The Euro and the Geography of International Debt Flows

Galina Hale[*]

Federal Reserve Bank of San Francisco

Maurice Obstfeld

University of California, Berkeley, NBER and CEPR

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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 some of the peripheral countries, area-wide banking crisis, and sovereign debt problems. We analyze the geography of international debt flows using multiple data sources and provide evidence that after the euro's introduction, Core EMU countries increased their borrowing from outside of EMU and their lending to the EMU periphery.

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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] Some 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 these 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.[3]

One mechanism generating the big current account deficits of the European periphery could be summarized 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.[4] 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 largely took the form of debt instruments, often

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[1]See Lane (2006), Blank and Buch (2007), Lane and Milesi-Ferretti (2007), Spiegel (2009a), and Pels (2010) for the evidence on increased gross flows within the euro area and De Santis et al. (2003), Coeurdacier and Martin (2009), De Santis and 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).

[3]Fernandez-Villaverde et al. (2013) review a host of political-economy effects in the Eurozone periphery produced by the Eurozone credit bubble.

[4]Of course, the extent and form of these phenomena differed among the individual peripheral countries.

issued and held by banks. Thus, EMU contributed not only to the big net deficits of the peripheral countries, but to inflated gross foreign debt liability and asset positions for nonperipheral countries such as Belgium, France, Germany, and the Netherlands – countries that all experienced systemic banking crises after 2007.[5] The tendency for systemically important banks to increase leverage in line with balance sheet size (see Miranda-Agrippino and Rey (2013)) implied a substantial increase in financial fragility for these countries' financial sectors. Figure 1 illustrates how the leverage of core euro area banks rose in the 2000s.

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 the 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.[6] Second, transaction costs declined and currency risk disappeared for euro area investors investing in the periphery countries.[7] 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 and Sibert, 2005), which, moreover, were able to apply zero risk weights to these assets for computing regulatory capital.[8] (The EU's recent fourth Capital Requirements Directive continues to allow zero risk weights for euro area sovereign debts, even though the borrowing countries cannot print currency to pay their debts.) Fourth, financial regulations in the EU

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[5]See Laeven and Valencia (2013). Shin (2012) notes the role of EMU in encouraging cross-border bank lending within the euro area.

[6]Broner et al. (2014) argue that expected preferential treatment of domestic holders of domestic sovereign debt led to a national home bias in debt holdings after the euro crisis broke out. Analogous expectations might have led core euro area lenders to concentrate their risks on euro area borrowers prior to the euro crisis.

[7]Hale and 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.

[8]For documentation of similar carry trade behavior after 2007, see Acharya and Steffen (2013). Regarding ECB haircut policy, Fels (2005) noted: "[A]t its weekly refinancing operations, the ECB does not discriminate between member countries' debt ratings when accepting bonds as collateral. Therefore, the banking system has no incentive to discriminate between these bonds, either, because banks can always ship bonds of a lesser credit quality to the ECB to obtain liquidity." As the Buiter-Sibert (2005) analysis also makes clear, collateral quality matters most in states of the world where the borrower defaults on its loan, so a failure to impose borrower-specific haircuts provides a further subsidy to risk taking. For a microeconomic model of ECB refinancing operations, see Cassola et al. (2013).

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 considerations apply to debt flows, including bank loans, they seem less applicable to equity flows, especially portfolio flows, where the diversification motive is a major driver.

We distinguish our work from earlier studies of the effect of EMU on financial flows by disaggregating and differentiating the effects of EMU for core and periphery euro area countries. In particular, we examine how EMU changed patterns of both external lending to core and periphery countries, as well as between core and periphery countries.

The paper begins by documenting the large increases between 1999 and 2007 in the net foreign 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.[9]

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. The example is admittedly extreme, so at the end of the section we discuss more realistic versions of the same basic mechanism.

For the purpose of our example, 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). There is no uncertainty and all lending is accomplished via safe bonds denominted in single numeraire. 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 prior to EMU and remained so afterward. If we assume in our model that these costs are zero and that capital can flow freely between the regions, then C and R will both face the same global interest rate r.

The transaction costs of lending from either C or R to the P region, however, were relatively high

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[9]See Acharya et al. (2011), Brunnermeier et al. (2011), De Grauwe (2012), and Obstfeld (2013) for descriptions and discussions of this diabolical loop – also known as the "doom loop" or "lethal embrace."

prior to EMU because P countries were less integrated into the global capital market. Imperfect integration was due to a number of factors including currency, financial, and political risks. Thus, borrowers in P faced a higher interest rate when borrowing from outside the region than the interest rate prevailing between the C and R regions. We denote the difference by τ. Figure 1 illustrates the pattern of global imbalances prior to EMU. Given the prevailing interest rate prior to EMU, external imbalances are shown as being comparatively 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 lending to the EMU periphery decline, but remain unchanged (or at least decline by less) for the rest of the world. Thus, Core EMU countries, and their banks, can benefit from the "carry trade" of intermediating financial flows from outside of EMU to the periphery. As illustrated in Figure 2, this leads to an increase in the interest rate and current account surpluses in both the C and R regions. Those surpluses balance the higher current account deficit of P. Because the transaction costs R faces for investing in P are higher than those that C faces, financial institutions in C borrow from R to lend to P, pocketing the carry. And because all lending from R to P must pass through C, the new equilibrium features an increase in both the *gross* foreign liabilities and assets of C that can be as high as R's current account surplus.

Perceptive observers have noted similar dynamics:

> "German banks could get money at the lower rates in the euro zone and invest it for a decade in higher yielding assets: for much of the 2000s, those were not only American toxic assets but the sovereign bonds of Greece, Ireland, Portugal, Spain, and Italy. For ten years this German version of the carry trade brought substantial profits to the German banks — on the order of hundreds of billions of euros ... The German advantage, relative to all other countries in terms of cost of funding, has developed into an exorbitant privilege. French banks exploited a similar advantage, given their

major role as financial intermediaries between AAA-rated countries and higher yielding

debtors in the euro area." (From Carlo Bastasin, *Saving Europe: How National Politics*

Nearly Destroyed the Euro, Washington, D.C.: Brookings, 2012, page 10.)

Of course, other outcomes are possible. For example, if there are increasing marginal costs for R lenders of funneling funds through C financial markets, then it could happen that the cost of peripheral borrowing falls enough for EMU and outside creditors alike that the lending of outside creditors to the GIIPs rises.[10] It seems plausible that a number of the financial market changes caused by EMU affected intra-EMU transaction costs and costs of external trades somewhat differently, so 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 illustrates the well-known fact that EMU led to a compression of government bond spreads between the Core and Periphery.[11] Figure 4 shows that net foreign liabilities of the GIIPS were increasing mostly vis-à-vis the rest of EMU, while Figure 5 shows that by 2008 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 in our simplified analytical example.

This complexity is natural once one extends the conceptual framework to encompass uncertainty. Of course, diversification motives provide an explanation for some of the gross two-way financial flows (especially in equities) that persisted after the euro's introduction. For that reason, we focus on debt flows in our empirical analysis below. In addition, under uncertainty – either in a mean-

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[10]Coeurdacier and Martin (2009) argue that for some asset classes EMU resulted in significant transaction cost savings for investors in countries outside and inside EMU alike. We return to this point below.

[11]Econometric analyses of the pre-crisis convergence of euro area sovereign yields include Ehrmann et al. (2011) and Gerlach et al. (2010).

variance framework or in a value-at-risk framework such as that of Bruno and Shin (2013) – the preceding changes in expected peripheral returns for Core and rest-of-world lenders could imply portfolio-balance shifts but not corner solutions, with R lenders reducing, but not eliminating, their P lending while simultaneously increasing their lending to C. Indeed, as noted above, it is plausible that the peripherals' adoption of the euro somewhat lowered the perceived risks of rest-of-world lending to them – currency stability even against external currencies was more likely, and the peripherals' access to core credit and ECB facilities might have reassured external lenders as to the effective seniority of their own claims. Thus, it would not be surprising to see R claims on P actually rise, while simultaneously rising on C.

After describing our data, the remainder of this paper provides more direct evidence on the effect of EMU on global financial flows.

3   Data

An ideal data set for our analysis would consist of all gross debt flows between each country pair, classified by the nationality as well as the location of the entity extending funds to a borrower. Unfortunately, such data do not exist.

