Credit Supply During a Sovereign Crisis

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Abstract

We study the effect of the European sovereign debt crisis on the lending activity of foreign and domestic banks operating in Italy, in terms of both credit granted and interest rates charged. Using a sample of over 2 million bank-firm relationships between December 2010 and December 2011 from the Italian Credit Register, we find that foreign banks tightened their supply of credit less than Italian banks: lending by foreign banks grew by about 2 percentage points more, and the interest rate they charged was 20 basis points lower than Italian banks. We also provide evidence on the transmission channels by including bank balance sheet characteristics in our regressions. Finally, we study the extensive margin of credit by analyzing banks' propensity to terminate an existing relationship and to accept a loan application. We estimate all models on a sample of firms borrowing from at least two banks and we include firm*period fixed effects in all regressions, thus controlling for all firm unobserved heterogeneity.

Keywords: Credit Supply, Sovereign Debt Crisis, Bank Lending Channel.

Jel Codes: G21, F34, E44, E51

1 Introduction

Since the recent outburst of the European sovereign debt crisis, much debate has revolved around the impact that increased country risk could have on financial intermediaries, on their balance-sheets and on their capacity to grant credit to firms and households for investment and consumption. Sovereign debt crises are often accompanied by banking crises. Typical patterns observed along history suggest that banking crises fuel sovereign

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debt crises, as governments disburse vast amounts of money to rescue troubled intermediaries, and soaring costs of sovereign debt generate a shock to banks' funding which reduces their ability to supply credit. Tightening credit supply may induce, or worsen, a recession, exacerbating and possibly amplifying sovereign tensions. These feedback effects pose significant challenges for the identification of the effect of sovereign crisis on credit supply.

In this paper we provide evidence on the dynamics of credit supply during the recent European sovereign debt crisis, assessing the effect that the rise in the risk associated to the Italian sovereign debt has produced on the lending activity of banks operating in Italy, both in terms of credit granted and in terms of its cost. To this aim, we study the lending supply of Italian and foreign banks on a sample of over 2 million bank-firm relationships between December 2010 and December 2011 from the Italian Credit Register.

First, we assess whether Italian banks tightened credit supply more than foreign banks (both branches and subsidiaries) headquartered in countries with low sovereign risk. We exploit the variability of our dataset along both the time and the cross-section dimensions, in a quasi-experimental fashion. We define a pre-crisis period, between December 2010 and June 2011, and a crisis period, between June 2011 and December 2011. Our identification hypothesis is that the outburst of the sovereign crisis in Italy was fairly exogenous with respect to the lending policies of Italian banks. This is reasonable since the Italian banking system did not represent a source of instability for public finances (see, among others, IMF 2010 Article IV consultation on Italy) and Italy did not experience a housing bubble. Then, Italian banks constitute the treated group, affected by increasing sovereign spreads, while banks from countries less affected by sovereign tensions (Germany, UK, France, the Netherlands, U.S., etc.) represent the control group. In theory the behavior of foreign banks is ambiguous: on the one hand, since they did not suffer from funding difficulties and could get funding at a lower cost, they may have been more able to increase credit supply, possibly raising their market share; on the other hand, they may have preferred to stay away from a country stormed by a sovereign crisis, as a risk reduction strategy.

As a second step, we investigate the channels through which the sovereign debt shock has been transmitted to the asset side of financial intermediaries, by including balance sheet characteristics of banks as control variables. The main channel of the impact of higher sovereign risk on lending should be through the liabilities side of banks, increasing their funding cost. Rises in sovereign risk adversely affect banks' funding costs through several channels. A first direct channel is through the losses on holdings

of government debt, that can make the asset side of banks riskier and the availability of funding more costly. Second, a riskier government debt can reduce the value of collateral that can be used by banks in interbank transactions or in obtaining liquidity from central banks. A third mechanism goes through the transmission of downgrades from sovereign to the ratings of domestic banks. Finally, the benefit in terms of funding given by explicit or implicit government guarantees can be severely weakened when public finances are in distress. In order to account for these transmission channels, we focus on wholesale funding, portfolio holdings of GIIPS (Greece, Ireland, Italy, Portugal and Spain) government bonds observed at the beginning of each sample periods of our analysis (December 2010 for the pre-crisis period, June 2011 for the crisis period). They capture the extent to which banks have been exposed to the impact of the crisis. We also control for capital positions and returns on assets since they measure bank ability to absorb shocks.

We find significant evidence of a higher growth of credit granted by foreign banks with respect to Italian banks. We also find that the former increased interest rates charged to non-financial firms less than the latter. These results are robust to the adoption of a continuous treatment, such as the variation of the spread between yields on 10-year domestic government bonds and the German Bund of corresponding maturity. Moreover, among Italian banks, we find that those more exposed to foreign interbank funding and more reliant on repos with central counterparties contracted credit growth more. We find that Italian banks that were more reliant on foreign interbank funding and that held a higher ratio of sovereign securities from troubled countries to total assets increased the cost of credit by a larger amount during the crisis. By contrast, better capitalized banks, those more reliant on domestic interbank funding and more reliant on repos with central counterparties increased the cost of credit by a lower amount. Overall these results indicate that the sovereign crisis had a significant causal effect on credit supply, and that the transmission channel came mainly through the structure of banks' funding and the exposure of banks to sovereign assets.

As an extension, we examine whether Italian banks terminated relationships and rejected new loan applications more than banks less exposed to the crisis, as the risk on the Italian sovereign went up. The extent to which banks decide to terminate existing relationships and to start new relationships crucially shapes borrower's access to credit. When an existing relationship is cut, borrowers may need to look for alternative funding sources or scale down investment. When a new relationship is started, borrowers get a significant boost in their access to credit; moreover, this may represent a positive signal of borrower's ability to stay in business for other financiers, suppliers and customers.

We find that foreign banks are more likely to terminate an existing relationship than Italian banks. Moreover, foreign banks were less likely than Italian banks to accept a loan application prior to the crisis, but they did not change their behavior much after the sovereign crisis burst. By contrast, Italian banks drastically reduced their likelihood of accepting a loan application since June 2011. These results show that foreign banks, while tightening credit less with respect to Italian banks, did not relax their selectivity criteria during the crisis; if any, they increased it, being more likely to cut credit and maintaining high rejection rates. An interpretation of this finding could be that foreign banks "flew to quality" during the crisis, by concentrating on supporting less fragile borrowers.

The paper is structured as follows: the next section examines related literature, section 3 discusses the identification strategy, section 4 presents the dataset and the main descriptive statistics, section 5 contains the results, section 6 concludes.

2 Related Literature

Our contribution is related to three streams of literature. First, we relate to the studies on the real effects of sovereign debt crises and sovereign defaults. Arteta and Hale (2008) examine how access to foreign credit to the private sector varies during sovereign debt crises. They group micro-level data on bond issuance and foreign syndicated bank loan contracts of firms into different export and non-export sectors. They find systematic evidence of a decline in foreign credit over the period between 1984 and 2004 for 30 emerging markets in the aftermath of a sovereign debt crisis. Borensztein and Panizza (2009) investigate whether default episodes give rise to a credit crunch, relying on a methodology inspired by Rajan and Zingales (1998) and Dell'Ariccia, Detragiache, and Rajan (2005): using industry-level data available for 149 countries over the period 1975-2000, they test whether defaults have a significantly larger effect on sectors that are more heavily dependent on external finance. Their results indicate that defaults have a limited impact on credit supply. Taking a broader perspective, Furceri and Zdzienicka (2011) evaluate the overall losses in terms of output that debt crises exert over the short and medium term, on a panel of 154 countries from 1970 to 2008. They find that the effects are sizeable, both the contemporaneous ones (6 percentage points) and those observed in the medium term over a 10 year horizon (up to 10 percentage points of GDP). De Paoli et al. (2009) look at broad effects of debt crises on output as well; running a counterfactual analysis on 40 episodes of sovereign debt crises they also find that the output losses are prolonged and large. Yet, reductions in output seem to be significantly

more pronounced when debt crises are associated with a banking and/or currency crises, which occur for over half of the crises in the sample. It is therefore difficult to isolate the causal effect of the sovereign crisis.

