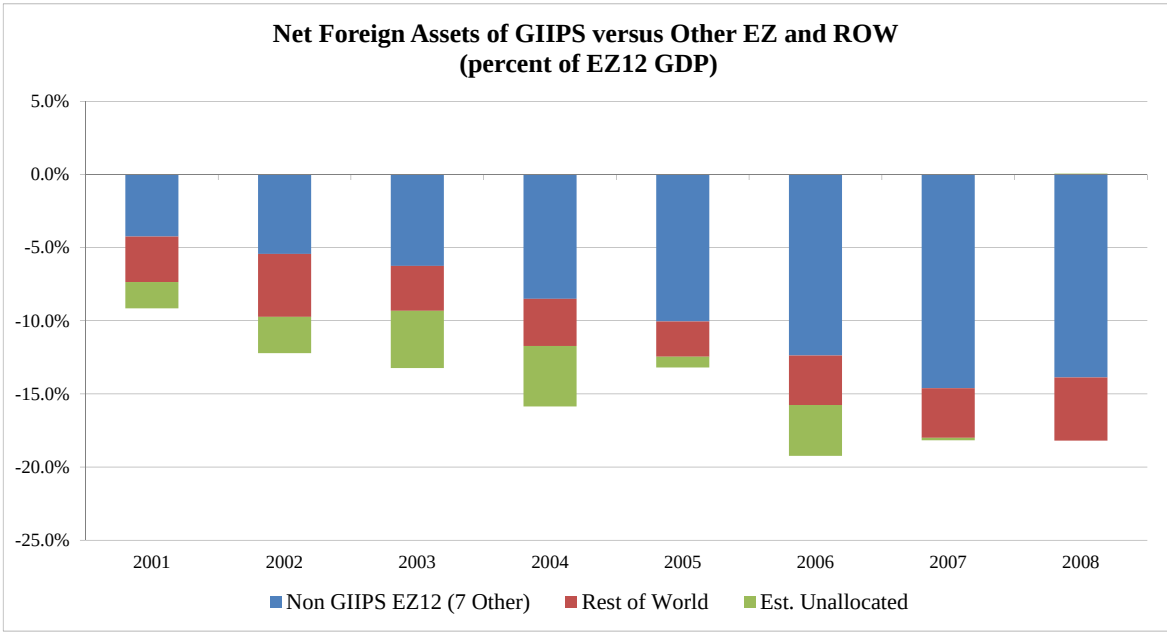
Because asset trade between *R* and *P* remains relatively costly post-EMU, all net lending from *R* to *P* is intermediated through *C*, which must raise its gross foreign assets and liabilities alike by an amount equal to the surplus savings of *R*. *P*'s deficit rises as its external borrowing cost falls.

