

Firm credit in the euro area: A tale of three crises

Sarah Holton, Martina Lawless and Fergal McCann*

Central Bank of Ireland, Dame Street, Dublin 2, Ireland.

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Abstract

Using survey data from 2009 to 2011, we analyse the effects of the recent euro area economic, financial and private debt crisis on the supply of and demand for bank finance for small and medium enterprises (SMEs). At the country level, we identify three distinct aspects of the recent crisis in the euro area affecting firm credit through different channels. Controlling for country fixed effects, the impact of a weak real economy on firm credit operates both by reducing firms' demand for bank financing and by lenders increasing loan rejections and tightening terms and conditions on credit allocated. On the other hand, financial conditions have no significant effect on demand, but they do affect credit supply as we find that financial tensions worsen the chances of obtaining credit and its terms and conditions. We interpret this as evidence of a bank balance sheet channel negatively impacting credit provision. We find that private sector indebtedness has important effects on SMEs' credit access and its terms and conditions.

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1 Introduction

The recent economic crisis in the euro area has put financial markets and sovereign debt markets under almost unprecedented pressure. This paper looks at how these events have affected firms' financing across the euro area by examining loan applications, rejection rates and changes in the terms and conditions of lending. Our paper exploits cross-country micro-level data on Small and Medium Enterprises (SMEs) in the euro area over time to identify firm and country-level characteristics that have driven changes in credit supply and demand. We identify three separate but connected aspects of the euro area crisis that have affected lending: a real economic crisis, a financial/sovereign crisis and a private sector debt overhang crisis.

Past studies have emphasised the importance of separating supply and demand drivers of credit growth (Adrian and Shin, 2009) and analysed the extent to which credit provision is affected by bank and firm balance-sheet strength. As comparable micro data across countries are rarely available, it has been difficult to examine the relative impact of macroeconomic factors and the channels through which they operate on the supply and demand for credit. This paper addresses this issue directly by examining the effects of the recent euro area economic, financial and debt crisis on SMEs' access to bank finance.

We use a survey on access to finance of SMEs in the euro area (SAFE) carried out by the European Central Bank (ECB) during 2009 and 2010, which allows us to separate banks' supply of loans from firms' demand for credit. The survey data we use allow us to separate supply and demand, while the cross-country nature of our data allows us to identify specific country and time-varying drivers of crisis-era shifts in credit supply and demand, thus filling this gap in the literature.

We focus on bank credit as it has been shown to be the chief form of financing available to SMEs (Beck, Demirguc-Kunt, and Maksimovic, 2008). We distinguish between firms' perception of the availability of finance and their actual experience obtaining credit and the terms and conditions at which they receive it and test what firm characteristics and macroeconomic factors affect each of these different components of credit access. Overall, we find that larger and older firms face the lowest risk of having loan applications rejected, but that age and size are less important for firms' perceptions of credit availability than they were for actual experience of obtaining a loan. Two key variables in explaining perceptions of a reduction in credit availability were if the firm reported a deterioration in profits or negative prospects.

We consider a range of real, financial and debt stock variables that can influence access to finance and discuss their possible impact on supply, demand, and credit conditions. We separate the effects of the euro area crisis into three distinct components: the real economy,

the sovereign/financial sector, and private sector debt overhang. We use GDP growth and domestic demand to capture real economic effects, and sovereign bond yields and banks' credit default swaps (CDS) to capture the impact of financial variables on credit conditions and loan supply. We also include total private sector indebtedness to capture debt overhang.

We find distinct effects of the real and sovereign/financial crises. A weaker real economy is associated both with more restrictive credit supply and with weaker credit demand. Financial and sovereign factors mostly lead to tighter supply conditions, both through credit rationing and higher interest rates. This provides evidence of a micro-level lending channel through which sovereign and financial problems can cause heterogeneity in monetary policy transmission in the euro area and can exacerbate recessions by constraining credit provision to the real economy. The concern that "transmission is threatened" in countries where "sovereign debt and bank funding markets have virtually seized up" (Bini Smaghi, 2011) appears to be validated by our findings.

Another finding relates to the notable impact of debt overhang on the supply side measures of loan rejection and credit terms and conditions. This suggests that countries with the largest accumulated pre-crisis debt levels will face more credit rationing and tightened supply-side conditions.¹ A high ratio of private credit to GDP can lead to bank and borrower-level deleveraging requirements through the bank lending and borrower balance sheet channels respectively (both Ciccarelli, Maddaloni, and Peydro (2010) and Jiménez, Ongena, Peydró, and Saurina (Forthcoming) distinguish between these channels). Our evidence suggests that debt overhang indeed has an effect on credit supply, and although our data do not allow us to distinguish between bank and borrower balance sheet channels, it is likely that both are in operation given the macroeconomic context.

Our identification of supply side drivers of adverse credit conditions which are not explained by borrower-level characteristics has implications outlined in a large literature on the impact of such problems on the real economy. Campello, Graham, and Harvey (2010) show that firms that are financially constrained planned lower employment and technology, capital and marketing expenditure than matched unconstrained firms, while Mach and Wolken (2011) show that credit constraints are of vital importance in predicting which small firms exit the market.

The remainder of the paper is organised as follows: Section 2 discusses the literature and hypotheses, Section 3 describes the data used, Section 4 describes the methodology and reports results on the firm and country characteristics affecting different elements of credit

¹Similar to Stiglitz and Weiss (1981) we mean credit rationing as the excess demand for loanable funds which is not satisfied as "banks deny loans to borrowers who are observationally indistinguishable from those who receive loans."

access and Section 5 concludes.

2 Literature, Theory and Testable Hypotheses

In this section, we briefly review some of the literature on firm finance, its relationship with the credit channel of monetary policy and the theories relevant to the supply and demand of credit to provide a framework for understanding which macroeconomic explanatory variables may affect either supply of credit, demand for credit, or both, before we test our hypotheses in Section 4.

2.1 Firm Finance and the Credit Channel

Previous research on SME funding across countries such as Beck, Demirguc-Kunt, Laeven, and Maksimovic (2006), Brown, Ongena, Popov, and Yesin (2011), Albareto and Russo (2012) and Psillaki and Daskalakis (2009) consistently find that variation in access to financing across firms is strongly negatively related to factors such as firm size, growth, private ownership, foreign ownership, export status and firm age. Foreign-owned firms have been shown to be considerably less likely to report difficulties in accessing credit, even controlling for other characteristics. The literature has found that these patterns hold true in both “normal” and crisis sample periods.

The only previous paper to consider the role of macroeconomic factors in influencing firms’ access to finance is Beck, Demirguc-Kunt, Laeven, and Maksimovic (2006), who focus on developing and transition countries. Their chief finding is that institutional quality and financial market development are the most robust determinants of access to finance across 80 countries in 1999 and 2000. Our study is therefore the first to estimate the impact of factors associated with the recent financial crisis on SME access to finance.

The credit channel literature deals with “imperfect information and other “frictions” in credit markets” and is concerned with the effectiveness of the monetary policy transmission mechanism in providing finance to the real economy (Bernanke and Gertler (1995)). The credit channel comprises the bank lending channel and the balance sheet channel which deal with the impact of banks’ and borrowers’ balance sheets respectively on the supply of credit. Peek and Rosengren (1995) provide an overview of the bank lending channel and highlight the effect of banking structures on lending to firms.

One of the challenges faced by this literature relates to problems in delineating between supply and demand effects in analysing movements in credit (Kashyap and Stein, 2000). Certain contributions have focused on distinguishing between these supply and demand effects, using firm level data (Kashyap, Stein, and Wilcox, 1993), matched firm-bank data (Albertazzi

and Marchetti, 2010) and bank lending survey data (Hempell and Kok Sorensen (2010), Ciccarelli, Maddaloni, and Peydro (2010) and Del Giovane, Eramo, and Nobili (2010)). Using loan application data for Spain, which includes information on both firm and bank balance sheets, Jiménez, Ongena, Peydró, and Saurina (2012) find evidence that the bank lending channel is strongest since the onset of the global financial crisis.

Our paper adds to this literature by identifying country level factors which impact on supply and demand and by showing that weaker sovereigns and banks, as well as a more indebted private sector, are associated with tighter credit conditions being imposed on SME borrowers. Both Mishkin (1995) and Bernanke and Gertler (1995) highlight that because “asymmetric information can be particularly pronounced for small companies” they are more likely to be “bank-dependent”. This makes the bank lending channel all the more relevant for SMEs, as emphasized by Beck, Demirguc-Kunt, and Maksimovic (2008).

2.2 Factors affecting supply and demand

We examine three groups of macroeconomic effects on the SME credit market - developments in the real economy, financial and sovereign variables and the effect of private sector debt overhang. This subsection reviews previous research on how these aggregate factors can influence supply and demand for credit at the firm level.

