Real Effects of the Sovereign Debt Crisis in Europe: Evidence from Syndicated Loans

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ABSTRACT

We explore the impact of the European Sovereign Debt Crisis and the resulting credit crunch on the corporate policies of firms. We show that banks' exposures to impaired sovereign debt and the risk-shifting behavior of undercapitalized banks are two important contributors to the negative real effects suffered by European firms. In particular, we present firm-level evidence showing that the lending contraction of banks affected by the crisis depresses the investment, job creation, and sales growth of the firms with significant business relationships to these banks. During the crisis, these firms show behavior typical for financially constrained firms.

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Starting in 2009, countries in the periphery of the eurozone drifted into a severe sovereign debt crisis as concerns about the deterioration of credit quality made it increasingly difficult for the affected countries to refinance and service existing debt. Since the deterioration in the sovereigns' creditworthiness fed back into the financial sector (Acharya et al. (2014b); Acharya and Steffen (2015)), lending to the private sector contracted substantially in Greece, Ireland, Italy, Portugal, and Spain (the GIIPS countries). For example, in Ireland, Spain, and Portugal, the overall lending volume of newly issued loans fell by 82%, 66%, and 45% over the 2008-2013 period, respectively.[1] This loan supply contraction led to a sharp increase in the uncertainty for borrowing firms as to whether they would be able to secure bank funding in the future. As Pietro Fattorini, the owner and manager of a 23-year-old Italian company puts it: "It's like starting to drive on the motorway without knowing if you'll find gas stations on the way."[2]

This statement suggests that the contraction in bank lending negatively affected the corporate policies of firms and thus might have been an important contributor to the severity of the European Sovereign Debt Crisis. However, there is still no conclusive evidence as to (i) how important the bank lending channel was to the severity of the crisis as opposed to the overall macroeconomic shock; (ii) whether the credit crunch had any real effects for the borrowing firms in Europe since firms facing a withdrawal of credit from one financing source might have been able to get funding from another source (Adrian et al. (2013); Becker and Ivashina (2014a)); and (iii) what actually caused the tightening in bank lending.

Against this background, our paper makes two important contributions to the literature. First, we show that the decline in bank lending during the European Sovereign Debt Crisis was indeed an important contributor to the severity of the crisis. In particular, we present firm-level evidence that the loan supply contraction of banks affected by the sovereign debt crisis made firms with a higher dependence on these banks financially constrained. As a result of the limited access to bank financing, we show that firms affiliated with banks affected by the crisis encountered strong negative real outcomes; their investments, employment growth, and sales growth faltered. Our estimates suggest that the credit crunch explains between one-fifth and one-half of the overall negative real effects in the sample.

[1] "SMEs in peripheral Eurozone face far steeper borrowing rates" by Patrick Jenkins, *Financial Times*, October 10, 2013.

[2] "Italian Banks' Woes Hurt Small Firms" by Giovanni Legorano, *The Wall Street Journal*, December 1, 2013.

Second, to the best of our knowledge, we are the first to explore the complex channels through which the European Sovereign Debt Crisis induced a reduction in bank lending, as well as the associated negative real effects for borrowing firms. We document that the negative real effects of the debt crisis that can be attributed to the bank lending channel are primarily associated with (i) banks from GIIPS countries facing increased risk of losses on their significant domestic sovereign bondholdings, and (ii) the resulting incentive of under-capitalized banks from GIIPS countries to engage in risk-shifting behavior by buying even more domestic sovereign bonds, thereby crowding out corporate lending.

Our sample is based on loan information data obtained from Thomson Reuters LPC's DealScan, which provides extensive coverage of bank-firm relationships throughout Europe. We augment this dataset by hand-matching firm-specific information from Bureau van Dijk's Amadeus database and bank-specific information from various sources. The sample includes firms from all European countries that were severely affected by the sovereign debt crisis (the GIIPS countries) and firms incorporated in Germany, France, and the U.K. (the non-GIIPS countries), which are the countries with the largest number of syndicated loans among the European countries that were not significantly affected by the sovereign debt crisis. Our sample period covers the 2006–2012 period.

Our dataset provides three key advantages for studying the economic impact of the sovereign debt crisis and the resulting lending supply contraction on European firms. First, the fact that the sample is pan-European and includes a geographical breakdown of the firms' subsidiary revenues enables us to more precisely disentangle the adverse effects on the real economy caused by the macroeconomic demand and the bank credit supply shock. Second, our sample enables us to rule out the possibility that a reduction in bank lending by domestic banks is substituted by bank credit from foreign financial institutions. Third, and most importantly, the bank-specific information together with data on bank-firm relationships allows us to determine which channels drive the contraction in bank lending, and thus cause the negative real effects for borrowing firms.

There are at least three potential channels through which the sovereign debt crisis might have affected bank lending and, in turn, the corporate policies of borrowing firms: one passive and two active. The passive channel is the hit on a bank's balance sheet. The active channels are risk-shifting and moral suasion. The passive channel works through the dramatic increase in the risk of GIIPS sovereign debt, which directly translated into losses for banks due to

their large sovereign bondholdings, as shown by the recent European Banking Authority's (EBA's) EU-wide stress tests and capital exercises. To cope with these losses, banks had to deleverage and thus might have reduced lending to the private sector (e.g., see Bocola (2014) for a theoretical model of this mechanism).

In the first active channel, the risk-shifting motive arises since weakly-capitalized banks from GIIPS countries might have had incentives to increase their risky domestic sovereign bondholdings even further. This asset class offers a relatively high return and at the same time has a very high correlation with the banks' portfolio (Diamond and Rajan (2011); Crosignani (2014)). The latter is important since a proper "risk-shifting asset" only generates large losses in states of the world in which the bank is in default anyway, which is true for domestic sovereign debt as European banks usually have large domestic government debt holdings (in the case of GIIPS banks often exceeding 100% of their core capital). In addition, eurozone regulators consider these bonds to be risk-free (i.e., attach zero risk weights) and removed the concentration limits for sovereign debt exposures, which allows large bets without having to provide equity capital. This risk-shifting mechanism might have led to a crowding-out of lending to the private sector and thus might have negatively impacted the real economy.

In the second active channel, according to the moral suasion motive, a government might have explicitly or implicitly pressured domestic banks to increase their domestic sovereign bondholdings in case it found it difficult to refinance its debt (e.g., Becker and Ivashina (2014b)), which also might have crowded out lending to the real sector.

To assess whether the European Sovereign Debt Crisis affected the real economy in Europe through the bank lending channel, we start by taking into account all potential bank lending channels (i.e., balance sheet hit, risk-shifting, and moral suasion) by using a bank's country of incorporation as a proxy for how strongly it was affected by the crisis. All three channels are related to the banks' country of incorporation as (i) banks' generally have large domestic sovereign bondholdings, implying a large exposure to *domestic* sovereign risk (balance sheet hit channel) and (ii) banks might willingly or due to government pressure increase their *domestic* sovereign debt holdings even further, which potentially crowds out corporate lending (risk-shifting and moral suasion channels).

Based on a bank's country of incorporation, we divide banks into two groups: (i) GIIPS banks, which are banks headquartered in GIIPS countries, and (ii) non-GIIPS banks, that

is, banks from Germany, France, and the U.K. To consistently estimate the real effects for borrowing firms having pre-crisis relationships with banks affected by the sovereign debt crisis, in our main specification we compare the change in the corporate policies after the beginning of the crisis across firms from the same country and industry but which differ in their dependence on GIIPS banks. In particular, we include industry-country-year fixed effects to capture any time-varying shocks to an industry in a given country that may have affected the credit demand of borrowing firms, their access to credit, and/or their real outcomes. Moreover, we include foreign bank country-year fixed effects to absorb any unobserved, time-varying heterogeneity that may arise because a firm's dependency on banks from a certain country might be influenced by whether this firm has business in the respective country. Consider as an example a German firm borrowing from a Spanish bank and a German bank. For this firm, we also include a Spain-year fixed effect to capture the firm's potential exposure to the macroeconomic downturn in Spain during the sovereign crisis. Furthermore, we control for unobserved, time-constant firm heterogeneity and observable time-varying firm characteristics that affect the firms' corporate policies, loan demand, and/or loan supply.

Our results document that during the sovereign debt crisis, firms with a high dependence on banks incorporated in GIIPS countries have exhibited behavior that is typical for financially constrained firms. That is, they had lower interest coverage ratios and leverage, have demonstrated a significantly positive propensity to save cash out of their cash flows, and have relied more on cash relative to bank lines of credit for their liquidity management. These results are not observed for firms that are not dependent on GIIPS banks, nor for highly GIIPS bank-dependent firms in the pre-crisis period prior. We then explore how these financially constrained firms adjusted their corporate policies. We find that firms that had significant business relationships with GIIPS banks decreased investment more, and experienced less job creation and sales growth compared to firms that were less dependent on GIIPS banks.

These findings do not seem to be driven by how firms and banks formed business relationships in the pre-crisis period. Comparing firms with high and low dependency on GIIPS banks suggests that firms in the two groups are comparable in terms of the outcome variables and other observable dimensions in the pre-crisis period, confirming that the parallel trend assumption holds. Furthermore, there were no significant pre-crisis differences between GIIPS and non-GIIPS banks that could explain our results. Lastly, we can rule out that loan

syndicates that include GIIPS banks were of lower quality in the pre-crisis period.

To check the robustness of our results, we alternatively identify the real effects caused by the decrease in loan supply by tracking the change in the corporate policies of firms that are not directly affected by the macroeconomic shock in the periphery of the eurozone or any other part of the world. In particular, we focus our analysis on non-GIIPS firms that had a pre-crisis relationships with GIIPS banks, but do not have business exposure to GIIPS or other non-EU countries.[3] To this end, we collect revenue information of all foreign and domestic subsidiaries of the firms in our sample. Furthermore, to rule out that a firm's dependency on GIIPS banks is positively correlated with its non-observed business exposure to GIIPS countries, we only consider non-GIIPS firms for which the GIIPS bank relationships are due to reasons unrelated to the geographical distribution of the firms' business exposure. In particular, we only consider firms that inherited their relationship with a GIIPS bank through bank mergers or acquisitions or which had a lending relationship to a foreign bank that has historically had a large presence in the respective country.[4] All results continue to hold for this alternative identification strategy, confirming that the bank lending channel was an important contributor to the negative real effects for borrowing firms during the sovereign debt crisis. In addition, this result shows that even firms that were not directly affected by the crisis had to face indirect consequences if they had strong ties to banks that were affected by the sovereign debt crisis. This finding thus highlights that the extensive cross-border lending relations in Europe can amplify the shock transmission across the eurozone.

To ensure that the negative real effects are caused by a loan supply reduction, we analyze whether the impact of having a connection to GIIPS banks was less pronounced for firms that were either highly likely able to obtain financing from another source or for which the loan supply tightening did not lead to a financing shortage as they recorded an even larger loan demand decrease. Indeed, we only find significant real effects that can be attributed to banks' lending behavior for firms that were unlikely able to tap alternative funding sources, that is, non-listed firms, unrated firms, and firms that were not able to switch banks or issue bonds. Furthermore, we find that firms with higher exposure to the macroeconomic shock in the European periphery (thus relative low loan demand) suffered less real effects through the

[3]For example, a German company without significant business activity in GIIPS or non-EU countries that had a pre-crisis lending relationship with a Spanish bank.

[4]Roughly 90% of lending relationships between non-GIIPS firms without subsidiaries in GIIPS or other non-EU countries and GIIPS banks can be explained by these two reasons.

bank lending channel compared to firms that had less or no business exposure to the affected regions (thus relative high loan demand). These results again confirm that the limited access to funding due to lending relationships with banks affected by the European Sovereign Debt Crisis played a major role in inducing negative real effects for the affected borrowing firms.

We use a partial equilibrium analysis to quantify the importance of the credit supply shock. By estimating the counterfactual real outcome if a firm had a lower exposure to affected banks, we can get an estimate of the magnitude of the real effects that were due to the loan supply disruptions of GIIPS banks. Our results suggest that in the case of GIIPS firms, between one-third and one-half of the overall negative real effects in our sample can be attributed to banks' lending behavior. For non-GIIPS firms, we can explain between one-fifth to one-quarter of the aggregate reduction in the real outcome variables. Not surprisingly, we can explain less of the overall evolution for non-GIIPS firms since many borrowers in non-GIIPS countries have no exposure to GIIPS banks.

Given that firms that had a pre-crisis lending relationship with a bank affected by the European Sovereign Debt Crisis suffered significant negative real effects, we then test what actually caused the bank lending contraction and ultimately the negative real effects for borrowing firms. To this end, we determine for each bank in our sample to what degree it was "affected" by the crisis, where affected is defined, in line with the three potential channels through which the crisis might have affected bank lending, as having (i) an above median exposure to sovereign risk (balance sheet hit), (ii) a below median capitalization or rating (risk-shifting), or (iii) an above median influence of governments (moral suasion).

To collect evidence for the hit on the balance sheet channel, we use data from the EBA's EU-wide stress tests and capital exercises and calculate each bank's exposure to the sovereign debt crisis. Furthermore, we obtain information about the banks' health from SNL Financial (leverage) and Bloomberg (ratings) to analyze whether GIIPS banks with low capital buffers engaged in risk-shifting by buying additional domestic sovereign debt and cutting corporate lending. Finally, we use data about government interventions, government bank ownership, and government board seats to measure the influence of governments on their domestic banks and test whether real effects can also be attributed to the moral suasion channel.

Both active channels, the risk-shifting and the moral suasion channel, are consistent with an increase in domestic sovereign bondholdings over the crisis period, which makes their disentanglement challenging. Therefore, we first explore whether banks changed their

sovereign debt holdings after the outbreak of the European Sovereign Debt Crisis. We find that weakly-capitalized GIIPS banks significantly increased their holdings of domestic sovereign debt, whereas we do not find a statistically significant relationship between our moral suasion proxies and the propensity of banks to buy additional domestic sovereign debt. This indicates that risk-shifting played a more important role for the cutback in lending.

To formally test the importance of the different channels for the reduction in bank lending, we apply a modified version of the Khwaja and Mian (2008) estimator, which exploits multiple bank-firm relationships before and during the sovereign debt crisis to control for loan demand and other observed and unobserved borrowing firm characteristics. However, since syndicated loans usually have relatively long maturities and we do not observe changes within the same loan over time (e.g., credit line drawdowns), a large number of observations in our sample have no significant year-to-year change in the bank-firm lending relationships. Therefore, we have to aggregate firms into clusters to generate enough time series heterogeneity in bank lending, which then allows us to control for observed and unobserved firm characteristics that are shared by firms in the same cluster. In particular, we form firm clusters based on the country of incorporation, the industry, and the firm rating.

Our results show that banks with higher sovereign risk in their portfolios tightened lending more and charged higher loan spreads in the crisis period than banks with lower sovereign risk exposures. Furthermore, the findings show that weakly-capitalized GIIPS banks cut their lending more and charged higher spreads than well-capitalized GIIPS banks, irrespective of whether risk-shifting incentives are proxied with leverage or rating. With regard to the moral suasion channel, none of the three proxies indicates that moral suasion influenced bank lending during the sovereign debt crisis.

We next examine whether these channels also played an important role in causing the real effects experience by borrowing firms. In line with our bank lending regressions, our results confirm that the negative real effects of the sovereign debt crisis that can be attributed to the bank lending channel are mainly due to the hit on banks' balance sheets (resulting from their large sovereign debt holdings) and their incentive to engage in risk-shifting behavior (i.e., buying more risky sovereign bonds).

In summary, we shed light on the complex interaction between bank and sovereign health and its impact on the real economy. In particular, we show that there are significant spillovers from periphery sovereigns to the local real economy, as well as cross-border spillovers to firms

in non-GIIPS countries that are transmitted through the bank lending channel. Therefore, while the eurozone greatly benefits its members by deepening the degree of financial integration, we document that cross-border bank lending also can facilitate the shock transmission. In particular, when the banking sector experiences an aggregate shock like the periphery sovereign debt crisis and it is not recapitalized.

I. Related Literature

In general, our paper contributes to the literature on how shocks on banks' liquidity or solvency are transmitted to the real economy. Starting with Bernanke (1983), several researchers have taken on this theme.[5]

In particular, our paper adds to the literature on the impact of the European Sovereign Debt Crisis on bank lending. Existing theory suggests that sovereign crises can affect the real economy through several channels in complex ways based on the nature of the interaction between bank and sovereign health. According to Acharya et al. (2014b), distress in the financial sector might induce governments to bailout weak banks, which, in turn, increases sovereign credit risk. An increase in sovereign risk, however, lowers the value of both government guarantees and the banks' bondholdings, thereby again weakening the financial sector. Bocola (2014) shows that higher sovereign risk not only tightens the banks' funding constraints, but also raises the risks associated with lending to the corporate sector, both of which lead to a decrease in the credit supply. Farhi and Tirole (2014) allow in their model for both sovereign debt forgiveness and financial sector bailouts. In this setting, banks might have an incentive to engage in collective risk-shifting by buying domestic bonds, which might not be prohibited by their domestic governments if there is a possibility of sovereign debt forgiveness. Uhlig (2014) shows that governments in risky countries have an incentive to allow their banks to load up on domestic sovereign debt if these bonds can be used for repurchase agreements with a common central bank.

