

# Credit Access for Small and Medium Firms

## Survey Evidence for Ireland

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### Abstract

The extension of credit to SMEs in Ireland has been identified as a necessary condition for economic recovery and job growth. The debate on whether the reduction in credit to this sector is caused by credit rationing by banks or a lack of credit demand on the part of SMEs has received much attention in media and policy circles. Owing to a lack of relevant available micro-data, research on this issue in Ireland has been sparse to date. The aim of this paper is to provide evidence using recently available firm-level data from the Central Statistics Office and the European Central Bank. Using the CSO data, we find a moderate decline in credit applications, coupled with a very large increase in credit rejection rates. Using firm-level production data, we find no evidence that the accepted firms have been pooled according to firm performance - more productive and fast-growing firms are as likely to be rejected as any other firm. Using the ECB data, we show that Irish firms are 15 to 18 percent more likely to be rejected for credit than a comparable Eurozone SME. We show also that Irish firms are less likely to have had decreased credit demand than other Eurozone SMEs in the 2009-10 period.

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# 1 Introduction

Ireland experienced an unprecedented credit boom in the years leading up to 2008. Outstanding credit to private sector Irish resident firms grew by 194% between 2003 and the peak in March 2009, as shown in Figure 1. Since then, credit has contracted sharply, falling by 18% in two years (March 2009 to March 2011). This is in part explained by the need to reduce the size of the Irish banking sector and move away from unsustainable loan-to-deposit ratios, as specified in the Financial Measures Programme<sup>1</sup>:

The Central Bank has agreed with the External Partners that a sustainable Loan to Deposit Ratio for the aggregate domestic banking system is 122.5%, meaning a surplus of some €70bn of loans. Deleveraging these loans will reduce dependence on wholesale funding and set the foundation for a sustainable banking sector.

In order to protect the domestic economy from the negative effects of this deleveraging process, the Programme emphasises that the deleveraging is to come from “non-core” assets, and not from “core portfolios” which would continue “to service the retail, SME and corporate banking requirements of the Irish economy.” In an effort to ensure that small and medium enterprises (SMEs) would continue to be able to access credit, an annual lending target of €3bn was established for the two main banks as part of recapitalisation requirements. However, the Credit Review Office (CRO 2011) says it will be a “challenge” for this target to be met. This paper uses firm level data to assess how SMEs perceive current credit conditions and takes some tentative steps towards disentangling the relative effects of changes in supply versus demand.

We focus on SMEs for a number of reasons.<sup>2</sup> SMEs account for a considerable proportion of economic activity in most countries. Even prior to the current financial crisis, the funding opportunities and constraints of this type of firm had been of interest to economists and policy-makers. The SME group accounts for the vast majority of enterprises in the EU and employs more than half of the labour force. In Ireland, SMEs account for 99% of firms and employ 68% of workers (European Commission, 2009b).

The SME sector makes up a significant proportion of employment but, as a sector it is characterised by a greater degree of output and profit volatility than larger enterprises. They are also more liable to failure; manufacturing firms with fewer than 20 employees have been found to be five times more likely to fail in a given year than larger firms (OECD, 2006). This is the case even in times of stable economic growth. In times of recession or crisis, SMEs are particularly vulnerable as their limited diversification and dependence on short-term credit give them much less of a buffer against demand falls than are available to larger firms (OECD, 2009). Furthermore, SMEs have limited internal resources and little or no direct

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<sup>1</sup>Online version of report available at <http://www.centralbank.ie/regulation/industry-sectors/credit-institutions/Documents/The%20Financial%20Measures%20Programme%20Report.pdf>

<sup>2</sup>We follow the European Commission definitions of a small firm as one employing fewer than 50 employees and a medium firm as having between 50 and 250 employees (European Commission, 2009a).

access to capital markets and they thus tend to rely mainly on banks for funding. As a result, the fall in bank credit is likely to impact SMEs much more directly than larger firms.

Given the previous reliance of Irish economic growth on Foreign Direct Investment and latterly on property and construction, the development of a productive, innovative and internationalised indigenous SME sector has become a key national policy objective. Central to the debate on the growth of this sector has been the issue of access to finance. The importance of the issue is made clear by Deputy John Perry, Minister of State at the Department of Jobs, Enterprise and Innovation in a Dáil debate on the SME sector on 19 July 2011<sup>3</sup>:

The availability of credit to viable businesses is a recurring challenge that has hampered new or expanding firms from developing new products and markets, and thereby protecting or creating jobs. This is a challenge the Government is determined to address.

To date, it has been difficult to assess how the difficulties in the banking sector have been impacting on SMEs. The available data on firms' interactions with the credit market is limited, with even the most comprehensive Irish firm-level datasets providing no information on firms' finances or borrowings. The debate on credit access has therefore been dominated by anecdotal evidence and disagreement on whether the observed fall in aggregate credit is due to reduced demand from firms or from banks restricting supply.

On the "reduced supply" side of the debate, a number of ad-hoc surveys have been carried out showing impressions of tightened credit standards by banks. A survey of its members by the Institute of Certified Public Accountants in Ireland (CPA), carried out in July 2011, reported that 87% believe banks are not "open for business".<sup>4</sup> In addition, 61% of CPA members gave their opinion that viable businesses had been refused credit. Another survey by the Irish Small and Medium Enterprises Association (ISME), found that of its members, 30% applied for credit in the second quarter of 2011, and 54% of these were refused.<sup>5</sup>

On the other side of the debate, the Credit Review Office (CRO) and Banking Industry Federation maintain that banks are willing to lend, but that there has been a major fall in demand since the recession began (see for example the CRO's 5th Quarterly Report). A survey of banks in Ireland, the Bank Lending Survey<sup>6</sup>, carried out by the Central Bank found reports of credit standards tightening between 2008 and 2010 and remaining unchanged since July 2010. This survey also reported credit demand falling from 2008-10, and stabilising since late 2010.