Real economy: The important link between finance and the real economy is well documented (King and Levine, 1993) and the relationship between the two can be varied and bidirectional (Demetriades and Hussein, 1996). Real economy developments could affect all aspects of financing, including supply, demand and its terms.

Changes in economic growth can affect firms’ output expectations and their expected returns on investment, which will alter their demand for credit (Lown and Morgan, 2006). Economic growth can also affect the supply of credit in a number of ways. A negative shock can adversely affect firms’ asset values, income and prospects and so would make lending riskier, or it could affect banks’ balance sheets and alter their ability to lend to other sectors.

As we are focusing primarily on SMEs, which tend to be less international than larger firms in their market coverage and also in terms of their ability to raise external funds, we look not only at GDP growth but also at the domestic demand component of GDP (i.e. excluding net exports) to see whether it has a stronger effect on SME financing.

Financial and sovereign: Financial and sovereign variables are also thought to have an important impact on monetary transmission and the credit channel. Sovereign bonds are expected to impact the supply and terms and conditions of credit offered by banks. Gonzalez-Paramo (2011) outlines three main channels by which sovereign bonds affect bank financing. First the yield on sovereign bonds serves as a benchmark, either explicitly or implicitly, for

interest rates on loans charged by banks, and are generally seen as a floor for private sector funding costs (price channel).

Secondly, given that sovereign bonds are the predominant source of collateral used in refinancing operations with the Eurosystem and in the interbank market, when the value of banks' collateral declines they must either reduce the amount they borrow or provide more collateral. Restricted access to funds for banks will have implications for their ability to finance the private sector (liquidity channel).

Finally a decrease in the price of sovereign bonds held by banks causes a decline in the value of their assets, and reduces their capital base, which could ultimately restrict the supply of credit to the private sector (balance sheet channel). Therefore we would expect government bond yields to have an effect on the supply and conditions of firm financing, particularly from banks, which is the focus of this paper.

When banks' risk and costs of funding rise, they impact the price and quantity of credit they can provide to the real economy. For this reason we use credit default swaps (CDS) spreads on bank bonds to capture stress in financial markets and the banking sector. CDS is expected to impact the supply and terms and conditions of bank financing as funding costs will be higher for banks with high CDS prices.

Debt overhang: To capture the effect of indebtedness levels in different countries we use the outstanding stock of credit to the private sector over GDP. Private debt to GDP can impact either the supply of or the demand for credit. As stated in the introduction, debt overhang can create a need to deleverage on the part of firms, thus decreasing the incentive to invest and reducing demand for credit (see Rogoff (2011) for a discussion of the current crisis as “Great Contraction” and Koo (2011) for a discussion of “balance sheet recessions”). On the supply side, banks that have a large loan book and need to reduce the size of their balance sheet in order to improve their capital ratios will have to deleverage regardless of the quality of applicants, “by selling some of their assets or reducing their lending” (Blanchard (2009)). Alternatively, the accumulation of debt may lead to uncreditworthy borrowers being rejected in their loan applications.

3 Data

This section describes the firm-level data used to measure credit access and the indicators of the macroeconomic environment we use to examine differences in the firm-level patterns across countries. Subsection 3.1 provides a description of the background and coverage of the Survey on Access to Finance of Small and Medium Enterprises (SAFE). The following Subsection 3.2 gives the detail on the five survey questions on credit conditions that we use as

dependent variables. Subsection 3.3 describes the firm and country level explanatory variables used in the empirical analysis.

3.1 Survey on Access to Finance of Small and Medium Enterprises (SAFE)

Since 2009, the ECB has conducted half-yearly waves of the SAFE survey of euro area SMEs. The aim of the survey is to provide information on the financing needs of SMEs, their experience in attempting to access finance, along with information on their perceptions of current economic and financial conditions. The survey also asks firms about changes in their turnover, employment, ownership type, age and sector of activity.² As one can see from Table 1, the majority of the sample across the six waves of the survey that we use, comes from the largest four countries in the euro area: Germany, Spain, France and Italy, for whom the sample of firms is representative. The overall sample for all countries is also representative of euro area SMEs.³

Figure 1 gives an indication of the breakdown of the data by sector, size age and ownership type, averaged across the six periods. We see that over a third of firms can be categorised as service firms, with a quarter in manufacturing and a quarter in retail. In terms of size, one third of firms can be considered micro and small respectively, with a quarter of the sample being medium firms and 8% large firms.⁴ In terms of age, we see that almost three quarters of firms have been in existence for over ten years. Half of firms in the sample are owned by multiple owners who are either family members or business partners, while a further quarter are sole traders. Public shareholding, venture capital and “other firms or business associates” make up the other quarter of the sample.

3.2 Dependent Variables

There are a number of questions that we use as dependent variables in our analysis, all of which are outlined in Table 2.

Beginning with bank rejection rates, firms are asked the following question to gauge success rates in accessing bank finance:

If you applied and tried to negotiate for this type of financing over the past 6

²See Ferrando and Griesshaber (2011) for an empirical analysis of the firm-level determinants of access to finance using the early survey rounds of the SAFE.

³The sample was stratified by firm size class, economic activity and country.

⁴A micro firm in this instance is a firm with less than 10 employees. Small firms have between 10 and 49 employees, medium firms have between 50 and 250 employees, while large firms have over 250.

months, did you: Receive all the financing you requested; receive only part of the financing you requested; refuse to proceed because of unacceptable costs or terms and conditions; or have you not received anything at all?

We code as “Rejected” all firms who received less than 75% of the requested financing, refused to proceed or received nothing at all. Only firms that received all or more than 75% of requested financing are coded as “Not Rejected”. This is our measure of credit supply that will be used in the next section.

Firms were also asked to give their opinion on the availability of finance. This question is useful in that it allows us to include credit perceptions from firms that did not formally apply for a loan and therefore captures any potentially discouraged borrowers. This is based on a question for bank loans, with firms asked:

Would you say that their availability has improved, remained unchanged or deteriorated for your firm over the past 6 months?

We use a dummy variable equal to 1 if firms report a deterioration in loan availability, and 0 otherwise.

Firms are asked the following question, which we use as a measure of changes in loan demand:

For each of the following types of external financing, please tell me if your needs increased, remained unchanged or decreased over the past 6 months.

We focus on the reported demand for bank loans and define a dummy variable that equals 1 if demand has decreased and 0 if demand has remained unchanged or has increased.

Firms are also asked two questions about lending conditions:

We will now consider the terms and conditions of the bank financing (including bank loans, overdraft and credit lines) available to your firm. For each of the following items, could you please indicate whether they were increased, remained unchanged or were decreased over the past 6 months?

We will utilise the answers to this question for “level of interest rate” and “size of loan available” as two measures of lending conditions.

Table 3 gives the share of firms in each country that take a 1 for each dummy that will be used as a dependent variable in our analysis. A fairly high level of variation across countries can be seen for all of the variables. For example, around 40% of Greek and Irish firms report being rejected for a loan at some point in the three years covered by the survey. This is close to double the average rejection rate for the euro area as a whole and many multiples of the

rejection rates of 7.7% in Finland and 8.6% in Austria. In most countries, the percentage of firms reporting a perceived deterioration in loan availability is higher than the loan rejection rates, perhaps indicating that discouragement amongst borrowers is affecting the rate of loan applications or that loans are being granted for smaller amounts than originally applied for.

Demand for credit has decreased across all countries across this period, which is unsurprising given the economic decline. We also see that variation across countries in the fall in demand is considerably less than the variation in actual or perceived credit supply. We do not see falls in demand being substantially more common in the more crisis-hit countries than in the better performing “core” countries, with the highest demand decreases actually observed in the Netherlands and Finland.

Increases in interest rates on loans appear to be a very prevalent constraint, affecting over half of firms across the euro area and up to three-quarters of firms in countries such as Spain and Greece. We also look at changes in loan size as an indicator of the quantity of credit being offered to individual firms and find that just under 20% were able to access larger amounts than in an earlier period with the other 80% finding loan size being offered on acceptance of a credit application was unchanged or lower than previously.

3.3 Explanatory Variables

The firm characteristics used as explanatory variables include indicators of firm size (measured by employment), an indicator of profits, a dummy if the firm is a subsidiary (as opposed to a stand-alone business), age, perception of future prospects as improving or unchanged, ownership structure, measures of access to public funds, and change in capital. Details of these explanatory variables are provided in Tables 4 and 5.

To capture the effect of economic activity we use the percentage change in seasonally adjusted GDP for each country over the 6 month period for each survey wave (GDP Change). We also examine if the magnitude of the real economy effect for SME financing is different if we restrict the measure to the domestic demand component of GDP (Domestic demand), in other words excluding the effect of international trade which would generally be dominated by larger firms. For sovereign yields, we use the average level of the 10 year benchmark government bond yield for each country over the 6 month survey periods (Govt bond yields).