Regarding the empirical evidence, De Marco (2014) and Popov and Van Horen (2014) find that after the outbreak of the European Sovereign Debt Crisis, non-GIIPS European banks with significant exposures to GIIPS sovereign bonds reduced lending and increased

[5]For a comprehensive overview over the "natural experiment" literature on shocks that induce variation in the cross-section of credit availability, see Chodorow-Reich (2014).

loan rates more than non-exposed banks. Similar to our study, De Marco (2014) and Popov and Van Horen (2014) also use data on syndicated lending. Bofondi et al. (2013) confirm this finding using bank-firm matches from the Bank of Italy's Credit Register. Finally, Becker and Ivashina (2014b) conclude that banks shifting from firm lending to increasing their domestic sovereign bondholdings is aggravated by the moral suasion of European governments. These studies, however, neither analyze the consequences of the contraction in bank lending during the sovereign debt crisis for the real economy, nor determine which channels actually cause the significant negative real effects.

Most importantly, our paper adds to the natural experiment literature on the real effects of bank lending supply shocks at the firm-level, which is a challenging task as it requires data on bank-firm relationships, as well as firm-level information. Therefore, there have only been a few papers addressing this research question. Regarding the recent 2008-09 financial crisis, Chodorow-Reich (2014) uses the DealScan database and employment data from the U.S. Bureau of Labor Statistics Longitudinal Database to show that firms that had pre-crisis relationships with banks that struggled during the crisis reduced employment more than firms that had relationships with healthier lenders. Similarly, Bentolila et al. (2013) match employment data from the Iberian Balance Sheet Analysis System and loan information obtained from the Bank of Spain's Central Credit Register to document that during the recent financial crisis, Spanish firms that had relationships with banks that obtained government assistance recorded a higher job elimination than firms with relationships with healthy banks. Finally, Cingano et al. (2013) use the Bank of Italy's Credit Register to provide evidence that firms which borrowed from banks with a higher exposure to the interbank market experienced a larger drop in investment and employment levels in the aftermath of the recent financial crisis.

However, the impact of sovereign debt crisis on bank lending is much more complex compared to the bank lending supply shock caused by the 2008-09 financial crisis, which mainly impaired the banks' financial health. As shown by the theoretical literature (e.g., (Diamond and Rajan (2011); Crosignani (2014)), aside from its impact on bank health, a sovereign debt crisis might additionally lead to a crowding-out of corporate lending as it creates incentives for banks to increase their risky domestic sovereign bondholdings. Moreover, governments might pressure domestic banks to buy even more domestic sovereign debt, which might also crowd out lending. To our knowledge, our paper and a concurrent paper by Balduzzi et al.

(2014) are the only papers that investigate the real effects of the European Sovereign Debt Crisis. Using survey data on micro and small Italian firms, Balduzzi et al. (2014) find that firms with connections to banks with high CDS spreads invest less, hire fewer workers, and reduce borrowing. In contrast, we use data from syndicated loans, which are mainly used by large corporations. Therefore, our estimates serve as a lower bound for the adverse effects of the bank credit supply shock in Europe, since these effects are supposedly even more pronounced for smaller firms given their inability to find alternative funding sources.

Our paper is the first to shed light on the question through which channels the European Sovereign Debt Crisis actually caused a contraction in bank lending and the resulting real effects for borrowing firms. In particular, we document that the negative real effects of the sovereign debt crisis are due to both risk-shifting behavior and a reduction in bank health from exposures to impaired sovereign debt.

II. Data

We use a novel hand-matched dataset that contains bank-firm relationships in Europe, along with detailed firm and bank-specific information. Information about bank-firm relationships are from Thomson Reuters LPC's DealScan, which provides a comprehensive coverage of the syndicated loan market. In Europe, bank financing is the key funding source for firms, as banks provide more than 70% of debt for European firms and only very few bonds are issued in Europe (see Standard&Poor's (2010) and Dombret and Kenadjian (2015)).

Syndicated loans are an important financing source for European non-financial corporations as on average between 2005 and 2009 roughly 20% of all extended loans to these firms were syndicated loans.[6] We collect information on syndicated loans to non-financial firms from all GIIPS countries. In addition, to be better able to disentangle the macro and bank lending supply shock, we include in our sample firms incorporated in Germany, France, and U.K. (non-GIIPS countries), which are the countries with the largest number of syndicated loans among the European countries that were not significantly affected by the sovereign debt crisis. Consistent with the literature (e.g., Sufi (2007)), all loans are aggregated to

[6]Figure A1 in the Online Appendix shows the fraction of syndicated loans relative to the total amount of loans issued to non-financial corporations in a given country, measured as the average fraction for the 2005–2009 period.

a bank's parent company. Our sample period is from 2006 to 2012, such that we have a symmetric time window surrounding the beginning of the European Sovereign Debt Crisis.

We augment the data on bank-firm relationships with firm-level data taken from Bureau van Dijk's Amadeus database. This database contains information on 19 million public and private companies from 34 countries, including all EU countries. DealScan and Amadeus do not share a common identifier. To merge the information in these databases, we hand-match firms to the DealScan database. Amadeus groups firms into different size categories ranging from "small" to "very large". Perhaps not surprisingly, firms in the intersection of Amadeus and DealScan are either classified as "large" or "very large". For firms to be classified as large, they have to satisfy at least one of the following criteria: operating revenue of at least €10 million, total assets of at least €20 million, at least 150 employees, or be publicly listed. The respective criteria for very large companies are: at least €100 million operating revenue, at least €200 million total assets, or at least 1,000 employees. Table A1 in the Online Appendix reports the results of a comparison of firms in the intersection of Amadeus and DealScan and the remaining firms from GIIPS countries and Germany, France, and U.K. in the category of "very large" in Amadeus. The comparison shows that the firms in our sample are on average larger and have a higher ratio of tangible to total assets, but are comparable along other firm characteristics. Furthermore, we hand-match our sample to the Capital IQ database to obtain detailed data on the whole debt structure for a subsample of our firms, including detailed information on total outstanding and undrawn credit lines.

In addition, we augment the dataset with bank-level information from various sources. We retrieve data about the sovereign debt holdings of European banks from the EBA's EU-wide stress tests and capital exercises. Furthermore, we obtain information about the banks' health from SNL Financial (leverage) and Bloomberg (ratings). To get data about governmental influence on European banks, we obtain data about government interventions compiled from information disclosed on the official EU state-aid websites.[7] Finally, we compile government bank ownership data from Bankscope, and extract the fraction of directors affiliated with the respective government from the BoardEx database. The definitions of all variables are summarized in Table I.

[7]The data can be obtained from: `http://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=3`.

III. Financial and Real Effects of the European Sovereign Debt Crisis

Our objective is to examine the association between a bank's exposure to the European Sovereign Debt Crisis and the resulting corporate policy of its borrowing firms. We expect that firms that are more dependent on banks significantly affected by the sovereign debt crisis were more financially constrained during the crisis and thus acted differently both in terms of financial and real decisions compared to less affected firms.

A. Methodology

We start with broadly assessing whether the European Sovereign Debt Crisis affected the real economy through the bank lending channel. Therefore, to first capture all channels through which banks were affected, we use a bank's country of incorporation as a measure for its exposure to the sovereign debt crisis. The bank's country of incorporation is a good "catch-all" measure as (i) banks' bond portfolios are generally biased towards *domestic* sovereign bondholdings, implying that there is a strong positive relation between a bank's country of incorporation and its exposure to the sovereign debt of that country (hit on balance sheet); (ii) GIIPS banks have an incentive to buy additional risky *domestic* debt (risk-shifting); and (iii) GIIPS governments potentially pressure domestic banks to increase their *domestic* sovereign bondholdings (moral suasion). All three channels could potentially lead to a reduction in the corporate loan supply, either by reducing a bank's debt capacity (hit on balance sheet), or by crowding-out corporate lending (risk-shifting and moral suasion). In Section IV, we provide a more detailed explanation of the three channels and analyze which of these channels are of first-order importance for the negative real effects incurred by the borrowing firms.

For the analysis, we divide banks into two groups: (i) GIIPS banks, which are banks headquartered in GIIPS countries given that these countries are most affected by the sovereign debt crisis and (ii) non-GIIPS banks, that is, banks from Germany, France, and the U.K., which are the countries with the largest number of syndicated loans among the European countries that were not significantly affected by the sovereign debt crisis. To measure a firm's dependency on GIIPS banks in a given year, we determine the fraction of the firm's

total outstanding syndicated loans that is provided by GIIPS lead arrangers. Therefore, the *GIIPS Bank Dependence* of firm i in country j, and industry h in year t is defined as:

$$GIIPS\ Bank\ Dep._{ijht} = \frac{\sum_{l \in L_{ijh,min\{t,t_i\}}} \frac{\Phi_l}{\#Lead\ Arranger_l} \cdot Loan\ Amount_l}{Total\ Loan\ Amount_{ijh,min\{t,t_i\}}}, \tag{1}$$

where $\Phi_l = \sum_{b \in l} GIIPS_b$ and L_{ijht} are all of firm i's loans outstanding at time t. $GIIPS_b$ is a dummy variable that indicates whether lead arranger bank b is incorporated in a GIIPS country, in which case it is equal to one and otherwise zero. Hence, Φ_l counts the number of GIIPS lead arranger banks in the syndicated loan l, while $\#Lead\ Arranger_l$ is the total number of lead arrangers in loan l. Furthermore, t_i refers to the last year in which none of firm i's banks entered the respective crisis period yet. We keep the *GIIPS Bank Dependence* constant at its pre-sovereign debt crisis level for each crisis year to address the concern that firms with bad performance during the crisis lost the opportunity to get funding from non-GIIPS banks and thus could only rely on GIIPS banks.[8] Otherwise, our results could be biased since badly performing firms then would have been more likely to have a higher *GIIPS Bank Dependence*, and we could not attribute the effects we find to the credit crunch.

Our choice to measure *GIIPS Bank Dependence* based on lead arrangers is motivated by the central role that these banks play in originating and monitoring a syndicated loan (Ivashina (2009)). Therefore, when a lead arranger either chooses or is forced to curtail its lending activities, we expect this to significantly impact the borrowing firm. We follow Ivashina (2009) and identify the lead arranger according to definitions provided by Standard & Poor's, which for the European loan market are stated in Standard & Poor's Guide to the European loan market (2010). Therefore, we classify a bank as a lead arranger if its role is either "mandated lead arranger", "mandated arranger", or "bookrunner".

The change in a firm's financial and real variables after the start of the European Sovereign Debt Crisis is determined by its pre-crisis lending relationships (our main variable of interest), its observable and unobservable firm characteristics, and an unobserved idiosyncratic component uncorrelated with the observable and unobservable firm characteristics. To consistently estimate the financial and real effects for firms of having a pre-crisis

[8] As indicated by the term $\min\{t, t_i\}$. We obtain qualitatively similar results if we use the average (2005–2009) pre-crisis *GIIPS Bank Dependence* of each firm (see Panel C of Table A3 in the Online Appendix). The reason is that lending relationships are quite sticky (see Section III.D for more details).

relationship with banks affected by the sovereign debt crisis, we thus need statistical independence between a firm's pre-crisis lending relationships, in particular, its exposure to GIIPS banks, and the unobserved firm characteristics that affect either their financial or real outcomes. Therefore, in our empirical analysis, we control for a rich set of firm characteristics to remove any potential confounding factors and avoid an omitted-variable bias.

In particular, we include firm fixed effects to capture unobserved time-invariant firm heterogeneity and firm-level control variables to capture other determinants of the firms' corporate policies, loan demand, and loan supply. These controls include firm size, leverage, net worth, the fraction of tangible assets, the interest coverage ratio, and the ratio of EBITDA to total assets. For the analysis of the firms' cash flow sensitivity of cash we also include a firm's cash flow and its capital expenditures.

Furthermore, GIIPS countries went through a severe recession starting in 2010 (2009 in the case of Greece) while non-GIIPS countries were not significantly affected by economic downturns. To alleviate concerns that our results are driven by different aggregate demand fluctuations in our sample countries and/or in particular industries within these countries, we add interactions between industry, year, and country fixed effects. Thereby, we remove the possibility of spurious results due to time-varying shocks to an industry in a given country that may have affected the credit demand of borrowing firms, as well as their real outcomes.

Perhaps our biggest challenge is the concern that a firm's dependency on GIIPS and non-GIIPS banks might be determined by whether this firm has business in the respective countries. For example, a German firm might choose to borrow from a Spanish bank because it has business in Spain. If this is the case, we could potentially overestimate the negative real effects that can be attributed to the bank lending channel since our results could then be driven by the possibility that a firm's business exposure to affected countries impacted both, its *GIIPS Bank Dependence* and the negative real effects.

To address this concern, and ensure orthogonality between a firm's *GIIPS Bank Dependence* and its unobserved characteristics, our main specification also includes foreign bank country times year fixed effects. Consider as an example a German firm borrowing from both a Spanish and a German bank. Besides the industry-country-year fixed effect, we include for this firm a Spain-year fixed effect to capture the firm's potential exposure to the macroeconomic downturn in Spain during the European Sovereign Debt Crisis.

In the following, we present descriptive statistics and explore whether our identification

assumptions are plausible. In Panel A of Table II, we show the pre-crisis differences of the corporate policies across firms with a *GIIPS Bank Dependence* above and below the sample median. For simplicity, we label an exposure above (below) the sample median in the following high (low) *GIIPS Bank Dependence*.[9] The fact that there is no systematic difference between the real outcomes of firms with high and low *GIIPS Bank Dependence* before the European Sovereign Debt Crisis indicates that the reasons for how banks and firms match cannot explain the real outcomes for borrowing firms in a bivariate OLS context.

Panel B of Table II presents descriptive statistics for the firm-level control variables, split into firms with high and low *GIIPS Bank Dependence* in the pre-crisis periods. Firms with high *GIIPS Bank Dependence* tend to be larger, have more tangible assets, a higher leverage, and lower interest coverage ratios. To test these observed differences more formally, we follow Imbens and Wooldridge (2009) and report the normalized difference of the two subsamples, which are defined as the averages by treatment status, scaled by the square root of the sum of the variances, as a scale-free measure of the difference in distributions. This measure avoids the mechanical increase in sample size, which is typically observed for t-statistics. Imbens and Wooldridge (2009) suggest as a rule of thumb that the normalized difference should not exceed an absolute value of one quarter. We also report standard t-statistics for the difference in means between the two groups. As can be seen in Panel B of Table II, only total assets is close to (but still below) this threshold (t-tests reveal significant differences for total assets and tangibility) while all others are well below this threshold, suggesting that firms in the two groups are comparable along most observable dimensions.

The descriptive statistics in Table II also help to rule the possibility of spurious results due to an endogenous matching of firms and banks in the pre-crisis period that is driven by firm quality. If low-quality firms were more likely to enter into business relationships with GIIPS banks before the European Sovereign Debt Crisis, our results could be driven by the fact that these firms are less resilient against the shock of the crisis. However, the fact that there is no systematic difference between the corporate policies and real outcomes of firms with high and low *GIIPS Bank Dependence* before the European Sovereign Debt Crisis and that the correlation between *GIIPS Bank Dependence* and the firm control variables is in general very low alleviates this concern. Table A2 in the Online Appendix shows that the fraction of bank financing relative to total debt is not systematically different between firms

[9]Note that of course the sample median varies for the different subsamples analyzed in the paper.

with high and low *GIIPS Bank Dependence*, which alleviates the concern that firms that have a higher dependency on GIIPS banks might be in general more bank-dependent. If this would have been the case, these firms would be more financially constrained during a banking crisis compared to less bank-dependent firms not because they suffer from a shock to their banks' health but because it is harder for them to acquire funding in general.

Furthermore, to ensure that the negative real effects for borrowing firms are actually caused by the shock of the European Sovereign Debt Crisis on GIIPS banks, we have to rule out two alternative explanations for how firms' pre-crisis lending relationships could have affected loan outcomes and, in turn, the firms' financial and real decisions.

First, GIIPS banks might have been already less healthy than non-GIIPS banks in the pre-crisis period. This would not have necessarily affected firms borrowing from GIIPS bank in the pre-crisis period. However, a lower bank health might have made GIIPS banks less resilient against the crisis. In this case, the real effects for borrowing firms would not have been solely be due to the negative impact of the crisis on banks, but, in addition, also driven by the fact that GIIPS banks were more vulnerable to the fallout of the crisis. To address this possibility, Panel E of Table II presents descriptive statistics for various bank quality measures for the pre-crisis period, split into GIIPS and non-GIIPS banks. The results show that GIIPS banks were on average smaller and had higher equity ratios compared to non-GIIPS banks, while impaired loans to equity and the Tier 1 ratio were not significantly different across the two groups. Furthermore, the higher equity capitalization does not seem to have been due to higher asset risk of GIIPS banks as the average five-year CDS spreads were not significantly different between the two groups of banks. Therefore, we can reject the possibility that the negative real effects for borrowing firms were caused by a lower crisis resilience of GIIPS banks. If anything, GIIPS banks seem to have been healthier than non-GIIPS banks before the crisis.