We contribute to this literature by examining specifically the channel of credit, evaluating how the recent sovereign debt crisis, by increasing banks' funding cost, has been transmitted to bank lending, in terms of both quantities and prices. The originality of our contribution lies mainly in three aspects. First, we study the effect of an episode of sovereign debt crisis that can be considered fairly exogenous with respect to the banking sector; in this way we are able to isolate the effect of sovereign tensions from the often concurring banking crises. Moreover, we provide evidence about a sovereign crisis affecting a developed country which is part of a currency union, where the risk of a currency crisis is basically non-existent and monetary policy is determined by all member countries. As a consequence, the analysis of the sovereign crisis in Italy represents an ideal laboratory for studying the impact of sovereign tensions on credit supply. Secondly, by relying on a unique dataset on bank-firm relationships, we are able to fully control for firm-level unobserved heterogeneity, thus isolating the impact of supply from the impact of demand factors and properly addressing the endogeneity issues that typically challenge the studies of the effect of financial crises. Third, we concentrate on the initial phase of a sovereign crisis, and not of a country sovereign default. This allows us to zoom into the mechanisms that drive the transmission of sovereign tensions to the real sector, thus feeding back into larger public deficits.

Second, our paper is also broadly related to the literature on global banks and on the international transmission of shocks. This literature has mostly focussed on how foreign banks might have contributed to "export" tensions affecting the domestic market, thus highlighting a mechanism of international transmission of shocks. In their seminal papers, Peek and Rosengren (1997, 2000) examine the impact of the fall of Japanese stock prices of the 1990s on cross-border lending by Japanese banks. They show that Japanese bank branches operating in the U.S. tightened their credit supply**.** Popov and Udell (2010), based on survey data on SME financing on 14 CEE countries in the period 2005-2008, find evidence of international transmission of financial distress in the early stage of the crisis, with Western European banks restricting credit supply more than domestic banks. Cetorelli and Goldberg (2011) show that the transmission of shocks spurred by global banks to emerging economies in the 2007-2009 crisis was large. Using bilateral country-level data they show that the impact took place not only through contraction of cross-border loan supply by foreign banks and foreign banks' affiliates, but also by domestic banks that suffered a funding shock due to the reduction of inter-

bank cross–border lending. Schnabl (2011) examines the impact that a negative liquidity shock to international banks such as the 1998 Russian default had on credit to Peruvian firms. Using bank-level data, he finds that the impact was significant. The channel was inter-bank funding and the effect was strongest for domestic firms that were borrowing internationally. De Haas and Van Horen (2011) also find that banks that were more severely affected by funding constraints have reduced their lending abroad significantly, analyzing data on cross-border syndicated lending by 75 banks to 59 countries over the period 2000-2009. Finally Kalemli-Ozcan et al. (2011) take a broader perspective and show that during the 2007-2009 crisis the impact of financial integration on output cycles has changed as opposed to the period 1970-2007: whereas before 2007 tighter financial linkages were associated with more divergent output cycles, in the more recent years they were correlated with greater synchronization.

Our paper builds on these studies analyzing the patterns of credit granted by domestic and foreign banks. Yet, unlike the previous literature, the intermediaries that are hit by the shock are the domestic ones, and we exploit the presence of foreign banks in the domestic market as a control group to identify a causal effect of sovereign shocks on credit supplied by domestic banks. We can do this because the 2011 sovereign crisis is reasonably exogenous to the conditions of Italian banks. We also contribute by employing a robust identification strategy which controls for unobservable characteristics of borrowers, including their demand of credit.

Third, from a methodological point of view, our paper relates to the empirical literature on the bank lending channel that uses credit registry data. Khwaja and Mian (2008) study the impact of an unexpected liquidity shock on credit supply on Pakistani data. They find that banks more exposed to the liquidity shock contracted their supply of credit more. Their paper also makes an important methodological contribution since they propose to control for firm-level unobserved characteristics including firm fixed effects. To do so they focus on firms borrowing from at least two banks. Jimenez, Ongena, Peydrò, Saurina (2011) and (2012) apply a similar technique to identify the banks' balance sheet channel of monetary policy and to study the effect of monetary policy on banks' risk taking. Bonaccorsi and Sette (2012) use a similar identification strategy to study how the structure of banks' balance sheet affected credit supply during the 2007-2008 financial crisis. They find that banks relying more on interbank funding and on securitization, and those holding less liquidity tightened credit supply more and were less likely to accept loan applications.

3 Identification strategy

Identifying a causal effect of sovereign tensions on credit supply poses important challenges.

First, sovereign tensions may increase uncertainty, inducing firms to scale down their investment plans, leading to a lower demand for credit. Second, banks more exposed to sovereign tensions may lend to a different set of firms (e.g. firms with weaker balance sheets, riskier firms, etc.) than banks less exposed to sovereign tensions. This is particularly true when we directly compare Italian and branches and subsidieries of foreign banks, as the latter may lend to different firms than Italian banks do. Hence, it is critical to properly control for firm level demand for credit, for firms' riskiness, and, more generally, for firm unobserved heterogeneity. The richness of our dataset allows us to do so. Since Italian firms typically resort to multiple lenders (Detragiache et al. 2000, more recently Gobbi and Sette 2011) , we focus on firms borrowing from at least two banks and we use an identification strategy akin to Khwaja and Mian (2008), Jimenez et al. (2012), Bonaccorsi and Sette (2012). The inclusion of firm-period fixed effects in all regressions makes possible to identify the effect of the sovereign crisis on credit growth and on the change in the cost of credit by controlling for all firm-level unobserved heterogeneity that affects the dynamics of credit granted and of its cost in each period.

Third, sovereign spreads may rise as a consequence of a deterioration in domestic banks' balance sheets, or of the burst of an asset price bubble. This was not the case in Italy, as the country was not affected by an asset bubble (neither real nor financial) in the period before the crisis (not even before the 2007-2008 financial crisis), and Italian banks weathered the post-Lehman crisis better than their European and American counterparts (see OECD 2009 among others). As a consequence, the Italian government did not have to increase its fiscal outlays to rescue the financial sector. The weakeness of Italian public finances is in fact driven by the high level of public debt and the low growth rate of the economy, which are bothe long standing problems (Bank of Italy 2011). The involvement of Italy in the European sovereign debt crisis stemmed mostly from a change in the risk taking attitude of international investors; there was no internal specific event triggering it. This is very useful for identification since the abrupt rise in spreads which occurred over the summer of 2011 can be considered as an exogenous shock with respect to conditions of Italian banks and firms[1].

To provide further support to our identification strategy, Fig. 1 shows the magnitude

[1] Later developments may discount deterioration in banks' access to funding, firms' profitability caused by the recession and government measures taken in the Autumn of 2011.

of the increase in sovereign spreads on Italian 10 year government bonds with respect to the benchmark 10 year German Bund. All the action is concentrated in the second part of 2011, when spreads increased abruptly since June, reaching 370-390 basis points in September 2011 and a peak of 530 basis points in November.

As a first step we estimate a difference-in-difference model, in which the observational unit is a credit relationship between a firm and a bank, and we compare two periods, the first half of 2011 (pre-crisis) and the second half of 2011 (crisis):

$$\Delta credit_{i,j,t} = \beta_1 foreign_j + \beta_2 foreign_j * crisis_t + \alpha_{i,t} + \varepsilon_{i,j,t} \quad (1)$$

$$\Delta APR_{i,j,t} = \gamma_1 foreign_j + \gamma_2 foreign_j * crisis_t + \alpha_{i,t} + \varepsilon_{i,j,t} \quad (2)$$

where $\Delta credit_{i,j,t}$ is the difference in the log credit granted by bank j to firm i in period t, and $\Delta APR_{i,j,t}$ is the change in the Annual Percentage Rate charged by bank j to revolving credit lines granted to firm i in period t[2]. Foreign is a dummy variable taking the value 1 if bank j is foreign owned (we include both branches and subsidiaries)[3]. The term $foreign * crisis$ is an interaction between the dummy $foreign$ and the dummy variable $crisis$ which takes the value 1 in the second half of 2011. We also include a full set of firm-period fixed effects, $\alpha_{i,t}$, which control for firm level unobserved heterogeneity in each period (including firm level demand for credit, firm balance sheet conditions, etc.). These fixed effects also absorb the dummy $crisis$, which therefore does not appear in the equations above. The effect is identified on firms that borrow from at least one Italian and one Foreign bank in at least one period[4]. Our focus in on the parameters β_2 and γ_2 which capture the differential behavior of foreign banks relative to domestic banks during the crisis.