Figure 3: Government bond spreads between GIIPS and Core



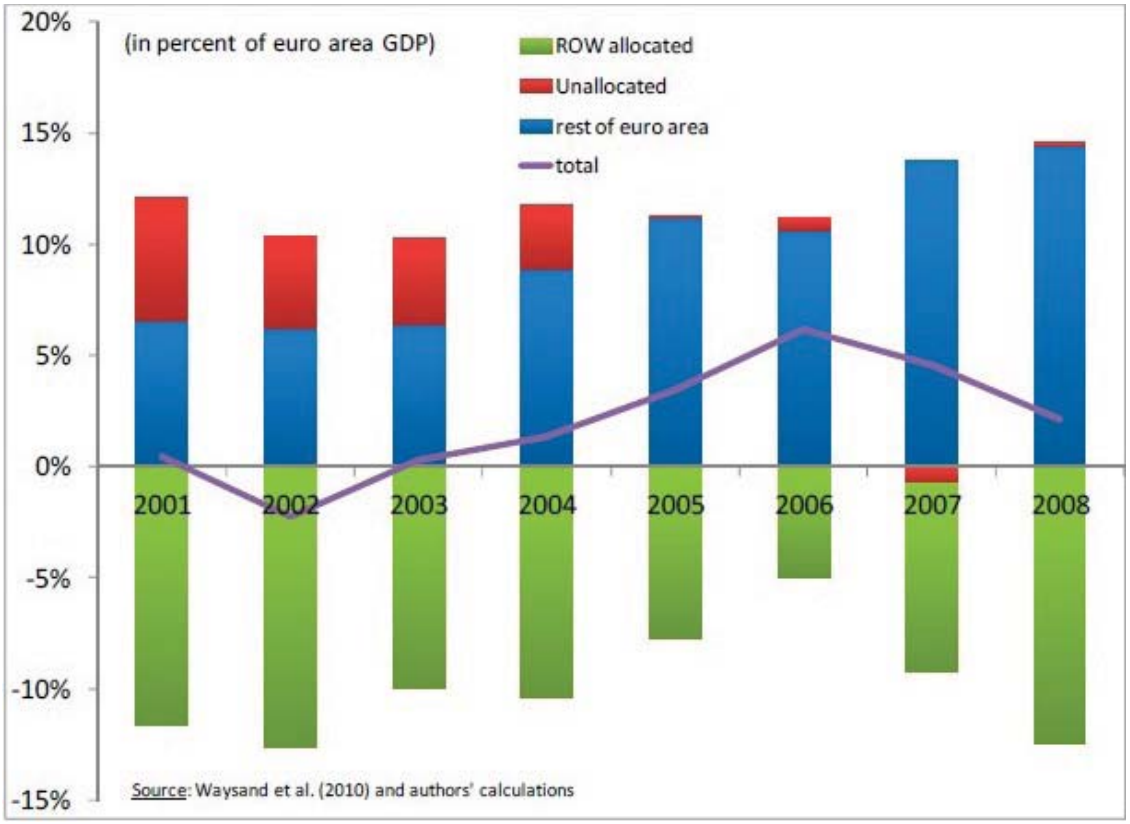
Note: Bond spreads are computed as a difference between unweighted average government bond yields in core EMU countries and in GIIPS.

Figure 4: Evidence from Position (not Flow) Data



Source: Waysand, Ross, and de Guzman (2010), following Chen, Milesi-Feretti, and Tressel (forthcoming)

Figure 5: Net Foreign Asset Positions of Euro Area Core countries



Note: Chart courtesy of F.Pappada

Figure 6: Portfolio debt (CPIS) and bank claims (BIS) by region in the beginning of EMU period and their change by 2007.