Second, we have to rule out the possibility that the negative real effects have been caused by ex-ante differences in the quality of the loan syndicates. If, for some reason, healthier non-GIIPS banks have avoided joining loan syndicates with GIIPS banks, GIIPS banks would have been left with ex-ante worse non-GIIPS banks. For example, despite the fact that firms with high and low *GIIPS Bank Dependence* did not differ significantly, there could have been ex-ante information asymmetries between non-GIIPS banks and firms regarding the resilience of GIIPS banks against a future crisis. Hence, in contrast to borrowing firms,

healthier non-GIIPS banks might have foreseen the consequences of the crisis for GIIPS banks. This would imply that loan syndicates with GIIPS lead arrangers would have been of lower quality to begin with, which could drive our results. To alleviate this concern, we divide non-GIIPS banks into two groups: banks with an above and below median fraction of deals with GIIPS banks. Comparing these two groups of banks, we find that they did not differ in terms of capital ratios and that non-GIIPS banks that had issued a high fraction of loans with GIIPS banks had a lower fraction of impaired loans (see Panel F of Table II). CDS spreads again did not differ between these two groups of banks. Hence, the negative real effects for borrowing firms do not seem to be caused by an ex-ante lower quality of syndicates that include GIIPS banks.

B. Empirical Results for Main Specification

This section presents results for the effect of a firm's *GIIPS Bank Dependence* on its financial and real outcomes. We first divide our sample into two periods: one before the sovereign debt crisis (2006-2008 for Greece, 2006-2009 for all other GIIPS countries) and one during the crisis (2009-2012 for Greece, 2010-2012 for all other GIIPS countries).[10] This yields a symmetric time window around the beginning of the European Sovereign Debt Crisis. For each bank, we construct an indicator variable, $Crisis_{bt}$, which is equal to one if bank b's country of incorporation is in the respective crisis period at time t.

We begin by exploring the effect of the sovereign debt crisis on several firm outcomes graphically.[11]. In Panels A-C in Figure 1, we plot the time series of the average employment growth rates, the investment levels, and sales growth rates, respectively, for firms with a high and low *GIIPS Bank Dependence*, as defined in Eq. (1). Figure 1 shows that, while the pre-crisis trend was similar for the two groups of firms, a higher *GIIPS Bank Dependence* led to larger negative real effects during the crisis. For example, employment growth rates for borrowing firms with a high *GIIPS Bank Dependence* did not recover during the crisis

[10] In 2009, Greek bond yields started to diverge from the yields of other eurozone members. The Greek five-year sovereign CDS spread escalated from 100 bps in May 2009 to 250 bps by the end of the year. During 2010 investors also started to lose confidence in Italy, Ireland, Portugal, and Spain. For these countries, the CDS spreads more than doubled between March and May 2010. Our results are robust to choosing alternative definitions of the crisis period, that is, setting the start of the crisis period in Greece to 2010 and/or the start of the crisis period in Ireland and Portugal to 2009.

[11] Note that we control for observable firm characteristics such as industry, country, leverage, size, and net worth in the figures.

period while employment rates for firms with a lower *GIIPS Bank Dependence* showed an increase. Similar results can be found for the other dependent variables.

To formally investigate whether borrowing firms with significant business relationships with GIIPS banks became financially constrained during the sovereign debt crisis, we follow Almeida et al. (2004). They show that firms that expect to be financially constrained in the future respond by saving more cash out of their cash flow today, whereas financially unconstrained firms have no significant link between their cash flow and the change in cash holdings. For the cash flow sensitivity of cash, we employ the following specification for firm i in country j, and industry h in year t:

$$\begin{aligned}
\Delta Cash_{ijht+1} &= \beta_1 \cdot GIIPS\ Bank\ Dependence_{ijht} \\
&+ \beta_2 \cdot GIIPS\ Bank\ Dependence\ in\ Crisis_{ijht} \\
&+ \beta_3 \cdot GIIPS\ Bank\ Dependence_{ijht} \cdot Cash\ Flow_{ijht} \\
&+ \beta_4 \cdot GIIPS\ Bank\ Dependence\ in\ Crisis_{ijht} \cdot Cash\ Flow_{ijht} \\
&+ \beta_5 \cdot Cash\ Flow_{ijht} + \gamma \cdot X_{ijht} + Firm_{ijh} + Industry_h \cdot Country_j \cdot Year_{t+1} \\
&+ ForeignBankCountry_{k \neq j} \cdot Year_{t+1} + u_{ijht+1}, \qquad (2)
\end{aligned}$$

where

$$GIIPS\ Bank\ Dep.\ in\ Crisis_{ijht} = \frac{\sum_{l \in L_{ijht_i}} \frac{\Gamma_l}{\#Lead\ Arranger_l} \cdot Loan\ Amount_l}{Total\ Loan\ Amount_{ijht_i}} \qquad (3)$$

with $\Gamma_l = \sum_{b \in l} GIIPS_b \cdot Crisis_{bt}$. Hence, Γ_l is the number of GIIPS lead arrangers in loan l that already entered the crisis period. *GIIPS Bank Dependence in Crisis* is thus a measure for how affected a firm is during the sovereign debt crisis due to its bank relationships. The unit of observation is a firm-year. Our key variables of interest in the regression in Eq. (2) is the firms' cash flow sensitivity of cash during the crisis for firms that are dependent on GIIPS banks (β_4 in Eq. (2)). If firms with a high *GIIPS Bank Dependence* become financially constrained during the sovereign debt crisis, we expect that they save more cash out of their generated cash flows to build up a liquidity buffer against the possibility of not being able to obtain future funding, that is, we expect β_4 in Eq. (2) to be positive.

For the firms' employment and sales growth rates, as well as their net debt, interest

coverage ratio, and investment levels, we estimate the following panel regressions:[12]

$$\begin{aligned} y_{ijht+1} &= \beta_1 \cdot \textit{GIIPS Bank Dependence}_{ijht} \\ &+ \beta_2 \cdot \textit{GIIPS Bank Dependence in Crisis}_{ijht} \\ &+ \gamma \cdot X_{ijht} + \textit{Firm}_{ijh} + \textit{Industry}_h \cdot \textit{Country}_j \cdot \textit{Year}_{t+1} \\ &+ \textit{ForeignBankCountry}_{k \neq j} \cdot \textit{Year}_{t+1} + u_{ijht+1}. \end{aligned} \tag{4}$$

The unit of observation is again a firm-year. Our key variables of interest in the regression in Eq. (4) is the firms' *GIIPS Bank Dependence in Crisis* (β_2 in Eq. (4)). If firms were adversely affected by the sovereign debt crisis through the bank lending channel, then we expect β_2 in Eq. (4) to be negative. The results of our main specification of how *GIIPS Bank Dependence* is affecting firms' financial and real decisions are presented in Table III. Column (1) provides results for net debt ((current + non-current liabilities - cash)/total assets). The coefficient of *GIIPS Bank Dependence in Crisis* (β_2 in Eq. (4)) is negative, indicating that during the sovereign debt crisis, firms with a higher exposure to GIIPS banks reduced external debt financing more than other firms. A one standard deviation higher *GIIPS Bank Dependence* during the crisis period leads to a reduction in net debt of 3.9 percentage points.[13]

Column (2) of Table III presents results for the degree to which firms saved cash out of their cash flow. The coefficient of the interaction of *GIIPS Bank Dependence in Crisis* with cash flow (β_4 in Eq. (2)) is statistically significant at the 5% level. This positive coefficient implies that a higher *GIIPS Bank Dependence in Crisis* induced firms to save more cash out of their cash flow for precautionary reasons. Note that there is no significant relation between the *GIIPS Bank Dependence* of a firm and its propensity to save cash out of its cash flow in the pre-crisis period. More precisely, a one standard deviation higher *GIIPS Bank Dependence in Crisis* implies that these firms save 3 cents more per euro of cash flow. This compares well to the magnitudes found by Almeida et al. (2004), who show that financially constrained firms save on average 5-6 cents per dollar of cash flow, while unconstrained firms have no significant relation between cash flow and the change in cash holdings. Hence, these results indicate that firms with a high *GIIPS Bank Dependence* became financially

[12]Since roughly 90% of our observations have no information on R&D expenses in Amadeus, we cannot investigate the impact of GIIPS bank dependence on R&D.

[13]Results are qualitatively similar if we use the leverage ratio instead of net debt as the dependent variable.

constrained during the crisis. Furthermore, Column (3) of Table III presents results for the firms' interest coverage ratio. Firms with a higher *GIIPS Bank Dependence in Crisis* had significant lower interest coverage ratios during the crisis period, implying that, by becoming financially constrained, they were also suffering from a deterioration in their credit quality. The estimates suggest that a one standard deviation higher *GIIPS Bank Dependence in Crisis* results in a 2.3 percentage points lower interest coverage ratio.

Acharya et al. (2014a) show that firms with higher liquidity risk are more likely to use cash rather than bank credit lines for liquidity management because the cost of credit lines increases with liquidity risk. This is due to the fact that banks retain the right to revoke access to liquidity precisely in states where the firms need liquidity due to, for example, a liquidity shortfall because of negative cash flows. Since banks themselves faced a substantial liquidity shock during the sovereign debt crisis, we expect that firms with a high *GIIPS Bank Dependence* could have lost access to their bank credit lines either because the credit lines were not prolonged or revoked. These firms should thus increasingly have relied on cash rather than on lines of credit to manage their liquidity.

To test this implication, we follow Acharya et al. (2014a) and hand-match our sample to the Capital IQ database. This enables us to obtain data on the whole debt structure for some of our sample firms including detailed information on total outstanding and undrawn credit lines. We construct two measures for the liquidity composition of borrowing firms from these data. First, we consider the fraction of the total amount of outstanding credit lines over the sum of the amount of total outstanding credit line and cash. Second, we construct a measure that captures the fraction of undrawn credit lines (i.e., the amount of a firm's credit line that is still available and can be drawn in case of liquidity needs) over undrawn credit lines and cash. In Figure A2 in the Online Appendix, we plot the time series of the average total and undrawn credit lines. We show that there was a clear change in firm liquidity management during the sovereign debt crisis. Column (4) of Table III reports results for a firm's overall credit line, whereas column (5) reports results for the undrawn credit lines. Across both specifications, we find that firms with a higher *GIIPS Bank Dependence in Crisis* were less able to rely on secure funding from lines of credit.[14]

To summarize, our results on the firms' financial policy indicate that firms with a high

[14]Due to the smaller number of observations in this analysis, we cannot use it in our sample splits in Section III.D and also cannot use foreign bank country*year fixed effects for this analysis.

GIIPS Bank Dependence showed the typical pattern of financially constrained firms during the sovereign debt crisis. They relied more on cash holdings for their liquidity management because the possibility of getting liquidity from their bank lines of credit became more uncertain. Hence, if firms became financially constrained during the sovereign debt crisis due to the lending behavior of their main banks, then these firms should also have responded by adjusting their real activities.

Therefore, we next examine how the sovereign debt crisis impacted the corporate policies of firms. We estimate panel regressions (see Eq. (4)) where y_{ijht+1} measures employment growth (Δlog *Employment*), investment (*CAPX / Tangible Assets*), or sales growth (Δlog *Sales*), respectively.[15] Table III presents the results. Consistent with the suggestive evidence from Figure 1, columns (6)-(8) show that firms with a high *GIIPS Bank Dependence in Crisis* had a significantly lower employment growth rate, cut investment by more, and experienced a larger sales growth reduction than firms that were less dependent on GIIPS banks. More precisely, a one standard deviation higher *GIIPS Bank Dependence in Crisis* of borrowing firms leads to a 4.1 percentage point reduction in employment growth, a 6 percentage point decrease in capital expenditures, and a 4.9 percentage point decrease in sales growth.

As a robustness check, we provide two alternative definitions for our key independent variable. First, we measure a firm's exposure to affected banks through the risk of their "indirect sovereign debt holdings through their lenders". More precisely, we use the weighted average sovereign credit spread in year t, where the weights are given by firms' "indirect sovereign debt holdings", that is, for each firm, we measure the exposure it has to sovereign risk through the sovereign debt holdings of the banks from which it received loans. We then replace the term *GIIPS Bank Dependence in Crisis* in Eqs. (2) and (4) with the risk of their "indirect sovereign debt holdings". The results are presented in Panel A of Table A3 in the Online Appendix. Second, we replace the fraction of syndicated loans provided by GIIPS banks with the fraction of total debt that is provided by GIIPS banks in the form of syndicated loans. This alternative definition helps us to more precisely account for the difference in the overall bank dependence of firms. Using this alternative measure helps us to reconfirm the validity of our earlier findings that firms with high and low *GIIPS Bank Dependence* do not differ in terms of their overall dependence on banks. Panel B of Table A3

[15] Amadeus does not report capital expenditures. We construct a proxy for investments using the following procedure: $(Fixed\ Assets_{t+1} - Fixed\ Assets_t + Depreciation)/(Fixed\ Assets_t)$. We set *CAPX* to 0 if negative.

presents the results for this alternative way of measuring the dependence on GIIPS banks. In both panels, all results remain economically and statistically significant.

To provide further robustness that high and low GIIPS bank dependent firms were comparable in terms of the outcome variables in the pre-crisis period, we conduct a placebo test where we define the placebo crisis period as either ranging from 2006 to 2007 or from 2006 to 2008. The results are reported in Table A4 in the Online Appendix. None of the *GIIPS Bank Dependence in Placebo Crisis* terms is significant for the placebo crisis definitions, indicating that GIIPS bank dependent firms did not show significantly different trends in the pre-sovereign debt crisis period.

C. Alternative Identification Strategy using Firms' Business Exposure

In our main specification (see Eqs. (2) and (4)), we ensure the statistical independence between a firm's *GIIPS Bank Dependence* and its unobservable firm characteristics by controlling for a firm's business exposure to its foreign lenders' home countries via fixed effects. In this section, we alternatively identify the real effects caused by the decrease in loan supply by tracking the change in corporate policies of non-GIIPS firms that had a pre-crisis relationship with a GIIPS bank. The strategy is similar to the one applied by Peek and Rosengren (1997), who also use domestic firms (in their case U.S. firms) that had borrowed from foreign banks (in their case Japanese banks) to isolate the supply effects of the bank lending channel. However, compared to their approach, we take two additional precautionary steps to ensure that the results are not driven by the possibility that domestic firms that borrowed from a foreign bank are also more likely to have business exposure to the respective country and are thus potentially also affected by the macroeconomic downturn in this country.

First, we restrict our sample to firms that were not directly affected by the macroeconomic shock in the periphery of the eurozone or any other part of the world. In particular, we restrict our sample to non-GIIPS firms without subsidiaries in a GIIPS country or any other non-EU country (e.g., a German firm without subsidiaries). To this end, we collect information on all foreign and domestic subsidiaries of the borrowing firms in our sample, along with information about the revenues generated by their subsidiaries.[16]

[16]Ideally, we would also like to control for the export/import dependence of our firms and their subsidiaries to specific countries. These data, however, are only available for a very small subsample of our firms in Amadeus, rendering it impossible to also control for export/import dependence.

To enhance our understanding of how the firm-bank relationships between non-GIIPS firms without GIIPS subsidiaries and GIIPS banks emerged, we investigate the history of these lending relationships prior to our sample period. Two main explanations for the existence of these firm-bank relationship stand out, which can jointly explain roughly 90% of the lending relationships. First, many non-GIIPS firms inherited their relationship to a GIIPS bank through bank mergers or acquisitions (explains roughly 68% of non-GIIPS firm - GIIPS bank links). That is, the firm had a relationship to a domestic bank that was later acquired by a GIIPS bank. Consider as an example the German catering firm "Die Menu Manufaktur Hofmann", a firm located in Southern Germany that delivers food to the cafeterias of hospitals, corporations, etc. Figure A5 in the Online Appendix shows that its business activities are limited to Germany and Austria. Prior to our sample period, this company obtained a loan from the Bavarian-based Bayerische Hypo- und Vereinsbank AG, which was later acquired by the Italian bank UniCredit in 2005. After 2005, all of its syndicated loans were originated by UniCredit. Second, the Bank of Ireland has historically a large presence in the U.K. (explains roughly 22% of non-GIIPS firm - GIIPS bank links). For example, in 2006 it was the fifth largest bank in terms of the number of deals in the U.K. Therefore, a large fraction of the firm-bank relationships between non-GIIPS firms without GIIPS subsidiaries and GIIPS banks were established due to reasons that were not related to the geographical distribution of the firms' business exposure.

As a second precautionary step, we thus restrict our analysis to non-GIIPS firms whose lending relationship to a GIIPS firm can be explained by one of these two main reasons. That is, that they either inherited their pre-crisis lending relationship with a GIIPS banks due to an acquisition or that they borrowed from a GIIPS bank before the crisis that is very active in the respective country's credit market. Applying these preventive measures alleviates the concern that a non-GIIPS firm's dependency on a GIIPS bank might be determined by whether it has business in the periphery of the eurozone and thus ensures statistical independence between a firm's *GIIPS Bank Dependence* and its unobservable firm characteristics.

In Panels A-C of Figure 2, we plot the time series of the average employment growth rates, the investment levels, and sales growth rates, respectively, of the firms in this subsample. The figure shows that also for non-GIIPS firms without GIIPS subsidiaries, firms with a higher *GIIPS Bank Dependence* suffered larger negative real effects during the crisis, while their pre-crisis trend was comparable to firms that were less dependent on GIIPS banks.

This finding is consistent with the evidence presented in Panels A-C in Figure 1.