A key assumption underlying the validity of these models is that credit growth and the change in interest rate from Italian and Foreign banks have a similar trend before the crisis. This can be seen in Figure 2 and in Figure 3. Figure 2 shows the 6-month change

[2]The reference rate for loans to non-financial corporations in Italy is the Euribor. In the case of revolving credit lines, this is the 1-month Euribor. Its movements are absorbed by firm*period fixed effects, so that our analysis, at least in the case of revolving credit lines, captures the effects of the sovereign crisis on spreads on loans to non-financial corporations. In the case of term loans, this is made more complicated by the lack of detailed data on the maturity of the loan (we only know whether its maturity is above or below 2 years).

[3]In standard difference-in-difference models the dummy variable is usually associated with the tratment group (Italian banks, in our framework), but we preferr to highlight the role of foreign banks.

[4]Suppose firm 1 borrows from Italian bank A, and Foreign bank B at June 2011. Our identification compares credit growth (and the interest rate changes) between June and December 2011 by bank A and B to the same firm 1. Then, we also add a pre-crisis period (December 2010-June 2011) to take care of possible different dynamics in credit supply by Italian and Foreign banks, but having repeated observations for the same firm-bank pairs is not strictly necessary for identification purposes.

in the log credit granted by Italian and Foreign banks. While prior to the burst of the crisis the two series moved similarly, after June, credit from foreign banks kept growing, although at a lower rate, while credit growth from Italian banks turned negative. Figure 3 shows the change in the Annualized percentage rates on revolving credit lines, and here also we observe a different behaviour between the period pre- and post- crisis.

As an extension, we also test the following model:

$$\Delta credit_{i,j,t} = \beta_1 \Delta spread_{j,t} + \beta_2 \Delta spread_{j,t} * crisis_t + \alpha_{i,t} + \varepsilon_{i,j,t} \quad (3)$$

$$\Delta APR_{i,j,t} = \gamma_1 \Delta spread_{j,t} + \gamma_2 \Delta spread_{j,t} * crisis_t + \alpha_{i,t} + \varepsilon_{i,j,t} \quad (4)$$

where variables are the same as above, except $\Delta spread$ which is the change in the spread with the German Bund on the 10 year sovereign securities of the country in which bank j is headquartered. This is computed as the average of the first quarter of 2011 for the pre-crisis period, and for the third quarter of 2011 for the crisis period. We do so in order to avoid possible endogeneity issues, as the burst of the European sovereign debt crisis occurred during the third quarter of 2011, and later developments may have been affected by the worsening of the business cycle, at least in Italy. This model studies whether changes in spreads affected credit supply, and if the effect changed after the crisis. Again our focus is on the parameters β_2 and γ_2, which capture the differential behavior of foreign banks during the crisis vis à vis Italian ones.

Finally, we investigate the channels through which sovereign tensions affected banks' supply of credit. In this case we estimate the following models

$$\Delta credit_{i,j,t} = crisis_t * (\beta_1 interbank_{j,t} + \beta_2 giips_{j,t} + \beta_3 capital\_ratio_{j,t} + \beta_4 ROA_{j,t}) + \beta_5 crisis_t * foreign_j + \alpha_{i,t} + \lambda_j + \varepsilon_{i,j,t} \quad (5)$$

$$\Delta APR_{i,j,t} = crisis_t * (\gamma_1 interbank_{j,t} + \gamma_2 giips_{j,t} + \gamma_3 capital\_ratio_{j,t} + \gamma_4 ROA_{j,t}) + \gamma_5 crisis_t * foreign_j + \alpha_{i,t} + \lambda_j + \varepsilon_{i,j,t} \quad (6)$$

where $interbank_{j,t}$ is the share of interbank funding to total assets of bank j at the beginning of period t (December 2010 or June 2011),[5] $giips_{j,t}$ is the ratio of sovereign securities from Greece, Ireland, Italy, Portugal and Spain in bank j balance sheet at the beginning of period t to total assets, $capital\_ratio_{j,t}$ is the Tier 1 regulatory capital ratio (Tier 1 capital to risk weighted assets) of bank j at the beginning of period t,

[5] All bank balance sheet variables are measured at the beginning of each period to avoid simultaneity biases.

$ROA_{j,t}$ is return on assets of bank j at the beginning of period t. All these variables are interacted with the dummy *crisis*. Banks' reliance on interbank funding is a first transmission channel for the shock: banks more exposed to interbank funding were affected by the shock more as interbank markets "dried-up" after the sovereign crisis burst. Exposure to European "peripheral" countries is a second transmission channel. On the one hand, the higher the exposure to these risky assets, the higher the losses banks recorded in their balance sheets, and the more the cost of funding increased, as fears mounted that banks could face large losses. On the other hand portfolio holdings of government bonds constitutes a form of collateral available for refinancing from the central banks, and for collateralized interbank borrowing. Hence, the net effect of this variable may be ambiguous. Then, $capital\_ratio$ and ROA are two controls for banks' capital and profitability, and thus for bank ability to absorb shocks. Finally, we include bank fixed effects λ_j.

All regressions include also variables intended to capture the specificity of the relationship between firm i and bank j. The first one is the share of total credit to firm i supplied by bank j (SHARE OF TOTAL CREDIT). *Ex ante* its expected sign is ambiguous: on the one hand, being this variable a measure of the relative exposure of bank j towards firm i, one could expect it to be negatively correlated with loan growth and positively correlated with the change in the interest rate; on the other hand it could be interpreted as a proxy of the strength of the bank-firm relationship, therefore reversing the expected sign. Moreover SHARE OF TOTAL CREDIT can also partially account for the initial size of the loan. The second variable is the share of drawn over credit granted by bank j to firm i (DRAWN OVER GRANTED). This control measures how intensively credit lines are used and is also able to account for the heterogeneity in the thresholds applied by banks with respect to the maximum ratio of drawn over granted credit. The third variable is the share of overdraft over total granted credit by bank j to firm i (OVERDRAFT). This regressor aims at controlling for the composition of total credit by different types of loan contracts and also captures the different variability over time inherent to the specific type of loan.

4 Data and Descriptive Statistics

Dataset. We use a unique dataset containing information at the bank-firm relationship level on credit quantities and prices. We obtain data on individual bank-firm relationships from the Italian Credit Register (CR). This lists all outstanding loan amounts above 30,000 Euros (less than 40,000 USD) that each borrower (both firms and house-

holds) has with banks operating in Italy, including branches and subsidiaries of foreign banks. Loans are distinguished into three classes: revolving credit lines, term loans, and loans backed by account receivables. The dataset include both granted and drawn amounts. We focus our study on credit granted, as this better captures a decision of bank to supply credit. Drawn credit is influenced by the decision of the borrower to use available lines, and this is largely affected by demand. Intermediaries are required by law to report this information. Data is of very high quality since intermediaries use the CR as a screening and monitoring device for borrowers.[6]

We also use information on interest rates charged by a representative sample of banks (103 Italian banks and 10 branches and subsidiaries of foreign banks) to Italian borrowers. These data are included in a sub-section of the Credit Register ("Taxia database").

We obtain consolidated and unconsolidated (in case of stand-alone banks) balance sheets for Italian banks from the Supervisory Reports submitted by the intermediaries to the Bank of Italy, which is in charge of banking supervision in the country. We obtain consolidated balance sheet data for foreign banks from Bankscope. Finally, data on sovereign yields, which we use to compute spreads, are from Thomson Datastream.

We merge these different data using the bank identification number ("ABI code"), and the data on sovereign yields using the bank headquarter home country code.

Data on credit quantity and interest rates are collected at December 31, 2010, June 30, 2011 and December 31, 2011. Bank balance sheet information refers to December 31 2010 and to June 30 2011.