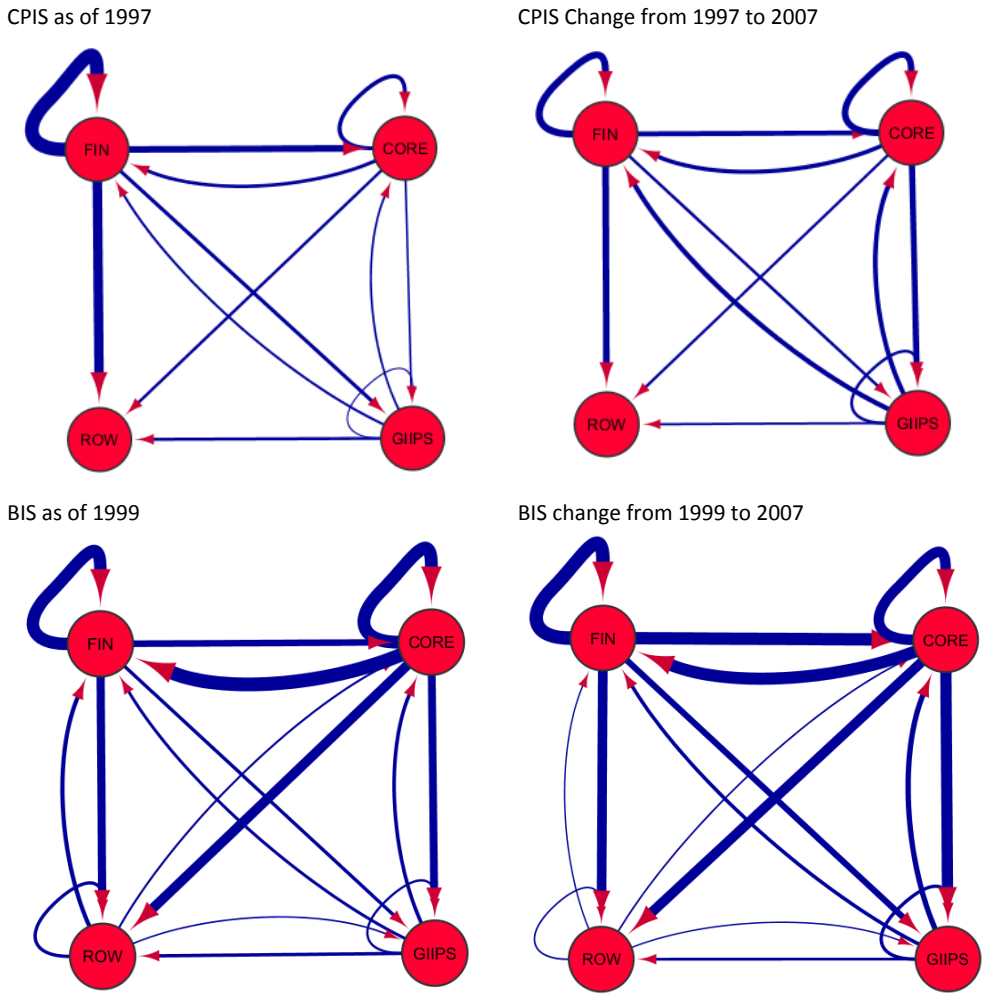


Figure 7: Geographical distribution of Core to GIIPS lending.