Figures from surveys focusing on members of trade associations and lobby groups may not always be representative of the experiences of the wider body of firms but, up until now, little information from

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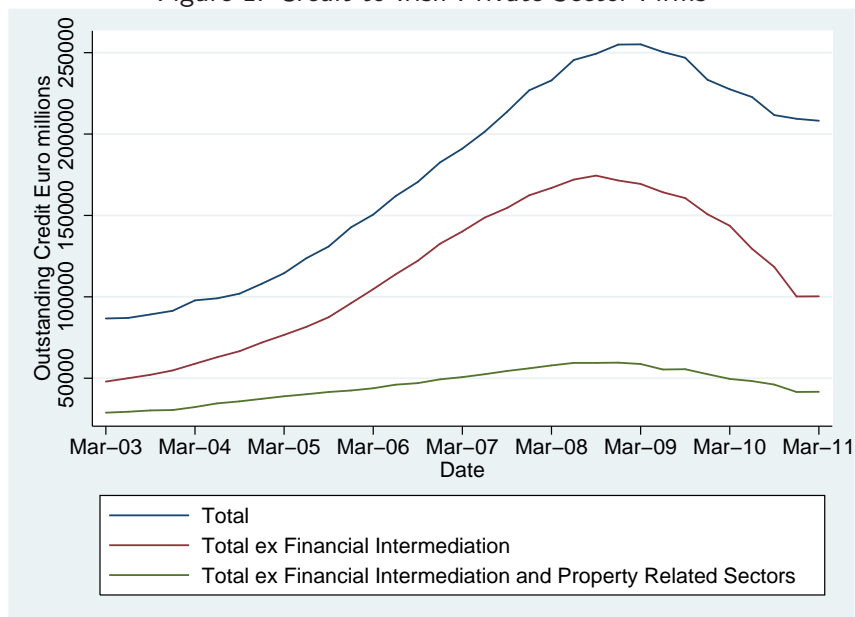
<sup>3</sup>Transcript available here: <http://debates.oireachtas.ie/dail/2011/07/19/00008.asp>

<sup>4</sup>Press release available at <http://www.cpaireland.ie/displaycontent.aspx?groupid=367&headerid=1873>

<sup>5</sup>Press release available at <http://www.isme.ie/downloads/3008/11161bankwatchsurvey.doc>

<sup>6</sup><http://www.centralbank.ie/mpolbo/mpolicy/Pages/lendingsurvey.aspx>

Figure 1: Credit to Irish Private-Sector Firms



disinterested sources has been available. This paper presents analysis of two surveys of Irish SMEs, both of which draw their samples from the whole relevant population and thus provides the first objective evidence on firms' demand for credit and experience of supply decisions.

The first survey is the Access to Finance survey carried out by the Central Statistics Office. It collected information on the change in credit application and rejection rates for a representative sample of Irish SMEs between 2007 and 2010. We find a relatively small decrease in loan application rates over the period. On supply, we first compare the changes in the Irish figures over the period to European countries in which an identical survey was carried out. This suggests that no other country in Europe has seen as big a relative increase in loan rejection rates, and only Bulgaria has a lower absolute rejection rate than Ireland in 2010. We then match the Irish data with quantitative information from other CSO sources and use it to compare the characteristics of rejected and accepted firms along a number of performance dimensions, such as productivity, sales, growth and the firm's relative position in their sector. This allows us to determine if there is evidence of sorting by quality of the firms that successfully accessed credit in 2010. No statistically significant differences could be found between accepted and rejected firms on the basis of observable firm characteristics.

The second set of data is the Survey of Access to Finance in Europe (SAFE) which is a biannual survey carried out by the European Central Bank across all Euro member states. Currently four waves of the survey are available. We make use of this data to compare Irish firms to similar Eurozone firms using matching techniques. This allows us to address the question of whether Irish firms are different

from comparable Eurozone firms in terms of their changes in credit demand in 2009-10 and the degree to which they have been rationed credit. We find that firms in Ireland are less likely to have decreased their demand for credit than comparable firms in the Euro area as a whole or when compared to the peripheral crisis countries. Irish firms are also significantly more likely to have been refused credit than their counterparts elsewhere.

One variable for which we cannot control is the degree to which Irish SMEs are over-leveraged. Given the extent of the credit and construction boom in Ireland up to 2007, it is eminently possible that Irish SMEs have accumulated higher levels of debts than other European firms. On account of this fact, it is prudent to interpret our estimates as upper bounds on the probability of rejection due solely to the firm being Irish, with the potential that a certain proportion of the Irish coefficient is in fact explained by property-related over-leverage. One finding that mitigates this concern comes from comparisons between Irish rejection rates and those of Baltic states which experienced similar credit booms to Ireland in the past decade. These comparisons suggest that, even when considering countries with a very similar previous economic pattern, Irish rejection rates appear to be high. Additionally, an analysis of the reasons for rejection shows that one-fifth of Irish SMEs were rejected due to over-leverage, leaving four-fifths of firms who were rejected for other reasons, including 15 percent who were rejected for no reason. The question of SME leverage in Ireland will require more detailed firm-level data in order to be comprehensively addressed.

The remainder of the paper is structured as follows. Section 2 discusses some previous work on SME credit constraints. Section 3 presents the evidence from the CSO Access to Finance survey and Section 4 focuses on the SAFE results. Section 5 concludes.