The BIS collects data on bank claims at the country-pair level, but where their data identify the nationality of the lender (the BIS *consolidated* data), these are reported as stocks. BIS *locational* banking data classify lenders by residence rather than ultimate ownership, but these data are available as flows (actually, valuation-adjusted stocks) in addition to stocks. Both types of BIS data omit the debt holdings of non-bank financial institutions.[12]

An important difference between BIS consolidated and locational data is how cross-border mergers and acquisitions (M&As) are reflected in the data. M&As in principle would not affect locational

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[12]In fact, the BIS data are limited to debt holdings of BIS-reporting banks, with a changing coverage of individual banks over time (Cerutti, 2013).

data, but would change the consolidated data by reassigning the claims held by the target institution to the acquirer, which change would be reflected by an increase in claims owned by the country of the acquirer and a decline in claims owned by the country of the target. Thus, changes in consolidated claims reflect not only actual changes in claims, but changes in ownership structure of banking institutions. This is a nontrivial issue in Europe, which saw a number of banking M&As after the euro's launch.

In terms of this paper's hypothesis, M&A might be a relatively low-risk means for banks outside the euro zone to acquire claims on GIIPS: The acquired bank – even though its owner resides outside the euro area – might still benefit from cost advantages in lending to the periphery (for example, access to ECB refinancing facilities). Thus, a Swedish bank might find it prudent to route loans to Portugal through an acquired Finnish subsidiary. Consolidated, but not locational data, would in this case show financial-center claims on the GIIPS increasing even when *direct* lending from financial centers to GIIPS was relatively costly. Of course, *any* financial-center routing of loans to GIIPS through subsidiaries in core countries would appear in consolidated data as an increase in financial-center claims on GIIPS, but could be driven by cost advantages derived from the subsidiary's location under the euro area umbrella.

Strictly speaking, a test of our hypothesis would ideally distinguish between lenders whose loans to the EMU periphery become more profitable after the advent of EMU and those who might benefit less. Unfortunately, neither the residence not the nationality principle captures the distinction perfectly. A subsidiary of a U.S. bank in Frankfurt with access to ECB refinancing facilities might have an advantage in lending to the EU periphery – and in this case locational rather than consolidated BIS data would place that lender in the correct category. On the other hand, a German bank subsidiary residing in New York could likewise have a lending advantage for the EMU periphery – in which case the consolidated data would get it right. Thus it is useful, in our view, to look at both locational and consolidated BIS data.

The BIS has recently declassified some of its bilateral data on banking sector claims, both on locational (by geographical location of each institution) and consolidated (by geographical location of the headquarters) bases. However, we have access to the entire set of locational and consolidated bilateral data through classified access. As noted earlier, consolidated data allow us to trace debt flows to the headquarters country of each financial institution.[13] 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 (as noted above) are not available in flow form and do not include currency breakdown, which would allow estimation of 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.[14] 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.

An alternative data source comes from the IMF, which reports bilateral portfolio debt and equity holdings for selected countries in its Coordinated Portfolio Investment Survey (CPIS) data set. These are reported only as stocks and include non-bank investors. Moreover, the CPIS data on national asset holdings (like the BIS locational banking data, but unlike the BIS consolidated data) are based on the residence principle, and continuous data coverage starts only in 2001 (although the data set includes a pilot survey from 1997). 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 on gross positions in real U.S. dollars, which we compute by dividing nominal U.S. dollar positions by the U.S. CPI. Because CPIS data for Luxembourg are particularly noisy, we exclude Luxembourg from

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[13]For the importance of intra-institutional transfers, see Cetorelli and Goldberg (2011) and Shin (2012).

[14]Among previous studies, Blank and Buch (2007) and Kalemli-Ozcan et al. (2010) use BIS locational data, while Spiegel (2009a) uses the consolidated data.

the analysis of CPIS data.[15]

Our final data source is loan-level data available for syndicated bank loans through Dealogic's Loan Analytics, Syndicated lending is of course only a subset of total debt flows. In addition, banks from several different countries may participate in a syndicate, complicating the attribution of loan amounts to individual lenders; and the data report loan origination, not actual drawdown or repayment information. Loan Analytics reports the universe of international syndicated loans not only by banks but also by other financial institutions.[16]

We classify the nationality of each loan in Loan Analytics based on the nationality of lender parent and borrower parent, i.e., on a 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.

In order to piece together the most accurate picture possible, we make use of all of the available data sources, with the understanding that each of them is at best a noisy proxy for the type of gross debt flows that our hypothesis describes.

For our empirical analysis, we divide the world into four regions. Two regions are GIIPS and the rest of the euro area, which we label Core (Austria, Belgium, Finland, France, Germany, Netherlands, Luxembourg).[17] We separate the rest of the world into two groups. The first group includes the rest of the EU and large reporting financial centers (Fin): Canada, Denmark, Japan,

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[15]Lane (2006), who uses the CPIS data, likewise excludes Luxembourg.

[16]See Cerutti et al. (2014) for a detailed comparison of BIS and Loan Analytics data.

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

Sweden, Switzerland, UK, and US. The second group consists of all remaining countries (ROW).[18]

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 begin by documenting percentage changes in country-pair stocks of claims, in real U.S. dollars, during the EMU time period. Figure 7 is a heat map that shows these percentage changes for BIS locational and consolidated data, as well as for the CPIS data. The figures show the matrix of bilateral positions of EMU countries, the U.K. and the U.S. It is apparent that lending from all countries to the U.K. and the U.S. declined or increased much less than lending to EMU countries. Among EMU countries, Netherlands, Greece, Ireland, Portugal, and Spain, experienced the biggest increases in debt inflows from most countries. Comparing the top and middle panels, we see a few examples illustrating important differences between consolidated and locational BIS data. For

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[18]The sample of countries in ROW varies depending on the data source we use. It generally includes advanced economies as well as emerging markets. For CPIS data, all available countries are included on both lender and borrower sides, amounting to 91 ROW countries as lenders and 137 countries as borrowers. For BIS consolidated data the only available ROW lender is China, and we include all available vis-à-vis countries in our data, which amounts to 197 borrowing countries. For BIS locational data we exclude offshore financial centers, including all other available reporting countries as lenders and limiting vis-à-vis countries to the same set of reporting countries, amounting to 32 ROW countries.

example, the increase in U.K. lending to Core EMU countries was very large if measured using consolidated data, but not locational data. This reflects that much U.K. lending to Core EMU countries took place through British subsidiaries residing abroad.

We next examine how the geographical composition of international lending and borrowing changed relative to positions accumulated prior to EMU. Figure 8 shows portfolio debt holdings and banking claims using CPIS and BIS (both consolidated and locational) data across four regions: financial centers (FIN), the core Euro area (CORE), the GIIPS, and the rest of the world (ROW). The left-hand-side of the chart presents each regions's stock of claims at the beginning of EMU vis-à-vis another region, with the thickness of the lines reflecting holdings, measures in real USD, as a share of global gross positions, also measured in real USD. The right-hand-side of the chart presents changes in gross positions from the beginning of the EMU period through the end of 2007, in real USD, scaled by the global change in gross positions in real USD over this same time period. In interpreting these charts, we view the stocks of claims at the beginning of EMU as a reflection of flows that occurred prior to EMU.

The top panel maps portfolio debt holdings. Because there is a gap in coverage between 1997 and 2001, we take 1997 as our benchmark pre-EMU year, keeping in mind incomplete coverage of the data in this year. It is apparent that the debt market was not important prior to EMU for international lending within the euro area. After the introduction of the euro, however, we observe an increase in portfolio debt claims of CORE on GIIPS and other CORE countries that is substantially larger than the amount of claims accumulated prior to EMU. We can also see a substantial increase in the portfolio debt claims of ROW on GIIPS relative to the accumulation of these claims prior to the EMU period. It appears that at the same time there is also a slight decline in bond claims accumulation from FIN to GIIPS relative to pre-EMU period.

The middle panel shows the claims of the banking system using consolidated BIS data. Here we see very clearly a substantial 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. 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. As we observed on the Figure 7, much of this lending went to the housing boom countries, Spain and Ireland.

The bottom panel shows the claims of the banking system using locational BIS data. Here we also observe an increase in banking flows from CORE to GIIPS relative to the flows accumulated prior to EMU. We do not, however, see an increase in flow from FIN to CORE, indicating that the increase in lending that we observed with consolidated data was largely due to lending by foreign subsidiaries of financial center banks.