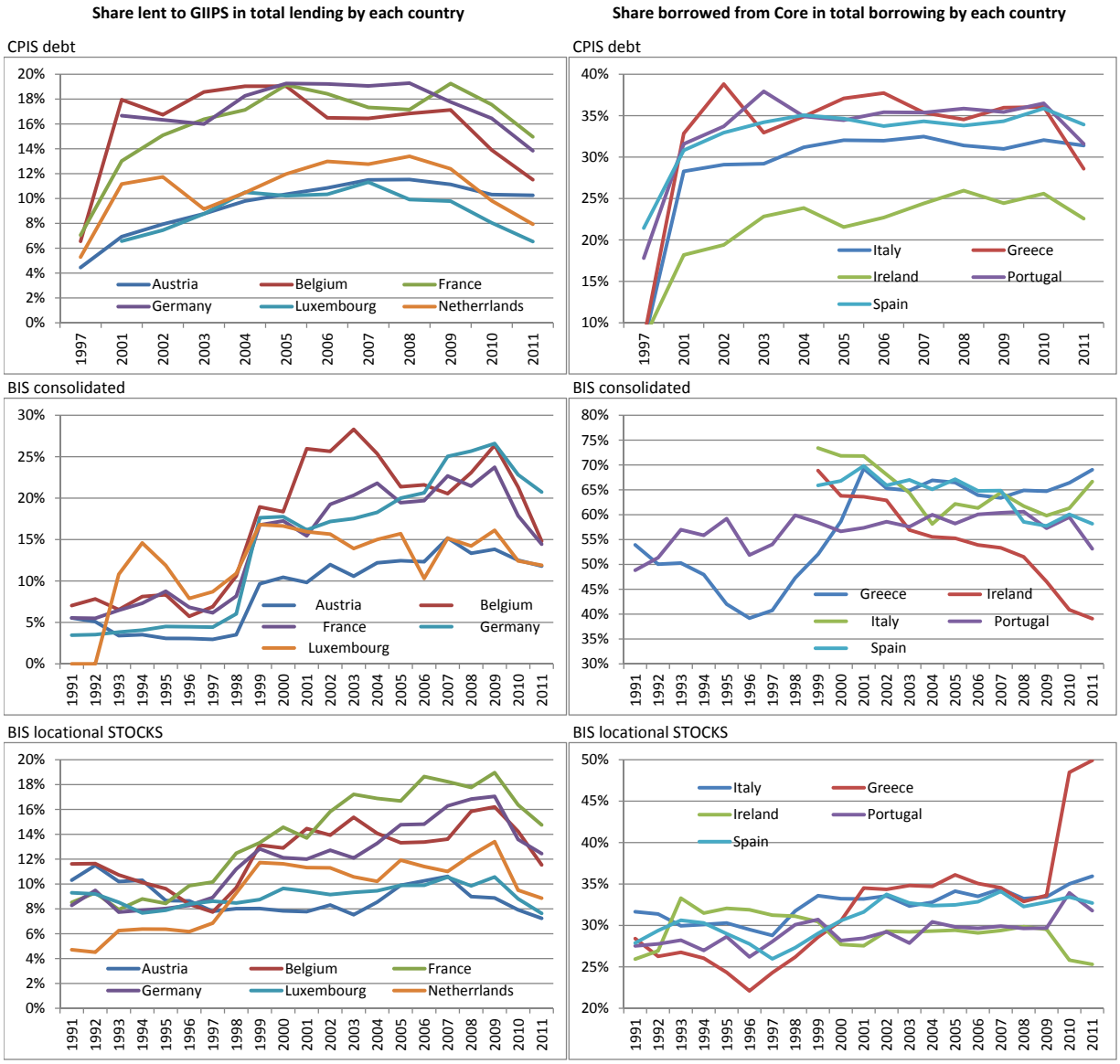


Figure 8: Syndicated lending from CORE to GIIPS by borrower's ownership (Bil. USD)

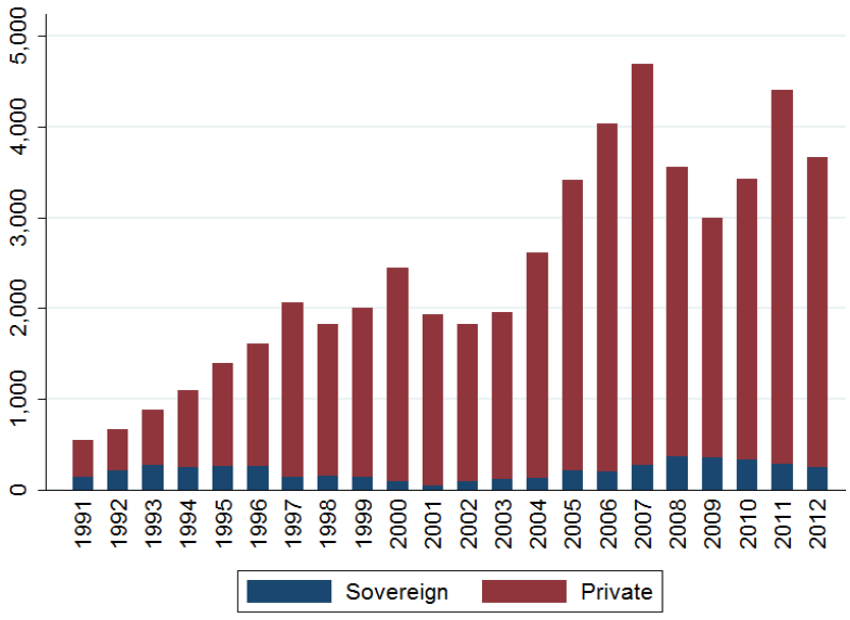


Figure 9: Borrowing from Financial Centers and lending to GIIPS of individual banks (real USD)