For the formal analysis, we apply specifications that are very similar to our main specifications from Eqs. (2) and (4). The only difference is that due to the reduced sample size, we cannot control for both industry-country-year fixed effects and foreign bank country-year fixed effects at the same time in the subsidiary analysis. We therefore include industry-year and foreign bank country-year fixed effects, assuming that the industry-specific shocks in non-GIIPS countries were similar. Panel A of Table IV provides multivariate results for the evidence presented in Figure 2. As the table shows, all results continue to hold, confirming that the decline in lending of banks, which were adversely affected by the sovereign debt crisis, had negative real effects for borrowing firms. Panel C of Table II shows that firms in this subsample did not differ across *GIIPS Bank Dependence*, which again rules out that there was an endogenous matching of firms and banks in the pre-crisis period that was driven by firm quality. As a further robustness check, we restrict the sample to firm-bank relationships where firms inherited their banks through M&A transactions. That is, we only consider cases where non-GIIPS firms borrowed from a domestic bank that was later acquired by a GIIPS bank. This yields qualitatively similar results (see Panel B of Table IV). To further rule out that our results are driven by firms that are incorporated in export dependent industries, Panel C of Table IV restricts the analysis to non-GIIPS firms without subsidiaries in GIIPS or any other non-EU country that are operating in non-tradable sectors. We follow Mian and Sufi (2014) to identify tradable and non-tradable sectors. All results continue to hold for firms operating in non-tradable sectors.

D. Supply and Demand Factors of Bank Lending

If the real effects documented in Section III.C were actually caused by a reduction in loan supply from banks affected by the European Sovereign Debt Crisis, we would expect that the negative real effects from having a high *GIIPS Bank Dependence* were less pronounced for firms that were less prone to becoming financially constrained. In particular, we should observe smaller or no significant real effects of having a business relationship with a bank affected by the crisis (i) for firms that, relative to the decrease in loan supply, experienced an even larger decrease in loan demand and (ii) for firms that were very likely able to substitute the reduction in loan supply with other means of financing. Therefore, to assure that our

results are indeed driven by a loan supply decrease, in this section, we compare the negative real effects incurred by these different subsets of firms.

We start with testing whether firms that had a relative low demand for bank loans during the sovereign debt crisis suffered less real effects through the bank lending channel compared to firms that had a high demand for loans. In particular, firms that were heavily exposed to the negative macroeconomic shock in the periphery of the eurozone had presumably a very low or no demand for additional bank loans as a firm's demand for bank financing is strongly influenced by its investment and growth opportunities. For these firms, the reduction in loan supply due to a business relationship with a bank affected by the crisis should be overcompensated by the loan demand decrease and thus should be without effect. As a result, while of course having experienced very significant real effects due to the negative macroeconomic shock, these firms should not have suffered additional negative real effects from encountering a drop in loan supply.

To check this, we use the revenue information for all foreign and domestic subsidiaries of the firms in our sample to determine each firm's geographical revenue distribution. As shown by the results in Panel A-C of Table IV, non-GIIPS firms that had no observable business exposure to GIIPS countries experienced strong negative real effects of having a high *GIIPS Bank Dependence*. In contrast, according to the above-mentioned arguments, we would expect that the real effects of having a high *GIIPS Bank Dependence* are significantly less pronounced for non-GIIPS firms with business exposure to GIIPS countries (e.g., a German firm with subsidiaries in Italy or Spain), since these firms should have had a significant lower demand for bank loans. To test this prediction, we rerun the regressions applied in Section III.C, that is, we control for *industry*year* and *foreign bank country*year* fixed effects to absorb possible unobserved macroeconomic shocks. Indeed, looking at Panel D of Table IV, these firms seem less financially constrained when having a high *GIIPS Bank Dependence in Crisis* and, in line with this result, we find weaker negative effects for employment and no negative effects for investments and sales growth.

As an additional robustness check, we do the same exercise for GIIPS firms and divide the firms according to their business exposure to non-GIIPS countries. GIIPS firms that were less exposed to the crisis because they have a large fraction (highest tercile) of their revenue generated by subsidiaries in non-GIIPS countries (e.g., a Spanish firm that has a significant fraction of its revenues generated by a German subsidiary) should have had a higher demand

for loans compared to GIIPS firms that generate their revenue mainly in GIIPS countries. Hence, we expect to see larger negative real effects as a result of having a high *GIIPS Bank Dependence* for the former group of firms compared to the latter group. Panel A of Table A5 in the Online Appendix shows that GIIPS firms with a high fraction of their revenue generated by foreign non-GIIPS subsidiaries experienced significant real effects as a result of having a pre-crisis lending relationship with GIIPS banks.[17] As expected, when looking at Panel B of Table A5, we find weaker effects both in terms of economic and statistical significance for GIIPS firms with a majority of their business in GIIPS countries (e.g., a Spanish firm without subsidiaries).

Next, along the same lines, we investigate whether firms that were more likely able to substitute a possible reduction in loan supply with other means of financing suffered less real effects from having a high *GIIPS Bank Dependence in Crisis* than firms that are more bank-dependent. In particular, we split our sample into listed and non-listed firms, as well as rated and unrated firms. The underlying assumption is that non-listed and unrated firms have fewer alternative funding sources, since they are less likely to be able to raise additional public equity or issue bonds, implying that these firms are more bank-dependent (Sufi (2007)). Moreover, there is less publicly available information for these firms, requiring more monitoring and information collection by banks. Overall, in case bank-related loan supply factors played a role during the crisis, non-listed and unrated firms should thus have been much more affected when having a high dependency on GIIPS banks than listed and rated firms, which have access to alternative sources of funding.

Panel A of Table V presents the results for the subsample of listed firms, while Panel B presents the results for non-listed firms. The table shows that our results continue to hold for non-listed firms; however, we do not find any evidence that listed firms showed the typical behavior of a financially constrained firm or that they had significantly negative real effects during the crisis period. The results for the sample split between rated and unrated firms are shown in Panels C and D, respectively. All our results are driven by firms without access to the public bond market. Only for unrated firms do we find significant real effects that can be attributed to banks' lending behavior. Therefore, in line with the findings of Becker and Ivashina (2014b), firms with alternative funding sources thus seem to be able to substitute

[17]Panel D of Table II shows that the firms in this subsample did not differ across *GIIPS Bank Dependence* in the pre-crisis period, which again rules out a firm quality driven endogenous bank-firm matching.

the lack of bank financing, whereas non-listed and unrated firms cannot easily alter their funding sources and thus suffered significant real effects when having a high dependency on banks affected by the sovereign debt crisis. Panel E and F of Table V, in which we report results separately for firms that did issue bonds during the sample period and firms that did not, reconfirm this finding. In line with the previous results, only firms that were not able to substitute the lack of bank lending by issuing bonds experienced real effects of having relationships to banks affected by the sovereign debt crisis.

Besides being better able to substitute a loan supply decrease with funds from other financing sources, larger and public firms should also find it easier than smaller and private firms to borrow from sources other than their previous lender. Therefore, we investigate in the following in greater detail the evolution of bank relationships during the crisis period and test whether the real effects of having a high *GIIPS Bank Dependence* were more pronounced for firms that were not able to acquire a new bank relationship during the crisis.

Previous work (e.g., Chodorow-Reich (2014)) documents that bank relationships in the syndicated loan market are sticky, suggesting that most firms do not switch banks. Indeed, we find in our sample as well that for roughly 75% of firms the *GIIPS Bank Dependence* does not change throughout the sample period. As expected, mostly listed firms are able to switch banks since for these firms more publicly information is available, which reduces asymmetric information problems. In contrast, roughly 70% of firms with constant bank relationships are non-listed firms, as shown in Panel C of Table VI. Panel A of Table VI shows that all results continue to hold for the subsample of firms that do not switch banks, whereas we do not find significant effects for firms that switch banks, as shown in Panel B.

These results again confirm that the limited access to funding due to lending relationships with banks affected by the European Sovereign Debt Crisis played a major role in causing the negative real effects experienced by the affected borrowing firms. Therefore, two important contributions of this study are the documentation of (i) strong spillovers from high-spread euro area sovereigns to the local real economy through the bank lending channel and (ii) significant cross-border spillovers from the crisis in GIIPS countries to firms in non-GIIPS countries are transmitted through the bank lending channel. Therefore, while the euro greatly benefits its members by deepening the degree of financial integration, the extensive cross-border bank lending has also facilitated the transmission of shocks across the eurozone.

E. Aggregate Effects

With some additional assumptions, we can use the firm-level results for the different subsamples from Tables IV and A5 (which is in the Online Appendix) to inform the debate regarding the aggregate effects of the loan supply shock of the European Sovereign Debt Crisis. The strategy to estimate the aggregate effects is similar in spirit to the procedure used in Chodorow-Reich (2014). For each borrower, we estimate what his performance would have been if he had borrowed from the least affected syndicate, which in our case is a syndicate without GIIPS banks in the lead arranger position. We employ a partial equilibrium analysis, that is, we assume that the overall real effect equals the sum of the real effects at the firm level. Moreover, we assume that the least affected loan syndicate did not shift its lending supply function during the crisis. We explain our strategy to estimate aggregate effects using employment growth rates as an example. We perform the same analysis for investment and sales growth rates. We start by defining the counterfactual employment growth rate of firm_{ijh} if it had borrowed entirely from non-GIIPS banks:

$$\widetilde{y_{ijht}} \;=\; \widehat{y_{ijht}} - \beta_1 \cdot \textit{GIIPS Bank Dep.}_{ijht} - \beta_2 \cdot \textit{GIIPS Bank Dep. in Crisis}_{ijht}, \quad (5)$$

where $\widehat{y_{ijht}}$ denotes the fitted value from the respective regression. In the case of employment, we then use the counterfactual employment growth rate to calculate the counterfactual employment level $\widetilde{Emp_{ijht}}$ and similarly the fitted value employment level $\widehat{Emp_{ijht}}$. The total losses due to the bank lending shock during the crisis period are then given by

$$\textit{Total Losses} \;=\; \sum_{t\in[t_i+1,T]} \sum_{ijh} [\widetilde{Emp_{ijht}} - \widehat{Emp_{ijht}}], \quad (6)$$

where T is the last sample year (i.e., 2012). The fraction of the sample net employment change during the crisis that is caused by banks' lending behavior is then given by

$$\frac{\sum_{t\in[t_i+1,T]} \sum_{ijh} [\widetilde{Emp_{ijht}} - \widehat{Emp_{ijht}}]}{\sum_{ijh} [Emp_{ijhT} - Emp_{ijht_i}]}. \quad (7)$$

In the following, we focus on two subsamples of firms, where we are best able to disentangle the macroeconomic shock from the bank lending shock. Looking at the results for non-

GIIPS firms without subsidiaries in GIIPS or other non-EU countries, we find that overall employment decreased by 1.6% during the European Sovereign Debt Crisis. Our effect accounts for 25% of this decline, that is, firms would have cut employment by 25% less, had they borrowed from loan syndicates without GIIPS banks acting as lead arrangers. Similarly, firm investment fell by 2%; 24.8% of this decline in investment can be explained by the contraction in bank lending. Finally, sales decreased by 2%; 21.4% of this reduction in sales can be attributed to the loan supply shock.

Considering the sample of GIIPS firms with a high fraction of revenue generated by non-GIIPS subsidiaries, we find that overall employment fell by 5.6% during the European Sovereign Debt Crisis period. We can attribute 53.6% of this decline to the bank lending supply shock. Similarly, investment fell by 13%, of which 43.2% can be explained by banks' lending behavior. For the evolution of sales, we find an overall decrease of 3.6% over the European Sovereign Debt Crisis period, of which we can explain 37% of the decline.

There are two things to note about these magnitudes. First, perhaps not surprisingly, the reduction in employment, investment, and sales was smaller in non-GIIPS countries, which were less affected by the European Sovereign Debt Crisis, than in GIIPS countries. Second, we can explain less of the overall reduction in employment, investment, and sales in non-GIIPS countries. The main reason for this is that a considerable number of non-GIIPS firms without subsidiaries in GIIPS or other non-EU countries have zero exposure to GIIPS banks, implying that for them $\widetilde{y_{ijht}}$ equals $\widehat{y_{ijht}}$. Put differently, for a substantial number of non-GIIPS firms in this subsample, there are no loan supply disruptions caused by GIIPS banks, implying that, overall, we can explain less of the overall macroeconomic evolution.

IV. Active and Passive Transmission Channels

Given that firms that had a pre-crisis lending relationship with a bank affected by the European Sovereign Debt Crisis suffered significant negative real effects as a result, in this section, we shed more light on how exactly sovereign credit risk translated into the bank lending contraction and the resulting negative real effects for firms. Compared to financial crises, which only impair the banks' financial health, the impact of sovereign crises on bank lending is much more complex. There are at least three potential channels through which banks might have been affected by the sovereign debt crisis: one passive and two active.

The passive channel works through the dramatic increase in risk of GIIPS sovereign debt during the crisis. EBA data show that banks generally had large direct holdings of domestic government debt. Therefore, the increase in risk of GIIPS sovereign debt directly translated into losses that weakened the asset side of GIIPS banks' balance sheets and as a result made these banks riskier (Acharya and Steffen (2015)). This can lead to losses for the banks via three channels: (i) banks sell government bonds realizing a loss; (ii) bonds are in the trading book and therefore marked to market; and (iii) bonds are pledged to the European Central Bank (ECB), which makes margin calls in case the value of the collateral falls. Table A6 in the Online Appendix shows that indeed there was a significant positive relationship between banks' GIIPS sovereign debt holdings and their CDS spreads over the crisis period. To cope with these losses, GIIPS banks might have deleveraged and reduced lending to the private sector (Bocola (2014) explores this mechanism in a theoretical model). We call this the "hit on balance sheet channel". This effect is amplified by the significant withdrawal of wholesale funding by U.S. money market funds (Ivashina et al. (2015)).

To get a better idea of how strongly a bank was affected by the risk of its domestic sovereign portfolio, we construct a similar measure as in Popov and Van Horen (2014), and measure the exposure to domestic sovereign risk of bank b in year t as follows:

$$Domestic\ Sovereign\ Debt\ Risk_{bt} = \frac{Domestic\ Sov.\ Bondholdings_{bt} \cdot CDS_t}{Total\ Assets_{bt}}. \tag{8}$$

Given that the sovereign bondholdings are multiplied with the respective CDS spreads of the bonds, this measure accounts for the amount of bondholdings of the respective bank, as well as for the risk associated with these holdings. We classify a bank as affected if its CDS-weighted holdings of domestic sovereign debt are above the sample median.

The two active channels are the risk-shifting channel and the moral suasion channel. The risk-shifting motive arises since, as the default risk of GIIPS countries increased, highly levered GIIPS banks had an incentive to increase their domestic sovereign bondholdings (Diamond and Rajan (2011); Crosignani (2014)). The reason for this behavior is as follows. In case a bank wants to engage in risk-shifting, it is looking for an asset that is correlated with its other sources of revenue and that, at the same time, offers a comparatively high expected return. In particular, the asset should only generate losses in states of the world in which the bank is in default anyway. Since banks usually have large holdings of domestic government

debt (e.g., the holdings of domestic sovereign bonds of Unicredit and Intesa in mid-2011 amounted to 121% and 175% of their core capital, respectively[18]), they would fail anyway as soon as their domestic government is not able to repay its sovereign debt. Furthermore, during the European Sovereign Debt Crisis, the sovereign debt of GIIPS countries promised a high return, thereby making this asset class very attractive for risk-shifting purposes. In addition, according to the "Capital Requirements Directive" (CRD), European regulators consider that sovereign bonds are risk-free (i.e., attach zero risk weights); thus, banks do not need to hold any capital against potential losses on government bonds. On top of that, European regulators removed the concentration limits for sovereign debt exposures, while a bank's exposure to a single borrowing firm is limited to 25% of its Tier 1 capital. For these reasons, sovereign debt allows larger bets compared to other asset classes, in particular corporate loans. Furthermore, for risk-shifting purposes, corporate loans have in addition the disadvantage that they have an idiosyncratic risk component, while the banks' domestic sovereign debt holdings all default in the same states of the world.

One might argue that, for risk-shifting purposes, banks might have had an incentive to buy the GIIPS sovereign debt that generates the highest yields, which during the European Sovereign Debt Crisis was Greek sovereign debt. However, even though there probably is a positive correlation between the default probability of Greek and other GIIPS sovereign debt, the relationship is far from being perfectly correlated. Since non-Greek GIIPS banks hardly had any exposure to Greek sovereign debt during the European Sovereign Debt Crisis[19], it is very unlikely that non-Greek GIIPS banks would fail if Greece defaults on its sovereign debt. Therefore, for these banks, domestic sovereign debt dominates Greek sovereign debt with regard to its suitability as a risk-shifting asset. Due to liquidity, leverage, and capital constraints induced by market forces and regulatory constraints, this incentive of GIIPS banks' to engage in risk-shifting by loading up on risky domestic sovereign debt might have led to a crowding-out of lending to the private sector during the sovereign debt crisis.

We apply two different measures to identify which banks are weakly-capitalized and thus more prone to risk-shifting behavior. First, we consider a GIIPS bank to be weakly-capitalized if its total equity to total assets ratio (obtained from SNL Financial) at the end

[18] "Europe's Banks Struggle With Weak Bonds" by Landon Thomas Jr., NYTimes.com, August 3, 2011.

[19] In fact, at the beginning of the crisis in early 2010 periphery banks had 90% of their GIIPS sovereign bond holdings from their own sovereign; this number rose to 97% by the end of 2012 (see Crosignani (2014)).

of 2009 is below the sample median. Second, as a robustness check, we use the banks' rating before the sovereign debt crisis (i.e., at the end of 2009) as an alternative measure of bank health. To determine the rating cutoff, we follow Drechsler et al. (2014) and use the ratings (obtained from Bloomberg) from the main rating agencies (Moody's, Standard & Poor's, and Fitch). We then assign a numerical value to each rating: 1 for AAA, 2 for AA+, and so on, and compute the median rating for each bank. This measure has the advantage that it is based on assessments by market participants, rather than on accounting measures.