To see whether the regional patterns are driven by specific countries, we turn to Figure 9. The top panel of Figure 9 is based on the CPIS data, the middle panel on BIS consolidated data and the 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 7-9, we present estimates for a set of cross-sectional regressions based on the gravity framework that has been used by Portes and Rey (2005), Lane (2006), Coeurdacier and 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.[19] The results are presented in Table 1, with columns (1) and (2) showing regression results for CPIS data, columns (3) and (4) showing the results for the BIS consolidated data, and columns (5) through (8) showing results for the BIS locational data: first as change in stocks, then as accumulation of valuation-adjusted flows. In the odd-numbered columns we do not include any controls, while in the even-numbered columns we control for sum of imports of country j from country i during the indicated time period.[20]

We focus on region pairs that drew our attention in analyzing Figure 8. 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.[21] 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.[22] These effects remain when we control for trade.

The magnitudes of the differences across regions are substantial, but plausible. In order to see this, note that the left-hand side is a change in the natural logarithm of the stock variable (with the

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[19]We also experimented with computing the differences between BIS locational and consolidated claims for each country to proxy for lending intermediated by affiliates, but did not observe any significant patterns.

[20]In the regressions with stocks, the left-hand-side variable is unit-free — percentage change in stocks during indicated time period. In contrast, in regressions with flows, the left-hand-side variable is unscaled accumulation of flows in real USD. Therefore, for the flow regressions, we include initial stock on the right-hand-side as a control variable. We attempted to include additional control variables: housing price growth differentials, interest rate differentials, gravity-type measures such as geographical distance and common language, as well as indicators of trade blocks: EMU, NAFTA, ASEAN. These variables did not enter significantly and did not affect our results.

[21]We also experimented with including lending from GIIPS to CORE among region pairs. The addition of this variable could affect other coefficients because it changes the base category composition. We found that lending from GIIPS to CORE increased significantly more than average during the EMU time period, but inclusion of this category did not substantially affect our other results.

[22]Note that we do not find a statistically significant increase in lending from FIN to CORE in the BIS locational stocks regression (column (6)). This suggests that some of the results in the consolidated BIS regressions are driven by banks located outside FIN countries.

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exception of the BIS locational flows regressions), while the variables of interest are 0/1 indicators. Thus, $100 * (e^{\beta} - 1)$ gives us a percentage difference between the region pair examined and the excluded set of region pairs. For example, when we control for trade, we find that an increase in total stock of bank claims as measured by the change in BIS consolidated stocks (column (4)) was 51 percent for the excluded group,[23] 87 percent for claims of CORE on GIIPS, and 75 percent for claims of FIN on CORE.

We next turn to the country-pair by year panel data analysis, similar to the approach taken by Blank and 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 by 96 and 38 percent, respectively. We also see an increase in syndicated lending of CORE to GIIPS by 27 percent. Similarly to the cross-section regressions, we find that lending from financial centers to CORE increased both through bond market (by 10 percent) and bank lending, by 49 percent overall and by a factor of 2 through the syndicated loan market. We also see that direct lending of financial centers to GIIPS declined in the bond market (by 32 percent) but increased through bank lending, although by a smaller percentage than their bank lending to CORE (18 percent in

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[23]Obtained as $100 * (e^{CONSTANT} - 1)$.

the case of BIS data, and 30 percent for syndicated loans). Finally, we observe a decline in lending from CORE to financial centers through the bond market, by 40 percent.

One important difference between the results in the Table 1 and Table 2 regressions is that in the panel regressions, we observe an increase in lending by banks from CORE to FIN during the EMU period. Combining this result with the cross-section results in Table 1, we conclude that while the increase in bank lending from CORE to FIN during the EMU time period was on average smaller than for other region pairs, the level of lending from CORE banks to FIN was still higher on average during the EMU time period than prior to EMU.

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 by banks and through 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. That is, it could have caused not only greater lending from the CORE to the GIIPS, but also more lending from the financial centers to the CORE and possibly less lending by them to the GIIPS.

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 a carry trade banks switched from loans to GIIPS sovereigns to lending to them through the debt market. Indeed, we observe a sharp decline in syndicated bank lending from CORE to GIIPS sovereigns at the start of EMU period. While overall syndicated lending from CORE banks to GIIPS increased

throughout this time period, lending to sovereigns dropped nearly to zero, resulting in a sharp drop of the share in sovereign borrowers in total syndicated lending to GIIPS in the early 2000s (Figure 10).

The only source of data on the geographical composition of borrowing and lending by individual banks is the Loan Analytics data base. Top banks appear as both lenders and borrowers in these data, allowing us to see how the geography of their lending is related to 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 in Figure 11.[24]

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

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[24]These banks are systemically large: Bayern and Deutsche Bank's assets were 17 and 82 percent of Germany's GDP, ING Group's assets were 212 percent of Netherlands' GDP, and Reiffeisen's assets were 38 percent of Austrian GDP, all as of the end of 2011.

centers and their lending to GIIPS during the pre-crisis EMU period – a one-to-one increase. 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.[25] 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 the Loan Analytics data we also provide evidence 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, number of lenders in the syndicate, and year fixed effects.[26]

Figure 12 shows a plot of the estimated year 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.[27] 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

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[25]The ROW countries that lend to GIIPS banks in this sample are Australia, China, Egypt, Hong Kong, Israel, Malaysia, Norway, Panama, Singapore, Korea, Taiwan, Turkey, as well as Middle East and offshore financial centers.

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

[27]These dynamics are not explained by the increased number of loans extended to GIIPS, which did not occur until 2004.

syndicate in lending to GIIPS.[28]

4.3 Robustness tests

Our first concern is that the European Union banks outside the euro zone might have considerable advantage over banks outside the the EU. There are two main reasons for this: first is the general harmonization of banking rules in the EU, second is the fact that some EU banks outside the euro zone have access to ECB lending facilities. The most important set of non-euro zone EU banks resides in the UK, which we include among the financial centers, but may behave differently than banks from the U.S. or Japan.

For the CPIS and locational BIS data, it is especially important to note that there are many foreign-owned banks in the UK, and these happen to be banks that are internationally active. Lending to Irish banks, in particular, is frequently channeled from core EMU banks through their London branches and will therefore be reported as lending from financial centers to GIIPS in any data that are based on the residence principle. This problem is less important for the BIS consolidated data and the Loan Analytics data, which are reported on a nationality basis.

In fact, when we separate lending from the UK to GIIPS in our Table 1 regressions, we find a significantly larger increase in BIS flows to GIIPS from the UK than from the rest of the financial centers.

For these reasons, we conduct a series of robustness tests with respect to the treatment of UK borrowers and lenders.[29] In our first test, we reclassify the UK as a Core EMU country. Surprisingly, our cross-section results change very little, especially for the CPIS and BIS locational data. The only coefficient that becomes substantially smaller, and no longer significant, is that on lending from financial centers to Core, for BIS consolidated data. In the panel regressions, none of the

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

[29]In the interest of saving space, we do not report these results, but they are available from us upon request.

results is substantially affected. The regression fit with UK classified as CORE is worse than in our benchmark model, suggesting that the UK is better classified as a financial center than as part of core EMU. Alternatively, we can drop UK as a lender or as both lender and borrower in the regressions. We find that the impact on cross-section regressions is the same as reclassifying UK as Core, but there is no effect at all in panel regressions. Thus, we conclude that our results are not driven by the specifics of the UK financial system.

Our next concern is that Norway and Iceland, which we classify as "Other" countries, are heavily involved with the euro area, to a similar degree as are Sweden and Denmark, which we classified as financial centers. To make sure our results are not driven by excluding them, we reclassify both Norway and Iceland as financial centers and re-estimate the regressions in Tables 1 and 2. We find that our results are generally unaffected, except in cross-section regressions the coefficient on lending from financial centers to Core and to GIIPS are now positive and statistically significant in all specifications and we lose some significance of the coefficients of Core to financial centers lending. In panel regression an increase in lending from FIN to GIIPS is no longer significant in the BIS data, and is positive for CPIS data.

Before the crisis, certain European banks became increasingly exposed to Central and Eastern Europe (CEE), including the Baltic countries. In particular, Austrian banks were known to be lending actively to all of CEE, while Scandinavian banks were known to be heavily involved in the Baltics. Thus, we isolate lending from Austria to GIIPS, from Austria to CEE apart from the Baltics, and from Austria and the Scandinavian countries to the Baltics and re-estimate our Table 1 and Table 2 regressions. We find that even though lending through all of these channels increased dramatically, our main results are not substantially affected by separating these flows from the rest.

5   Conclusion

The big 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 and financed the accumulation of these imbalances. Not only did peripheral countries borrow more after EMU; 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.