To capture the extent to which stress in the financial sector affects firms’ access to finance, we use the log of the price of the median CDS on bank bonds in different countries (Log of CDS) for each period. This variable is collected from Thompson Reuters. To capture the effect of indebtedness levels, we use the outstanding stock of credit to the private sector over GDP (Private Debt to GDP) in different countries at the start of each 6 month period. The sources of each of these variables are listed in Table 6 and summary statistics for the macroeconomic

variables along with the dependent variables are shown in Table 7.

The standard deviation and extent of the min-max spreads for the macro variables in Table 7, in particular for GDP growth and government bond yields, shows the wide divergence in the impact of the crisis on the countries in the sample. For GDP growth and domestic demand, both the highest and lowest values are for Finland, whose economy shrank considerably in the first half of 2009 but then recovered strongly. On the other hand, several of the other countries experienced negative growth rates for most of the sample period, most notably Ireland, Spain and Portugal, while Greek GDP fell in all periods. The maximum observations on government bond yields and CDS prices also relate to Greece and the highest value of private debt to GDP was experienced by Ireland. The lowest values of all these variables were observed in Germany and Finland.

4 Methodology and Results

4.1 Empirical Methodology

Our empirical strategy is to examine the factors that affect firms' experiences of accessing credit and changes in demand, from the survey questions outlined in Section 3.1. As the questions are qualitative in nature and the dependent variables are all binary, we use the following probit specification:

$$\text{Firm financing}_{i,j} = \theta + \beta \text{ Firm characteristics}_{i,j} + \gamma \text{ Country}_j + \alpha \text{ Macro} + \varepsilon_{i,j} \quad (1)$$

The dependent variables, labelled Firm financing $_{i,j}$ in equation (1), represent different aspects of supply, demand and terms and conditions as outlined by the five variables defined in Table 2; namely loan rejection, loan perception, demand decrease, interest increase and loan size increase. The firm level independent variables capture characteristics and firm specific factors as outlined in Table 4 and 5, such as age, size, profits, ownership and capital position.

In the initial specification we include a vector of country dummies along with the firm level variables to control for unobserved country specific factors that may influence firms' responses. In subsequent specifications we add the macroeconomic variables outlined in Table 6 and examine how the changes in these factors over time influence the credit conditions available to firms beyond the country fixed effect.

We look at the macroeconomic variables one by one as the level of multicollinearity would be very high if all the variables were pooled. For the analysis we use all the observations from the eleven countries outlined in Table 1 across the six survey periods between 2009 and 2011.

As it is likely that there is correlation between the observations from specific countries and periods, all standard errors are clustered at the country-time level.

4.2 Firm Characteristics and Variation Across Countries

Table 8 reports the results of the probit regressions for all five dependent variables regressed on just the country dummies and the firm level characteristics. Column (1) shows that smaller and younger firms were the most likely to have their application for a bank loan rejected; this result is in line with most of the previous literature on firm access to finance.⁵ Access to other sources of funds, either from a public source or in terms of the firm's own capital, reduce the probability of loan rejection. Firms reporting unchanged prospects (relative to deteriorated prospects) were also less likely to have been rejected, but improved prospects had no additional effect. The country dummies in the loan rejection regression are mostly significant. Using Germany as the reference country, the country dummies are positive and significant in five cases (Spain, Ireland, Greece, Netherlands and Portugal) showing a higher probability of credit being refused to firms from these countries even after controlling for firm performance.

Column (2) of Table 8 analyses firms' credit perceptions. This is a useful exercise as it includes firms that did not formally apply for a loan and therefore captures any potentially discouraged borrowers. As we can see, contrary to the results for firms' experience, size is not a significant characteristic for firms' perceptions of credit availability and age is much less important than it is for actual experience of obtaining a loan. This echoes the findings of Artola and Genre (2011). A decline in profits over the previous six months is significantly related to a firm reporting a reduction in credit availability, as are negative firms prospects. Access to alternative funds and own capital position have similar effects on perception as on actual rejection. Only Greek and Irish firms are significantly more likely to report deteriorations in credit availability relative to Germany.

Turning to reported demand for bank loans in column (3) of Table 8, we can see that smaller firms are the least likely to have reduced their demand for loans, whereas older firms are more likely to have reduced their demand. This may be because older firms are more likely to have higher levels of internal resources, or as suggested by Becchetti and Trovato (2002), smaller, younger firms may have higher growth potential and need more finance to invest. Firms that have had an improvement in their capital positions are also more likely to have had a decrease in credit demand. Firms in Spain, Ireland, Finland and the Netherlands are more likely to have had a decrease in demand relative to Germany.

⁵See papers such as Beck, Demirguc-Kunt, Laeven, and Maksimovic (2006), Brown, Ongena, Popov, and Yesin (2011), Albareto and Russo (2012) and Psillaki and Daskalakis (2009).

In relation to the terms and conditions of credit which are shown in columns (4) and (5) of Table 8, we can see that improved access to public funds makes it less likely that a firm has had an increase in their interest rate and more likely that they have had an increase in the size of loan facilities available to them. What may seem unusual is that smaller firms were less likely to have seen an increase in rates. However, this greater tightening of credit standards for large firms has also been identified in the ECB’s bank lending survey responses and was a significant feature in Germany. It was reported to be partly because “savings banks and credit cooperatives, as typical lenders to SMEs, were initially less badly affected by the crisis and did not adjust their credit standards until the general economic situation deteriorated” Deutsche Bundesbank (2010). Of all the country dummies that are significant for the terms and conditions of credit in columns (4) and (5), they all indicate more adverse conditions than in Germany, in that they are more likely to have seen increases in interest rates and less likely to have seen increases in loan sizes.

4.3 Effects of the Macroeconomic Variables

Table 8 shows that country dummies are an important explanatory factor in the various measures of firm credit access. To capture the changes in macroeconomic conditions over 2009-2011, an exceptionally dramatic time period for the euro area economy, we examine the impact of the range of measures described in Table 6. In each specification, we continue to control for country fixed effects thereby focusing on the time-varying element of the additional macroeconomic variables.

We begin by looking at the probability of rejection of loan applications in Table 9. The firm-level characteristics from Table 8 are included in all of the specifications, but are suppressed for presentational reasons. Despite controlling for country fixed effects, most of the macro variables enter with statistical significance. Growth in domestic demand is strongly associated with a lower likelihood of being refused credit. Somewhat surprisingly, however, GDP growth does not have the same significant effect. As discussed earlier in Section 2.2, this may be due to the more domestically orientated nature of SMEs. These results provide the intuitive finding that financial institutions do in general respond to conditions in the macroeconomy by refusing more loans.

The measures of bank funding costs (government bond yields and bank CDS) both increase the firm-level probability of being rejected for a loan, even though a wide range of firm performance characteristics have been included in the regression. This confirms the fears of commentators such as Bini Smaghi (2011) that difficulties in interbank and sovereign bond markets have been passed through to the real economy. The outstanding stock of private debt within the economy also has a strong effect increasing loan rejection. Unfortunately we do

not have any information on the debt levels of the firms themselves, but at a country level it seems that debt overhang presents a considerable drag on credit availability.

Looking briefly at the country fixed effects, we see that Ireland and the Netherlands have generally positive coefficients, showing higher rejection rates relative to Germany even taking into account the other macroeconomic controls. The coefficients for other countries most strongly affected by the financial crisis (Greece, Spain and Portugal), on the other hand, are not significant when the macroeconomic factors are included, indicating that the loan rejection rates are in line with the falls in economic activity in these cases.

Table 10 finds that the perceived deterioration in lending is associated primarily with higher levels of funding costs, as the government bond yield is the only significant macro variable adding to the country fixed effects. One could also speculate that the high level of media coverage to developments in bond yields, particularly in the peripheral countries, may have filtered through to perceptions of credit availability in a different way to the factors affecting individual loan supply and demand decisions.

Turning to demand for credit, Table 11 shows that, as expected, lower GDP growth and domestic demand in the economy have a significant dampening effect on demand for credit. The factors picking up cost of funding and current outstanding debt levels do not have any significant effect on the individual firm demand for credit beyond that already captured in the country fixed effect (which of course does not vary over the six survey waves). We thus find that economic prospects are primarily impacting firms' appetite for financing, rather than the sovereign and financial crisis.

Debt overhang and higher costs of bank funding are associated with higher interest rates being charged, as shown in Table 12. This indicates that some of banks' increased costs of funding are being passed on to firms through higher rates, again confirming worries among policymakers of a pass-through of banking difficulties to real economic activity. The effect of debt overhang on interest rates is most likely an indicator of a higher risk premium being sought in countries with high existing debt levels. The negative effect of domestic demand on interest rates could also be interpreted as banks being more willing to lend at lower rates if the prospects for the economy appear better as this would reduce the riskiness of any individual loan decision.

The same effect of domestic demand is found on loan sizes as on interest rates, as shown in Table 13 which looks at the probability that a firm got an increase in the size of its credit facilities over the previous six months. The cost of bank financing is rather surprisingly not significant, perhaps indicating that any restrictions in credit are coming from loan rejection rather than adjusting the size of facilities for those firms that do have credit approved.