The second active channel that might have led to a crowding-out of corporate lending is the moral suasion channel (see Becker and Ivashina (2014b)). As the sovereign debt crisis peaked, governments in GIIPS countries faced severe problems in refinancing their debt. In these cases, governments may have turned to their domestic banks and forced them to purchase domestic sovereign debt.

We use three proxies to measure the degree to which banks are prone to the moral suasion of their sovereigns. First, following Acharya and Steffen (2015), we use data about government interventions compiled from information disclosed on the official EU state-aid websites to classify banks into intervened and non-intervened banks.[20] The idea is that intervened banks are more prone to moral suasion as the influence of governments on these banks is arguably larger. We classify a bank as affected if it received some form of financial aid from its government. Second, we follow Iannotta et al. (2013) and compile government bank ownership data from Bankscope. As shown in De Marco and Macchiavelli (2014), government ownership seems to have an influence on banks' domestic sovereign bondholdings as banks with a high government ownership share hold, in general, significant more domestic sovereign debt compared to other banks. We construct an indicator variable "*High Fraction of Government Ownership*", which is equal to one if the share owned by the government for a given bank in a certain year is above the median of the distribution. Lastly, government control over banks can also be measured by government board representation. We follow Becker and Ivashina (2014b) and extract the fraction of directors affiliated with the government from the BoardEx database. For our empirical analysis, we construct an indicator variable equal to one if the fraction of government affiliated directors exceeds the median.

[20]The data can be obtained from: `http://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=3`.

A. Change in Banks' Sovereign Holdings

Both active channels, the risk-shifting and the moral suasion channel, are consistent with an increase in domestic sovereign bondholdings over the crisis period, which makes their disentanglement particularly challenging. Therefore, we start with exploring whether and which banks changed their sovereign debt holdings after the outbreak of the European Sovereign Debt Crisis.

In Figure 3, we plot the evolution of GIIPS (Panel A) and domestic (Panel B) sovereign debt exposure over time for banks incorporated in non-GIIPS countries (left part of graph) and GIIPS countries (right part of graph). The blue solid line shows the evolution of the sum of the respective banks' sovereign bondholdings scaled by the sum of banks' total assets at the end of the respective year. The red dashed line shows the sum of sovereign bondholdings multiplied by the sovereign's CDS spread as a fraction of the sum of total assets.

Figure 3 shows that most of the GIIPS sovereign bondholdings held by GIIPS banks are domestic, implying a very high correlation between measures of bank affectedness based on overall GIIPS sovereign bondholdings and domestic sovereign bondholdings. In addition, Figure 3 indicates that the riskiness of GIIPS sovereign bondholdings spiked in the crisis period, which severely affected the health of GIIPS banks due to their large domestic sovereign bondholdings, as shown by the significant positive relationship between banks' GIIPS sovereign debt holdings and their CDS spreads (see Table A6 in the Online Appendix).

Furthermore, Panel A of Figure 3 shows that, while non-GIIPS banks slightly decreased their GIIPS sovereign debt exposure between 2009 and 2011, GIIPS banks kept their GIIPS sovereign debt holdings constant. Regarding the domestic sovereign debt holdings, Panel B of Figure 3 documents that both GIIPS and non-GIIPS banks hold their domestic sovereign exposure constant in our sample period. Hence, this preliminary evidence is not consistent with the risk-shifting and moral suasion hypotheses.

However, even though GIIPS banks on average did not significantly increase their domestic sovereign bondholdings, as shown in Panel B of Figure 3, we cannot rule out that the risk-shifting channel and the moral suasion channel played an important role for banks' lending behavior and the resulting real effects of borrowing firms. The fact that, on average, the domestic sovereign bondholdings of GIIPS banks do not change is also consistent with distressed banks (i.e., those with high risk-shifting incentives) increasing their holdings, while other banks decrease their domestic sovereign bondholdings. Similarly, only those

GIIPS banks that are very dependent on their governments might be pressured to increase their domestic sovereign bondholdings, while less dependent banks might not. To investigate these possibilities, we analyze the respective subsets of GIIPS banks separately.

We start with the risk-shifting channel and plot the evolution of the domestic sovereign debt exposure over time separately for well-capitalized (low leverage) and weakly-capitalized (high leverage) GIIPS banks. As can be seen from Panel A of Figure 4, weakly-capitalized GIIPS banks increased their holdings of domestic sovereign debt significantly by roughly 4 percentage points of total assets. This indicates that risk-shifting might have played a role for the cutback in lending of highly leveraged banks. To test the robustness of this finding, we use the banks' rating before the sovereign debt crisis (i.e., at the end of 2009) as an alternative measure of bank health. In Panel B of Figure 4, we plot the evolution of the domestic sovereign debt exposure for high-rated GIIPS banks (left part of graph) and low-rated GIIPS banks (right part of graph), where we consider a GIIPS bank to be low-rated if its median rating is below the A+ threshold. Results remain qualitatively unchanged, which again supports the risk-shifting hypothesis. To test whether this increase in domestic sovereign debt holdings of banks prone to risk-shifting is also statistically significant, Table A7 in the Online Appendix presents regression results where the dependent variable is the change in a bank's domestic sovereign debt holdings over the 2009 to 2011 period. As can be seen from Panels A and B, indeed both high leverage and low rating GIIPS banks significantly increased their holdings of domestic sovereign debt during the crisis.

Next, we analyze whether GIIPS banks increased their domestic sovereign bondholdings during the sovereign debt crisis due to pressure from their governments. Panels C–E of Table A7 in the Online Appendix show that for none of the moral suasion proxies (i.e., government intervention, government bank ownership, or government control) there are significant effects on the change in a bank's domestic sovereign debt holdings.

B. Lending

Given that risk-shifting seems to have played an important role for the increase in domestic sovereign debt holdings, while we do not find evidence for moral suasion, we now investigate the importance of the three potential channels, that is, hit on balance sheet, risk-shifting, and moral suasion, for the lending supply contraction formally.

B.1. Methodology

To test the importance of the different channels for the reduction in bank lending, we apply a modified version of the Khwaja and Mian (2008) estimator, which exploits multiple bank-firm relationships before and during the sovereign debt crisis to control for loan demand and other observed and unobserved borrowing firm characteristics.

While we observe a large number of firms borrowing from multiple banks, we face some constraints in data availability, that render it unfeasible to use the original setup of Khwaja and Mian (2008). First, in contrast to their approach, our dataset contains information only at the time of the origination of the loan, which does not allow us to observe changes over time for a particular loan (e.g., on credit line drawdowns). Second, the syndicated loans in our sample generally have long maturities. Taken together, these two facts imply that a large number of observations in our sample experience no significant year-to-year change in bank-firm lending relationships. This requires us to modify the Khwaja and Mian (2008) estimator and aggregate firms into clusters to generate enough time series bank lending heterogeneity to meaningfully apply the estimator to our data. In particular, we track the evolution of the lending volume and loan spreads from a specific bank to a certain firm cluster.

To this end, we form firm clusters based on the following three criteria, which capture important drivers of loan demand, as well as the quality of firms in our sample: (1) the country of incorporation; (2) the industry; and (3) the firm rating. The main reason for aggregating firms based on the first two criteria is that firms in a particular industry in a particular country probably share a lot of firm characteristics and were thus likely affected in a similar way by macroeconomic developments during our sample period. Our motivation behind forming clusters based on credit quality follows from theoretical research in which credit quality is an important source of variation driving a firm's loan demand (e.g., Diamond (1991)). To aggregate firms into clusters, we assign ratings estimated from interest coverage ratio medians for firms by rating category provided by Standard & Poor's.[21] This approach exploits the fact that our measure of credit quality, which is based on accounting information, is monotone across credit categories (Standard&Poor's (2006)). We follow Standard & Poor's and assign ratings on the basis of the three-year median interest coverage ratio of each firm, where the median is calculated from the period preceding the sovereign debt crisis.

[21]Note that only a small fraction of all firms in our sample have a rating from one of the rating agencies.

We use the following panel regression to estimate the annual change in loan volume provided by bank b in country j to firm cluster m in year t:

$$\begin{aligned} \Delta Volume_{bjmt+1} &= \beta_1 \cdot GIIPS\ Bank_{bj} \cdot Crisis_{bt} \\ &+ \beta_2 \cdot Affected\ GIIPS\ Bank_{bj} \cdot Crisis_{bt} \\ &+ \gamma \cdot X_{bjt} + Firm\ Cluster_m \cdot Year_{t+1} \\ &+ Firm\ Cluster_m \cdot Bank_{bj} + u_{bjmt+1}. \end{aligned} \tag{9}$$

The unit of observation is a bank-year-firm cluster. Besides controlling for bank characteristics (log of total assets, capital ratio, ratio of impaired loans to equity) we add firm-cluster times year fixed effects. This allows us to control for any observed and unobserved characteristics that are shared by firms in the same cluster and that might influence loan outcomes. Moreover, we interact firm-cluster and bank fixed effects. Thereby, we exploit the variation within the same firm cluster and bank over time. This not only controls for any unobserved characteristics that are shared by firms in the same cluster, or bank heterogeneity, but also for relationships between firms in a given cluster and the respective bank.

B.2. Results

Panel A of Table VII presents the results for the change in lending volume. The dependent variable represents the annual change in loan volume provided by a given bank to a given firm cluster. To examine whether the results for the financial and real effects of borrowing firms from Section III are indeed associated with a reduction in bank lending, we start with our broad measure for a bank's affectedness (i.e., the banks' country of incorporation) used to capture all three potential channels. Column (1) of Panel A in Table VII presents the results for this proxy. The coefficient of the GIIPS bank dummy during the crisis period is negative and statistically significant, which is consistent with the interpretation that GIIPS banks significantly decreased their lending volume to the real sector during the sovereign debt crisis. This finding thus supports the results presented in Section III that the lending contraction of banks affected by the crisis was an important driver for the negative real effects experienced by their borrowing firms.

In the following, we present the results for the three potential channels that may affect the lending behavior of banks to the real sector. Column (2) in Panel A of Table VII shows

the results for the hit on balance sheet channel. The coefficient of the sovereign risk dummy variable interacted with the crisis dummy variable is negative and significant. This finding indicates that banks with larger sovereign risk in their portfolios reduced lending during the crisis by a larger fraction than banks with lower sovereign risk exposure.[22] Therefore, the risk associated with the sovereign bondholdings and thus the losses incurred due to the sovereign debt crisis indeed play an important role for the lending behavior of banks.

Next, we test whether the reduction in bank lending is also driven by risk-shifting incentives, that is, whether weakly-capitalized GIIPS banks, which increased their domestic sovereign bondholdings during the sovereign debt crisis, also decreased their corporate lending. The results are presented in columns (3) and (4) in Panel A of Table VII. We find that weakly-capitalized GIIPS banks cut their lending to the real sector more than well-capitalized GIIPS banks, irrespective of how we proxy for risk-shifting incentives. These results indicate that the active increase in domestic sovereign bondholdings, shown in Figures 4, results in a crowding-out of private sector lending by weakly-capitalized GIIPS banks.

Finally, we examine whether the moral suasion channel affects bank lending during the sovereign debt crisis. Columns (5)–(7) of Table VII present the results for our three proxies for moral suasion: government interventions, government ownership, and government control over banks. The point estimates of the three proxies for moral suasion interacted with the crisis indicator variable are not significantly different from zero. For example, the interaction of the intervened GIIPS bank variable with the crisis indicator variable is zero in magnitude and not statistically significant. Overall, we do not find evidence that moral suasion has played a role in the banks' lending decisions in our sample period.

Panel B of Table VII shows the robustness of our results when we use the change in the spread of newly issued loans instead of the change in volume as the dependent variable. We find qualitatively similar results here. Taken together, our evidence indicates that the balance sheet hit caused by the increase in sovereign risk and the risk-shifting channel are of first-order importance regarding the effect of the sovereign debt crisis on bank lending behavior. However, we note that GIIPS banks might have engaged in even greater risk-shifting and/or might have been forced by their governments to buy domestic debt after

[22] As described above, for most banks the majority of their sovereign bondholdings are domestic, which is why the coefficients for the domestic and GIIPS sovereign risk exposure measures are very similar in magnitude. For brevity, we only report the results for the domestic sovereign risk exposure measures.

the end of our sample period, that is, after 2012. Furthermore, GIIPS governments might have implicitly encouraged banks to engage in risk-shifting by implementing regulations that favor such behavior. Alternatively, governments might not have faced the need to pressure banks into buying more domestic sovereign debt since the weakly-capitalized banks did so anyway. Finally, government moral suasion could have been stronger for less healthy banks as they were likely to need government assistance in the future.

C. Financial and Real Outcomes

C.1. Methodology

We now examine which of the three channels contributed to the financial and real effects of borrowing firms. We apply regressions similar to the ones from Eqs. (2) and (4). In addition, we construct several variables denoted *Affected Bank Dep.* at the firm-year level, reflecting how much credit comes from affected banks in a given year, where we distinguish between affected and non-affected banks using the same proxies as in Table VII. The computation is similar to Eq. (1), with the only difference being that $\Phi_l = \sum_{b \in l} \mathit{Affected}_b$, where $\mathit{Affected}_b$ is a dummy variable that indicates whether lead arranger bank b is affected through the respective channel, in which case it is equal to one and otherwise it is zero. For the firms' employment and sales growth rates, as well as their net debt, interest coverage ratio, and investment levels, we estimate the following panel regressions:

$$\begin{aligned} y_{ijht+1} &= \beta_1 \cdot \mathit{GIIPS\ Bank\ Dependence}_{ijht} \\ &+ \beta_2 \cdot \mathit{Affected\ Bank\ Dependence}_{ijht} \\ &+ \beta_3 \cdot \mathit{Affected\ GIIPS\ Bank\ Dependence}_{ijht} \\ &+ \beta_4 \cdot \mathit{GIIPS\ Bank\ Dependence\ in\ Crisis}_{ijht} \\ &+ \beta_5 \cdot \mathit{Affected\ GIIPS\ Bank\ Dependence\ in\ Crisis}_{ijht} \\ &+ \gamma \cdot X_{ijht} + \mathit{Firm}_{ijh} + \mathit{Industry}_h \cdot \mathit{Country}_j \cdot \mathit{Year}_{t+1} \\ &+ \mathit{ForeignBankCountry}_{k \neq j} \cdot \mathit{Year}_{t+1} + u_{ijht+1}. \end{aligned} \tag{10}$$

Affected GIIPS Bank Dependence is also computed similar to Eq. (1), with the only difference being that now $\Phi_l = \sum_{b \in l} \mathit{Affected}_b \cdot \mathit{GIIPS}_b$, whereas *Affected GIIPS Bank Dependence*

in Crisis is calculated similar to Eq. (3), with the only difference being that now $\Gamma_l = \sum_{b \in l} Affected_b \cdot GIIPS_b \cdot Crisis_{bt}$. The unit of observation is again a firm-year. Our key variable of interest in regression Eq. (10) is the firms' dependence on affected GIIPS banks during the crisis (β_5 in Eq. (10)). If affected GIIPS banks reduced their loan supply during the crisis, we expect that firms with lending relationships to these banks should incur negative real effects, that is, we expect β_5 in Eq. (10) to be negative. Along the same lines, we modify the regression from Eq. (2) to analyze the change in the cash flow sensitivity of cash during the crisis.

C.2. Results

We begin by reporting results for the passive bank lending channel, that is, whether the increase in sovereign risk that induced banks to deleverage and thus decrease their corporate lending, affected borrowing firms by making them financially constrained. The results are presented in Table VIII. In Panel A, the affected indicator variable is equal to one if a bank's GIIPS sovereign portfolio credit risk exposure is above the sample median. In Panel B, the domestic sovereign portfolio credit risk exposure is used to distinguish between affected and non-affected banks. The coefficient of the variable for being dependent on an affected bank in the crisis period is negative and significant for all dependent variables. Therefore, Panels A and B show that the hit on the affected banks' balance sheets resulted in negative financial and real effects for firms that have a lending relationship with these banks.

Next, we examine whether the active bank lending channels, that is, the risk-shifting and the moral suasion channel, led to real effects for borrowing firms. Table IX reports results for the risk-shifting channel. The affected bank measure is based on the GIIPS banks' leverage (Panel A) or rating (Panel B), respectively. The results for both bank health proxies indicate that the real effects were much stronger for firms that have a lending relationship with a GIIPS bank that was weakly-capitalized and thus not able to cope with losses due to the sovereign debt crisis. These banks engaged in risk-shifting by increasing their risky domestic sovereign bondholdings. This behavior decreased bank lending even more compared to well-capitalized GIIPS banks that were better able to manage their losses incurred during the sovereign debt crisis and thus had less or no risk-shifting incentives.

Finally, the results for the moral suasion proxies are presented in Table X. We find that our moral suasion proxies do not appear to have an effect on the corporate policies of bor-

rowing firms. Neither government interventions, nor government board seats or government ownership have any explanatory power in the cross-section. This is consistent with the fact that there is now statistical significant relationship between our moral suasion proxies and the lending behavior of banks in our sample. Therefore, banks' exposures to impaired sovereign debt and risk-shifting behavior of undercapitalized banks seem to be of first-order importance for explaining the negative real effects suffered by European firms, while we find no evidence that moral suasion by governments to buy more domestic sovereign debt has played a major role.