The findings raise important questions for future research, questions that would have to be pursued at a more granular level with respect to both lenders and borrowing countries. Can we identify the precise mechanisms promoting heavy lending from EMU core to EMU periphery during the euro's first decade, and which were most important quantitatively? Acharya and Steffen (2013) have made some progress on similar questions using the recent data from European Banking Authority stress tests. To what extent did different peripheral countries differ in their borrowing behavior? Before 2009, the peripheral economies showed considerable diversity in terms of financial infrastructure, government deficits, and asset-price developments. How did these differences affect their demands for loans from abroad, as well as their own investments in foreign countries?

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Figure 1: Leverage of core euro area banks
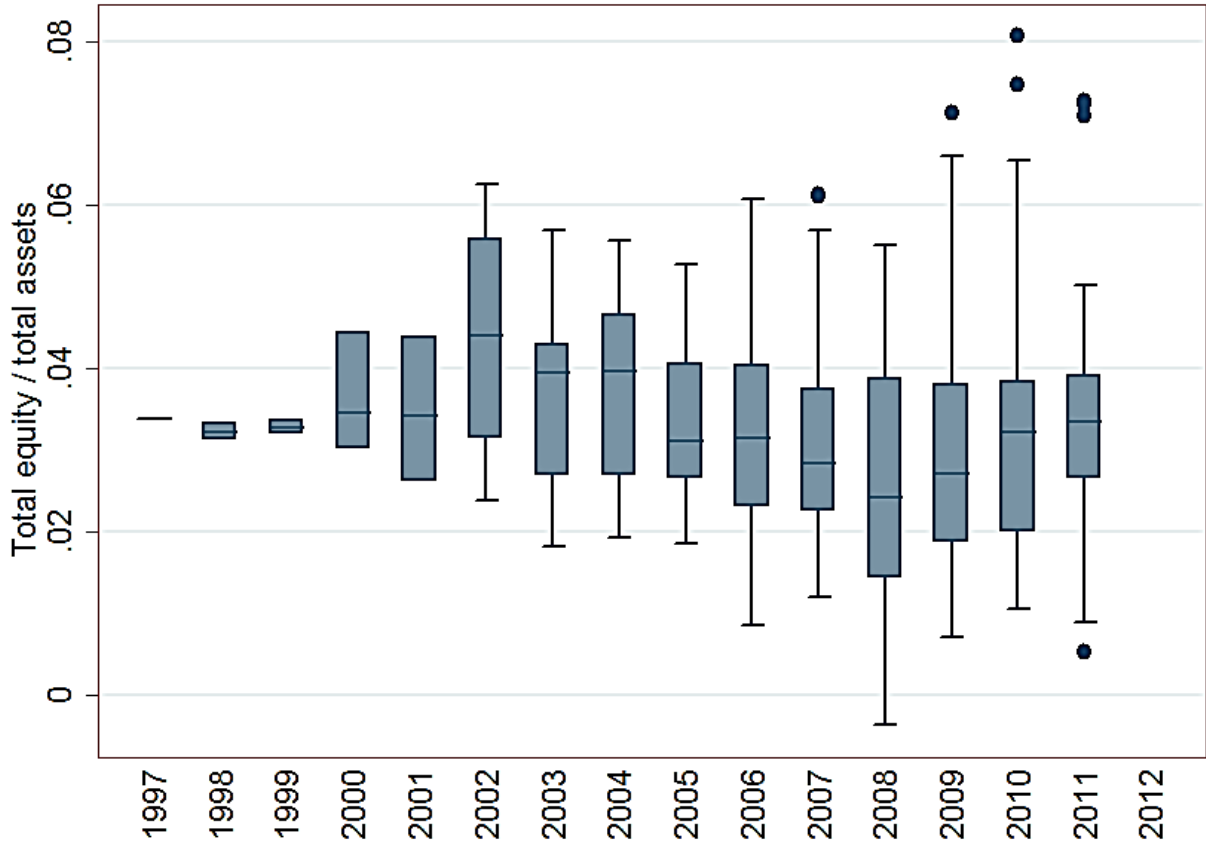
Source: Bankscope Note: Boxed represent the 25th to 75th percentile range, with horizontal line indicating the median. Whiskers extend to adjacent values, dots are outside values. Very limited coverage of institutions prior to 2004.

Figure 2: Global imbalances before the Euro
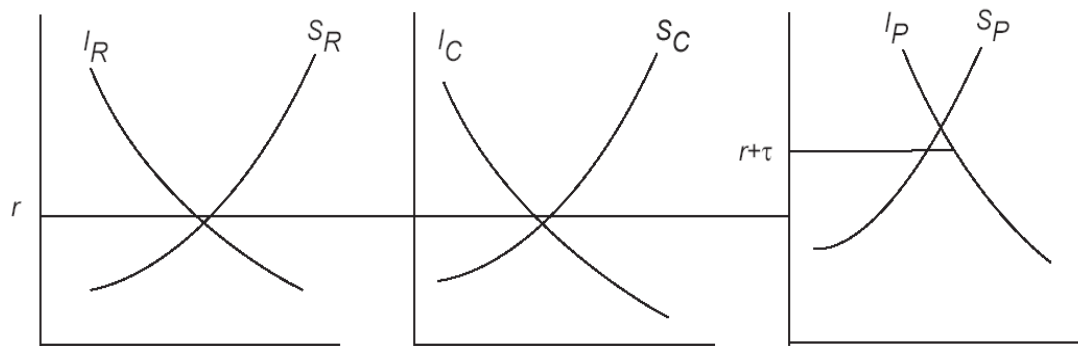
Before EMU, Rest of World *(R)* and Core euro zone countries (*C*) have very low mutual asset transaction costs, but both face a cost **τ** of lending to the Peripheral euro zone (*P*). The cost **τ** largely disappears for *C*, but less so for *R*, when the euro is introduced.

Figure 3: Global imbalances after the euro
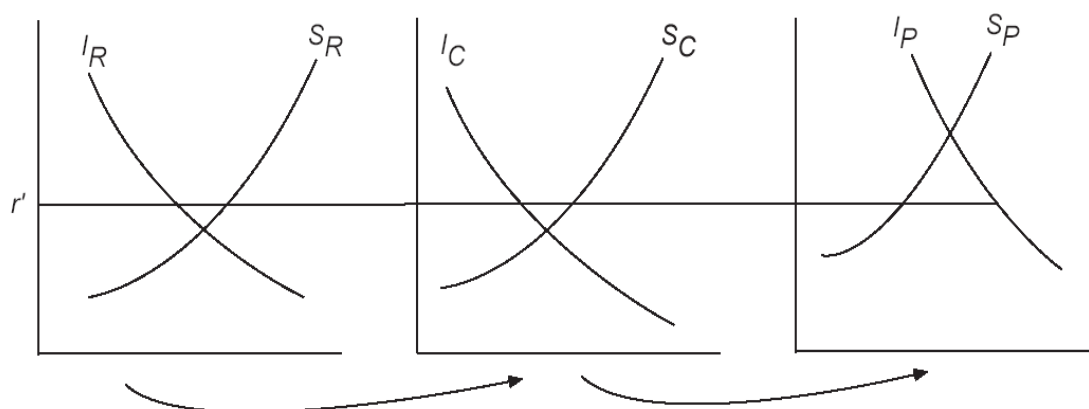
Because asset trade between *R* and *P* remains relatively costly post-EMU, all net lending from *R* to *P* is intermediated through *C*, which must raise its gross foreign assets and liabilities alike by an amount equal to the surplus savings of *R*. *P*'s deficit rises as its external borrowing cost falls.