## **2 SMEs and Credit Constraints: Background**

Credit constraints have been defined by the OECD (2006) as occurring when SMEs cannot obtain financing from banks, capital markets or other suppliers of finance even when they have the capability to use those funds productively. In a situation where economically viable projects may have to be restricted or even abandoned because of funding difficulties, this has the potential to have serious negative consequences for ongoing innovation and growth. It is this potential scenario that motivates the concern for identifying and measuring whether SMEs are credit constrained and, if they are, if there is any way that these constraints can be alleviated.

The greater difficulty of smaller firms in accessing credit relative to larger firms revolves around differences in risk profile and information asymmetries between the firm and lending institution (OECD, 2006). It can be difficult for SMEs to convince banks of the quality of their business plans and, for newer firms in particular, it can take a considerable amount of effort to build a reputation that signals that they are low risk. From the bank's point of view, the costs involved in assessing and monitoring SMEs act as a disincentive to funding this market. For larger institutions, transactions lending that relies

on financial statements of firms as an information source is often preferred. Furthermore, SMEs often have less collateral that could protect creditors (ECB, 2007). Banks may, in some circumstances, prefer to ration credit rather than use interest rate changes to compensate for risk if there are concerns that this might result in adverse selection and hence a riskier loan portfolio (OECD, 2006). The conceptual framework of Berger and Udell (2006) suggests, however, that the above difficulties can be mitigated if banks use alternative transactions lending technologies such as using credit scoring data, asset-based lending and factoring

Research on the funding of SMEs in Ireland has been relatively limited due primarily to a lack of sufficient data. Ad hoc survey methods have been used to gain some information on the existence of financing constraints. Personal sources of financing of the proprietor and external debt collateralised by personal assets were found to be important sources of finance by Mac an Bhaird and Lucey (2006) in their survey of 275 small firms. This was particularly the case for younger firms, with retained earnings becoming a more significant source of funds for established firms. Most firms (86%) in this sample reported that banks were willing to provide overdraft funding but no more detailed information on credit constraints or loan turndown was collected.

Mazars (2009) published an independent report commissioned by the Government to examine the availability of credit to SMEs in Ireland, in the face of widespread anecdotal reports that the banking crisis was negatively impacting business credit. Of the firms surveyed for the report, 52% reported that they were refused credit in the last 12 months. When queried about the reasons given by banks in turning down loan applications, the firms reported that they were told there had been “a change in bank lending policy” and “the sector in which the business operates is no longer a sector to which the bank is prepared to lend”. The latter was particularly the case when the firm operated in the real estate, construction and manufacturing sectors.

This paper contributes to the literature on SME credit in Ireland both by utilising two new data sources and by approaching the issue of credit demand and credit supply using separating equilibrium t-tests and propensity score matching.

## **3 CSO Access to Finance Survey**

### **3.1 Data Description**

The Central Statistics Office carried out an Access to Finance survey covering Irish SMEs in 2010, with the results released in May 2011 (CSO 2011). The total sample was 800 firms, drawn from firms that had employed between 10 and 249 people in 2005 and continued to employ at least 10 people when the survey was carried out. The questionnaire related to firm activities in 2010 and retrospective questions were asked about financing in 2007. All of the firms were independent entities (i.e. no subsidiaries were included on the assumption that financing decisions would primarily be taken in the group headquarters).

The Access to Finance survey contains qualitative information on the type of finance that the firm tried to obtain, the outcome of their application and their impression on how financing standards had changed.

The CSO assigns each firm an unique identifying number that enabled us to merge the results of the Access to Finance survey with two other sources of data. Depending on their sector, the firm finance information was matched to either the Census of Industrial Production or the Annual Services Inquiry (see CSO 2008 and CSO 2009 for full descriptions of these surveys). Both of these sources provide quantitative data on production, productivity, employment and international trade. We were able to match 635 of the firms to one of these other surveys.<sup>7</sup> The Census of Industrial Production data used covered 2005 to 2009, while the Annual Services Inquiry covered 2005 to 2008. Given that the firm information is therefore lagged either one or two years relative to the financing information, we will concentrate on broad measures of firm quality that are likely to be persistent. There is an implicit assumption here that the shocks hitting the economy would have had symmetric effects on firms operating within the same sector (defined at the NACE2 level).

A number of other caveats are worth noting before moving to the survey results. The first is that there is a “survivor bias” to be borne in mind, particularly when looking at the retrospective results, as we cannot observe any firms that exited since 2007 and these may have been firms more likely to have had difficulty accessing credit at that time. Thus our findings on credit supply for 2007 are likely to understate the true rejection rate. The second item to note is that when we observe a firm that did not apply for any type of finance, we do not have any further information on the reasons for not applying. Therefore, we are unable to distinguish between firms that had sufficient internal resources and did not need any external financing from those that did not apply because they felt that an application was bound to be rejected. There is also no separation of questions relating to new loans from those restructuring existing credit arrangements, so we cannot tell if these are being treated differently by the banks. As mentioned in the Introduction, we cannot identify firms’ leverage in the data. Therefore, over-indebtedness as a factor explaining rejection is not included in our T-tests.

### **3.2 Summary of Credit Demand and Supply**

Out of the total sample, approximately 200 firms applied for loan financing in each of the two years referred to in the survey. In 2007, 37.2% of firms applied for loan finance and in 2010 this had fallen to 30.7%. This shows a reasonably significant reduction in the demand for credit, but given the extent of the fall in economic activity between 2007 and 2010, it does not suggest that credit demand has “fallen off a cliff”. Unfortunately, as we pointed out in the previous subsection, we cannot tell how much of this reduction might be due to discouraged borrowers relative to the reduction coming from a drop in investment opportunities. However, if there was a widespread perception amongst firms that credit was being restricted, one might have expected a larger reduction in credit applications.