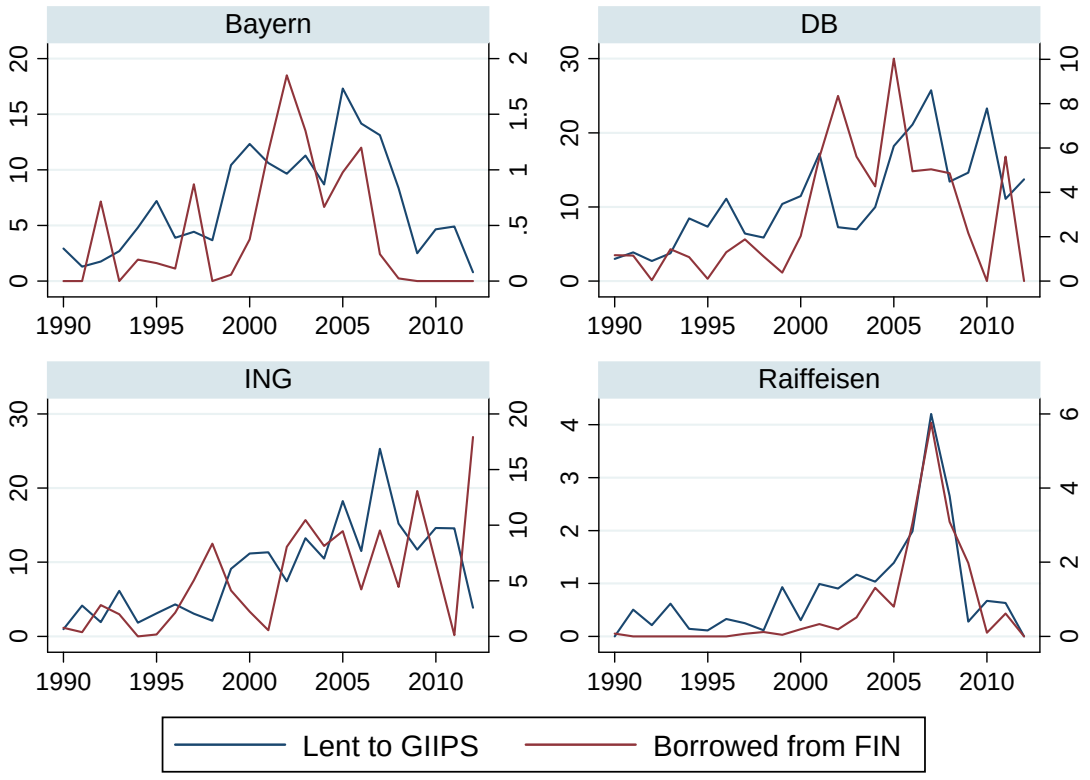


Figure 10: Probability of FIN bank participating in a loan syndicate (year fixed effects from linear probability regression)