Figure 4: Government bond spreads between GIIPS and Core
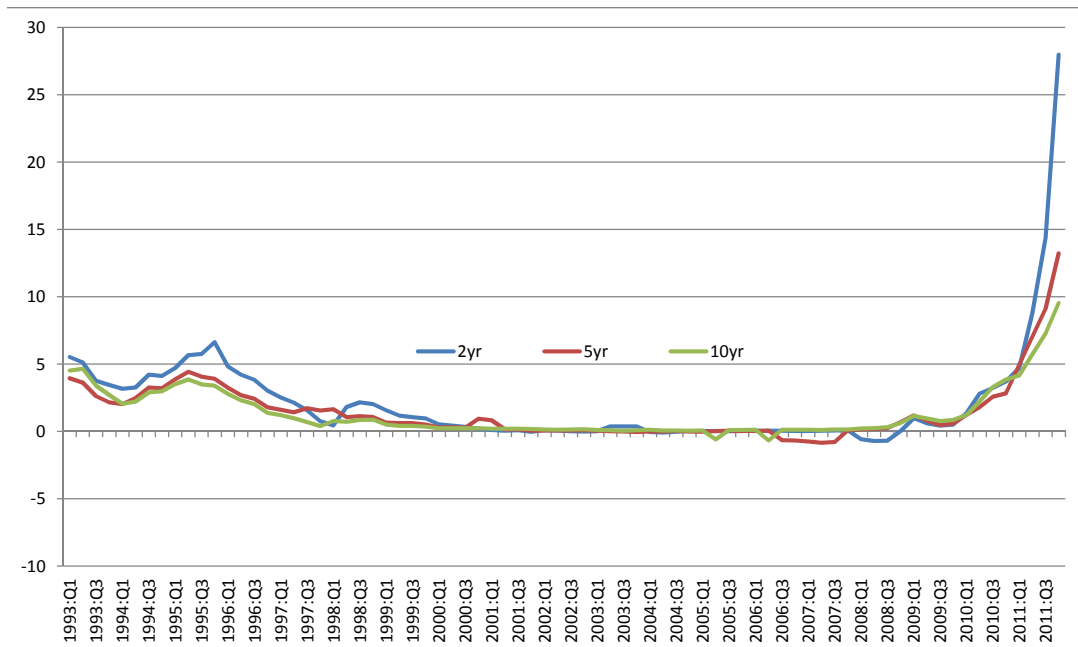
Note: Bond spreads are computed as a difference between unweighted average government bond yields in core EMU countries and in GIIPS.

Figure 5: Evidence from position (not flow) data

Net Foreign Assets of GIIPS versus Other EZ and ROW
(percent of EZ12 GDP)
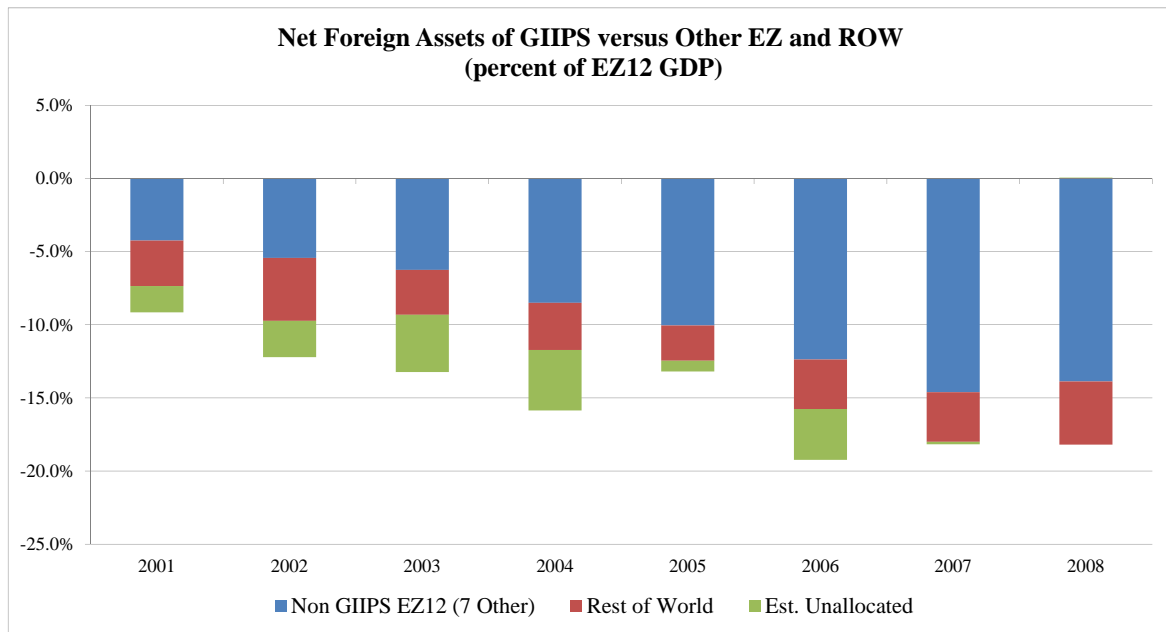
Source: Waysand, Ross, and de Guzman (2010), following Chen, Milesi-Feretti, and Tressel (forthcoming)

Figure 6: Net foreign asset positions of euro area core countries
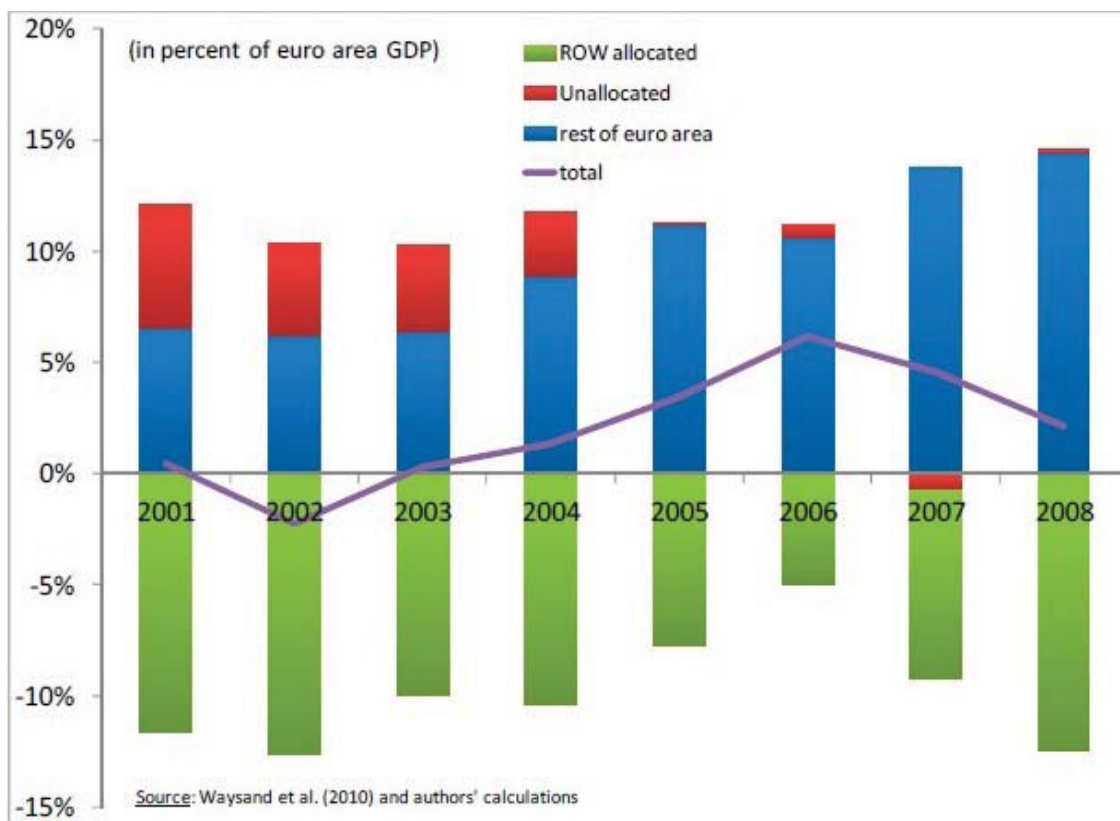
Note: Chart courtesy of F.Pappada

Figure 7: Changes in bilateral debt stocks during EMU period.

BISC percent change in real stock from 1999 to 2007.