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<sup>7</sup>The unmatched firms were primarily in either construction which is not included in either dataset or in services as the Annual Services Inquiry does not provide a full census of firms with under 20 employees.

Table 1: Access to Bank Loans

|      | Unsuccessful |       | Partial |       | Successful |       | Total |
|------|--------------|-------|---------|-------|------------|-------|-------|
|      | No.          | %     | No.     | %     | No.        | %     |       |
| 2007 | 4            | 1.96  | 6       | 2.94  | 194        | 95.10 | 204   |
| 2010 | 44           | 24.72 | 33      | 18.54 | 101        | 56.74 | 178   |

Table 2: Access to All Loan Sources

|      | Unsuccessful |       | Partial |       | Successful |       | Total |
|------|--------------|-------|---------|-------|------------|-------|-------|
|      | No.          | %     | No.     | %     | No.        | %     |       |
| 2007 | 2            | 0.83  | 8       | 3.33  | 230        | 95.83 | 240   |
| 2010 | 36           | 16.67 | 35      | 16.20 | 145        | 67.13 | 216   |

Turning to credit supply, Table 1 shows the breakdown of the outcome of applications for bank credit in both 2007 and 2010. The survey allows firms to indicate if they had been successful, unsuccessful or if the application had been “partially” successful.<sup>8</sup> As we can see, the level of unsuccessful applications in 2007 is close to negligible, with under 2% rejected and only a further 3% granted less credit than they had applied for. The change in the percentage of successful applications fell from slightly over 95% in 2007 to just under 57% in 2010. The rejection rate increased to almost a quarter, while a further 19% of firms were partially successful in their applications.

Table 2 broadens the definition of financing from bank loans to also include other official financing sources such as overdrafts and non-bank financial institutions. The success rate for these wider financing options was higher than for bank loans alone, with over 67% of firms accessing some type of credit. However, this still contrasts strongly with the 96% success rate in 2007. These figures can be benchmarked against European comparator countries, as the Access to Finance survey was carried out as part of a wider European Commission study. Tables 22 and 23 give the results for the same study carried out in twenty European countries. Table 22 shows that Ireland had the second highest acceptance rate in Europe in 2007, which one might argue was certainly overly profligate. However, Table 23 shows that, relative to European comparator countries, Irish SMEs appear to be experiencing particular difficulties in accessing financing in 2010. As Table 24 makes apparent, no other country has seen a similar fall in its position on the acceptance rate ranking, with Ireland falling from the 2nd highest to 19th highest accep-

<sup>8</sup>No further questions are asked about the extent of the “partial” success in terms of the percentage of credit applied for that was actually granted.

tance rate, which points to an over-correction relative to 2007 lending levels. Looking at pure rejection rates, i.e. considering “partially accepted” firms as part of the “accepted” category, does not alter this picture. Looking at further international comparable data sources, a survey of firm bank applications carried out in Latvia, Estonia, Hungary and the Czech Republic showed similarly high acceptance rates in 2005 to those we find in the 2007 results for Ireland. Loan rejection rates increased significantly when the survey was repeated in 2009, with rates that ranged from 7% in Hungary to 21% in Latvia.<sup>9</sup> Even this most extreme contraction in Eastern Europe does not match the increase in Irish rejection rates recorded in Tables 22 to 24. UK evidence also shows a sharp increase in rejection rates in SME applications for credit from 6.1% in 2001-04 to 16.3% in 2008, but even for the riskiest group of firms the rejection rates do not reach Irish levels (Frazer, 2010). Of importance here is that the Baltic States and the UK are comparable to Ireland in that there were large credit and construction booms in all these countries in the past decade. The fact that Ireland has higher rejection rates than any of these countries helps alleviate concerns that our extreme findings for Ireland are purely explained by property-related over-leverage of Irish SMEs.

One could claim that a large fall in Irish SME credit acceptance rates is to be expected, given the significant fall in output experienced since the onset of the economic crisis in 2007. We address this issue in Figure 2 by plotting a linear fit of changes in loan acceptance rates on changes in output for each country reported in Table 22 and 23. This plot shows a positive relationship, with larger contractions in output associated with larger declines in the acceptance rate. Importantly from the point of view of our analysis, Ireland is found significantly below the fitted line, indicating that the decline in credit acceptance rates is larger than that expected given the decline in output. For robustness, Figure 3 in the Appendix plots a similar relationship, looking at the pure rejection rate rather than the pure acceptance rate. The picture does not change, with Ireland now lying above the fitted line in this case, indicating that this finding is robust to the category in which partially accepted firms are placed.

Looking at a breakdown by broad sector in Table 3, we do not observe any major difference between manufacturing and services. Both sectors show a success rate close to two-thirds for applications for our broader definition of financing in 2010.

### **3.3 Testing Credit Allocation**

We have seen that there was a sharp increase in rejection rates, particularly for bank loans, during the recession. However, this alone is not sufficient evidence of a credit crunch. The OECD definition of credit constraints in Section 2 included an important proviso that it applied to firms that have the capability to use those funds productively. Given the extent of the fall in economic activity between 2007 and 2010, a reduction in credit could be a reflection of a lack of investment opportunities that banks feel have

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<sup>9</sup>Authors' calculations using World Bank/European Bank for Reconstruction and Development survey data, details available on request. See appendix, Table 25 and 26 for summary statistics on the Baltic and UK results.

Figure 2: Change in acceptance rate versus change in output.