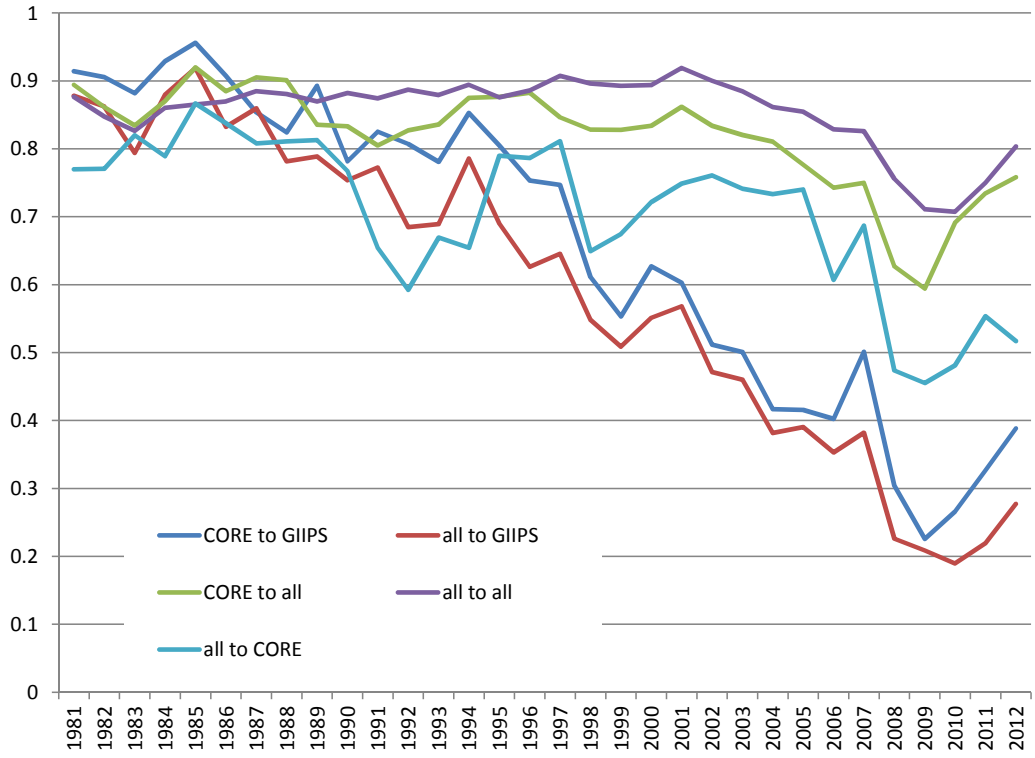


Table 1: Cross Section regressions.

Dependent variable:	Δln(CPIS) 1997-2007 (1)	Δln(BISC) 1999-2007 (2)	ln(BISL Flow) 1999-2007 (3)	Δln(CPIS) 1997-2007 (4)	Δln(BISC) 1999-2007 (5)	ln(BISL Flow) 1999-2007 (6)
CORE to FIN	-0.917**	-0.269***	0.0298	-0.903**	-0.615***	0.0507
	(0.313)	(0.0486)	(0.195)	(0.335)	(0.0620)	(0.237)
CORE to GIIPS	1.104***	0.648***	1.583***	1.112***	0.332***	1.601***
	(0.313)	(0.0486)	(0.183)	(0.325)	(0.0595)	(0.219)
FIN to CORE	-0.540	0.579***	0.767***	-0.530	0.248***	0.787***
	(0.313)	(0.0486)	(0.173)	(0.330)	(0.0607)	(0.214)
FIN to GIIPS	-0.420	0.730***	0.604***	-0.415	0.439***	0.621***
	(0.313)	(0.0486)	(0.131)	(0.320)	(0.0573)	(0.164)
ln(Trade)				-0.0128	0.0801***	-0.00931
				(0.0415)	(0.00843)	(0.0216)
ln(Stock in 1999)			0.457***			0.459***
			(0.0442)			(0.0425)
Constant	1.993***	0.408***	1.118***	2.107***	-0.0162	1.182***
	(0.313)	(0.0486)	(0.0539)	(0.353)	(0.0452)	(0.134)
Observations	284	2703	1958	284	2703	1958
Adjusted R^2	0.137	0.00276	0.386	0.134	0.0158	0.386

EMU= years 1999-2007. CPIS is stock of portfolio debt claims from CPIS data in real USD.
BISC is stock of total cross-border bank claims from consolidated BIS data in real USD.
BISL Flow is valuation-adjusted flows of total cross-border bank claims from locational BIS data in real USD.
Difference between logs of stocks in 2007 and 1997 or 1999 is computed for stock variables, as indicated.
Flows are summed up for years 1999-2007. We control for stock in 1999 using BIS locational data.
CORE includes Austria, Belgium, France, Germany, Luxembourg (except CPIS), Netherlands. GIIPS includes Greece, Ireland, Italy, Portugal, Spain. FIN includes Canada, Denmark, Japan, Sweden, Switzerland, UK, US.
Robust standard errors clustered at lender region-borrower region pair level in parentheses.
*(P< 0.10), **(P< 0.05), ***(P< 0.01).