V. Conclusion

In this paper, we show that the European Sovereign Debt Crisis and the resulting credit crunch in the eurozone periphery caused significant negative real effects for borrowing firms in Europe. We find that firms that had a pre-crisis lending relationship with banks that suffered from the sovereign debt crisis became financially constrained during the crisis. As a result, these firms had on average lower employment growth rates, lower levels of investment, and lower sales growth rates. This holds true for both GIIPS and non-GIIPS firms.

Moreover, we shed light on the question of how the European Sovereign Debt Crisis actually induced a contraction in bank lending and the resulting real effects for borrowing firms. We document that the negative real effects that can be attributed to the bank lending channel are primarily associated with (i) banks from GIIPS countries facing losses on their substantial domestic sovereign bondholdings, and (ii) the resulting incentives of undercapitalized banks from GIIPS countries to engage in risk-shifting behavior by buying even more domestic sovereign bonds, thereby crowding out corporate lending.

Therefore, our findings foster the understanding of the unfolding of the European Sovereign Debt Crisis and yield important insights on how to overcome the economic recession in the periphery of the eurozone. Our results indicate that an effective bank recapitalization could significantly contribute to the economic recovery in Europe, since the pressure to deleverage due to the banks' weakened financial health and the resulting risk-shifting incentives of undercapitalized banks seem to be the most important determinants for the stagnation of bank lending in Europe and, in turn, the firms' low investment levels.

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Table I - Variable Definitions

Variable	**Definition**
Dependent Variables (winsorized at the 5% level)	
Net Debt	$\frac{Current\ +\ Non\text{-}Current\ Liabilities\ -\ Cash}{Total\ Assets}$
$\Delta Cash$	$\frac{Cash_{t+1} - Cash_t}{Total\ Assets_t}$
Interest Coverage Ratio	$\frac{EBIT}{Interest\ Expense}$
Employment Growth	$ln(Employment_{t+1}) - ln(Employment_t)$
CAPX	$\frac{Fixed\ Assets_{t+1} - Fixed\ Assets_t + Depreciation}{Fixed\ Assets_t}$, set to 0 if negative
Sales Growth	$ln(Sales_{t+1}) - ln(Sales_t)$
Key Explanatory Variables	
$Crisis_{bt}$	Dummy equal to one if bank b's country of incorporation is in crisis period at time t
$GIIPS\ Bank\ Dependence_{ijht}$	$\frac{\sum_{l \in L_{ijh,min\{t,t_i\}}} \frac{\sum_{b \in l} GIIPS_b}{\#Lead\ Arranger_l} \cdot Loan\ Amount_l}{Total\ Loan\ Amount_{ijh,min\{t,t_i\}}}$
$GIIPS\ Bank\ Dependence\ in\ Crisis_{ijht}$	$\frac{\sum_{l \in L_{ijht_i}} \frac{\sum_{b \in l} GIIPS_b \cdot Crisis_{bt}}{\#Lead\ Arranger_l} \cdot Loan\ Amount_l}{Total\ Loan\ Amount_{ijht_i}}$
$Affected\ Bank\ Dependence_{ijht}$	$\frac{\sum_{l \in L_{ijh,min\{t,t_i\}}} \frac{\sum_{b \in l} Affected_b}{\#Lead\ Arranger_l} \cdot Loan\ Amount_l}{Total\ Loan\ Amount_{ijh,min\{t,t_i\}}}$
$Affected\ GIIPS\ Bank\ Dependence_{ijht}$	$\frac{\sum_{l \in L_{ijh,min\{t,t_i\}}} \frac{\sum_{b \in l} Affected_b \cdot GIIPS_b}{\#Lead\ Arranger_l} \cdot Loan\ Amount_l}{Total\ Loan\ Amount_{ijh,min\{t,t_i\}}}$
$Affected\ GIIPS\ Bank\ Dependence\ in\ Crisis_{ijht}$	$\frac{\sum_{l \in L_{ijht_i}} \frac{\sum_{b \in l} Affected_b \cdot GIIPS_b \cdot Crisis_{bt}}{\#Lead\ Arranger_l} \cdot Loan\ Amount_l}{Total\ Loan\ Amount_{ijht_i}}$
Affected Bank Measures	
CDS Weighted GIIPS Sov. Bondholdings	Banks with an above median ratio of $\frac{\sum_j \text{Sov. Bondholdings}_{jt} \cdot \text{CDS}_{jt}}{\text{Total Assets}_t}$, $\forall j \in$ GIIPS
CDS Weighted Domestic Sov. Bondholdings	Banks with an above median ratio of $\frac{Domestic\ Sov.\ Bondholdings_t \cdot Domestic\ Sov.\ CDS_t}{Total\ Assets_t}$
High Leverage	Banks with a below median ratio of $\frac{Total\ Equity}{Total\ Assets}$
Low Rating	Banks with a rating of A+ or worse
Gov. Intervention	Banks that received government support during the sovereign debt crisis
High Fraction Gov. Own.	Banks with an above median fraction of government ownership
High Fraction Gov. Board	Banks with an above median fraction of government affiliated directors on the board
Control Variables (winsorized at the 5% level)	
$\ln(Assets)$	Natural logarithm of total assets
Leverage	$\frac{Total\ Assets\text{-}Total\ Equity}{Total\ Assets}$
Net Worth	$\frac{Total\ shareholder\ funds\&Liabilities\ -\ Current\&Non\text{-}Current\ Liabilities\ -\ Cash}{Total\ Assets}$
Tangibility	$\frac{Fixed\ Assets}{Total\ Assets}$
EBITDA/Assets	$\frac{EBITDA}{Total\ Assets}$
Cash Flow	$\frac{Cash\ flow}{Total\ Assets}$

Table II - Descriptive Statistics pre-Crisis

Panel A: Dependent Variables		**Panel B: Explanatory Variables**								
		Emp. Growth	CAPX	Sales Growth	Total Assets (mn)	Tangibility	Int. Cov.	Net Worth	EBITDA/Assets	Leverage
	Mean	0.054	0.195	0.057	4330	0.610	2.98	0.220	0.108	0.620
High GIIPS Bank Dep.	Median	0.033	0.116	0.056	737	0.632	1.94	0.206	0.104	0.619
	Std. Dev.	0.157	0.243	0.221	7710	0.211	3.32	0.174	0.075	0.198
	Mean	0.045	0.192	0.049	2460	0.547	3.24	0.227	0.115	0.604
Low GIIPS Bank Dep.	Median	0.021	0.112	0.052	416	0.557	2.06	0.233	0.104	0.592
	Std. Dev.	0.162	0.249	0.205	5370	0.240	3.50	0.187	0.098	0.256
Diff.		0.009	0.003	0.007	3050	0.062	-0.267	-0.007	-0.0062	0.163
(t-Stat)		(1.14)	(0.25)	(0.69)	(7.08)	(5.55)	(-1.58)	(-0.84)	(-1.41)	(1.41)
Normalized Diff.					0.242	0.197	-0.053	-0.027	-0.056	0.049
Correlation with GIIPS Bank Dep.					-0.037	0.087	-0.116	-0.064	-0.127	0.117

Panel A presents descriptive statistics of dependent variables while Panel B presents explanatory variables split into firms with a high and low *GIIPS Bank Dependence*. High (low) *GIIPS Bank Dependence* is an indicator variable equal to one if the fraction of total outstanding loans to a firm provided by GIIPS lead arrangers is above (below) the sample median. The sample consists of all firms in the intersection of DealScan and Amadeus that are located in: Greece, Italy, Ireland, Portugal, Spain (GIIPS countries) or Germany, France, U.K. (non-GIIPS countries).

Table II - Descriptive Statistics (contd.)

Panel C: Non-GIIPS firms without GIIPS or other non-EU subsidiaries							
		Total Assets (mn)	Tangibility	Int. Cov.	Net Worth	EBITDA/Assets	Leverage
High GIIPS Bank Dep.	Mean	6330	0.580	1.968	0.200	0.087	0.664
	Median	1370	0.527	1.340	0.182	0.085	0.673
	Std. Dev.	10200	0.223	2.546	0.132	0.048	0.139
Low GIIPS Bank Dep.	Mean	8710	0.559	1.939	0.210	0.101	0.646
	Median	2560	0.558	1.300	0.180	0.099	0.678
	Std. Dev.	12000	0.167	2.540	0.143	0.062	0.128
Diff. (*t*-Stat)		-2380 (-1.37)	-0.0208 (-0.68)	-0.028 (-0.07)	0.010 (0.50)	-0.0145 (-1.35)	0.0177 (0.84)
Normalized Diff.		-0.151	-0.075	-0.008	0.051	-0.178	0.095
Correlation with GIIPS Bank Dep.		-0.07	-0.03	0	0.01	-0.09	-0.02

Panel D: GIIPS firms with high fraction of revenue generated by non-GIIPS subsidiaries							
High GIIPS Bank Dep.	Mean	1080	0.536	3.508	0.208	0.118	0.662
	Median	495	0.570	2.540	0.216	0.106	0.625
	Std. Dev.	2980	0.240	3.358	0.209	0.070	0.228
Low GIIPS Bank Dep.	Mean	1310	0.564	2.855	0.210	0.105	0.655
	Median	233	0.579	1.855	0.199	0.093	0.630
	Std. Dev.	3510	0.284	3.036	0.225	0.082	0.295
Diff. (*t*-Stat)		-224 (-0.47)	0.027 (0.70)	-0.653 (-1.52)	-0.001 (-0.04)	-0.012 (-1.11)	0.006 (0.16)
Normalized Diff.		0.049	0.075	-0.142	-0.006	-0.120	0.018
Correlation with GIIPS Bank Dep.		-0.037	0.087	-0.092	-0.064	-0.127	0.169

Panels C and D present descriptive statistics of explanatory variables for the pre-crisis period. Panel C reports summary statistics for non-GIIPS firms without GIIPS or other non-EU subsidiaries and Panel D reports results for GIIPS firms with a high fraction of revenue generated by non-GIIPS subsidiaries. Both panels are split into firms with high and low *GIIPS Bank Dependence* (subsample specific cutoff points are used to classify firms as high or low *GIIPS Bank Dependence*). Panel C includes firms located in Germany, France, or U.K. (non-GIIPS countries) that do not have subsidiaries located in Greece, Italy, Ireland, Portugal, or Spain (GIIPS countries) or any other non-EU country. Panel D includes firms in GIIPS countries that have a high fraction of their revenues generated by non-GIIPS subsidiaries.

Table II - Descriptive Statistics (contd.)

Panel E: GIIPS vs. non-GIIPS Banks						
		Total Assets (mn)	Equity/Assets	Impaired Loans/Equity	Tier1 Ratio	Avg 5-year CDS Spread
GIIPS Banks	Mean	192330	0.064	0.376	0.085	60.79
	Median	80378	0.062	0.325	0.080	60.95
	Std. Dev.	260356	0.018	0.271	0.025	18.34
Non-GIIPS Banks	Mean	658094	0.030	0.412	0.087	60.27
	Median	412977	0.027	0.351	0.086	44.49
	Std. Dev.	658926	0.013	0.276	0.018	45.07
	Diff. (*t*-Stat)	-465763 (-6.07)	0.034 (13.03)	-0.035 (0.76)	-0.001 (-0.51)	0.5 (0.04)
	Normalized Diff.	-0.657	1.531	-0.093	-0.064	0.017
Panel F: Non-GIIPS Banks						
High fraction GIIPS syndicates	Mean	710191	0.030	0.35	0.087	63.62
	Median	419654	0.025	0.27	0.087	45.24
	Std. Dev.	622090	0.013	0.25	0.018	54.18
Low fraction GIIPS syndicates	Mean	573659	0.034	0.48	0.088	55.00
	Median	223165	0.033	0.43	0.082	42.72
	Std. Dev.	717822	0.010	0.29	0.019	28.46
	Diff. (*t*-Stat)	136532 (0.87)	-0.004 (-1.55)	-0.012 (-1.81)	-0.001 (-0.12)	-8.61 (-0.38)
	Normalized Diff.	0.178	-0.243	-0.336	-0.038	-0.140

Panels E and F present descriptive statistics for the banks in our sample in the pre-crisis period. Panel E compares GIIPS and non-GIIPS banks, while Panel F compares non-GIIPS banks with an above and below median fraction of deals issued with GIIPS Banks. Non-GIIPS banks are headquartered in Germany, France, or U.K. (non-GIIPS countries), whereas GIIPS banks are headquartered in Greece, Italy, Ireland, Portugal, or Spain (GIIPS countries).

Table III - Real and Financial Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Net Debt	ΔCash	Int. Cov.	$\frac{TotalCreditLine}{Cash+TotalCreditLine}$	$\frac{UndrawnCreditLine}{Cash+UndrawnCreditLine}$	Emp. Growth	CAPX	Sales Growth
GIIPS Bank Dep. in Crisis	-0.039***	0.003	-0.023***	-0.091**	-0.164***	-0.041***	-0.060***	-0.049***
	(-2.98)	(0.73)	(-2.82)	(-2.31)	(-3.33)	(-2.97)	(-2.70)	(-2.96)
Cash Flow*GIIPS Bank Dep.		-0.003						
		(-0.50)						
Cash Flow*GIIPS Bank Dep. in Crisis		0.007**						
		(2.44)						
Cash Flow		0.000						
		(0.10)						
R^2	0.543	0.442	0.395	0.831	0.841	0.423	0.587	0.494
N	4448	4003	4710	507	507	3781	4351	4214
Firm Controls	YES	YES	YES	YES	YES	YES	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Industry*Country*Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Foreign Bank Country*Year Fixed Effects	YES	YES	YES	NO	NO	YES	YES	YES

Table III presents firm-level regression results. The dependent variables are net debt, the change in cash holdings, interest coverage ratio, credit lines ratio, undrawn credit lines ratio, employment growth, investments, and sales growth, respectively. The sample consists of all firms in the intersection of DealScan and Amadeus that are located in: Greece, Italy, Ireland, Portugal, Spain (GIIPS countries) or Germany, France, U.K. (non-GIIPS countries) for the employment growth, investments, sales growth, net debt and cash flow regressions. For the credit line regressions, the sample consists of all firms in the intersection of DealScan, Amadeus, and Capital IQ that are located in a GIIPS or non-GIIPS country. *GIIPS Bank Dependence* is the fraction of total outstanding loans provided by GIIPS lead arrangers. *GIIPS Bank Dependence in Crisis* is the fraction of total outstanding loans provided by GIIPS lead arrangers that are incorporated in a crisis country in year t, where the crisis begins in Greece in 2009 and in 2010 in the other GIIPS countries. Firm control variables include the logarithm of total assets, tangibility, interest coverage ratio (not in Column (3)), EBITDA/total assets, leverage, net worth and for the cash regression a firm's cash flow and capital expenditures. All firm-level control variables are lagged by one period. All variables are defined in Table I. All regressions include firm and industry-country-year fixed effects, as well as all firm-level controls. Columns (1)-(2) and (5)-(7) additionally include foreign bank country-year fixed effects. Standard errors are adjusted for heteroscedasticity and clustered at the firm-level. Significance levels: * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$).

Table IV - Subsidiaries

	(1) Net Debt	(2) ΔCash	(3) Int. Cov.	(4) Emp. Growth	(5) CAPX	(6) Sales Growth
Panel A: Non-GIIPS Firms without GIIPS or other non-EU Subsidiaries						
GIIPS Bank Dep. in Crisis	-0.061**	-0.037	-0.056**	-0.097***	-0.093**	-0.074**
	(-2.59)	(-1.14)	(-2.01)	(-2.95)	(-2.07)	(-2.16)
Cash Flow*GIIPS Bank Dep. in Crisis		0.177***				
		(3.12)				
R^2	0.496	0.475	0.370	0.419	0.583	0.443
N	1175	997	1272	892	1107	1079
Panel B: Non-GIIPS Firms without GIIPS Subsidiaries (M&A only)						
GIIPS Bank Dep. in Crisis	-0.038*	0.009	-0.045**	-0.079***	-0.090***	-0.078**
	(-1.93)	(0.30)	(-2.54)	(-3.54)	(-3.26)	(-2.22)
Cash Flow*GIIPS Bank Dep. in Crisis		0.161**				
		(2.14)				
R^2	0.503	0.496	0.376	0.435	0.585	0.449
N	1066	895	1136	806	999	976
Panel C: Non-GIIPS Firms without GIIPS Subsidiaries (non-tradable sectors)						
GIIPS Bank Dep. in Crisis	-0.041**	-0.048	-0.059**	-0.089**	-0.061*	-0.083***
	(-2.41)	(-1.19)	(-2.16)	(-2.10)	(-1.79)	(-2.65)
Cash Flow*GIIPS Bank Dep. in Crisis		0.182***				
		(3.58)				
R^2	0.546	0.507	0.448	0.456	0.624	0.480
N	1007	864	1082	743	942	919
Panel D: Non-GIIPS Firms with GIIPS Subsidiaries						
GIIPS Bank Dep. in Crisis	-0.002	-0.005	-0.017	-0.027*	-0.010	-0.014
	(-0.10)	(-0.91)	(-1.24)	(-1.93)	(-0.48)	(-0.74)
Cash Flow*GIIPS Bank Dep. in Crisis		0.041**				
		(2.49)				
R^2	0.561	0.379	0.301	0.344	0.600	0.446
N	1315	1282	1333	1192	1304	1302
Firm Controls	YES	YES	YES	YES	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Industry*Year Fixed Effects	YES	YES	YES	YES	YES	YES
Foreign Bank Country*Year Fixed Effects	YES	YES	YES	YES	YES	YES

Table IV presents firm-level regression results. The dependent variables are net debt, the change in cash holdings, interest coverage ratio, employment growth, investments, and sales growth, respectively. The sample consists of firms in the intersection of DealScan and Amadeus. Panel A–C only include firms in Germany, France, or U.K. (non-GIIPS countries) that do not have subsidiaries in Greece, Italy, Ireland, Portugal, or Spain (GIIPS countries) or any other non-EU country. Panel B restricts the sample further to firms that have their GIIPS bank relationships because of bank M&As, whereas Panel C restricts it to firms active in non-tradable sectors. Panel D includes only firms in non-GIIPS countries that have at least one GIIPS subsidiary. *GIIPS Bank Dependence* is the fraction of total outstanding loans provided by GIIPS lead arrangers. *GIIPS Bank Dependence in Crisis* is the fraction of total outstanding loans provided by GIIPS lead arrangers that are incorporated in a crisis country in year t, where the crisis begins in Greece in 2009 and in 2010 in the other GIIPS countries. Firm control variables include the logarithm of total assets, leverage, net worth, tangibility, interest coverage ratio (not in Column (3)), and EBITDA/total assets and for the cash regression a firm's cash flow and capital expenditures. All firm-level control variables are lagged by one period. All variables are defined in Table I. All regressions include firm, industry-year, and foreign bank country-year fixed effects, as well as all firm-level controls. Standard errors are adjusted for heteroscedasticity and clustered at the firm-level. Significance levels: * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$).