Source	CORE Targets							GIIPS Targets					FIN Targets	
	Austria	Belgium	Finland	France	Germany	Luxembourg	Netherlands	Greece	Ireland	Italy	Portugal	Spain	UK	US
Austria		1.39%	1.98%	1.64%	2.20%	0.73%	3.14%	5.02%	3.17%	4.14%	2.56%	5.61%	0.94%	-0.18%
Belgium	1.18%		1.02%	2.20%	0.81%	0.13%	3.88%	12.33%	3.84%	0.39%	1.56%	4.91%	1.99%	1.43%
Finland	-0.81%	-0.82%		-0.21%	-0.82%	-0.88%	-0.11%	-0.63%	0.71%	-0.62%	-0.14%	4.04%	-0.80%	-0.94%
France	1.49%	1.25%	1.25%		0.66%	3.58%	2.82%	2.02%	11.92%	1.25%	4.22%	3.83%	3.33%	0.79%
Germany	1.44%	0.51%	0.22%	1.23%		0.18%	1.38%	2.08%	3.51%	1.38%	1.68%	4.17%	1.76%	1.88%
Luxembourg	-0.50%	-0.07%	-0.63%	1.00%	0.07%		-0.02%	0.70%	-0.41%	-0.20%	-0.05%	0.48%	-0.43%	-0.40%
Netherlands	0.40%	2.43%	0.52%	4.95%	1.30%	3.37%		3.77%	5.71%	0.81%	2.88%	6.88%	4.55%	0.75%
Ireland	19.18%	17.26%	18.99%	1.98%	1.57%	8.60%	5.99%	26.97%		21.67%	31.76%	6.46%	6.53%	6.87%
Italy	8.32%	1.01%	6.67%	1.53%	6.49%	0.64%	1.91%	1.17%	3.08%		-0.10%	1.69%	0.86%	0.32%
Portugal	1.47%	1.62%	1.89%	-0.33%	2.61%	2.68%	4.71%	2.31%	3.45%	-0.28%		0.82%	0.55%	-0.12%
Spain	1.02%	3.33%	2.30%	3.19%	0.22%	2.07%	6.11%	-0.45%	7.16%	0.36%	3.84%		3.44%	0.79%
UK	0.98%	3.44%	3.27%	8.33%	7.49%	8.37%	12.59%	0.60%	12.19%	3.00%	2.14%	9.68%		1.86%
US	1.21%	0.28%	-0.12%	3.29%	0.40%	5.65%	0.72%	0.30%	10.58%	0.84%	0.94%	4.48%	2.66%	

BISL percent change in real stock from 1997 to 2007.

Source	CORE Targets							GIIPS Targets					FIN Targets	
	Austria	Belgium	Finland	France	Germany	Luxembourg	Netherlands	Greece	Ireland	Italy	Portugal	Spain	UK	US
Austria		0.86%	2.20%	1.93%	4.88%	0.58%	5.59%	10.53%	10.65%	3.94%	5.12%	14.51%	1.72%	2.48%
Belgium	3.51%		0.54%	3.42%	1.85%		9.03%	8.29%	19.44%	1.57%	7.42%	10.93%	2.62%	1.14%
Finland	0.44%	-0.72%		0.23%	4.22%	1.02%	3.89%	0.02%	5.68%	2.06%	23.58%	8.98%	-0.32%	-0.68%
France	3.24%	2.61%	0.91%		3.09%	4.47%	4.78%	5.47%	14.44%	4.82%	5.69%	6.22%	2.58%	1.10%
Germany	3.85%	1.58%	1.37%	3.10%		3.06%	3.64%	5.05%	6.27%	5.31%	6.30%	15.86%	3.45%	4.56%
Luxembourg	0.42%		-0.29%	2.35%	0.45%		1.12%	4.58%	1.49%	0.60%	2.02%	5.49%	0.67%	1.41%
Netherlands	0.41%	6.23%	1.16%	1.98%	1.04%	3.64%		10.08%	4.84%	6.28%	2.84%	9.03%	6.28%	2.48%
Greece	-0.48%	0.04%	-0.87%	0.92%	1.11%	16.12%	1.28%		1.02%	0.35%	8.40%	0.55%	0.51%	1.72%
Ireland	8.82%	5.67%	0.63%	1.99%	3.47%	4.19%	13.73%	8.39%		15.77%	12.46%	9.68%	10.45%	5.58%
Italy	9.23%	1.23%	1.29%	1.58%	7.38%	1.65%	2.16%	5.02%	8.63%		2.80%	5.34%	-0.19%	-0.29%
Portugal	0.96%	0.79%	-0.04%	0.91%	5.64%	1.44%	6.93%	17.44%	14.30%	-0.54%		2.27%	0.76%	0.40%
Spain	2.96%	3.03%	5.14%	2.83%	4.43%	4.27%	18.43%	0.30%	8.83%	4.02%	5.24%		3.19%	2.52%
UK	0.67%	1.66%	0.56%	3.75%	0.92%	2.31%	5.90%	1.01%	10.36%	0.50%	2.89%	3.68%		2.52%
US	0.98%	0.91%	14.29%	6.36%	0.64%	0.72%	4.99%	-0.08%	11.01%	2.58%	0.20%	2.70%	4.93%	

CPIS percent change in real stock from 1997 to 2007.

| Source	CORE Targets							GIIPS Targets					FIN Targets	
	Austria	Belgium	Finland	France	Germany	Luxembourg	Netherlands	Greece	Ireland	Italy	Portugal	Spain	UK	US
Austria		47.58%	6.45%	15.93%	3.85%	64.24%	18.57%	14.21%	22.90%	11.77%	21.84%	7.51%	2.60%	1.71%
Belgium	6.30%		1.65%	6.38%	0.92%	0.92%	1.30%	14.78%	48.99%	5.50%	30.75%	43.07%	3.49%	1.04%
Finland	62.50%	50.78%		36.15%	14.12%	43.20%	90.61%	127.71%	36.35%	18.53%	80.64%	61.51%	8.01%	3.42%
France	13.59%	10.41%	1.86%		5.52%	27.08%	22.81%	31.77%	48.41%	32.86%	15.76%	7.65%	5.94%	3.31%
Germany							85.50%				6.56%			
Luxembourg							2.10%				7.49%			
Netherlands	4.02%	0.87%	4.56%	32.89%	1.43%	2.08%		35.46%	15.57%	11.43%	9.72%	10.03%	13.67%	7.53%
Greece							220.25%				502.37%			
Ireland	27.05%	17.21%	5.95%	18.57%	5.37%	11.18%	44.61%	67.19%		24.90%	28.65%	11.36%	14.65%	18.47%
Italy	6.44%	30.84%	6.62%	14.33%	6.54%	2.77%	9.70%	41.03%	23.53%		5.44%	6.66%	0.87%	2.67%
Portugal	27.84%	13.65%	3.66%	13.86%	8.97%	0.79%	21.35%	46.00%	38.11%	15.26%		4.09%	4.72%	1.47%
Spain	108.56%	80.30%	5.53%	51.01%	17.76%	46.19%	124.74%	5.15%	859.58%	41.56%	5.27%		6.31%	20.02%
UK	1.50%	5.10%	-0.18%	3.40%	0.27%	10.71%	11.83%	-0.18%	16.63%	-0.00%	1.11%	3.61%		1.86%
US	2.54%	0.60%	-0.47%	4.05%	0.66%	13.50%	6.71%	0.11%	17.43%	0.02%	0.83%	4.64%	5.07%	

Heatmap coloring based on percentiles for values displayed in table.

Figure 8: Portfolio debt (CPIS) and bank claims (BIS) by region in the beginning of EMU period and their change by 2007.
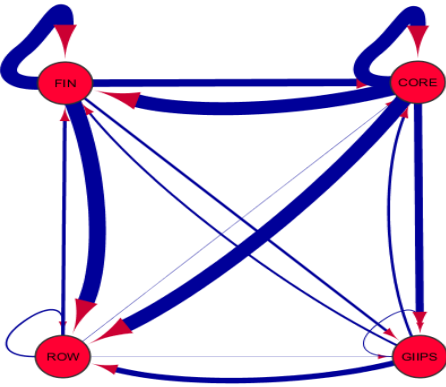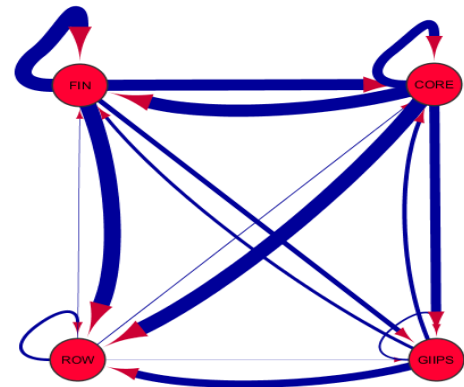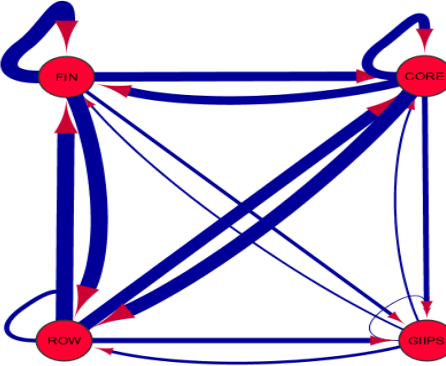
CPIS 1997
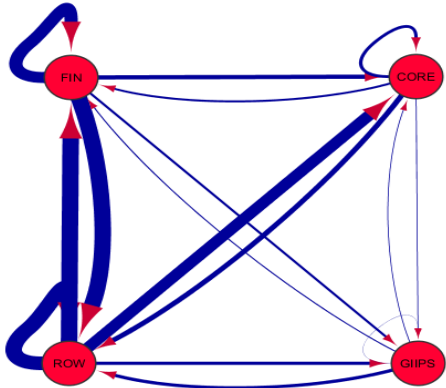
CPIS 1997-2007
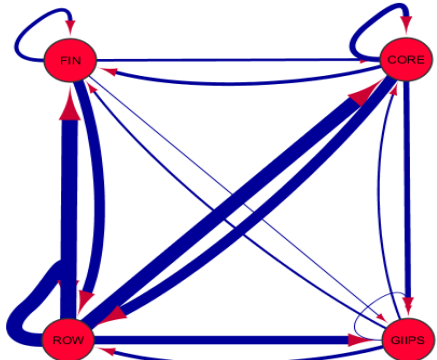
BIS Consolidated 1999