Sample selection. We include all non-financial firms with outstanding credit in the CR, including very small firms, such as sole proprietorships. We exclude firms with bad loans outstanding at the beginning of each period, since these are official classified as losses and banks will not grant further credit to these firms until the procedure to recover at least part of the outstanding amount is completed. To control for firm unobservable heterogeneity we select only firms borrowing from at least two banks. Since our identification strategy relies on a comparison between the behavior of foreign and italian banks borrowing to the same firm, we select firms that borrow from at least one Italian and one foreign bank. This yields about 695,000 relationships over the two periods (346,584 in the crisis period and 347,833 in the pre-crisis period), involving 173,830 firm-period couples (86,461 firms in the pre-crisis period, 87,369 in the crisis

[6] The CR also contains information on the borrowers' sector of activity (industry, defined at the 4-digit Nace level), location (province), type of business entity (corporations, limited partnerships, general partnerships, sole proprietorships, etc.).

Table 1: Descriptive Stastistics of Main Dependent Variables

	Mean	**Median**	**p25**	**p75**	**StdDev**	**N Obs**
ΔLog Credit	-0.054	0	-0.086	0	0.42	694,417
ΔLog Credit - Pre crisis	-0.042	0	-0.081	0	0.415	346,584
ΔLog Credit - Crisis	-0.067	0	-0.091	0	0.435	347,833
ΔAPR - Revolving	0.61	0.54	0.08	1.13	1.40	231,996
ΔAPR - Revolving - Pre crisis	0.40	0.39	0.00	0.85	1.36	111,314
ΔAPR - Revolving - Crisis	0.82	0.77	0.21	1.36	1.42	120,682
ΔAPR - Term Loans	0.40	0.33	0.17	0.50	0.63	166,656
ΔAPR - Term Loans - Pre crisis	0.33	0.32	0.18	0.42	0.53	80,601
ΔAPR - Term Loans - Crisis	0.46	0.35	0.16	0.57	0.50	86,055

period).

Dependent variables. We compute the log differences in outstanding credit in each bank-firm relationships between June 2011 and December 2010 and between December 2011 and June 2011 to obtain the growth rate of loans in the pre-crisis and in the crisis periods, respectively. We control for mergers and acquisition among banks, so that if a firm had a relationship with a bank, and the bank disappears because it is acquired or merged, we can track whether there is a new relationship with the newly formed bank, or with the acquirer, in which case we consider the relationship as still existing. We aggregate credit at the bank-level group, so if a firm borrows from two banks belonging to the same banking group, we consider this as a single relationship. We do so since lending and funding policies are typically decided at the banking group level, and we believe this is the relevant unit of observation to analyze the dynamics of credit supply.

Descptive statistics. Descriptive statistics for the three main measures of credit supply we use in the paper in Table 1. Credit contracted, on average, in both periods, but the contraction was larger after the crisis.

The other measures of credit supply we use are interest rates on revolving credit lines and on term loans. These are obtained as the ratio between the flow of interest rates paid by the borrower in a period and the products. This gives an average annual percentage rate on the loan. Interest rates increased more after the crisis than in the pre-crisis period. This is true for both revolving credit lines and for term loans. The former can be renegotiated at short notice by banks, and this explains why in the post-crisis period they grow more than term loans, whose conditions are more stable over time.

The dynamic of both credit granted and interest rates charged by Italian banks has been different from that of foreign banks after the crisis. As shown in Table 2, the growth rate of credit granted by Italian banks dropped from -3.8 to -7.1%, while that by

Table 2: Credit Supply by Italian and Foreign Banks

	Italian	**Foreign**
ΔCredit - pre crisis	-0.0388	-0.0517
ΔCredit - post crisis	-0.0719	-0.0547
ΔAPR - Revolving - Pre crisis	0.42	0.34
ΔAPR - Revolving - Crisis	0.87	0.62
ΔAPR - Term Loans - Pre crisis	0.35	0.32
ΔAPR - Term Loans - Crisis	0.52	0.33

foreign banks stood at -5.4% after the crisis, just 0.3 percentage points less than prior to the crisis. By the same token, the increase in the interest rates was much sharper for Italian banks vis à vis foreign banks. Of course, this evidence is only suggestive, as firms borrowing from foreign banks may be different from firms borrowing from Italian banks, in terms of lower demand for credit and higher risk. Regression analysis takes care of these possibilities.

It is important to notice that prior to the crisis credit growth was following rather constant patterns, which differed with respect to the behavior observed over the June 2011 - December 2011 period. As Table 2 and figures 2 illustrate, before mid-2011 the growth rate of credit by Italian banks was larger, less negative, than that by foreign banks. As for the change in interest rates charged by Foreign and Italian banks, patterns were not aligned as for credit growth (3). Yet, rates charged by both types of banks were increasing prior to the crisis. After the crisis, rates charged by Italian banks kept increasing at a faster pace.

As an extension we also study two further measures of credit supply: a dummy equal to one if a relationship is terminted during a period, and a dummy equal to one if a loan application is accepted.

Table 3 shows the distribution of bank-firm relationships by home country of the lender. More than a quarter of the relationships are from foreign banks. The majority are French owned. Then, German, American, Austrian, Spanish, Dutch and British banks hold more than 2,000 relationships. Banks from Japan, Switzerland, and Slovenia are less represented. Table 3 also shows the change in the spread of the 10 year sovereign security over the 10 year German Bund, between the average of January and the average of March 2011 for the pre-crisis period, and between the average of July 2011 and the average of September 2011 for the crisis period. It can be seen that this spread jumped

Table 3: Home Country of Banks included in the sample and changes in spreads

Country	**Number of relationships**	**%**	**ΔSpread - Pre crisis**	**ΔSpread - crisis**
Austria	8,407	1.21	-0.4	32.7
Switzerland	207	0.03	-9.4	45
Germany	22,888	3.30	0	0
Spain	4,361	0.63	3.2	83
France	135,071	19.45	-3.7	38
UK	2,314	0.33	-44	34
Japan	465	0.07	-13	98
Netherlands	2,921	0.42	5.1	15
Slovenia	42	0.01	-7.6	110
United States	9,355	1.35	-37	7.8
Total foreign	188,873	26.79		
IT	508,386	73.21	12	192

Table 4: Balance Sheet Variables of Banks

		Mean	**Median**	**p25**	**p75**	**StdDev**
	T1 Ratio	17.1	13.9	11.1	18.5	14.0
Pre-Crisis	Interbank/Assets	5.6	2.7	0.92	6.17	9.11
Period	Exposure to Piigs	13.8	11.9	6.8	18.4	10.2
(Dec 2010)	ROA	0.07	0.25	0.06	0.43	1.21
	Log Assets	6.9	6.0	5.0	6.9	3.7
	T1 Ratio	16.8	13.9	11.2	18.5	11.9
Crisis	Interbank/Assets	5.3	2.7	0.82	6.7	8.2
Period	Exposure to Piigs	13.6	11.5	6.7	17.8	9.9
(June 2011)	ROA	0.13	0.16	0.05	0.29	0.45
	Log Assets	6.9	6.0	5.0	6.9	3.7

very significantly, by almost 200 basis points, for Italian banks (see also Figure 1), for Slovenian (110 basis points), Japanese and Spanish banks (98 and 83 basis points, respectively). Prior to the crisis, spreads changed little, and in some instances, they decreased.

Our sample includes 582 banks, 49 of which foreign, in the pre-crisis period and 574, of which 47 foreign, in the post-crisis period. Descriptive statistics of banks' balance sheet variables are shown in Table 4.

There is large variability in banks' balance sheet structure and size. Larger banks rely more on interbank funding, are less capitalized, have a smaller exposure to troubled sovereign securities than smaller banks.