Our findings on macroeconomic factors can be summarised thus: there is clear evidence of a pass-through from sovereign and banking markets to borrowers' credit conditions in the real

economy; lenders respond in an intuitive way to weaknesses in the economy; the demand for bank financing appears influenced more by real economy performance than by financial and sovereign factors, as one would expect; countries where private sector credit is higher have higher bank rejection rates and more increases in the cost of credit.

4.4 Controlling for sample selection

In certain specifications in the previous section, non-random selection into the regression sample is a concern. Only firms that actually applied for a bank loan or overdraft are included in the sample for the loan rejection, interest rate and loan size increases equations. Therefore firms that did not apply because of possible rejection, because they had sufficient internal funds or for any other reason, are not captured in the sample. If there are unobservable factors driving this sample selection, the error term $\varepsilon_{i,j}$ in equation (1) may be correlated with the explanatory variables, causing bias. Because there are a number of reasons for a firm not applying for credit, which could indicate either a healthy or unhealthy financial position, there is no *ex-ante* unambiguous direction to the bias in our uncorrected models. In order to correct for any possible bias, and to gauge the impact on our results, we undertake Heckman’s well-known procedure.

Heckman (1979) developed a two step procedure to correct for bias that results from having a non randomly selected group of firms which involves first estimating the expected value of the error in a “selection equation” and including it as an explanatory variable in the equation of interest. Therefore, the first step involves estimating a firm’s decision to apply for a bank loan (selection equation) outlined as:

$$A^*_{i,j} = \eta \mathbf{w}_{i,j} + u_{i,j} \quad (2)$$

As the selection equation (2) deals with a firm’s loan application decision, it affects the dependent variables, loan rejection, interest rate increase and loan size increase, outlined in equation (1), as a values for these variables are only observed if $A_{i,j} = 1$. We can estimate the parameters η using a probit model for the equation for $A^*_{i,j}$ and use these estimates to calculate the inverse Mills ratio, which is the ratio of the standard normal density function of estimates to their standard normal distribution. The inverse Mills is then used as a regressor in equation 1 to remove part of the error that is correlated with the explanatory variables and avoid inconsistency.⁶

We proceed by re-estimating the specifications in Tables 8, 9, 12 and 13 using a Heckman selection model. In the first step, $\mathbf{w}_{i,j}$ must contain the original control variables and an

⁶We use bootstrapping techniques in all the second stage equations to correct for the fact that the inverse Mills ratio is estimated and so can result in heteroskedastic errors.

additional identifying variable. The identifying variable should ideally affect the probability of application but not the probability of financing conditions (bank rejection, interest rates or loan size) once a firm has applied. Therefore, we use firms' reported need for a bank loan as the additional identifying variable in stage 1, which is a dummy which takes a one if the firm answers the following question with "increased" and a zero if the firm answers "decreased" or "unchanged":⁷

For each of the following types of external financing, please tell me if your needs increased, remained unchanged or decreased over the past 6 months?

For loan rejections, the selection equation is shown in Column (1) of Table 14. We can see that smaller, younger, subsidiary firms whose access to public funds and prospects remained the same, are less likely to have applied for a loan. Firms with improved capital and prospects are more likely to have applied. Of the country dummies, we can see that firms in Finland, Ireland, Netherlands and Portugal are less likely to have applied. We also see that the instrument we use, reported need, has a positive effect on application, as would be expected and it is highly significant.

We calculate the inverse Mills ratio from this equation and we add it to our initial equation as shown in Column (2) of Table 14. Comparing these results with those shown in Column (1) of Table 8, we can see that now small firms as well as micro firms are more likely to be rejected in their loan applications, but there are no other major changes. Overall, correcting for the bias in the sample of firms that actually apply for a bank loan, leads to a stronger chance of small firms being rejected.

Turning to the terms and conditions of credit, we see that the selection equation estimated for all bank finance in Column (3) of Table 14 is largely the same as the one for loans only in Column (1), except that age is not a significant determinant for applying. When looking at the bias corrected estimations in Columns (4) and (5) compared to Columns (4) and (5) in Table 8, we can see that not many of the firm level variables change. For interest rate increases, only micro firms are now less likely to have seen interest rates increase and profits and capital are no longer significant determinants. More country dummies are now significant, with firms from Belgium, Finland and France more likely than German firms to have seen interest rate increases. Also notable in Columns (2), (4) and (5) the inverse Mills ratio is highly significant, indicating that the correction was necessary.

⁷In specifications using loan rejection as the dependent variable, we focus solely on bank loans. Where interest rate increases or size decreases are the dependent variable, we allow the dummy variable to take a one where either the need for bank loans or bank overdrafts has increased, as the survey question on terms and conditions relates to *all* bank financing, as opposed to loans only.

We re-estimate the specifications in Tables 9, 12 and 13 using a Heckman selection model and show the results in Tables 15, 16 and 17. Once again the inverse Mills ratio is significant in all specifications. In comparing the results of Table 15 to those in Table 9 for loan rejection, we can see that all the same macro variables are significant and of a similar magnitude, apart from private debt to GDP, which becomes marginally insignificant after we correct for any possible sample bias present. Table 16 repeats the estimations of Table 12 for interest rate increases correcting for sample selection, and shows that all the same macro variables are significant and of a similar magnitude, apart from government bond yields which become marginally insignificant. For the loan size estimations shown in Table 17, we can see that there are no major changes in the size or significance of our macro variables.

Overall, taking account of any sample bias which may be affecting results does not substantially change our main findings. For loan rejections, small firms are even more likely to be rejected in the general population of firms than when just looking at the sample who applied for credit. However, domestic demand and financial variables are still significant determinants of a firms success in accessing bank finance. For interest rates, there is little change in the firm level determinants and also domestic demand, private sector debt and banks' CDS all remain significant influences on the price of loans. There are no major changes for loan size. This shows that our results are largely speaking generally applicable to firms and do not just apply to a specific cohort that applies for bank finance.

5 Conclusions

This paper assesses the effect of three aspects of the recent euro area crisis on supply and demand (through rejection rates and terms and conditions) of bank credit for small and medium firms. It combines firm micro data from the ECB's SAFE survey with macroeconomic variables, focusing on simultaneous crises in the real economy (proxied by GDP and domestic demand), the financial/sovereign market and the effects of private sector indebtedness. The cross-country dimension of the data allows us to contribute to the literature on firm level determinants of financing obstacles by highlighting how country level factors influence firms' interactions with the credit market. In particular, it allows us to identify the country-level characteristics behind the literature's finding that the supply side of the bank lending channel becomes more active during times of crisis.

In line with previous studies, we find that larger and older firms face the lowest risk of having loan applications rejected. Firms that have potential access to other sources of funds also encountered a reduction in the probability of loan rejection. Age and size are less important for firms' perceptions of credit availability than they were for actual experience

of obtaining a loan. Two key variables in explaining perceptions of a reduction in credit availability were if the firm reported falls in profits over the previous six months or negative prospects for the forthcoming six months.

Overall, the effects of the three crises identified in the introduction can be summarised as follows: weakness in the real economy is shown to affect both the supply of and demand for credit; a weak sovereign or banking sector affects loan rejection and interest rates, but does not impact on demand; an over-indebted private sector appears to have some effect on loan rejection and also influences credit terms and conditions through increased interest rates.

From a policy perspective, one can conclude that the sovereign and financial crisis did affect the transmission of monetary policy in the euro area over the period in question and that tensions are spilling over into the real economy through tougher credit conditions being imposed on potential borrowers. The literature has already identified a number of detrimental effects on growth potential of such constraints. We thus have identified a potential negative feedback effect that will hamper firm financing and recovery in the euro area.

The research could be enriched if a longer series of survey data were available, particularly if data for both “normal” and crisis periods were analysed simultaneously. A longer time series would furthermore improve the empirical model, as the current model relies on variation across eleven countries over six survey waves. The explanatory power of the model would also be improved by analysis of SME balance sheet data on financial factors such as leverage, liquidity, profitability and headcount. Such continuous measures of SME performance would most likely lead to a richer set of results than those using the categorical variables available in the SAFE data.

Further research using the SAFE data set will focus on expanding the framework developed here to allow identification of economies experiencing restrictive lending conditions relative to economic fundamentals. Further work could also be done on the financing gap faced by firms, and on linking credit constraints to outcomes such as investment, thereby addressing a policy question of key importance in the current euro area economic environment.

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Table 1: Sample size by survey wave and country.