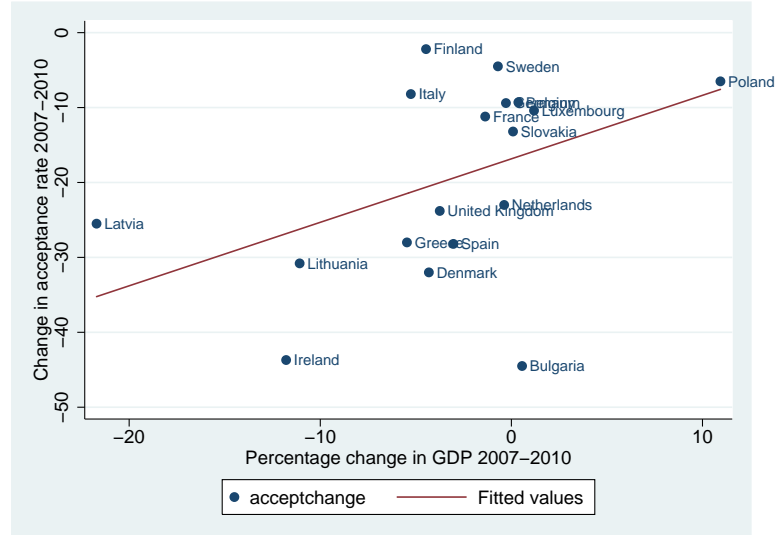


Table 3: Finance by Broad Sector

|              | Manufacturing | %      | Services | %      |
|--------------|---------------|--------|----------|--------|
| Unsuccessful | 8             | 19.51  | 21       | 15.33  |
| Partial      | 5             | 12.20  | 27       | 19.71  |
| Successful   | 28            | 68.29  | 89       | 64.96  |
| Total        | 41            | 100.00 | 137      | 100.00 |

a reasonable probability of success. If this is the case, the rejections could be largely a function of an increased risk profile and the refusals entirely prudent.

It is difficult to gauge empirically the strength of this argument. There are many firm characteristics that are unobservable in the data and extremely limited information on the purpose for which financing is sought. That said, the question of how credit is being allocated to SMEs is of such importance that every attempt to shed light on the process should be examined, even if the data cannot address all facets of the issue.

While it is impossible to quantitatively model all factors that should influence a bank's lending decision, we can make inferences from tests of the data available to us. We take as our working hypothesis that if the banking sector is "correctly" allocating credit, we should see a performance gap between rejected and accepted firms. On the other hand, if credit is being rationed in a "blanket" fashion, then rejected and accepted firms will not appear to be any different from one another.

In order to do this, we pool the data into two groups:

- Firms fully successful in obtaining finance.
- Firms partially successful or unsuccessful.

We then perform T-tests to examine if the means are the same across these two groups for a number of measures of firm performance. The first measures that we look at are labour productivity, labour productivity as a percentage of the frontier (most productive) firm in a sector, sales and sales growth. To define the frontier firm in the two relative measures, we make use of the full coverage of the Census of Industrial Production and Annual Services Inquiry for each sector at the NACE2 level. Assuming that the economic shocks of the past few years were symmetric within each narrow sector, each firm's position relative to the frontier should be reasonably stable over time. Table 4 presents T-tests comparing

Table 4: Productivity and Growth by Loan Outcome

|                          | Unsuccessful<br>/Partial | Successful | p-value | <i>N</i> |
|--------------------------|--------------------------|------------|---------|----------|
| Labour Productivity 2008 | 11.76                    | 11.71      | 0.67    | 178      |
| LP % of Frontier, 2008   | 0.73                     | 0.74       | 0.71    | 178      |
| log Sales, 2008          | 8.26                     | 8.31       | 0.80    | 178      |
| Sales growth 2008        | 0.0002                   | 0.0328     | 0.48    | 123      |

the means of successful and unsuccessful applicants for finance for each performance measure. The hypothesis being tested is that the means are equal between rejected and accepted firms.

For all four of the indicators of firm quality, we find no evidence of significant differences between firms that were successful and those that were unsuccessful in their credit applications. In terms of labour

productivity, they actually appear to perform worse than those firms that are unsuccessful or partially successful, while in terms of distance to frontier, they appear only marginally stronger (in no case is a result statistically significant). We also look at sales growth as a proxy for the growth potential of the firm, which is something that a lender is expected to take account of when deciding on capital allocation. We see that the successful firms in 2010 do appear to have been growing at a faster rate in 2007-08 than those who did not obtain their desired financing. This difference however is a long way from being statistically significant. This suggests that there is little sorting by quality taking place, at least not on the basis of these measures of past firm performance. For robustness, the tests of Table 4 were replicated, redefining the “successful” category to include both those firms that were fully or partially unsuccessful. Table 21 again finds no statistically significant differences between accepted and rejected firms.

Research in the field of international trade has consistently shown that exporters perform better than non-exporters along a wide range of firm characteristics. We therefore examine the composition of the 2010 loan finance success rate by firms’ exporter status. As above, the working hypothesis is that if the banks are correctly allocating capital according to risk, exporters should be more successful in obtaining loans than their counterparts serving only the domestic Irish market. Echoing our findings using productivity measures, we see in Table 5 that there appears to be no discrimination on firm “quality” - exporters are just as likely as non-exporters to be unsuccessful in their applications for loan finance in 2010. Both exporters and non-exporters have a rate of rejection of 16%, with almost identical rates for partial and successful applications as well. Table 6 presents an alternative measure by examining

Table 5: Export Status and Loan Outcome

|              | Non-Exporter | %      | Exporter | %      |
|--------------|--------------|--------|----------|--------|
| Unsuccessful | 23           | 16.31  | 6        | 16.22  |
| Partial      | 26           | 18.44  | 6        | 16.22  |
| Successful   | 92           | 65.25  | 25       | 67.57  |
| Total        | 141          | 100.00 | 37       | 100.00 |

the breakdown of the access to finance variable according to the quartile in which the firm resides in its NACE 2 industry’s labour productivity distribution in 2008. We again see that, for each quartile, the rates of acceptance are roughly similar. The firms that are most productive in their sector are more likely to be partially accepted for a loan, but are in fact less likely than other firms to be fully successful.