BIS Consolidated 1999-2007

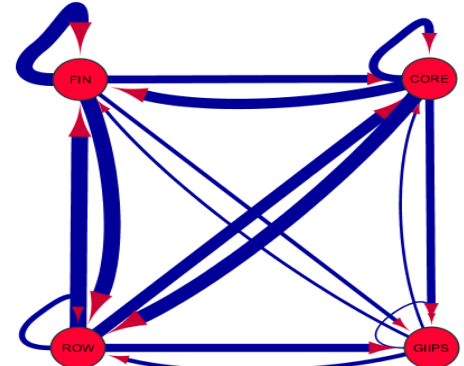BIS Locational 1999

BIS Locational 1999-2007

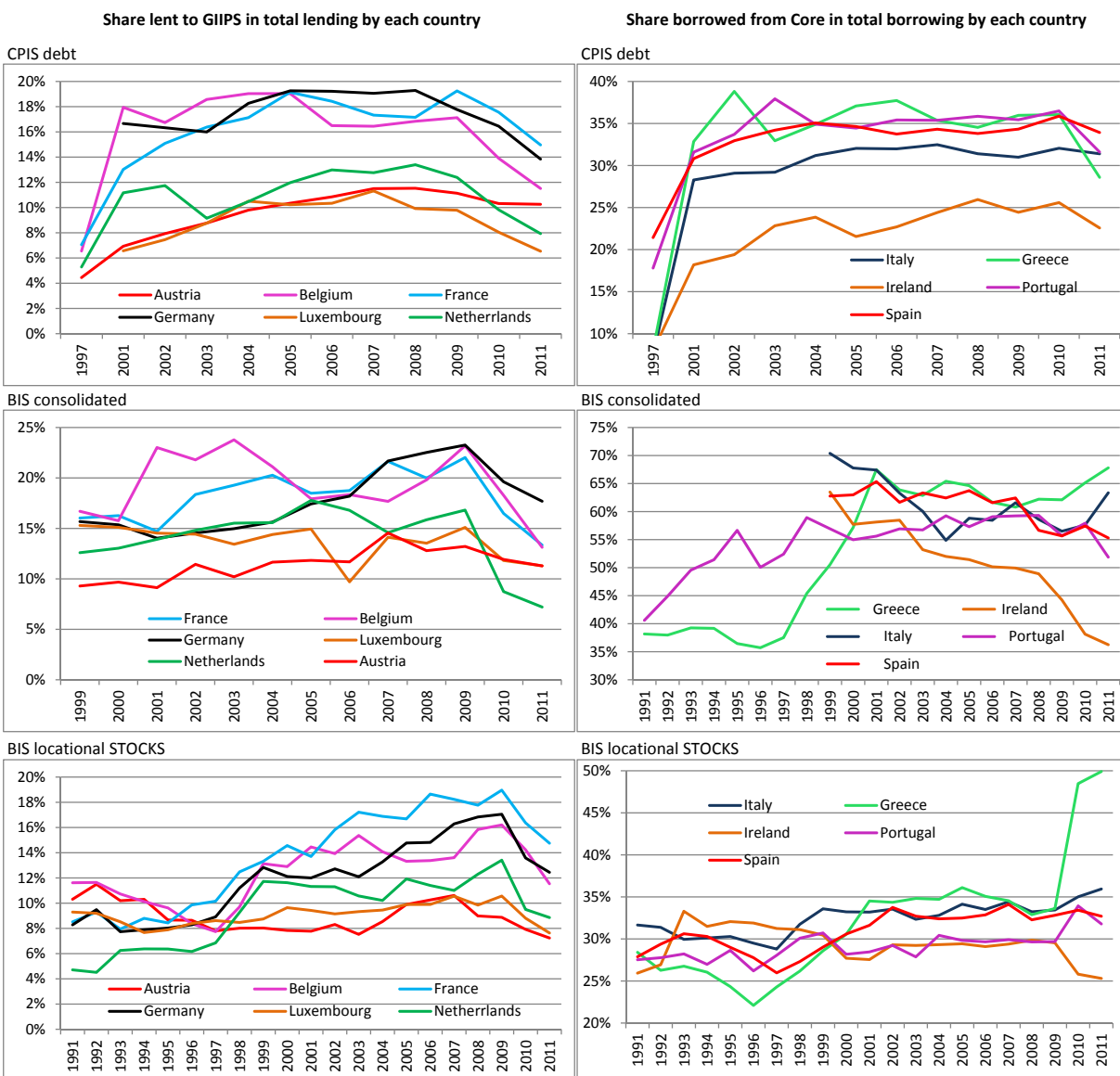Figure 9: Geographical distribution of Core to GIIPS lending.

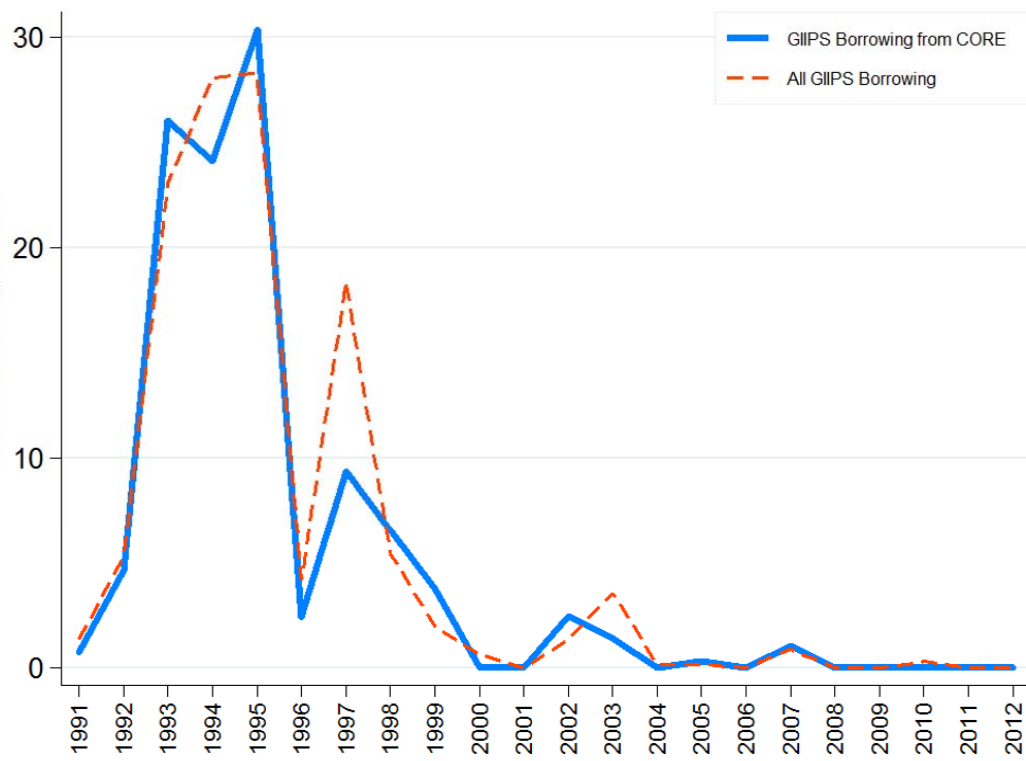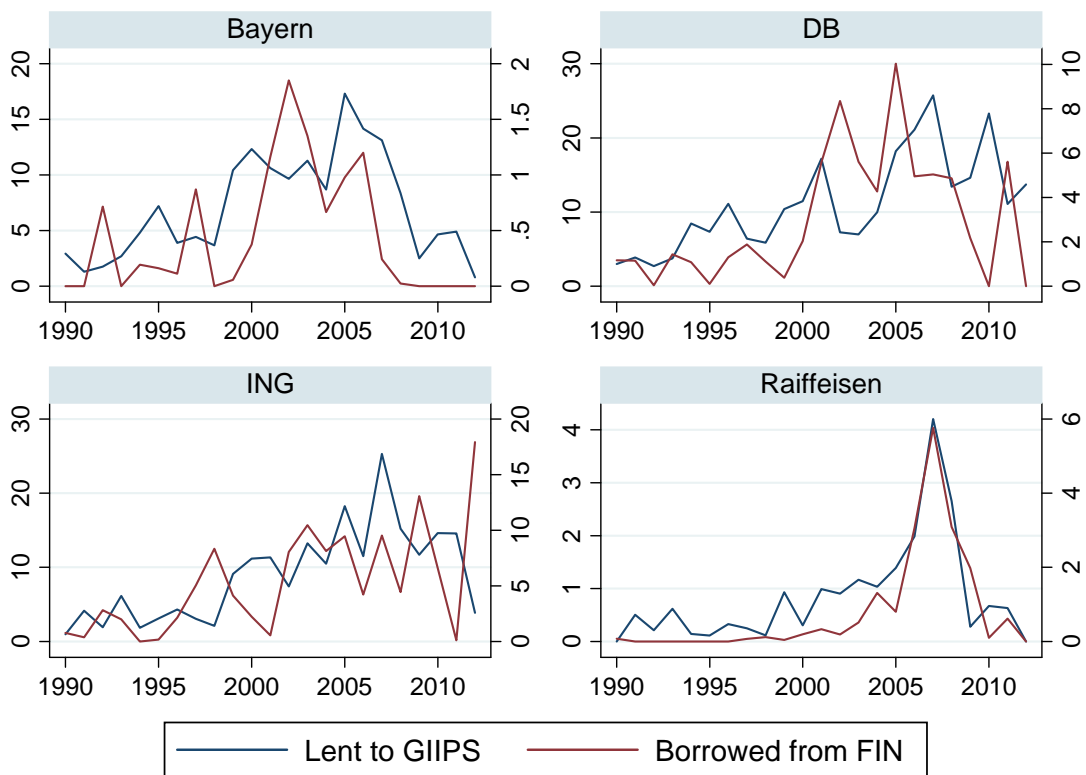Figure 10: Share of sovereign borrowers in syndicated lending to GIIPS (percent)