Table V - Firms' Ability to substitute Loan Supply Decrease

	(1) Net Debt	(2) ΔCash	(3) Int. Cov.	(4) Emp. Growth	(5) CAPX	(6) Sales Growth
Panel A: Listed Firms						
GIIPS Bank Dep. in Crisis	0.013	0.013*	-0.004	-0.038	-0.018	-0.037
	(0.68)	(1.95)	(-0.28)	(-1.41)	(-0.62)	(-1.36)
Cash Flow*GIIPS Bank Dep. in Crisis		-0.005				
		(-1.41)				
R^2	0.669	0.569	0.482	0.552	0.673	0.648
N	1805	1772	1832	1737	1786	1748
Panel B: Non-listed Firms						
GIIPS Bank Dep. in Crisis	-0.045**	0.003	-0.039**	-0.047**	-0.073**	-0.056**
	(-2.31)	(0.50)	(-2.52)	(-2.20)	(-2.12)	(-2.06)
Cash Flow*GIIPS Bank Dep. in Crisis		0.010**				
		(2.46)				
R^2	0.637	0.558	0.540	0.548	0.678	0.592
N	2643	2231	2878	2044	2565	2466
Panel C: Rated Firms						
GIIPS Bank Dep. in Crisis	-0.037	0.033	-0.002	-0.033	-0.056	-0.043
	(-1.15)	(1.59)	(-0.02)	(-1.10)	(-1.50)	(-1.22)
Cash Flow*GIIPS Bank Dep. in Crisis		-0.034				
		(-1.26)				
R^2	0.763	0.787	0.7344	0.739	0.764	0.826
N	572	562	586	539	565	546
Panel D: Unrated Firms						
GIIPS Bank Dep. in Crisis	-0.043***	0.005	-0.030***	-0.043***	-0.070***	-0.050***
	(-2.87)	(0.98)	(-2.87)	(-2.71)	(-2.96)	(-2.63)
Cash Flow*GIIPS Bank Dep. in Crisis		0.008***				
		(2.75)				
R^2	0.568	0.468	0.4241	0.461	0.614	0.502
N	3876	3441	4124	3242	3786	3668
Panel E: Firms with Bond Issues						
GIIPS Bank Dep. in Crisis	-0.012	-0.001	0.015	-0.028	-0.099	-0.056
	(-0.25)	(-0.07)	(1.12)	(-0.56)	(-1.40)	(-0.71)
Cash Flow*GIIPS Bank Dep. in Crisis		-0.004				
		(-0.10)				
R^2	0.843	0.836	0.801	0.798	0.833	0.764
N	354	334	363	328	349	339
Panel F: Firms without Bond Issues						
GIIPS Bank Dep. in Crisis	-0.043***	0.004	-0.028***	-0.040***	-0.067***	-0.043**
	(-2.88)	(0.84)	(-2.99)	(-2.61)	(-2.79)	(-2.35)
Cash Flow*GIIPS Bank Dep. in Crisis		0.007**				
		(2.39)				
R^2	0.552	0.444	0.412	0.439	0.596	0.493
N	4094	3669	4347	3453	4002	3875

Table V presents firm-level regression results. The dependent variables are net debt, the change in cash holdings, interest coverage ratio, employment growth, investments, and sales growth, respectively. The sample consists of all firms in the intersection of DealScan and Amadeus and located in: Greece, Italy, Ireland, Portugal, Spain (GIIPS countries) or Germany, France, U.K. (non-GIIPS countries). Panel A (B) includes listed (non-listed) firms. Panel C (D) includes rated (unrated) firms. Panel E (F) includes firms that did (did not) issue bonds during the sample period. *GIIPS Bank Dependence* is the fraction of total outstanding loans provided by GIIPS lead arrangers. *GIIPS Bank Dependence in Crisis* is the fraction of total outstanding loans provided by GIIPS lead arrangers that are incorporated in a crisis country in year t, where the crisis begins in Greece in 2009 and in 2010 in the other GIIPS countries. Firm control variables include the logarithm of total assets, leverage, net worth, tangibility, interest coverage ratio (not in Column (3)), and EBITDA/total assets and for the cash regression a firm's cash flow and capital expenditures. All firm-level control variables are lagged by one period. All variables are defined in Table I. All regressions include firm, industry-country-year, and foreign bank country-year fixed effects (not Panel C and E), as well as all firm-level controls. Standard errors are adjusted for heteroscedasticity and clustered at the firm-level. Significance levels: * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$).

Table VI - Switcher vs. non-Switcher

	(1)	(2)	(3)	(4)	(5)	(6)
	Net Debt	ΔCash	Int. Cov.	Emp. Growth	CAPX	Sales Growth
Panel A: Firms with constant *GIIPS Bank Dependence*						
GIIPS Bank Dep. in Crisis	-0.044***	0.002	-0.021*	-0.043**	-0.074***	-0.047**
	(-2.74)	(0.28)	(-1.94)	(-2.29)	(-2.81)	(-2.12)
Cash Flow*GIIPS Bank Dep. in Crisis		0.011***				
		(3.35)				
R^2	0.598	0.482	0.423	0.476	0.647	0.525
N	3405	3016	3607	2795	3326	3237
Panel B: Firms that switch their Bank Relationships						
GIIPS Bank Dep. in Crisis	-0.011	0.002	-0.018	-0.014	-0.018	0.008
	(-0.44)	(0.29)	(-0.88)	(-0.58)	(-0.54)	(0.19)
Cash Flow*GIIPS Bank Dep. in Crisis		0.002				
		(0.22)				
R^2	0.781	0.720	0.711	0.753	0.761	0.772
N	1043	987	1103	986	1025	977

Panel C: Switcher vs. non-Switcher

	Listed	Non-Listed	Cum.
Switcher	62.38%	37.62%	100%
Non-Switcher	27.27%	72.73%	100%

Table VI presents firm-level regression results. The dependent variables are net debt, the change in cash holdings, interest coverage ratio, employment growth, investments, and sales growth, respectively. The sample consists of all firms in the intersection of DealScan and Amadeus and located in: Greece, Italy, Ireland, Portugal, Spain (GIIPS countries) or Germany, France, U.K. (non-GIIPS countries). Panel A includes firms that have a constant *GIIPS Bank Dependence* throughout the sample period, whereas Panel B firms that switch their bank relationships. Finally, Panel C reports the fraction of firms with constant *GIIPS Bank Dependence* (non-switcher) in the listed and non-listed subsamples. *GIIPS Bank Dependence* is the fraction of total outstanding loans provided by GIIPS lead arrangers. *GIIPS Bank Dependence in Crisis* is the fraction of total outstanding loans provided by GIIPS lead arrangers that are incorporated in a crisis country in year t, where the crisis begins in Greece in 2009 and in 2010 in the other GIIPS countries. Firm control variables include the logarithm of total assets, leverage, net worth, tangibility, interest coverage ratio (not in Column (3)), and EBITDA/total assets and for the cash regression a firm's cash flow and capital expenditures. All firm-level control variables are lagged by one period. All variables are defined in Table I. All regressions include firm, industry-country-year, and foreign bank country-year fixed effects, as well as all firm-level controls. Standard errors are adjusted for heteroscedasticity and clustered at the firm-level. Significance levels: * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$).

Table VII - Lending Volume and Spread

	(1) ΔVolume	(2) ΔVolume	(3) ΔVolume	(4) ΔVolume	(5) ΔVolume	(6) ΔVolume	(7) ΔVolume
Panel A: Loan Volume							
GIIPS*Crisis	-0.046**		-0.018	-0.045*	-0.068**	-0.046*	-0.039*
	(-2.04)		(-0.71)	(-1.74)	(-2.12)	(-1.78)	(-1.66)
CDS Weighted Dom. Bondholdings*Crisis		-0.048**					
		(-2.00)					
High Leverage*GIIPS*Crisis			-0.076**				
			(-2.04)				
Low Rating*GIIPS*Crisis				-0.096**			
				(-1.97)			
Gov. Intervention*GIIPS*Crisis					0.044		
					(1.08)		
High Gov. Board*GIIPS*Crisis						-0.012	
						(-0.37)	
High Gov. Own.*GIIPS*Crisis							-0.045
							(-1.12)
R^2	0.707	0.744	0.731	0.730	0.727	0.730	0.730
N	5448	4947	5372	5372	5372	5372	5372
Panel B: Loan Spread							
	ΔSpread	ΔSpread	ΔSpread	ΔSpread	ΔSpread	ΔSpread	ΔSpread
GIIPS*Crisis	0.041*		0.018	0.045*	0.043	0.044*	0.052**
	(1.92)		(1.06)	(1.84)	(0.98)	(1.69)	(2.21)
CDS Weighted Dom. Bondholdings*Crisis		0.047*					
		(1.92)					
High Leverage*GIIPS*Crisis			0.082**				
			(2.03)				
Low Rating*GIIPS*Crisis				0.157*			
				(1.93)			
Gov. Intervention*GIIPS*Crisis					-0.022		
					(-0.45)		
High Gov. Board*GIIPS*Crisis						-0.075	
						(-1.14)	
High Gov. Own.*GIIPS*Crisis							-0.072
							(-1.07)
R^2	0.685	0.737	0.747	0.747	0.745	0.748	0.748
N	3230	3004	3171	3171	3171	3171	3171
Bank-Level Controls	YES	YES	YES	YES	YES	YES	YES
Firm Cluster-Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Firm Cluster-Bank Fixed Effects	YES	YES	YES	YES	YES	YES	YES

Table VII presents the results of a modified version of the Khwaja and Mian (2008) bank lending channel regression. The unit of observation is a firm cluster-bank-year. The dependent variable is the change in log loan volume (Panel A) or change in log spread (Panel B) of a bank-firm cluster relation in a given year where firm clusters are formed based on a firm's country of incorporation, industry, and rating. The rating of each firm is estimated from EBIT interest coverage ratio medians for firms by rating category provided by Standard & Poor's. We assign ratings on the basis of the pre-crisis median interest coverage ratio of each firm. Data are restricted to: (i) the set of firm cluster-bank relations that existed before the start of the sovereign debt crisis, and (ii) firm cluster-bank years where firms in a cluster borrow from at least one GIIPS bank and one non-GIIPS bank. *Crisis* is an indicator variable equal to one starting in 2009 for banks incorporated Greece and in 2010 for banks incorporated in all other GIIPS countries (beginning of the sovereign debt crisis) and zero before. All variables are defined in Table I. All regressions include firm cluster-year fixed effects, firm cluster-bank fixed effects, and bank controls (logarithm of total assets, equity/total assets, impaired loans/total equity). Standard errors are clustered at the bank level. Significance levels: * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$).

Table VIII - Passive Channel: Hit on Balance Sheet

Panel A: Risk of GIIPS Sovereign Bondholdings						
	(1)	(2)	(3)	(4)	(5)	(6)
	Net Debt	ΔCash	Int. Cov.	Emp. Growth	CAPX	Sales Growth
CDS Weighted GIIPS Sov. Bondholdings in Crisis	-0.018**	-0.000	-0.010**	-0.025**	-0.029**	-0.031*
	(-2.02)	(-0.01)	(-2.15)	(-2.03)	(-2.07)	(-1.80)
CDS Weighted GIIPS Sov. Bondholdings in Crisis*Cash Flow		0.011***				
		(2.73)				
R^2	0.553	0.472	0.423	0.441	0.609	0.516
N	4191	3781	4369	3573	4099	3972
Panel B: Risk of Domestic Sovereign Bondholdings						
CDS Weighted Domestic Sov. Bondholdings in Crisis	-0.019**	0.000	-0.011**	-0.027**	-0.031**	-0.027**
	(-2.24)	(0.14)	(-2.21)	(-2.23)	(-2.23)	(-2.22)
CDS Weighted Domestic Sov. Bondholdings in Crisis*Cash Flow		0.011***				
		(2.81)				
R^2	0.553	0.474	0.422	0.609	0.502	
N	4191	3781	4369	3573	4099	3972

Table VIII presents firm-level regression results. The dependent variables are net debt, the change in cash holdings, interest coverage ratio employment growth, investments, and sales growth, respectively. The sample consists of all firms in the intersection of DealScan and Amadeus that are located in: Greece, Italy, Ireland, Portugal, Spain (GIIPS countries) or Germany, France, U.K. (non-GIIPS countries), which have a lending relationship with a bank that was part of the EBA stress tests. *CDS Weighted GIIPS Sov. Bondholdings in Crisis* (Panel A) and *CDS Weighted Domestic Sov. Bondholdings in Crisis* (Panel B) measure the fraction of affected lead arrangers based on the risk-adjusted GIIPS and domestic sovereign bondholdings of banks in a firm's loan syndicate, respectively, that are incorporated in a crisis country in year t, where the crisis begins in Greece in 2009 and in 2010 in the other GIIPS countries. Firm control variables include the logarithm of total assets, leverage, net worth, tangibility, interest coverage ratio (not in Column (3)), and EBITDA/total assets and for the cash regression a firm's cash flow and capital expenditures. All firm-level control variables are lagged by one period. All variables are defined in Table I. All regressions include firm, industry-country-year, and foreign bank country-year fixed effects, as well as all firm-level controls. Standard errors are adjusted for heteroscedasticity and clustered at the firm-level. Significance levels: * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$).

Table IX - Active Channel: Risk Shifting

	(1) Net Debt	(2) ΔCash	(3) Int. Cov.	(4) Emp. Growth	(5) CAPX	(6) Sales Growth
Panel A: Leverage						
High Leverage GIIPS in Crisis	-0.032*	-0.003	-0.028**	-0.036**	-0.049**	-0.040**
	(-1.94)	(-0.73)	(-2.51)	(-2.13)	(-2.13)	(-2.01)
GIIPS in Crisis	-0.015	0.006	-0.012**	-0.025**	-0.031*	-0.019
	(-1.17)	(1.41)	(-2.37)	(-2.00)	(-1.70)	(-1.29)
High Leverage GIIPS in Crisis*Cash Flow		0.011**				
		(2.06)				
GIIPS in Crisis*Cash Flow		0.003				
		(0.68)				
R^2	0.554	0.461	0.431	0.430	0.594	0.500
N	4339	3918	4535	3695	4246	4115
Panel B: Rating						
Low Rating GIIPS in Crisis	-0.026*	-0.004	-0.019*	-0.032**	-0.044**	-0.063***
	(-1.68)	(-0.70)	(-1.68)	(-2.01)	(-1.99)	(-2.72)
GIIPS in Crisis	-0.033***	0.008*	-0.015***	-0.025*	-0.037**	-0.032**
	(-2.72)	(1.89)	(-2.97)	(-1.94)	(-2.10)	(-2.10)
Low Rating GIIPS in Crisis*Cash Flow		0.017*				
		(1.83)				
GIIPS in Crisis*Cash Flow		0.008**				
		(2.54)				
R^2	0.553	0.464	0.424	0.430	0.596	0.502
N	4339	3918	4535	3695	4246	4115

Table IX presents firm-level regressions. The dependent variables are net debt, the change in cash holdings, interest coverage ratio, employment growth, investments, and sales growth, respectively. The sample consists of all firms in the intersection of DealScan and Amadeus and located in: Greece, Italy, Ireland, Portugal, Spain (GIIPS countries) or Germany, France, U.K. (non-GIIPS countries), with a relationship with a bank that was part of the EBA stress tests. *GIIPS* measures the fraction of syndicated loans provided by GIIPS banks and *High Leverage GIIPS* (*Low Rating GIIPS*) the fraction provided by high leverage (low rating) GIIPS banks. A bank is considered highly leveraged if its total equity/total assets ratio is below the sample median in 2009 (separate median split for GIIPS and non-GIIPS banks) (Panel A) and it is considered to have a low rating if its median rating is A+ or lower in 2009 (Panel B). *GIIPS in Crisis* measures the fraction of syndicated loans provided by GIIPS banks and *High Leverage GIIPS in Crisis* (*Low Rating GIIPS in Crisis*) the fraction provided by high leverage (low rating) GIIPS banks that are incorporated in a crisis country in year t, where the crisis begins in Greece in 2009 and in 2010 in the other GIIPS countries.. Firm control variables include the logarithm of total assets, leverage, net worth, tangibility, interest coverage ratio (not in Column (3)), and EBITDA/total assets and for the cash regression a firm's cash flow and capital expenditures. All firm-level control variables are lagged by one period. All variables are defined in Table I. All regressions include firm, industry-country-year, and foreign bank country-year fixed effects, as well as all firm-level controls. Standard errors are adjusted for heteroscedasticity and clustered at the firm-level. Significance levels: * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$).