### 3.4 The reasons for rejection

For those firms rejected for bank loans in 2010, the survey asks which (if any) reasons were given by the bank for the rejection decision. Table 7 reports that too much debt already accumulated by the SME

Table 6: Productivity Distribution and Loan Outcome

|              | Quartile of firm's NACE2 Labour Productivity in 2008 |       |     |       |     |       |     |       |
|--------------|--|-------|-----|-------|-----|-------|-----|-------|
|              | 1st  | %     | 2nd | %     | 3rd | %     | 4th | %     |
| Unsuccessful | 4  | 17.39 | 10  | 20.41 | 8   | 17.39 | 7   | 13.73 |
| Partial      | 4  | 17.39 | 6   | 12.24 | 8   | 17.39 | 13  | 25.49 |
| Successful   | 15   | 65.22 | 33  | 67.35 | 30  | 65.22 | 31  | 60.78 |
| Total        | 23   | 100   | 49  | 100   | 46  | 100   | 51  | 100   |

was the most common reason for rejection in Ireland, and that Ireland was among the countries where this reason was most prevalent. This over-leverage of Irish SMEs is potentially linked to over-investment in property during the construction boom up to 2007, although data do not allow us to identify the breakdown of over-leveraged firms between property and other types of credit. The problem of debt overhang has been identified by many commentators<sup>10</sup> as the key barrier to recovery from the current economic crisis. In light of such proclamations, the figures for over-leverage appear worrying in the Irish context.

After over-leverage, the next most common reason for rejection in Ireland was “no reason”, with Ireland having the highest share of firms in this category. That the share of firms rejected for no reason was higher than that for insufficient collateral, a poor credit rating or risky potential of the borrower points to a significant degree of credit rationing in the Irish SME market.

### 3.5 How big a problem is credit?

The evidence from the CSO survey shows a fairly dramatic decline in the success rate for SME loan applications between 2007 and 2010. How big a problem is this for the firms? The survey asks firms to pick the five factors that are most likely to limit their growth between now and 2013. Table 8 reports results for the most frequently identified factors. Unsurprisingly, the general economic outlook is mentioned by almost all respondents. Perhaps more surprisingly, finance is picked as a growth-limiting factor by just a quarter of firms. A number of other constraints were chosen as more important than finance access, with 60% of firms reporting price competition/tight margins as an obstacle, 53% reporting domestic demand and 50% reporting labour costs.

We look at how the question on finance as a future obstacle is broken down among our firms that applied for a loan in 2010. Not surprisingly, Table 9 tells us that among unsuccessful firms in 2010, 75%

<sup>10</sup>See e.g. Rogoff (2011) for a discussion of the effects of over-leveraged balance sheets of households, governments and firms on the potential for economic recovery.

Table 7: Reasons given by bank for rejecting loan application. Countries with acceptance rates greater than 80% are excluded.

|             | Over-<br>Leverage | No reason | Insufficient<br>Collateral | Poor Credit<br>Rating | Risky<br>Potential |
|-------------|-------------------|-----------|----------------------------|-----------------------|--------------------|
| Bulgaria    | 2.7               | 13.5      | 8.5                        | 3.3                   | 4.9                |
| Denmark     | 5.7               | 4.5       | 12.5                       | 0.2                   | 1.8                |
| Germany     | 6.2               | 9.4       | 13.4                       | 13.6                  | 5.2                |
| Ireland     | 19.4              | 15.9      | 12.0                       | 2.6                   | 5.8                |
| Greece      | 9.4               | 13.0      | 9.9                        | 10.4                  | 4.7                |
| Spain       | 12.4              | 9.8       | 12.7                       | 11.8                  | 2.8                |
| Italy       | 4.3               | 4.1       | 3.6                        | 6.2                   | 1.7                |
| Cyprus      | 27.2              | 10.3      | 15.5                       | 3.7                   | 7.8                |
| Latvia      | 18.4              | 8.5       | 9.5                        | 0.1                   | 4.9                |
| Lithuania   | 8.7               | 10.6      | 11.0                       | 12.5                  | 5.2                |
| Luxembourg  | 4.5               | 6.9       | 10.2                       | 7.7                   | 5.3                |
| Netherlands | 4.6               | 4.3       | 7.3                        | 5.8                   | 5.8                |
| Slovakia    | 5.9               | 7.4       | 6.9                        | 14.0                  | 4.5                |
| Sweden      | 8.9               | 6.4       | 6.9                        | 6.6                   | 6.6                |
| UK          | 5.2               | 8.0       | 13.8                       | 5.9                   | 7.2                |

Table 8: Perceived Obstacles to Growth

|                    | Yes  | No   |
|--------------------|------|------|
| Price Competition  | 60.3 | 29.7 |
| Regulation         | 33.3 | 66.7 |
| Finance            | 25.2 | 74.8 |
| Market Competition | 47.2 | 52.8 |
| Wage Costs         | 50.2 | 49.8 |
| Domestic Demand    | 52.8 | 47.2 |
| General Economy    | 89.8 | 11.2 |

believe financing will be an obstacle to growth between now and 2013. Among partially successful firms, this figure falls to 43%, while among firms who were successful in 2010, 72% do not believe finance will be an obstacle to growth. Notice that this sample is of 216, rather than the 635 in Table 8, as only 216 firms applied for external finance in 2010.