Table 5: Balance Sheet Variables of Banks

		Mean	**Median**	**p25**	**p75**	**StdDev**
Italian	T1 Ratio	17.2	14.2	11.3	19.0	13.3
	Interbank/Assets	4.6	2.4	0.75	5.55	7.94
	Exposure to Piigs	14.4	12.3	7.5	18.7	9.8
	ROA	0.08	0.18	0.05	0.34	0.92
	Log Assets	6.0	5.8	4.9	6.7	1.55
Foreign	T1 Ratio	12.8	11.4	10.4	13.6	5.2
	Interbank/Assets	18.3	17.7	11.2	23.9	9.3
	Exposure to Piigs	1.64	0.88	0.19	2.22	2.03
	ROA	0.31	0.39	0.13	0.69	0.79
	Log Assets	19.7	20.3	18.1	20.9	1.6

Table 5 shows descriptive statistics of the main bank variables distinguishing between Italian and Foreign banks. The statistics are computed over both the crisis and pre-crisis period (data shown in Table 4 indicate that there is little difference across periods, with the partial exception of ROA).

Foreign banks are on average larger, rely more on interbank funding, have higher ROA, are less exposed to troubled sovereign securities. The relatively low standard deviation and the small interquartile range of all variables suggest that foreign banks are a more homogeneous group than Italian banks. Larger Italian banks have a balance sheet structure simlar to that of foreign banks. In our regressions, systematic differences across banks are controlled by bank fixed effects.

Finally, we describe basic statistics of the control variables include in our regressions: the share of total credit granted to the firm held by the bank, the ratio of drawn to granted credit, and the share of revolving credit lines (overdraft facilities) over total credit. Banks hold on average one third of credit in each relationship. The median share stands at about 18%. Firms draw about 64% of available credit, but the median firm draws 75% of it. Finally, overdraft facilities are on average 28% of total credit, 13.5% at the median. Italian banks tend to have a lower share of credit, the ratio of drawn to grantred credit is lower for Italian banks, the share of revolving credit lines is higher for Italian banks. The differences in the means of these variables between Italian and foreign banks, while not large in absolute value, are statistically significant.

Table 6: Descriptive Statistics of Relationship-Level Controls

		Mean	Median	p25	p75	StdDev
whole sample	Share	24.4	17.6	8.5	34.7	21.1
	Drawn/Granted (%)	63.7	75.0	35.7	97.8	35.7
	Share overdraft	23.7	9.1	1.5	30.7	31.9
Italian	Share	23.6	16.8	8.2	33.1	20.8
	Drawn/Granted (%)	62.2	71.5	33.4	96.2	35.8
	Share overdraft	24.4	10.0	2.3	32.2	32.0
Foreign	Share	27.3	20.0	8.5	41.7	23.2
	Drawn/Granted	69.6	87.6	43.2	100	13.3
	Share overdraft	21.9	5.0	0	25.9	32.1

5 Results

5.1 Credit quantity

Results from the estimation of equation 1 are displayed in table 7.

Columns 1 and 2 show the effect of the dummy "foreign bank" on the growth of credit granted. Before the crisis there is no difference between Italian and foreign banks (the treatment and control group, respectively). During the crisis, the behavior of the two types of banks is in fact different: credit granted by foreign ones grew by about 3 percentage points more than credit granted by Italian banks. These results are robust to the inclusion of bank fixed effects (column 2), which absorb the dummy "foreign bank". This may be important, since bank fixed effects control for differences in bank balance sheet structure (bank's balance sheet structure did not change much between December 2010 and June 2011), bank organizational structure, and other bank-level time invariant unobserved heterogeneity. Yet we do not observe much difference in the coefficients in the two specifications, and this suggests that the "foreign bank" variable of column 1 is already accounting for the relevant cross-section heterogeneity of banks.

Columns 3 and 4 display the effect of a continuous treatment, namely the change in the spread between the yields on the 10 year German Bund and on the government bond, with the same maturity, issued by the country in which the lender is headquartered. Results show that, whereas before the sovereign debt crisis the spread had a positive association with credit growth, after the crisis its sign reverses and the effect becomes negative and statistically different from zero. In particular after the burst of the crisis a bank whose home country experiences an increase of 100 basis points in the spread

records a 11 percentage points lower credit growth with respect to banks whose sovereign risk has remained unchanged. Column 4 shows results from regressions including bank fixed effects: after the burst of the European sovereign debt crisis, an increase of 100 basis points in the spread of the home country sovereign debt, with respect to the German Bund, leads to a lower credit growth by about 1.2 percentage points. Unlike in the regression with the dummy foreign, including bank fixed effects reduces the size of the coefficient of the interaction term with the delta spread: this is because the delta spread captures very little of bank-level variability. This finding is consistent with our hypothesis that the transmission of sovereign risk to credit supply mainly occurs through the funding structure of intermediaries, which is absorbed by bank fixed effects.

All regressions include firm-period fixed effects, so that all estimates refer to different banks lending to the same firms (within estimator).

As a robustness check we use credit drawn as an alternative dependent variable. Credit drawn is much more affected by firm demand for credit than granted credit. While we include firm-period fixed effects, credit drawn still partly reflects a decision of the firm, rather than a supply-side (bank) decision. Table 8 shows results. Columns 1 and 3 display estimates without including bank fixed effects, columns 2 and 4 show results including them. Overall, credit is drawn more intensely from foreign banks (column 2) and from banks whose spread increased less after the crisis (column 4), providing a picture consistent to the one coming from the analysis of credit granted.

We performed some further robustness checks: first we estimate the model excluding Spanish banks since these have also been affected by the crisis; second we cut the distribution of the dependent variable between the 1st and 99th percentile. In both cases results continue to hold.

5.2 Interest rates

We now move to study the behavior of foreign and Italian banks for what concerns the pricing of credit, estimating equations 2 and 4.

Table 9 shows results of regressions on the change in the Annual Percentage Rate (net of fees and commissions) on revolving credit lines in columns 1 and 2, and on a dummy variable equal to 1 if the above difference is positive. Although not significant at the 10 percent level, estimates shown in column 1 indicate that foreign banks increased the cost of credit less than Italian banks. The direction of the relationship is confirmed in the results shown in column 3: after the crisis the probability of an increase in the interest rate decreases with respect to the Italian ones. The effect is statistically significant. The

change in the spread on domestic government yields appears to have no effect on the change in the cost of credit (column 2). However, estimates for the probability of an increase in the interest rate displayed in column 4 show that a spread higher by 100 basis points makes this probability higher by 0.2 percentage points. The effect is statistically significant. I

We repeat the same estimation on the change in the Annual Percentage Rate (net of fees and commissions) on term loans. Results, shown in Table 10, are consistent with those for revolving credit lines. Foreign banks increased the price of credit less after the crisis than Italian banks. The change in spreads has a significant effect on the cost of credit.

5.3 The mechanisms

An important step forward of our analysis is to assess the transmission channels of the sovereign debt shock to credit supply. To this aim, we extend our baseline model including a set of bank balance sheet variables. In a first test, we include controls for bank reliance on interbank funding, the Tier 1 ratio, the amount of sovereign securities from European troubled countries (GIIPS), and return on assets. Since in this case we exploit the heterogeneity in bank balance sheet, we can also include firms that borrow only from Italian banks, provided that the firm borrows from at least two banks in a period. Then, the sample size increases significantly, reaching over 2 million bank-firm relationships.

Results for the regressions on the growth of credit quantity are shown in column 1 of Table 11. All the coefficients of bank balance sheet variables, interacted with the dummy crisis, have the expected sign: capital and ROA are positive, exposure to GIIPS and banks' reliance on interbank funding are negative. However, only the coefficient for the Tier 1 ratio is statistically significant.

As a further test, we exploit the availability of data on domestic and foreign interbank funding, and on repos through central counterparties, which allows to assess the specific impact of the different components of wholesale funding. These data are available for Italian banks only. Still, this analysis is very informative as it allows to examine the impact of precisely those sources of funding that were affected by the increase in sovereign spreads the most. Since we still include bank fixed effects, we identify the channels through the interaction between bank balance sheet variables and the dummy crisis. Results are shown in column 2 of Table 11. Now, the reliance on foreign interbank funding and on repos have negative and highly significant coefficients. The former dried-

up after the sovereign debt crisis burst; the loss of value and the increase in the haircuts applied on sovereign securities used as collateral hampered banks' access to this market. By contrast, the coefficient for the Tier 1 ratio is largely not significant.