	H1 2009	H2 2009	H1 2010	H2 2010	H1 2011	H2 2011	Total
Austria	224	204	201	501	503	501	2,134
Belgium	220	203	204	518	501	504	2,150
Germany	1,003	1,002	1,001	1,001	1,007	1,001	6,015
Spain	1,012	1,005	1,001	1,001	1,002	1,001	6,022
Finland	111	101	101	501	501	501	1,816
France	1,000	1,002	1,004	1,005	1,003	1,006	6,020
Greece	220	201	201	501	501	501	2,125
Ireland	110	102	101	501	503	501	1,818
Italy	1,006	1,005	1,001	1,001	1,002	1,001	6,016
Netherlands	323	253	257	503	501	501	2,338
Portugal	327	253	251	510	503	504	2,348
Total	5,556	5,331	5,323	7,543	7,527	7,522	38,802

Table 2: Dependent variables

Variables	Source	Coding
Loan Rejection dummy	<p>If you applied and tried to negotiate for a bank loan in the past 6 months, did you:</p> <ol style="list-style-type: none"> 1. Got everything 5. Got most (between 75% and 99%)** 6. Only got a limited part of it (between 1% and 74%)**; 3. Refused because the cost was too high; 4. Rejected 2. Got part*; <p>*only included in the first 2 surveys **only included from the third survey on</p>	<p>Binary variable:</p> <p>0 = if applied and got all (1) or most (5) 1 = got less than 75% (6), Refused because the cost was too high (3), rejected (4)</p>
Perceived loan availability deterioration dummy	<p>For bank loans, would you say that their availability has:</p> <ol style="list-style-type: none"> 1. Improved 2. Remained unchanged 3. Deteriorated 	<p>Binary variable:</p> <p>0 = if improved (1), remained unchanged (2) 1 = deteriorated (3)</p>
Loan demand decrease dummy	<p>For bank loans, please tell me if your needs have:</p> <ol style="list-style-type: none"> 1. Increased 2. Remained unchanged 3. Decreased 	<p>Binary variable:</p> <p>0 = increased (1), remained unchanged (2) 1 = decreased (3)</p>
Interest rate increase dummy	<p>We will now consider the terms and conditions of the bank financing available to your firm, for the level of interest rates, were they:</p> <ol style="list-style-type: none"> 1. Increased by the bank 2. Remained unchanged 3. Decreased by the bank 	<p>Binary variable:</p> <p>0 = remained unchanged (2), decreased (3) 1 = increased by the bank (1)</p>
Loan size increase dummy	<p>We will now consider the terms and conditions of the bank financing available to your firm, for the size of loan or credit line, was it:</p> <ol style="list-style-type: none"> 1. Increased by the bank 2. Remained unchanged 3. Decreased by the bank 	<p>Binary variable:</p> <p>0 = remained unchanged (2), decreased (3) 1 = increased by the bank (1)</p>

Table 3: Percentage of total responses per country with dependent variable equal to one.

	Loan Rejection	Perceived Deterioration	Demand Decrease	Int Rate Increase	Loan Size Increase
Austria	8.6	25.1	20.1	40.3	21.2
Belgium	13.6	19.9	18.7	39.6	23.3
Germany	14.9	21.7	18.2	26.6	22.5
Spain	32.1	34.5	16.2	74.4	18.9
Finland	7.7	14.6	22.8	39.0	18.4
France	14.2	23.0	13.3	36.9	22.0
Greece	40.0	50.1	15.4	73.0	14.9
Ireland	40.4	44.4	15.3	63.3	13.4
Italy	22.2	25.5	9.9	55.2	15.9
Netherlands	32.5	30.0	25.5	44.7	23.8
Portugal	28.2	36.6	14.7	66.3	13.2
Total	22.4	28.3	15.9	51.7	19.1

Table 4: Explanatory variables: firm level

Variables	Source	Coding
Firm size	How many persons does your company currently employ in full time or part time in your country in all locations?	Categorical variable: 1. From 1 to 9 employees 2. From 10 to 49 employees 3. From 50 to 249 employees 4. 250 or more employees
Age of firm	In which year was your firm registered?	Categorical variable: 1. 10 or more years 2. 5 years or more but less than 10 3. 2 years or more but less than 5 4. Less than 2 years
Profit fall	Please tell me whether your profit has: 1. Increased 2. Remained unchanged 3. Decreased	Binary variable: 0 = increased(1), remained unchanged (2) 1 = decreased (3)
Subsidiary dummy	How would you characterise your enterprise?Is it 1. part of a profit-oriented enterprise (e.g. subsidiary or branch) not taking fully autonomous financial decisions 2. an autonomous profit-oriented enterprise, making independent financial decisions 3. a non-profit enterprise (foundation, association, semi-government)	Binary variable 0 = an autonomous profit-oriented enterprise (2), a non-profit enterprise (foundation, association, semi-government) (3) 1 = part of a profit-oriented enterprise (e.g. subsidiary or branch) not taking fully autonomous financial decisions
Prospects	For your firm-specific outlook with respect to your sales and profitability or business plan, insofar as it affects the availability of external financing would you say that over the past 6 months it has: 1. Improved 2. Remained unchanged 3. Deteriorated	Binary variables: Improved prospects: 0 = unchanged(2),deteriorated(3) 1 = Improved (1) Unchanged prospects: 0 = Improved(1), deteriorated (3) 1 = remained unchanged (2) Deteriorated prospects: 0 = improved (1), remained unchanged (2) 1 = deteriorated (3)

Table 5: Explanatory variables: firm level (continued)

Ownership	<p>Who are the owners of your firm?</p> <ol style="list-style-type: none"> 1. Public shareholders, as company is listed on stock market 2. Family or entrepreneurs 3. Other firms or business associates 4. Venture capital firms or business angels 5. A natural person, one owner only 	<p>Owner Shareholder: 1 = Public shareholders (1) 0 = otherwise</p> <p>Owner Family: 1 = Family or entrepreneurs 0 = otherwise</p> <p>Owner Associates: 1 = Other firms or business associates (3) 0 = otherwise</p> <p>Owner VC: 1 = Venture capital firms or business angels (4) 0 = otherwise</p> <p>Owner individual 1 = A natural person, one owner only (5) 0 = otherwise</p>
Public fund access	<p>The availability of external financing depends on various factors, which are in part related to the general economic situation, your firm-specific situation and to lenders attitudes.</p> <p>In relation to access to public financial support including guarantees, over the past 6 months has it:</p> <ol style="list-style-type: none"> 1. Improved 2. Remained unchanged 3. Deteriorated 	<p>Improved public fund access: 1 = Improved (1) 0 = otherwise</p> <p>Unchanged public fund access: 1 = unchanged (2) 0 = otherwise</p> <p>Deteriorated public fund access: 1 = deteriorated (3) 0 = otherwise</p>
Capital	<p>The availability of external financing depends on various factors, which are in part related to the general economic situation, your firm-specific situation and to lenders attitudes.</p> <p>In relation to your firm's own capital, would you say that over the past 6 months it has:</p> <ol style="list-style-type: none"> 1. Improved 2. Remained unchanged 3. Deteriorated 	<p>Improved capital: 1 = Improved (1) 0 = otherwise</p> <p>Unchanged capital: 1 = unchanged (2) 0 = otherwise</p> <p>Deteriorated capital: 1 = deteriorated (3) 0 = otherwise</p>

Table 6: Explanatory variables: macro level

GDP Change	Gross domestic product, Constant prices, seasonally adjusted, Eurostat	The percentage change in GDP over the half year period for each survey round
Domestic Demand	Change in domestic demand component of GDP (government, consumption and investments), Eurostat	The percentage change over the half year period for each survey round
GB10Y	Yield of the benchmark 10 Year Government Index, Thompson Reuters Datastream	6 months average over the half year period for each survey round
Log of CDS	Credit default swaps on banks bonds in each country	Log of the price of the median bank CDS for each period.
Private Debt to GDP	Total stock of euro area private sector debt (loans and debt securities) from Monetary Financial Institutions' (MFIs excluding ECB) balance sheets in each country, Gross domestic product at market prices from ESA95 National Accounts, quarterly	The stock of debt at the start of each half year in question divided by total GDP in that half year

Table 7: Summary Statistics for Dependent and Macroeconomic Variables

Variable	Mean	Std.Dev.	Min	Max
Loan Rejection	0.22	0.42	0.00	1.00
Perceived Deterioration	0.28	0.45	0.00	1.00
Demand Decrease	0.16	0.37	0.00	1.00
Interest Rate Increase	0.52	0.50	0.00	1.00
Loan Size Increase	0.19	0.39	0.00	1.00
GDP Growth (% semi-annual)	-0.15	1.80	-8.11	3.30
Domestic Demand (% semi-annual)	0.39	2.08	-8.44	5.65
Gov. Bond Yields (6-month average)	4.79	3.98	1.89	32.75
Log CDS (Log median price)	5.35	0.75	4.33	7.76
Private Debt to GDP (% semi-annual)	1.90	0.67	0.98	3.42