Table 9: Perceived Finance Obstacle and Loan Experience

|              | No Problem | %     | Problem | %     | Total |
|--------------|------------|-------|---------|-------|-------|
| Unsuccessful | 9          | 25    | 27      | 75    | 36    |
| Partial      | 20         | 57.14 | 15      | 42.85 | 35    |
| Successful   | 104        | 71.72 | 41      | 28.27 | 145   |
| Total        | 133        | 61.57 | 83      | 38.42 | 216   |

### 3.6 Summary of findings: CSO's Access to Finance Survey

The Access to Finance survey carried out by the CSO measured changes in the SME credit market between 2007 and 2010. It showed a decline in credit demand, with the percentage of firms applying for a bank loan falling from 37.2% in 2007 to 30.7% in 2010. The change in demand was fairly modest however when compared with the sharp fall in approval rates for those firms that did apply. We observe rejection rates up from 5% in 2007 to 43% in 2010 for bank loans and rejection rates of 33% for all credit. Using comparable data, we observe almost no other country in the EU that has undergone a similar increase in loan rejection rates for SMEs.

We then examined if there was any evidence of sorting on firm quality between rejected and accepted firms. Using a range of measures of past firm performance and position relative to others in their sector, we could find no significant differences between the two groups of firms that could explain the differing experiences with credit providers.

Despite the contraction in credit availability, access to finance is considered an important impediment to future growth by a surprisingly small share of Irish SMEs. Broader concerns about the economic climate, cost levels and the intensity of competition were all regarded as barriers to future growth by a majority of firms, whereas finance was a key concern to approximately a quarter of survey respondents.

## 4 The ECB survey "Access to finance of small and medium-sized enterprises" (SAFE)

### 4.1 The Data

Since 2009, the ECB has conducted four half-yearly waves of the SAFE survey of Eurozone-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 to place their turnover, employment, ownership type,

age and sector of activity into categories. As one can see from Table 10, the majority of the sample comes from four countries: Germany, Spain, France and Italy, for whom the sample of firms is representative. The overall sample for all countries is also representative of Eurozone SMEs, but for individual countries apart from those already mentioned, the samples are not representative.<sup>11</sup>

Table 10: Breakdown of SAFE survey sample size by survey round and country.

|             | H1 2009 | H2 2009 | H1 2010 | H2 2010 | Total  |
|-------------|---------|---------|---------|---------|--------|
| Austria     | 224     | 203     | 200     | 500     | 1,127  |
| Belgium     | 220     | 202     | 203     | 517     | 1,142  |
| Germany     | 1,003   | 1,001   | 1,000   | 1,000   | 4,004  |
| Spain       | 1,012   | 1,004   | 1,000   | 1,000   | 4,016  |
| Finland     | 111     | 100     | 100     | 500     | 811    |
| France      | 1,000   | 1,001   | 1,003   | 1,004   | 4,008  |
| Greece      | 220     | 200     | 200     | 500     | 1,120  |
| Ireland     | 110     | 101     | 100     | 500     | 811    |
| Italy       | 1,006   | 1,004   | 1,000   | 1,000   | 4,010  |
| Netherlands | 323     | 252     | 256     | 502     | 1,333  |
| Portugal    | 327     | 252     | 250     | 509     | 1,338  |
| Total       | 5,556   | 5,320   | 5,312   | 7,532   | 23,720 |

Given the small sample size of Irish SMEs and the lack of representativeness of the sample, comparisons of Irish survey responses to the SAFE survey across time are of little value. The authors of the survey state that “the sample size in the other countries is too small to permit robust analysis in each country separately”. We focus instead on cross-country comparisons in which Irish firms are benchmarked against firms in comparator Eurozone countries using Propensity Score Matching (PSM, explained in Section 4.2). The SAFE data allow us to compare both supply and demand of SME credit in Ireland to Eurozone benchmarks. The aim of the empirical exercise on the supply side is to ascertain to what extent Irish firms are being refused credit, relative to similar firms in comparable countries. On the demand side, we estimate the difference in the likelihood of credit demand having changed in the previous six-month period for an Irish firm relative to a comparable Eurozone firm. While the results of these models do not tell us anything about the absolute levels of credit demand or credit supply in the Irish SME sector, they do give us a sense of the differing nature of the Irish credit market relative to comparable benchmark countries. Table 11 gives the breakdown of the following question in the survey,

<sup>11</sup>The sample was stratified by firm size class, economic activity and country.

referring to bank credit:

If you applied and tried to negotiate for this type of financing over the past 6 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 only part of the requested financing, refused to proceed or received nothing at all. Only firms that received all requested financing are coded as “Not Rejected”. This is our measure of credit supply that will be used in Section 4.2. Although we cannot say anything conclusive about these breakdowns for countries other than France, Germany, Italy and Spain, the rejection rates in Table 11 do suggest that Spanish, Irish and Greek SME credit markets have been particularly parsimonious in their allocation of credit to SMEs over 2009 and 2010. One is justified in being sceptical of any normative judgement on the rationing of credit in individual countries from this table. It is eminently possible that rejection rates in Ireland, Greece and Spain could be explained by increased riskiness of firms in these countries, in which case the banking sector would be deemed to be making credit decisions in a perfectly rational way. Our analysis in Section 4.3 will address this issue.