We then turn to study the effect of banks' balance sheet variables on the change in the interest rates charged on revolving credit lines. We choose to focus on this subset of loans only as the prices applied on these loans are more likely to respond quickly to variations in the cost of funding; furthermore there is a greater degree of comparability among revolving lines, as they are mostly un-collateralized and share the same maturity. Results are shown in columns 3 and 4 of Table 11. When foreign banks are included, and interbank funding is not disaggregated into domestic, foreign, and repos, only ROA is significant and positive, indicating that more profitable banks increased the cost of credit more than less profitable banks after the crisis burst. Column 4 shows results from regressions that include a finer disaggregation of interbank funding (available only for Italian banks). Now, all interactions between the dummy crisis and bank balance sheet controls are significant. More capitalized banks increased the cost of credit less. Banks more exposed to GIIPS and banks relying more on foreign interbank funding increased the cost of credit more after the crisis. Banks relying more on the domestic interbank market increased the cost of credit less. The coefficient on the reliance on repos has a negative and significant sign. This may seem counter-intuitive at first sight, since repos became more costly due to the lower value of Italian sovereign securities which are typically used as collateral in these transactions (hence collateral became more costly for Italian banks). However, collateralized transactions are cheaper than uncollateralized ones, especially in times of financial turmoil. Then, the reliance of a bank on collateralized transactions also captures the ability of banks to tap this relatively cheaper market. Finally, ROA has again a positive and significant coefficient.

All these regressions include firm*time fixed effects to control for all firm-period unobserved heterogeneity, and bank fixed effects, which absorb banks' initial conditions, including the initial levels of banks balance sheet variables. Then, the interactions between balance sheet controls and the crisis period capture the impact of the crisis on banks.

Overall these results suggest that banks more exposed to the forms of wholesale funding which became less available and more expensive after the sovereign debt crisis burst, were those banks that decreased credit the most.

5.4 Accepting loan applications and terminating existing relationships

As an extension to our previous analysis, we study whether the sovereign debt crisis also affected the propensity to terminate relationships and the willingness to accept applications for new loans.

As a first step, we estimate equations for the probability that a relationship is terminated. To this aim, we define a dichotomous variable taking value 1 if a bank-borrower relationship had positive credit granted only at the beginning of the period and value 0 if credit granted was positive at both periods. We compare the probabilities that a foreign and an Italian bank terminate a relationship with the same firm, by estimating a linear probability model which allows to include firm-period fixed effects. Table 12 shows that foreign banks are more likely to cut credit than Italian banks (columns 1 and 2, the latter includes bank fixed effects). The effect of the change in the spread is consistent (columns 3 and 4, the latter includes bank fixed effects), capturing the fact that foreign banks, for which the increase in the spread has been relatively limited, have been more likely to terminate credit relationships.

As a second step we examine the "extensive margin" of credit, in particular whether Italian and Foreign banks were more, less, or equally likely to grant loans to new clients. In line with Bonaccorsi and Sette (2012), we use data on loan applications recorded in the CR in order to analyse the probability of acceptance/refusal of new credit. Every time a bank requests information on a given borrower, the query is recorded in the CR, together with the motivation of the request, typically a loan application by a new client. This allows us to recover the number of applications made by each borrower to each bank for any given period.

We collected data on all the requests recorded between October 2010 and March 2011 and between July 2011 and December 2011, pre-crisis and crisis period, respectively. For each application we check if the bank granted any credit to the loan applicant in the sample period and in the following three months. Hence, a loan application submitted to a bank between October 2010 and March 2011 is classified as accepted if we observe that the bank grants credit to the borrower between October 2010 and June 2011, and one submitted between June and December 2011 is accepted if it appears as new credit from that bank between July 2011 and March 2012.

Our dependent variable is a dummy equal to 1 if the application of firm j to bank i is accepted, 0 otherwise. A stand-out descriptive feature of the frequency of accepted applications is that overall it has sharply dropped during the crisis, to 9 per cent between June 2011 and March 2012 from the 37 per cent observed in the three previous quarters.

In order to gauge which variables have an impact on the willingness to extend new credit and whether the behavior of Italian and Foreign banks has varied in a differential way during the crisis, we estimate a linear probability model. We also include firm fixed effects in some specifications to fully control for firm heterogeneity. However, this may induce a selection bias since the effect is identified on firms that make loan applications to at least two banks over a relatively limited period. The reason for applying twice might precisely be that the first application has been denied. Results are shown in Table 13. All regressions include bank fixed effects. Columns 1 and 3 show results without firm-period fixed effects, thus including also firms that make only one loan application in each period. Columns 2 and 4 include firm-period effects, and the analysis is done on firms that made loan applications to at least two different banks in each period.[7]. Results indicate that the willingness to accept a loan application by foreign banks decreased less than that of Italian banks after the crisis. Similarly, a smaller increase in spreads is associated with a higher willingness to accept a loan application. However, an inspection of descriptive statistics suggests that the effect comes from foreign banks remaining equally selective in accepting loan applications over time and Italian banks becoming way more selective after the sovereign crisis burst.[8]

The combination of the results for credit growth, for the probability that a relationship is terminated, and for the probability that a new loan is accepted provides an elaborate picture. Foreign banks, those that were less affected from increases in sovereign spreads, are more aggressive in cutting credit relationships and, furthermore, before the crisis they were less likely to accept a loan application than Italian banks. However, conditional on relationships being in place, foreign banks provide more credit than Italian banks. This suggests that foreign banks became more selective with their borrowers, yet once they have established a relationship they support their borrowers more. Possibly foreign banks have a tougher budget constraint than Italian banks, and are more able to cut more fragile relationships**.** This finding can be interpreted in the perspective of relationship lending: since foreign banks significantly entered the Italian market only in the second half of the 2000s, they have rarely been able to develop long-term bank-firm relationships. This possibility is in line with the results of De Haas and Van Horen (2012), who show that after Lehman's default, foreign banks continued to lend more to

[7] In this case identification is achieved thanks to firms applying for a loan to at least one foreign and at least one italian bank in each period.

[8] This is corroborated by regressions excluding bank fixed effects, but including a dummy for foreign banks: the latter is negative and significant, indicating that foreign banks were less likely to accept a loan application than Italian banks in the pre-crisis period. After the crisis this gap was filled because Italian banks reduced significantly their willingness to accept a new loan application.

countries where they have longer lending experience.

6 Concluding remarks

In this paper, we study the impact of the recent sovereign debt crisis on lending activity of Italian banks. To this aim, we exploit the variability observed between different categories of banks operating in Italy in quantities lent, interest rates charged, willingness to accept new applications and to terminate existing relationships over the transition between the pre-crisis and the crisis periods. We split our observations into treatment and control groups according to a dichotomous distinction between Italian and foreign banks and also according to the different variation of the sovereign spread relative to German Bund for each bank's nationality.

Our results show that Italian banks tightened their supply of credit more than foreign competitors, both in terms of quantities and prices, after the sovereign crisis burst. Lending by Italian banks grew by 2 percentage points less and the interest rates charged were about 20 basis points higher. Our estimates fully control for firm unobserved heterogeneity, by including firm-time fixed effects, and also hold when capturing bank unobserved heterogeneity through bank fixed effects. We also make an attempt to identify the channels through which the sovereign debt crisis has been transmitted to credit supply by exploring what bank balance sheet characteristics affected the growth of loans and their price. We find that banks that reduced their lending more significantly were those relying more heavily on wholesale funding, namely foreign interbank funding and repos with central counterparties, which became less available and more expensive after the sovereign debt crisis. Banks that increased the cost of credit more substantially were those with lower capitalization, more exposure to GIIPS, more reliance on foreign interbank funding and more reliance on repos with central counterparties, which also proxy the extent to which banks could tap on a relatively cheaper collateralized market.

Besides analysing the terms of existing credit relationships, our investigation also explores the differential behavior of Italian and foreign banks in accepting new loan applications and terminating existing relationships as the sovereign crisis burst. These results are particularly insightful, as they show that foreign banks, while tightening credit less with respect to Italian banks, did not relax their selectivity criteria during the crisis; if any, they increased it, being more likely to cut credit and maintaining very high rejection rates. An interpretation of this finding could be that foreign banks "flew to quality" during the crisis, by concentrating on supporting less fragile borrowers. This story suggests an examination of firms' characteristics, which we intend to pursue as a

further extension of our work, by studying whether Foreign and Italian banks behave differently depending on firms' riskiness (z-score, leverage, profits), liquidity, opacity (size, age, tangible to total assets).