Table 8: Baseline Specification - Firm Characteristics and Country Dummies

	Loan Rej	Loan Avail	Demand Dec	Interest Inc	Loan Size
1 to 9 employees (d)	0.115*** (5.03)	0.00366 (0.27)	-0.0307*** (-2.98)	-0.0914*** (-3.90)	-0.0249 (-1.42)
10 to 49 employees (d)	0.0294 (1.63)	-0.0171 (-1.64)	-0.00964 (-1.15)	-0.0329* (-1.76)	-0.00109 (-0.07)
Profit fall (d)	0.0162 (0.90)	0.0312*** (3.45)	-0.0235*** (-4.13)	0.0334** (2.02)	0.00830 (0.91)
Subsidiary vs Independent (d)	0.00984 (0.37)	-0.0235* (-1.77)	-0.0139 (-1.20)	-0.0177 (-0.74)	0.0134 (0.67)
Age >10 (d)	-0.0778*** (-4.15)	-0.0236** (-1.97)	0.0176** (2.43)	0.0117 (0.58)	-0.0192 (-1.18)
Improved prospects (d)	0.00217 (0.11)	-0.0735*** (-5.13)	0.00485 (0.34)	-0.0988*** (-4.21)	0.0164 (0.97)
Unchanged prospects (d)	-0.0842*** (-5.52)	-0.142*** (-12.34)	-0.0128 (-1.36)	-0.0791*** (-4.71)	-0.0212 (-1.61)
Improved public fund access (d)	-0.182*** (-11.74)	-0.192*** (-16.32)	0.00901 (0.55)	-0.149*** (-5.47)	0.128*** (7.11)
Unchanged public fund access (d)	-0.144*** (-8.99)	-0.254*** (-25.72)	-0.0193*** (-2.64)	-0.145*** (-9.90)	0.00141 (0.10)
Improved capital (d)	-0.125*** (-7.49)	-0.119*** (-9.96)	0.133*** (10.72)	-0.0219 (-0.96)	0.0413** (2.37)
Unchanged capital (d)	-0.0920*** (-5.59)	-0.121*** (-10.95)	0.0233*** (2.83)	-0.0426*** (-2.62)	-0.0172 (-1.24)
Austria (d)	-0.128*** (-3.45)	0.00691 (0.29)	0.00943 (0.63)	0.0535 (1.00)	-0.0161 (-0.88)
Belgium (d)	-0.0787** (-2.57)	-0.0599*** (-3.84)	0.0234* (1.89)	0.0488 (0.84)	-0.00261 (-0.13)
Spain (d)	0.0717** (2.29)	-0.0632** (-2.23)	0.0379*** (3.67)	0.405*** (12.05)	-0.0125 (-0.80)
Finland (d)	-0.144*** (-3.75)	-0.0766*** (-3.20)	0.0693*** (5.54)	0.0401 (0.67)	-0.0328** (-2.16)
France (d)	-0.0696** (-2.08)	-0.0516** (-2.24)	-0.0224** (-2.00)	0.0616 (1.40)	-0.00550 (-0.32)
Greece (d)	0.197*** (3.69)	0.125*** (3.81)	0.0256 (1.15)	0.336*** (10.41)	-0.0554* (-1.88)
Ireland (d)	0.162*** (3.39)	0.0986*** (2.90)	0.0222 (1.05)	0.226*** (4.80)	-0.0785*** (-3.40)
Italy (d)	0.0437 (1.41)	-0.0402* (-1.85)	-0.0458*** (-3.63)	0.246*** (4.85)	-0.0553*** (-2.71)
Netherlands (d)	0.129*** (2.62)	-0.0104 (-0.44)	0.0976*** (5.39)	0.0323 (0.54)	0.00797 (0.29)
Portugal (d)	0.104** (2.49)	0.0315 (1.03)	-0.00237 (-0.09)	0.297*** (8.65)	-0.110*** (-5.63)
N	4290	13000	13225	5831	5796
R ²	0.147	0.168	0.0455	0.172	0.0300

Marginal effects; *t* statistics in parentheses

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(d) for discrete change of dummy variable from 0 to 1

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 9: Loan Rejection

	(1)	(2)	(3)	(4)	(5)
GDP change	-0.009 (-0.87)				
Domestic demand		-0.015** (-2.40)			
Govt bond yields			0.006*** (3.13)		
Log of CDS				0.159*** (5.28)	
Private debt to GDP					0.144* (1.86)
Austria	-0.126*** (-3.58)	-0.117 *** (-3.17)	-0.128*** (-3.57)	-0.138*** (-5.04)	-0.150*** (-4.90)
Belgium	-0.082** (-2.57)	-0.069 ** (-2.03)	-0.081*** (-2.63)	-0.129*** (-5.92)	-0.081*** (-2.68)
Spain	0.0519 (1.24)	0.044 (1.44)	0.061* (1.95)	-0.038 (-1.48)	-0.148 (-1.52)
Finland	-0.141*** (-3.83)	-0.122*** (-2.95)	-0.141*** (-3.57)	-0.093 (-1.23)	-0.121*** (-2.77)
France	-0.076** (-2.23)	-0.070** (-2.21)	-0.070** (-2.19)	-0.045 (-1.30)	-0.093*** (-2.98)
Greece	0.072 (0.90)	0.026 (0.53)	0.091 (1.61)	-0.092** (-2.36)	0.103** (2.03)
Ireland	0.145** (2.52)	0.108** (2.32)	0.126*** (2.92)	-0.081** (-2.30)	-0.071 (-0.76)
Italy	0.028 (0.78)	0.025 (0.88)	0.033 (1.09)	0.011 (0.50)	0.015 (0.54)
Netherlands	0.112** (2.17)	0.104** (2.27)	0.129*** (2.85)	0.161*** (4.36)	-0.072 (-0.89)
Portugal	0.079 (1.61)	0.049 (1.29)	0.068* (1.65)	-0.052 (-1.61)	-0.091 (-1.19)
N	4150	4150	4290	4234	4150
Pseudo R^2	0.142	0.142	0.148	0.148	0.142

Firm characteristics as in Table 8 also included.

Time and sector dummies also included but not shown.

Marginal effects; t statistics in parentheses

* indicates significance at 10%, ** at 5% and *** at 1%

Table 10: Perception of Deterioration in Loan Availability

	(1)	(2)	(3)	(4)	(5)
GDP change	-0.018 (-1.53)				
Domestic demand		-0.009 (-1.26)			
Govt bond yields			0.003* (1.88)		
Log of CDS				0.042 (1.34)	
Private debt to GDP					0.185 (1.55)
Austria	0.002 (0.09)	0.016 (0.66)	0.007 (0.31)	0.006 (0.23)	-0.047 (-1.23)
Belgium	-0.068*** (-4.15)	-0.052*** (-3.67)	-0.061*** (-4.24)	-0.076*** (-4.37)	-0.064*** (-4.95)
Spain	-0.088*** (-3.41)	-0.074*** (-2.65)	-0.068** (-2.49)	-0.090*** (-2.63)	-0.277*** (-2.70)
Finland	-0.079*** (-3.30)	-0.061* (-1.94)	-0.075*** (-3.19)	-0.024 (-0.66)	-0.038 (-1.06)
France	-0.063** (-2.55)	-0.051** (-2.25)	-0.052** (-2.25)	-0.046* (-1.80)	-0.083*** (-2.79)
Greece	-0.008 (-0.17)	0.021 (0.54)	0.075* (1.93)	0.048 (0.76)	0.056*** (3.51)
Ireland	0.077** (2.46)	0.070** (2.27)	0.081** (2.46)	0.0343 (0.55)	-0.156 (-1.46)
Italy	-0.060*** (-2.65)	-0.048*** (-2.70)	-0.045** (-2.17)	-0.048*** (-2.63)	-0.067*** (-2.98)
Netherlands	-0.028 (-1.14)	-0.020 (-0.85)	-0.009 (-0.42)	-0.001 (-0.05)	-0.193** (-2.38)
Portugal	-0.005 (-0.14)	0.002 (0.06)	0.0131 (0.44)	-0.009 (-0.21)	-0.173* (-1.88)
N	12635	12635	13000	12735	12635
Pseudo R^2	0.164	0.164	0.169	0.167	0.165

Firm characteristics as in Table 8 also included.

Time and sector dummies also included but not shown.

Marginal effects; t statistics in parentheses, adjusted for clustering by country.