Table 2: Panel regressions.

Dependent variable	ln(CPIS) (1)	ln(BISL Flow) (2)	ln(LW) (3)
CORE to FIN $*$ EMU	-0.397***	0.395***	0.370***
	(0.0937)	(0.0359)	(0.0459)
CORE to GIIPS $*$ EMU	0.216**	0.324***	0.238***
	(0.0863)	(0.0808)	(0.0499)
FIN to CORE $*$ EMU	-0.272***	0.396***	0.711***
	(0.0705)	(0.0338)	(0.0460)
FIN to GIIPS $*$ EMU	-1.010***	0.163**	0.266***
	(0.0889)	(0.0646)	(0.0424)
ln(Trade)	-0.00465	-0.0848**	0.0168
	(0.0217)	(0.0291)	(0.0156)
ln(Total lent)	0.866***	0.285***	0.172***
	(0.0936)	(0.0511)	(0.0538)
ln(Total borrowed)	1.238***	0.193**	0.215***
	(0.122)	(0.0862)	(0.0230)
Observations	2678	27554	23324
Adjusted R^2	0.276	0.0111	0.379

EMU= years 1999-2007. CPIS is stock of portfolio debt claims from CPIS data in real USD.
BISL Flow is valuation-adj. flows of total cross-border bank claims from loc. BIS data in real USD.
LW is the total amount of loans issued by country i to country j in year t in real USD.
CORE includes Austria, Belgium, France, Germany, Luxembourg (except CPIS), Netherlands.
GIIPS includes Greece, Ireland, Italy, Portugal, Spain.
FIN includes Canada, Denmark, Japan, Sweden, Switzerland, UK, US.
Country-pair and year fixed effects are included in all regression Robust standard errors are clustered at lender region-borrower region pair level. *(P< 0.10), **(P< 0.05), ***(P< 0.01).

Table 3: Total lending to GIIPS. Bank-level regressions.

Dependent variable	Lent to GIIPS	Lent to GIIPS	Lent to GIIPS
Sample	Bank in Fin	Bank in Core	Bank in GIIPS
Borrowed from FIN * EMU	-0.0480	1.134**	0.0372
	(0.808)	(0.517)	(0.403)
Borrowed from ROW * EMU	2.182*	0.421	9.797**
	(1.083)	(2.898)	(3.705)
Borrowed from CORE * EMU	-0.581	-0.672**	-2.109**
	(1.651)	(0.288)	(0.944)
Borrowed from FIN	1.170	-3.524**	-2.253
	(2.910)	(1.316)	(1.921)
Borrowed from EMU	1.199	-5.060***	-2.074
	(3.258)	(1.129)	(1.712)
Borrowed from CORE	1.847	-2.205	-1.863
	(4.491)	(1.446)	(1.673)
Total lent by bank	0.085***	0.064***	0.069***
	(0.0224)	(0.0123)	(0.00721)
Total borrowed by bank	-1.163	2.329**	2.006
	(3.245)	(1.103)	(1.717)
Observations	198	396	234
Adjusted R^2	0.670	0.630	0.679

EMU= years 1999-2007. Borrowed from X is total amount of loans issued by X in real USD.
CORE includes Austria, Belgium, France, Germany, Luxembourg (except CPIS), Netherlands.
GIIPS includes Greece, Ireland, Italy, Portugal, Spain.
FIN includes Canada, Denmark, Japan, Sweden, Switzerland, UK, US.
Bank and year fixed effects in all regressions. Robust standard errors in parentheses
*(P< 0.10), **(P< 0.05), ***(P< 0.01).