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7 Appendix

Table 7: Baseline - Credit quantity

	(1)	(2)	(3)	(4)
DEP VARIABLE	$\Delta LOG(CREDIT)$			
FOREIGN BANK	-0.00954			
	(0.00955)			
FOREIGN BANK*CRISIS	0.0298**	0.0284**		
	(0.0133)	(0.0134)		
DELTA SPREAD			0.0972*	
			(0.0526)	
DELTA SPREAD*CRISIS			-0.109**	-0.0177**
			(0.0505)	(0.00806)
SHARE OF TOTAL CREDIT	-0.00120***	-0.00143***	-0.00122***	-0.00143***
	(0.000184)	(0.000170)	(0.000182)	(0.000169)
DRAWN OVER GRANTED	0.00707	0.0176**	0.00806	0.0176**
	(0.00826)	(0.00840)	(0.00793)	(0.00840)
OVERDRAFT OVER TOTAL CREDIT	0.133***	0.122***	0.131***	0.122***
	(0.0107)	(0.0124)	(0.0108)	(0.0124)
FIRM*TIME FIXED EFFECTS	yes	yes	yes	yes
BANK FIXED EFFECTS	no	yes	no	yes
Observations	694417	694417	694417	694417
R-squared	0.289	0.294	0.289	0.294
Number of Firm-Period Observations	173,830	173,830	173,830	173,830

standard errors clustered at bank level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Growth of Drawn Credit

DRAWN CREDIT	(1)	(2)	(3)	(4)
DEP VARIABLE	$\Delta LOG(CREDIT)$	$\Delta LOG(CREDIT)$	$\Delta LOG(CREDIT)$	$\Delta LOG(CREDIT)$
FOREIGN BANK	0.0608***			
	(0.0162)			
FOREIGN BANK*CRISIS	0.0525*	0.0553**		
	(0.0270)	(0.0269)		
DELTA SPREAD			-0.286***	
			(0.0929)	
DELTA SPREAD*CRISIS			0.215***	-0.0351**
			(0.0830)	(0.0162)
SHARE OF TOTAL CREDIT	-0.000510	0.000185	-0.000492	0.000185
	(0.000348)	(0.000283)	(0.000351)	(0.000283)
DRAWN OVER GRANTED	-1.315***	-1.385***	-1.316***	-1.385***
	(0.0487)	(0.0442)	(0.0486)	(0.0442)
OVERDRAFT OVER TOTAL CREDIT	-0.0286	0.00841	-0.0280	0.00845
	(0.0232)	(0.0264)	(0.0230)	(0.0264)
FIRM*TIME FIXED EFFECTS	yes	yes	yes	yes
BANK FIXED EFFECTS	no	yes	no	yes
Observations	595553	595553	595553	595553
R-squared	0.342	0.347	0.342	0.347
Number of Firm-Period Observations				

standard errors clustered at bank level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Interest Rates on Revolving Credit Lines

DEP VARIABLE	$\Delta APR - REVOLVING$		D($\Delta APR - REVOLVING > 0$)	
	(1)	(2)	(3)	(4)
FOREIGN BANK*CRISIS	-0.208		-0.0307**	
	(0.132)		(0.0144)	
DELTA SPREAD*CRISIS		-0.0599		0.0199**
		(0.396)		(0.00936)
SHARE OF TOTAL CREDIT	0.000352	0.000362	7.39e-05	7.39e-05
	(0.000461)	(0.000458)	(6.98e-05)	(6.98e-05)
DRAWN OVER GRANTED	0.0926***	0.0924***	0.0228***	0.0228***
	(0.0244)	(0.0247)	(0.00572)	(0.00572)
OVERDRAFT	0.144***	0.145***	0.0708***	0.0708***
	(0.0308)	(0.0305)	(0.00558)	(0.00558)
FIRM*TIME FIXED EFFECTS	yes	yes	yes	yes
BANK FIXED EFFECTS	yes	yes	yes	yes
Observations	231996	231996	231996	231996
R-squared	0.307	0.307	0.321	0.321
Number of Firm-Period Obs				

standard errors clustered at bank level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Interest Rates on Term Loans

DEP VARIABLE	ΔAPR_TERM		D($\Delta APR\_TERM > 0$)	
	(1)	(2)	(3)	(4)
FOREIGN BANK*CRISIS	-0.154**		-0.0434	
	(0.0757)		(0.0283)	
DELTA SPREAD*CRISIS		0.0994**		0.0285
		(0.0483)		(0.0185)
SHARE OF TOTAL CREDIT	6.19e-05	-0.000218	0.000517***	0.000517***
	(0.000188)	(0.000195)	(0.000121)	(0.000121)
DRAWN OVER GRANTED	-0.0994***	-0.0679***	0.0627***	0.0627***
	(0.0268)	(0.0234)	(0.0110)	(0.0110)
OVERDRAFT OVER TOTAL CREDIT	0.0445*	0.0463**	-0.0157**	-0.0157**
	(0.0227)	(0.0198)	(0.00763)	(0.00763)
FIRM*TIME FIXED EFFECTS	yes	yes	yes	yes
BANK FIXED EFFECTS	yes	yes	yes	yes
Observations	166656	166656	166656	166656
R-squared	0.364	0.374	0.371	0.371
Number of Firm-Period Observations				

standard errors clustered at bank level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Bank balance sheet structure

VARIABLES	(1) $\Delta LOG(CREDIT)$	(2) $\Delta LOG(CREDIT)$	(3) $\Delta APR-REVOLVING$	(4) $\Delta APR-REVOLVING$
TIER 1 RATIO * CRISIS	0.00154*	-0.000505	-0.00923	-0.0520***
	(0.000904)	(0.000776)	(0.0122)	(0.0140)
EXPOSURE TO GIIPS*CRISIS	-0.00151	0.000864	0.0105	0.0239***
	(0.00126)	(0.000563)	(0.00700)	(0.00827)
RETURN ON ASSETS*CRISIS	0.00841	0.0229	1.846***	1.214***
	(0.0222)	(0.0148)	(0.330)	(0.217)
INTERBANK/ASSETS*CRISIS	-0.000476		0.00430	
	(0.000614)		(0.00836)	
FOREIGN INTERBANK/ASSETS*CRISIS		-0.00324**		0.0714***
		(0.00162)		(0.0151)
DOMESTIC INTERBANK/ASSETS*CRISIS		-0.000298		-0.0302***
		(0.000409)		(0.00662)
REPOS/ASSETS*CRISIS		-0.00491***		-0.00839*
		(0.00120)		(0.00477)
LOG ASSETS*CRISIS	-0.00414**	-0.000413	0.0161*	-0.0779***
	(0.00175)	(0.00248)	(0.00867)	(0.0276)
SHARE OF TOTAL CREDIT	-0.00123***	-0.00123***	0.000238	0.000194
	(0.000117)	(0.000118)	(0.000182)	(0.000176)
DRAWN OVER GRANTED	0.00375	0.000937	0.160***	0.161***
	(0.00732)	(0.00717)	(0.0198)	(0.0200)
OVERDRAFT OVER TOTAL CREDIT	0.119***	0.121***	0.173***	0.164***
	(0.00901)	(0.00915)	(0.0180)	(0.0180)
FIRM*TIME FIXED EFFECTS	yes	yes	yes	yes
BANK FIXED EFFECTS	yes	yes	yes	yes
Observations	2,337,008	2,154,659	802,126	761,553
R-squared	0.022	0.023	0.034	0.037
Number of Firm-Period Observations	805,575	759,774	286,482	286,037

standard errors clustered at bank level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Extensive Margin: Probability a Relationship is Terminated