* indicates significance at 10%, ** at 5% and *** at 1%

Table 11: Decreased Demand

	(1)	(2)	(3)	(4)	(5)
GDP change	-0.022*** (-4.09)				
Domestic demand		-0.012*** (-2.82)			
Govt bond yields			0.0001 (0.06)		
Log of CDS				-0.002 (-0.07)	
Private debt to GDP					0.082 (1.62)
Austria	0.002 (0.11)	0.018 (1.14)	0.009 (0.63)	0.009 (0.63)	-0.016 (-0.75)
Belgium	0.007 (0.62)	0.031** (2.03)	0.023* (1.86)	0.023 (1.35)	0.019 (1.43)
Spain	0.0001 (0.01)	0.017 (1.21)	0.038*** (3.44)	0.039* (1.80)	-0.085 (-1.34)
Finland	0.062*** (5.46)	0.092*** (4.76)	0.069*** (5.56)	0.068*** (2.84)	0.092*** (4.86)
France	-0.040*** (-3.65)	-0.026** (-2.28)	-0.022** (-2.01)	-0.023** (-2.02)	-0.031** (-2.47)
Greece	-0.057** (-2.04)	-0.032 (-0.93)	0.024 (0.53)	0.028 (0.47)	0.024 (0.61)
Ireland	-0.004 (-0.19)	-0.014 (-0.78)	0.022 (0.90)	0.024 (0.52)	-0.085* (-1.67)
Italy	-0.068*** (-5.10)	-0.057*** (-3.80)	-0.046*** (-3.57)	-0.045*** (-3.29)	-0.058*** (-3.50)
Netherlands	0.067*** (4.14)	0.078*** (3.97)	0.098*** (5.38)	0.096*** (5.44)	-0.023 (-0.37)
Portugal	-0.044** (-2.12)	-0.039 (-1.40)	-0.003 (-0.10)	-0.001 (-0.03)	-0.091** (-2.01)
N	12874	12874	13225	12952	12874
Pseudo R^2	0.0480	0.0475	0.0455	0.0459	0.0469

Firm characteristics as in Table 8 also included.

Time and sector dummies also included but not shown.

Marginal effects; t statistics in parentheses, adjusted for clustering by country.

* indicates significance at 10%, ** at 5% and *** at 1%

Table 12: Increased Interest Rate

	(1)	(2)	(3)	(4)	(5)
GDP change	-0.007 (-0.43)				
Domestic demand		-0.030** (-2.34)			
Govt bond yields			0.007** (2.39)		
Log of CDS				0.122** (2.48)	
Private debt to GDP					0.412** (2.50)
Austria	0.053 (0.98)	0.078 (1.53)	0.052 (1.04)	0.040 (0.78)	-0.075 (-1.04)
Belgium	0.046 (0.77)	0.066 (1.32)	0.044 (0.80)	-0.007 (-0.12)	0.033 (0.63)
Spain	0.402*** (9.53)	0.375*** (10.81)	0.396*** (12.76)	0.339*** (9.28)	-0.201 (-0.77)
Finland	0.041 (0.68)	0.096* (1.88)	0.043 (0.77)	0.062 (1.03)	0.126* (1.95)
France	0.058 (1.20)	0.057 (1.34)	0.061 (1.47)	0.078* (1.96)	-0.022 (-0.44)
Greece	0.276*** (4.83)	0.187** (2.25)	0.282*** (7.72)	0.198*** (2.83)	0.275*** (7.05)
Ireland	0.225*** (4.28)	0.162*** (3.00)	0.198*** (4.38)	0.068 (0.77)	-0.350* (-1.83)
Italy	0.242*** (4.43)	0.223*** (4.83)	0.235*** (4.81)	0.223*** (5.02)	0.187*** (3.72)
Netherlands	0.026 (0.40)	-0.005 (-0.07)	0.034 (0.60)	0.052 (1.01)	-0.442*** (-3.59)
Portugal	0.293*** (6.82)	0.240*** (4.80)	0.273*** (7.55)	0.215*** (4.48)	-0.206 (-0.97)
N	5680	5680	5831	5770	5680
Pseudo R^2	0.166	0.168	0.173	0.175	0.168

Firm characteristics as in Table 8 also included.

Time and sector dummies also included but not shown.

Marginal effects; t statistics in parentheses, adjusted for clustering by country.

* indicates significance at 10%, ** at 5% and *** at 1%

Table 13: Increased Loan Size

	(1)	(2)	(3)	(4)	(5)
GDP change	0.014 (1.57)				
Domestic demand		0.013** (2.08)			
Govt bond yields			-0.003 (-1.58)		
Log of CDS				-0.024 (-0.97)	
Private debt to GDP					-0.046 (-0.50)
Austria	-0.011 (-0.52)	-0.025 (-1.21)	-0.016 (-0.84)	-0.013 (-0.72)	-0.002 (-0.04)
Belgium	0.008 (0.42)	-0.009 (-0.40)	-0.001 (-0.03)	0.009 (0.36)	0.0001 (0.00)
Spain	0.011 (0.48)	0.008 (0.35)	-0.008 (-0.47)	0.005 (0.20)	0.065 (0.39)
Finland	-0.028* (-1.85)	-0.053*** (-2.85)	-0.034** (-2.16)	-0.042* (-1.85)	-0.040* (-1.81)
France	0.008 (0.38)	-0.002 (-0.09)	-0.005 (-0.30)	-0.008 (-0.45)	0.005 (0.18)
Greece	-0.029 (-0.73)	-0.025 (-0.67)	-0.023 (-0.53)	-0.018 (-0.37)	-0.075*** (-3.91)
Ireland	-0.068*** (-2.74)	-0.051* (-1.83)	-0.068*** (-2.80)	-0.049 (-1.09)	-0.019 (-0.14)
Italy	-0.038* (-1.73)	-0.044** (-2.10)	-0.051** (-2.45)	-0.050** (-2.32)	-0.048* (-1.85)
Netherlands	0.026 (0.87)	0.025 (0.81)	0.008 (0.26)	0.005 (0.15)	0.077 (0.50)
Portugal	-0.090*** (-3.62)	-0.083*** (-2.80)	-0.101*** (-4.57)	-0.095*** (-3.62)	-0.065 (-0.63)
N	5645	5645	5796	5736	5645
Pseudo R^2	0.0312	0.0315	0.0302	0.0308	0.0309

Firm characteristics as in Table 8 also included.

Time and sector dummies also included but not shown.

Marginal effects; t statistics in parentheses, adjusted for clustering by country.

* indicates significance at 10%, ** at 5% and *** at 1%

Table 14: Heckman Correction of firm level variables and country dummies

	(1)	(2)	(3)	(4)	(5)
	Selection Loans	Loan Rej	Selection Finance	Interest Inc	Loan Size
Need loans (d)	0.438*** (44.58)				
Need finance (d)			0.270*** (25.81)		
Inverse Mills ratio 1		-0.0458*** (-2.59)			
Inverse Mills ratio 2				-0.170*** (-7.07)	-0.138*** (-8.17)
1 to 9 employees (d)	-0.134*** (-11.93)	0.124*** (5.45)	-0.0662*** (-8.06)	-0.0542** (-2.55)	0.00725 (0.44)
10 to 49 employees (d)	-0.0481*** (-4.55)	0.0349** (2.07)	-0.0275*** (-3.53)	-0.0191 (-1.11)	0.0160 (1.27)
Profit fall (d)	-0.00356 (-0.34)	0.0182 (1.13)	0.0113 (1.54)	0.0168 (1.01)	-0.00472 (-0.38)
Subsidiary vs Independent (d)	-0.0800*** (-5.78)	0.0163 (0.58)	-0.0313*** (-3.12)	-0.0117 (-0.44)	0.0267 (1.23)
Age >10 (d)	0.0212** (1.97)	-0.0750*** (-4.08)	-0.00298 (-0.38)	0.0178 (1.02)	-0.0133 (-1.03)
Improved prospects (d)	0.0266* (1.66)	0.00114 (0.05)	0.0125 (1.13)	-0.108*** (-4.59)	0.0127 (0.75)
Unchanged prospects (d)	-0.0258** (-2.25)	-0.0807*** (-4.91)	-0.0238*** (-2.93)	-0.0580*** (-3.16)	-0.00301 (-0.21)
Improved public fund access (d)	-0.0224 (-1.31)	-0.175*** (-11.04)	-0.0180 (-1.57)	-0.139*** (-4.88)	0.139*** (5.41)
Unchanged public fund access (d)	-0.0486*** (-4.56)	-0.137*** (-9.13)	-0.0338*** (-4.60)	-0.121*** (-7.41)	0.0205 (1.64)
Improved capital (d)	0.0288* (1.89)	-0.119*** (-6.48)	-0.0169 (-1.61)	0.00161 (0.07)	0.0571*** (2.82)
Unchanged capital (d)	0.00426 (0.36)	-0.0898*** (-5.36)	-0.0145* (-1.72)	-0.0234 (-1.20)	-0.000961 (-0.06)
Austria (d)	0.00353 (0.15)	-0.125*** (-4.21)	0.0243 (1.28)	0.0512 (1.30)	-0.0167 (-0.63)
Belgium (d)	0.0114 (0.51)	-0.0838*** (-2.73)	-0.0139 (-0.87)	0.0616* (1.67)	0.00496 (0.18)
Spain (d)	0.0752*** (4.18)	0.0734** (2.48)	0.0524*** (3.84)	0.398*** (19.51)	-0.0274 (-1.49)
Finland (d)	-0.0989*** (-4.72)	-0.130*** (-3.99)	-0.110*** (-10.60)	0.117*** (2.63)	0.0299 (0.75)
France (d)	0.0108 (0.66)	-0.0617** (-2.42)	-0.00645 (-0.54)	0.0735*** (2.63)	0.00465 (0.24)
Greece (d)	0.0158 (0.61)	0.208*** (4.37)	-0.0429*** (-2.82)	0.347*** (16.50)	-0.0420 (-1.62)
Ireland (d)	-0.128*** (-6.59)	0.189*** (3.57)	-0.0369** (-2.52)	0.247*** (8.78)	-0.0610** (-2.56)
Italy (d)	0.0397** (2.04)	0.0478 (1.52)	0.0529*** (3.48)	0.224*** (9.04)	-0.0756*** (-4.46)
Netherlands (d)	-0.189*** (-11.32)	0.160*** (2.76)	-0.0710*** (-5.68)	0.0588 (1.31)	0.0360 (1.03)
Portugal (d)	-0.0433* (-1.82)	0.107** (2.22)	-0.0330** (-2.21)	0.312*** (13.37)	-0.102*** (-4.94)
N	13162	32	4182	14072	5750
Pseudo R^2	0.166	0.150	0.161	0.181	0.0415

Marginal effects; t statistics in parentheses. Time and sector dummies also included but not shown.