Figure 11: Syndicated borrowing from financial centers and lending to GIIPS of individual banks

Source: Dealogic Loan Analytics and authors' calculations. Syndicated borrowing and lending only.

Figure 12: Probability of FIN bank participating in a loan syndicate (year fixed effects from linear probability regression)
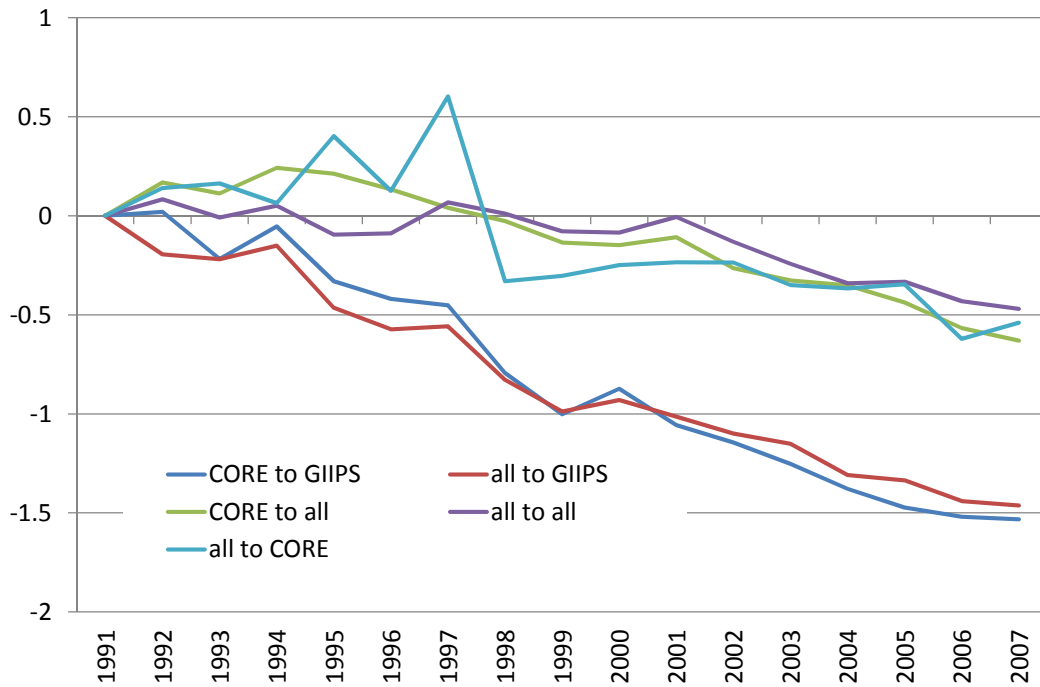
Note: reported are year fixed effects of the probit regressions by subsample indicated. Regressions include controls for loan amounts and number of lenders in the syndicate. Fixed effects are normalized to be 0 in the beginning of the sample for comparability across samples.

Table 1: Cross Section regressions.

Dependent variable:	Δln(CPIS Debt) 1997-2007		Δln(BISC) 1997-2007		Δln(BISL) 1997-2007		Δln(BISLF) 1997-2007	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CORE to FIN	-0.275	-0.398	-0.445**	-0.618***	-0.114*	-0.265***	0.0298	0.0507
	(0.205)	(0.247)	(0.152)	(0.104)	(0.0583)	(0.0859)	(0.195)	(0.237)
CORE to GIIPS	1.699***	1.588***	0.470***	0.309**	1.205***	1.078***	1.583***	1.601***
	(0.205)	(0.243)	(0.152)	(0.106)	(0.0583)	(0.0786)	(0.183)	(0.219)
FIN to CORE	0.154	0.0371	0.386**	0.218*	0.156**	0.0107	0.767***	0.787***
	(0.205)	(0.245)	(0.152)	(0.105)	(0.0583)	(0.0841)	(0.173)	(0.214)
FIN to GIIPS	0.144	0.0411	0.574***	0.423***	0.529***	0.413***	0.604***	0.621***
	(0.205)	(0.240)	(0.152)	(0.108)	(0.0583)	(0.0750)	(0.131)	(0.164)
ln(Trade)		0.0298*		0.0355**		0.0593**		-0.00931
		(0.0170)		(0.0131)		(0.0205)		(0.0216)
ln(Stock in 1999)							0.457***	0.459***
							(0.0442)	(0.0425)
Constant	1.384***	1.222***	0.579***	0.411*	0.708***	0.280**	1.118***	1.182***
	(0.205)	(0.193)	(0.152)	(0.200)	(0.0583)	(0.125)	(0.0539)	(0.134)
Observations	1656	1656	3455	3455	1538	1538	1958	1958
Adjusted R^2	0.00105	0.00135	0.00214	0.00559	0.00904	0.0176	0.386	0.386

EMU= years 1999-2007. CPIS is stock of portfolio debt claims from CPIS data in real USD.
BISC is stock of total international 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.
Trade is imports of country j from country i summed up for indicated time period.
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.
ROW country sample varies depending on the data source. See Appendix for the list.
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	-0.334***	0.395***	0.370***
	(0.0676)	(0.0359)	(0.0459)
CORE to GIIPS * EMU	0.675***	0.324***	0.238***
	(0.0855)	(0.0808)	(0.0499)
FIN to CORE * EMU	0.0956*	0.396***	0.711***
	(0.0541)	(0.0338)	(0.0460)
FIN to GIIPS * EMU	-0.274***	0.163**	0.266***
	(0.0556)	(0.0646)	(0.0424)
ln(Trade)	0.0003	-0.0848**	0.0168
	(0.019)	(0.0291)	(0.0156)
ln(Total lent)	0.773***	0.285***	0.172***
	(0.050)	(0.0511)	(0.0538)
ln(Total borrowed)	0.739***	0.193**	0.215***
	(0.187)	(0.0862)	(0.0230)
Observations	29608	27554	23324
Adjusted R^2	0.223	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 ROW	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 and lent to X are total amounts 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).