	(1)	(3)	(3)	(4)
DEP VARIABLE	Prob(cut=1)	Prob(cut=1)	Prob(cut=1)	Prob(cut=1)
FOREIGN BANK	0.0190			
	(0.0139)			
FOREIGN BANK*CRISIS	0.0156*		0.0167*	
	(0.00844)		(0.00865)	
DELTA SPREAD		-0.141**		
		(0.0606)		
DELTA SPREAD*CRISIS		0.119**		-0.0104*
		(0.0531)		(0.00552)
SHARE OF TOTAL CREDIT	-0.00253***	-0.00250***	-0.00207***	-0.00207***
	(0.000171)	(0.000170)	(0.000110)	(0.000110)
DRAWN OVER GRANTED	-0.0125	-0.0138*	-0.0375***	-0.0375***
	(0.00824)	(0.00810)	(0.00739)	(0.00739)
OVERDRAFT OVER TOTAL CREDIT	-0.0813***	-0.0796***	-0.0531***	-0.0531***
	(0.00704)	(0.00711)	(0.00422)	(0.00422)
FIRM*TIME FIXED EFFECTS	yes	yes	yes	yes
BANK FIXED EFFECTS	no	yes	no	yes
Observations	762478	762478	762478	762478
R-squared	0.407	0.408	0.429	0.429
Number of Firm-Period Observations	188,077	188,077	188,077	188,077

standard errors clustered at bank level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Extensive Margin: Probability a Loan Application is Accepted

	(1)	(2)	(3)	(4)
VARIABLES	Prob(accept=1)	Prob(accept=1)	Prob(accept=1)	Prob(accept=1)
CRISIS	-0.263***		-0.209***	
	(0.0289)		(0.0214)	
FOREIGN BANK*CRISIS	0.109***	0.0715***		
	(0.0364)	(0.0218)		
DELTA SPREAD*CRISIS			-0.437**	-0.267***
			(0.171)	(0.0971)
FIRM*TIME FIXED EFFECTS	no	yes	no	yes
BANK FIXED EFFECTS	yes	yes	yes	yes
Observations	926736	366743	926657	366681
R^2	0.088	0.099	0.088	0.098
Number of Firm-Period Observations		148358		148358

standard errors clustered at bank level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 1: Spread between 10-year Italian Btp and German Bund

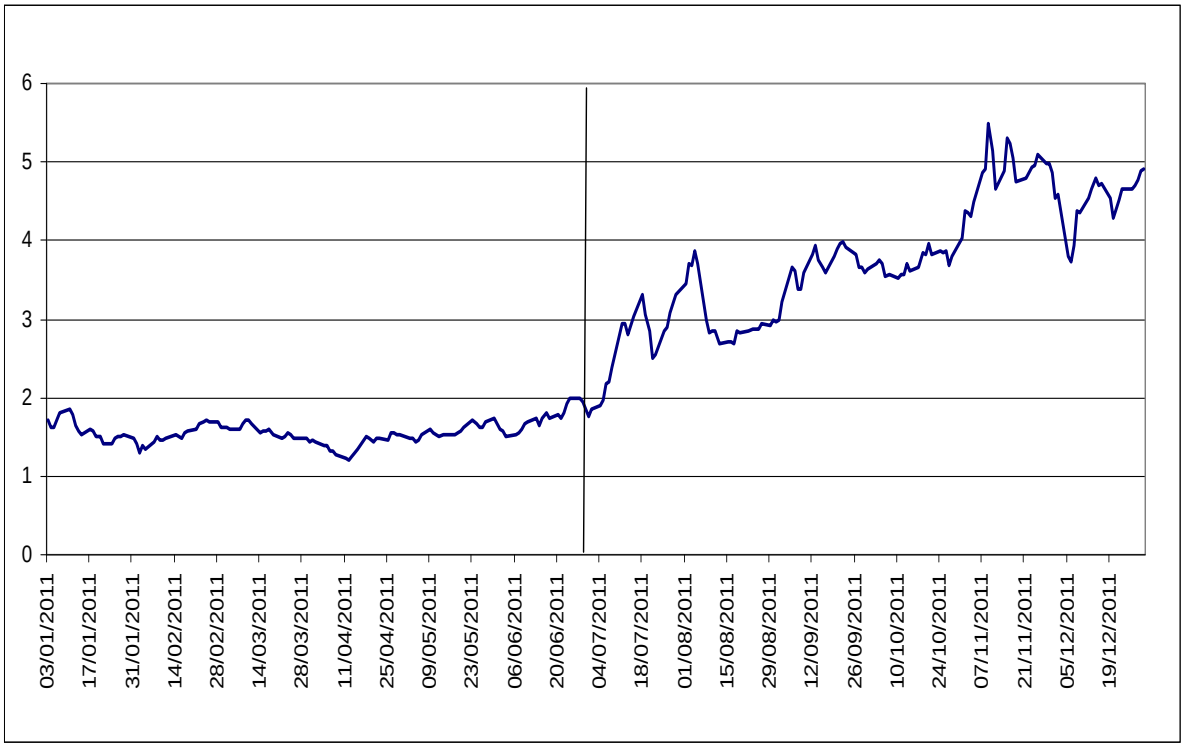

Figure 2: 6 month credit growth: Italian vs. Foreign banks

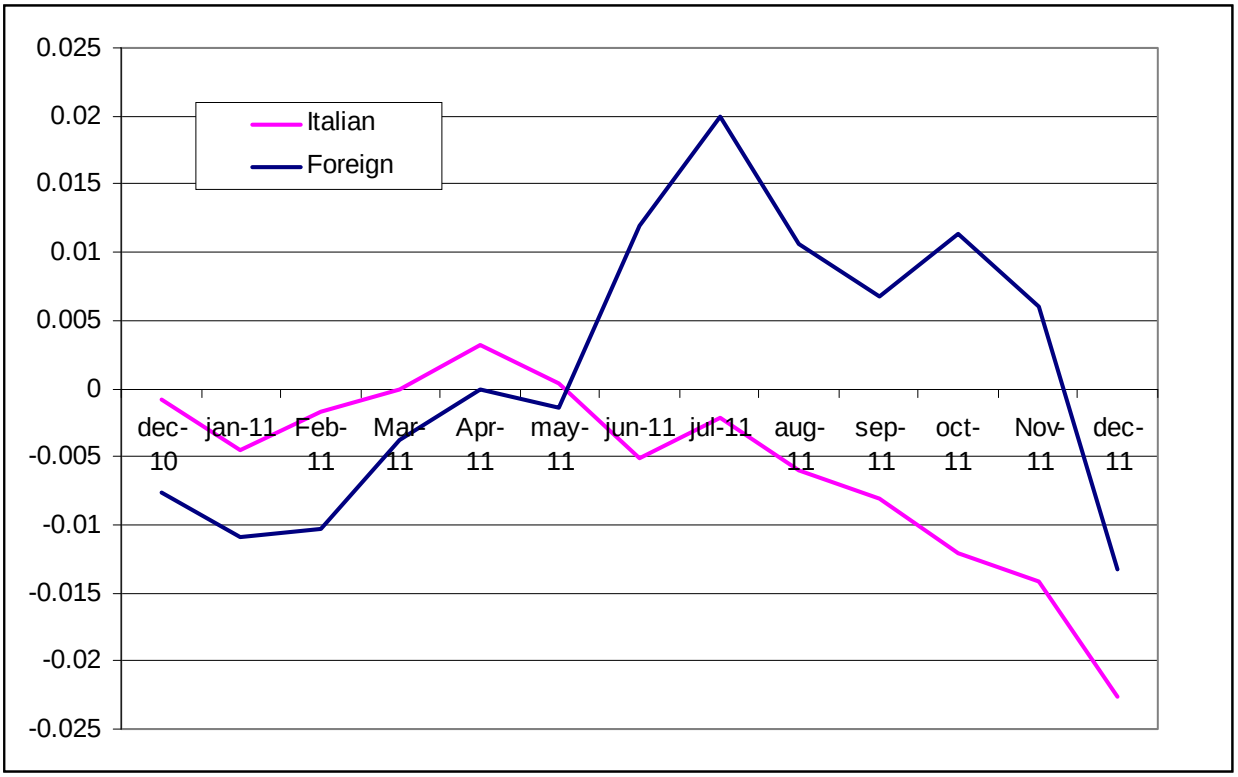

Figure 3: Annualized percentage rates: Italian vs. Foreign banks