(d) for discrete change of dummy variable from 0 to 1

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 15: Heckman Selection Model: Loan Rejection

	Loan Rej				
GDP change	-0.00597 (-0.50)				
Domestic demand		-0.0143* (-1.65)			
Govt bond yields			0.00588** (2.21)		
Log of CDS				0.153*** (4.02)	
Private debt to GDP					0.141 (1.43)
Austria (d)	-0.123*** (-4.41)	-0.114*** (-3.74)	-0.125*** (-4.26)	-0.135*** (-4.78)	-0.146*** (-5.11)
Belgium (d)	-0.0853*** (-2.85)	-0.0749** (-2.46)	-0.0857*** (-2.77)	-0.131*** (-4.98)	-0.0855*** (-3.01)
Spain (d)	0.0588* (1.67)	0.0470 (1.54)	0.0633** (2.26)	-0.0332 (-0.93)	-0.142 (-1.13)
Finland (d)	-0.128*** (-4.13)	-0.109*** (-2.96)	-0.128*** (-3.94)	-0.0803 (-1.29)	-0.107*** (-2.76)
France (d)	-0.0656** (-2.53)	-0.0624*** (-2.61)	-0.0618** (-2.44)	-0.0382 (-1.45)	-0.0848*** (-3.01)
Greece (d)	0.0937 (1.12)	0.0358 (0.52)	0.103* (1.71)	-0.0776 (-1.31)	0.109** (1.97)
Ireland (d)	0.174*** (3.36)	0.135** (2.49)	0.153*** (2.90)	-0.0554 (-0.96)	-0.0515 (-0.39)
Italy (d)	0.0368 (1.06)	0.0299 (0.98)	0.0374 (1.20)	0.0159 (0.53)	0.0197 (0.59)
Netherlands (d)	0.145** (2.47)	0.133** (2.40)	0.159*** (2.78)	0.193*** (3.29)	-0.0497 (-0.42)
Portugal (d)	0.0883 (1.64)	0.0542 (1.09)	0.0722 (1.49)	-0.0429 (-0.91)	-0.0866 (-0.84)
Inverse Mills ratio 1	-0.0416** (-2.33)	-0.0423** (-2.29)	-0.0449** (-2.43)	-0.0497*** (-2.74)	-0.0417** (-2.29)
Constant					
N	4050	4050	4182	4126	4050
Pseudo R^2	0.145	0.145	0.151	0.152	0.145

Firm characteristics as in Table 8 also included.

Time and sector dummies also included but not shown.

Marginal effects; t statistics in parentheses

(d) for discrete change of dummy variable from 0 to 1

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 16: Heckman Selection Model: Interest Rate Increase

	Interest Inc	Interest Inc	Interest Inc	Interest Inc	Interest Inc
GDP change	-0.0102 (-0.85)				
Domestic demand		-0.0318*** (-3.55)			
Govt bond yields			0.00600 (1.61)		
Log of CDS				0.111*** (2.84)	
Private debt to GDP					0.401*** (3.89)
Austria (d)	0.0498 (1.23)	0.0766** (1.99)	0.0504 (1.28)	0.0394 (1.01)	-0.0742 (-1.37)
Belgium (d)	0.0565 (1.52)	0.0795** (2.20)	0.0573 (1.57)	0.0105 (0.25)	0.0461 (1.27)
Spain (d)	0.389*** (14.84)	0.364*** (14.99)	0.390*** (18.95)	0.337*** (10.61)	-0.195 (-1.15)
Finland (d)	0.118*** (2.59)	0.171*** (4.05)	0.118*** (2.67)	0.127** (2.11)	0.194*** (4.37)
France (d)	0.0666** (2.24)	0.0681** (2.50)	0.0726*** (2.68)	0.0881*** (3.19)	-0.00843 (-0.23)
Greece (d)	0.291*** (6.69)	0.213*** (4.11)	0.308*** (8.66)	0.232*** (4.01)	0.298*** (9.41)
Ireland (d)	0.244*** (8.05)	0.184*** (4.68)	0.226*** (7.17)	0.110* (1.68)	-0.314** (-2.32)
Italy (d)	0.215*** (7.31)	0.198*** (7.22)	0.215*** (8.39)	0.202*** (7.56)	0.164*** (5.11)
Netherlands (d)	0.0493 (1.01)	0.0212 (0.45)	0.0597 (1.34)	0.0764* (1.73)	-0.418*** (-4.66)
Portugal (d)	0.305*** (10.48)	0.256*** (7.00)	0.294*** (10.46)	0.241*** (5.81)	-0.167 (-1.14)
Inverse Mills ratio 2	-0.175*** (-7.12)	-0.175*** (-7.26)	-0.168*** (-7.00)	-0.167*** (-7.26)	-0.174*** (-7.15)
Constant					
N	5609	5609	5750	5689	5609
Pseudo R^2	0.175	0.177	0.181	0.183	0.177

Firm characteristics as in Table 8 also included.

Time and sector dummies also included but not shown.

Marginal effects; t statistics in parentheses

(d) for discrete change of dummy variable from 0 to 1

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 17: Heckman Selection Model: Loan Size Increase

	Loan Size				
GDP change	0.0119 (1.26)				
Domestic demand		0.0131* (1.88)			
Govt bond yields			-0.00410 (-1.60)		
Log of CDS				-0.0355 (-1.22)	
Private debt to GDP					-0.0479 (-0.56)
Austria (d)	-0.0127 (-0.46)	-0.0258 (-0.97)	-0.0162 (-0.63)	-0.0129 (-0.46)	-0.00169 (-0.04)
Belgium (d)	0.0139 (0.47)	-0.00178 (-0.06)	0.00797 (0.28)	0.0233 (0.70)	0.00726 (0.26)
Spain (d)	-0.00764 (-0.30)	-0.00738 (-0.32)	-0.0208 (-1.04)	-0.00221 (-0.08)	0.0513 (0.34)
Finland (d)	0.0325 (0.80)	0.00318 (0.08)	0.0287 (0.70)	0.0109 (0.22)	0.0178 (0.39)
France (d)	0.0158 (0.71)	0.00799 (0.38)	0.00515 (0.26)	0.000307 (0.01)	0.0150 (0.55)
Greece (d)	-0.0135 (-0.25)	0.000562 (0.01)	0.00868 (0.19)	0.0179 (0.29)	-0.0542 (-1.53)
Ireland (d)	-0.0520** (-2.00)	-0.0318 (-0.94)	-0.0444 (-1.61)	-0.0129 (-0.25)	0.00438 (0.03)
Italy (d)	-0.0620*** (-2.85)	-0.0641*** (-3.21)	-0.0699*** (-3.86)	-0.0691*** (-3.63)	-0.0682*** (-3.07)
Netherlands (d)	0.0507 (1.33)	0.0535 (1.39)	0.0351 (0.97)	0.0302 (0.84)	0.111 (0.74)
Portugal (d)	-0.0856*** (-3.25)	-0.0748*** (-2.61)	-0.0882*** (-3.65)	-0.0786** (-2.48)	-0.0544 (-0.55)
Inverse Mills ratio 2	-0.133*** (-7.67)	-0.134*** (-7.57)	-0.139*** (-7.94)	-0.140*** (-8.08)	-0.134*** (-7.88)
Constant					
N	5576	5576	5717	5657	5576
Pseudo R^2	0.0417	0.0420	0.0420	0.0426	0.0414

Firm characteristics as in Table 8 also included.

Time and sector dummies also included but not shown.

Marginal effects; t statistics in parentheses

(d) for discrete change of dummy variable from 0 to 1

* $p < .1$, ** $p < .05$, *** $p < .01$