Table X - Active Channel: Moral Suasion

	(1) Net Debt	(2) ΔCash	(3) Int. Cov.	(4) Emp. Growth	(5) CAPX	(6) Sales Growth
Panel A: Intervened Banks						
GIIPS Gov. Intervention in Crisis	-0.004	-0.006*	-0.004	0.002	0.001	-0.011
	(-0.44)	(-1.95)	(-0.3)	(0.21)	(0.04)	(-0.62)
GIIPS in Crisis	-0.032**	0.009*	-0.012**	-0.032**	-0.040**	-0.038**
	(-2.55)	(1.95)	(1.96)	(-2.44)	(-2.26)	(-2.37)
GIIPS Gov. Intervention in Crisis*Cash Flow		0.009				
		(1.54)				
GIIPS in Crisis*Cash Flow		0.007*				
		(1.83)				
R^2	0.552	0.463	0.426	0.429	0.593	0.500
N	4339	3918	4535	3695	4246	4115
Panel B: Government Ownership						
High Fraction Gov. Own. GIIPS in Crisis	0.003	0.000	0.006	0.011	0.012	0.015
	(0.31)	(0.03)	(0.83)	(1.22)	(0.81)	(1.33)
GIIPS in Crisis	-0.024*	0.006	-0.030***	-0.031**	-0.044**	-0.046***
	(-1.74)	(1.33)	(-3.06)	(-2.14)	(-2.36)	(-2.80)
High Fraction Gov. Own. GIIPS in Crisis*Cash Flow		-0.000				
		(-0.04)				
GIIPS in Crisis*Cash Flow		0.010***				
		(2.69)				
R^2	0.554	0.463	0.428	0.430	0.593	0.500
N	4339	3918	4535	3695	4246	4115
Panel C: Government Board Seats						
High Fraction Gov. Board GIIPS in Crisis	0.012	-0.004	-0.002	0.011	0.012	0.015
	(1.10)	(-1.23)	(-0.26)	(1.04)	(0.83)	(1.21)
GIIPS in Crisis	-0.032**	0.006	-0.018**	-0.026*	-0.037**	-0.048***
	(-2.47)	(1.40)	(-2.59)	(-1.80)	(-2.16)	(-3.02)
High Fraction Gov. Board GIIPS in Crisis*Cash Flow		-0.002				
		(-0.41)				
GIIPS in Crisis*Cash Flow		0.012***				
		(3.31)				
R^2	0.553	0.462	0.424	0.431	0.593	0.500
N	4339	3918	4535	3695	4246	4115

Table X presents firm-level regression results. The dependent variables are net debt, the change in cash holdings, interest coverage ratio, employment growth, investments, and sales growth, respectively. The sample consists of all firms in the intersection of DealScan and Amadeus and located in: Greece, Italy, Ireland, Portugal, Spain (GIIPS countries) or Germany, France, U.K. (non-GIIPS countries), with a relationship with a bank that was part of the EBA stress tests. *GIIPS* is the fraction of syndicated loans provided by GIIPS banks; *Gov. Intervention* by GIIPS banks that received government support; *High Fraction Gov. Own.* by GIIPS banks with an above median government ownership; *High Fraction Gov. Board GIIPS* by GIIPS banks with an above median fraction of government affiliated directors. *GIIPS in Crisis* is the fraction of syndicated loans provided by GIIPS banks; *Gov. Intervention GIIPS in Crisis* by GIIPS banks that received government support; *High Fraction Gov. Own. GIIPS in Crisis* by GIIPS banks with an above median government ownership; *High Fraction Gov. Board GIIPS in Crisis* by GIIPS banks with an above median fraction of government affiliated directors, that are incorporated in a crisis country in year t, where the crisis begins in Greece in 2009 and in 2010 in the other GIIPS countries.. Firm control variables include the logarithm of total assets, leverage, net worth, tangibility, interest coverage ratio (not in Column (3)), and EBITDA/total assets and for the cash regression a firm's cash flow and capital expenditures. All firm-level control variables are lagged by one period. All variables are defined in Table I. All regressions include firm, industry-country-year, and foreign bank country-year fixed effects, as well as all firm-level controls. Standard errors are adjusted for heteroscedasticity and clustered at the firm-level. Significance levels: * ($p < 0.10$), ** ($p < 0.05$), *** ($p < 0.01$).

Figure 1. Real Effects - Entire Sample

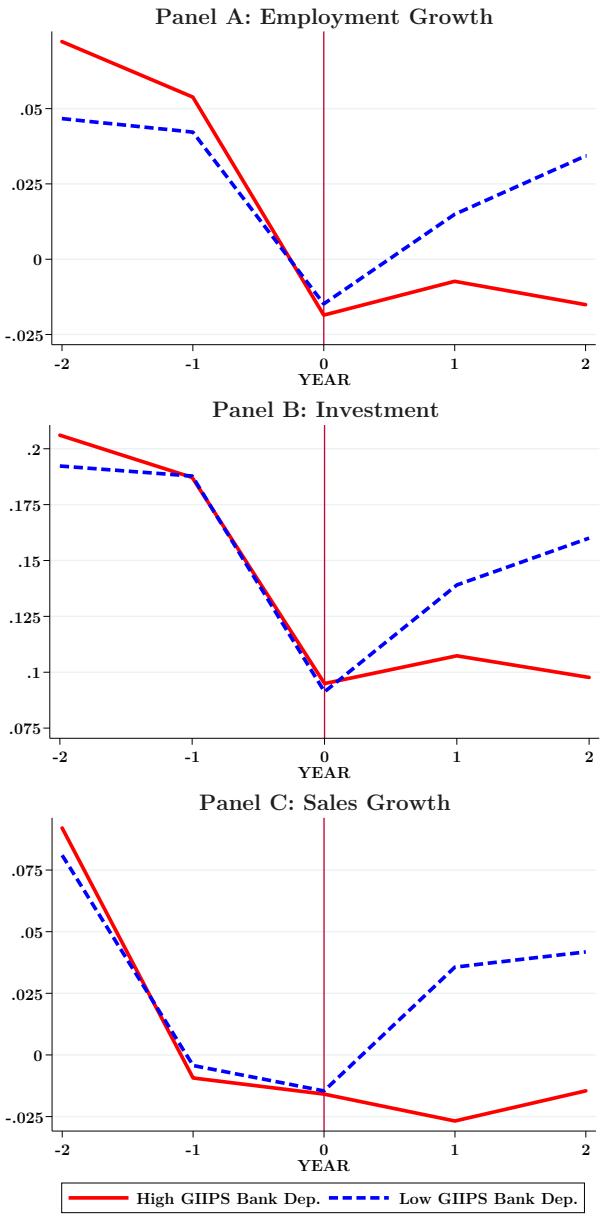


Figure 1 shows employment growth rates (Panel A), capital expenditures as a fraction of tangible assets (Panel B), and sales growth rates (Panel C) for firms with high (red solid line) and low (blue dashed line) *GIIPS Bank Dependence* in the pre-crisis period (years -2 and -1) and the crisis period (starting in year 0). We consider all loans in DealScan to firms located in: Greece, Italy, Ireland, Portugal, Spain, Germany, France, or U.K. We restrict the sample to firms with financial information in Amadeus.

Figure 2. Real Effects - Non-GIIPS Firms without GIIPS or other non-EU Subsidiaries

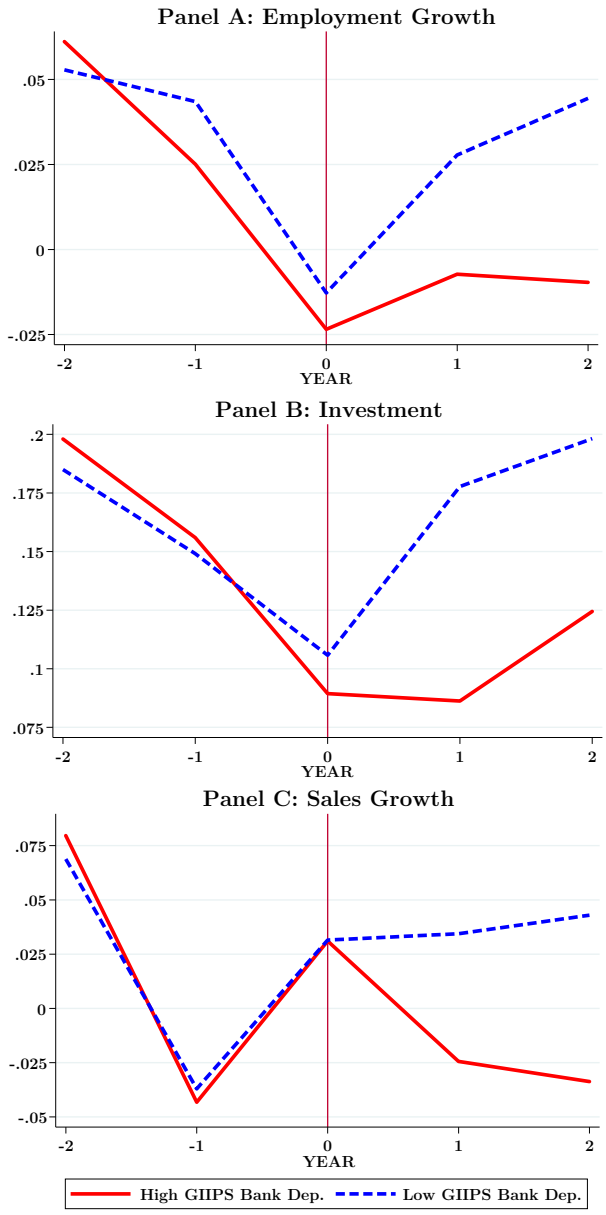
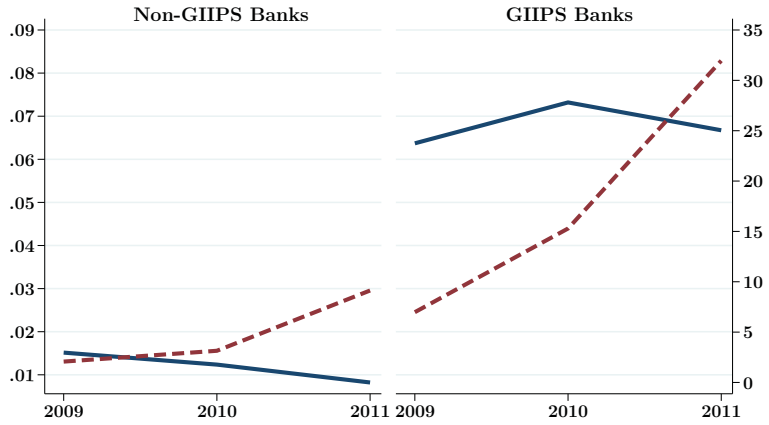


Figure 2 shows employment growth rates (Panel A), capital expenditures as a fraction of tangible assets (Panel B), and sales growth rates (Panel C) for firms in Germany, France, or U.K. with high (red solid line) and low (blue dashed line) *GIIPS Bank Dependence* in the pre-crisis period (years -2 and -1) and the crisis period (starting in year 0) that do not have subsidiaries in Greece, Italy, Ireland, Portugal, Spain, or other non-EU countries. We restrict the sample to firms with financial information available in Amadeus.

Figure 3. Evolution of Sovereign Debt Holdings - All Banks

Panel A: GIIPS Sovereign Debt Exposure (% Bank Assets)



Panel B: Domestic Sovereign Debt Exposure (% Bank Assets)

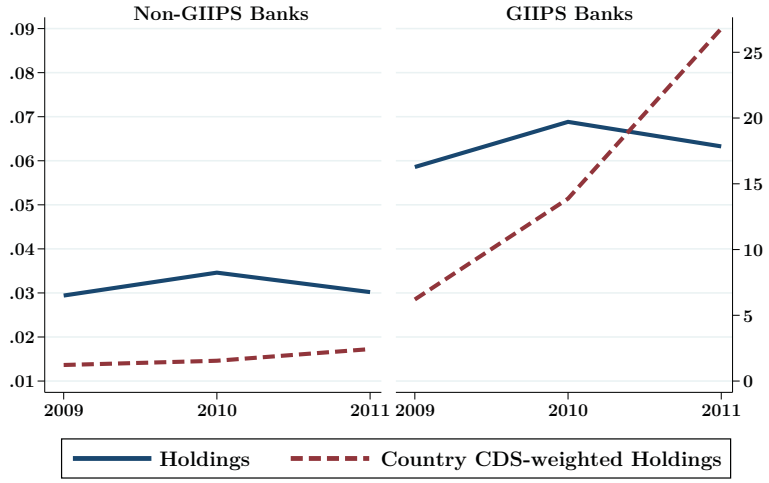
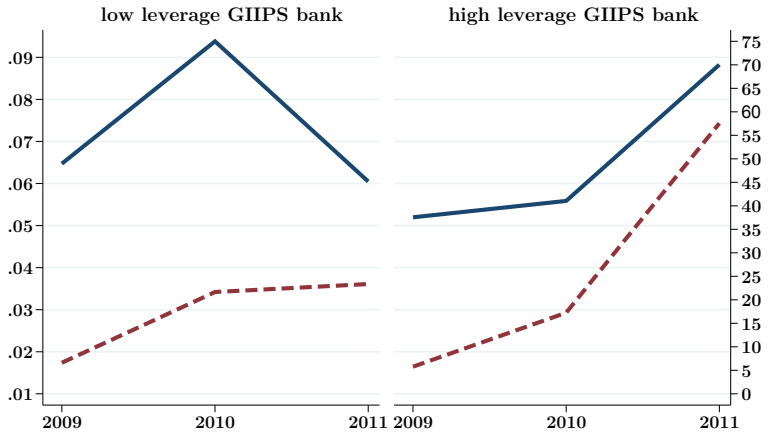


Figure 3 shows the banks' aggregated GIIPS (Panel A) and domestic (Panel B) sovereign bondholdings (solid blue line, left axis, as a fraction of total assets) and the banks' aggregated GIIPS (Panel A) and domestic (Panel B) sovereign bondholdings multiplied by the CDS spread of the respective GIIPS country (dashed red line, right axis, as a fraction of total assets). GIIPS banks comprise all banks headquartered in Greece, Italy, Ireland, Portugal, or Spain. Non-GIIPS banks consist of banks headquartered in France, Germany, or the U.K. Sovereign bondholding data are from the EBA. We compile total assets from SNL Financial and CDS spreads from Datastream. CDS spreads are measured at the end of the preceding year.

Figure 4. Evolution of Domestic Sovereign Debt Holdings - GIIPS Banks

Panel A: Domestic Sovereign Debt Exposure (% Bank Assets)



Panel B: Domestic Sovereign Debt Exposure (% Bank Assets)

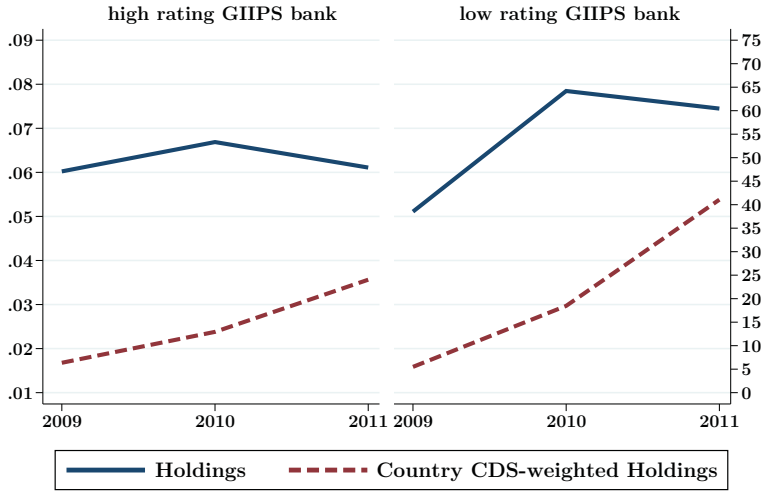


Figure 4 shows the banks' aggregated domestic sovereign bondholdings (solid blue line, left axis, as a fraction of total assets) and these holdings multiplied by the CDS spread of the banks' home countries (dashed red line, right axis, as a fraction of total assets). High (low) leverage GIIPS banks comprise all banks headquartered in Greece, Italy, Ireland, Portugal, or Spain that have a below (above) median total equity to total assets ratio (Panel A). Low (high) rating GIIPS banks comprise all banks headquartered in a GIIPS country that have a rating of A+ or lower (AA- or better) (Panel B). We compile total assets from SNL Financial and CDS spreads from Datastream. CDS spreads are measured at the end of the preceding year.