Table 11: Breakdown of the credit supply variable by country. Bank loans only.

| Country     | Not rejected |      | Rejected |      | Total |     |
|-------------|--------------|------|----------|------|-------|-----|
|             | No.          | %    | No.      | %    | No.   | %   |
| Austria     | 206          | 80.2 | 51       | 19.8 | 257   | 100 |
| Belgium     | 212          | 81.5 | 48       | 18.5 | 260   | 100 |
| Germany     | 683          | 74.6 | 233      | 25.4 | 916   | 100 |
| Spain       | 714          | 50.6 | 696      | 49.4 | 1,410 | 100 |
| Finland     | 92           | 84.4 | 17       | 15.6 | 109   | 100 |
| France      | 901          | 81.4 | 206      | 18.6 | 1,107 | 100 |
| Greece      | 169          | 47.7 | 185      | 52.3 | 354   | 100 |
| Ireland     | 54           | 44.3 | 68       | 55.7 | 122   | 100 |
| Italy       | 896          | 67.8 | 426      | 32.2 | 1,322 | 100 |
| Netherlands | 89           | 53.6 | 77       | 46.4 | 166   | 100 |
| Portugal    | 173          | 61.8 | 107      | 38.2 | 280   | 100 |
| Total       | 4,189        | 66.5 | 2,114    | 33.5 | 6,303 | 100 |

We also observe firms’ responses on their demand for bank loans. Table 12 gives country-level frequencies for the following survey question with reference to bank loans:

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

From Table 12, it does not appear that credit demand among Irish firms has been changing in any systematically different way to other Eurozone countries. The share of SMEs with increased, unchanged and decreased demand for bank loans, standing at 19.3, 60.8 and 19.9 percent respectively, match the total sample shares very closely. As with Table 11, we will get behind these figures in Section 4.3 by using PSM to compare each Irish firm to the most similar comparator firm from the rest of the sample.

Table 12: Change in firms' demand for bank loans in previous six months.

|             | Increased |      | Unchanged |      | Decreased |      | Total  |     |
|-------------|-----------|------|-----------|------|-----------|------|--------|-----|
|             | No.       | %    | No.       | %    | No.       | %    | No.    | %   |
| Austria     | 160       | 20.4 | 467       | 59.4 | 159       | 20.2 | 786    | 100 |
| Belgium     | 159       | 18   | 570       | 64.7 | 152       | 17.3 | 881    | 100 |
| Germany     | 604       | 21.3 | 1,656     | 58.5 | 572       | 20.2 | 2,832  | 100 |
| Spain       | 815       | 24.9 | 1,822     | 55.8 | 630       | 19.3 | 3,267  | 100 |
| Finland     | 108       | 17.8 | 367       | 60.4 | 133       | 21.9 | 608    | 100 |
| France      | 646       | 17.9 | 2,426     | 67.4 | 527       | 14.6 | 3,599  | 100 |
| Greece      | 239       | 29.7 | 414       | 51.4 | 152       | 18.9 | 805    | 100 |
| Ireland     | 130       | 19.3 | 409       | 60.8 | 134       | 19.9 | 673    | 100 |
| Italy       | 802       | 24.4 | 1,950     | 59.4 | 531       | 16.2 | 3,283  | 100 |
| Netherlands | 185       | 20.4 | 509       | 56.1 | 214       | 23.6 | 908    | 100 |
| Portugal    | 193       | 22   | 521       | 59.3 | 164       | 18.7 | 878    | 100 |
| Total       | 4,041     | 21.8 | 11,111    | 60   | 3,368     | 18.2 | 18,520 | 100 |

From our description of the credit supply and demand variables in this section, the initial suggestion coming from the data is that supply conditions have been very restrictive in Ireland relative to the Eurozone as a whole, and relative to all countries apart from Spain and Greece. On the demand side, the data do not offer any suggestion that credit demand has been falling more in Ireland than in other Eurozone countries. Section 4.2 will present the theory behind the Propensity Score Matching (PSM) methodology that we will use in Section 4.3 to test whether differences in credit supply and demand persist once we have matched Irish firms to comparator firms in other countries.

## 4.2 Propensity Score Matching

PSM was traditionally used in microeconomic studies of labour, education and health economics, with its use expanding to a broader range of topics in recent years. The broad aim of the methodology is to isolate the causal effect of a given treatment (often a policy change), by matching individuals in a

treatment group ( $T$ ) with individuals in a control group ( $C$ ) along a set of observable characteristics. This is necessary mainly where individuals have not been randomly assigned into the states  $T$  or  $C$ . The key Conditional Independence Assumption (CIA) of PSM is that, once observations have been matched on observables, the only factor driving any difference in the outcome variable of interest between  $T$  and  $C$  is the treatment itself. While clearly inferior to randomly assigning a policy intervention to one sample and depriving another sample of the same treatment and observing the difference in outcomes (a *purely experimental* approach), PSM offers a powerful observational alternative, once the CIA can be credibly posited to hold.

Mathematically, we can represent our treatment dummy  $D_i = 1$  if treatment occurs and  $D_i = 0$  if the individual  $i$  does not receive the treatment, i.e. is in the control group. Our outcome variable of interest (say the probability of being rejected for a loan), when individual  $i$  receives the treatment, is represented by  $Y_{1i}$ . The inherent problem in all observational studies is that the counterfactual  $Y_{0i}$  (the value of the outcome variable for individual  $i$  when treatment is not received), is never observed for the same  $i$ ,  $D_i = 1$ . The role of PSM is to estimate the causal effect of the treatment ( $Y_{1i} - Y_{0i}$ ). This effect is known as the Average Treatment Effect on the Treated (ATT). PSM begins by estimating a propensity score, first introduced by Rosenbaum and Rubin (1983). From the pool of treated and non-treated individuals  $i$ , with the vector of observable characteristics  $X$ , the propensity score is the probability that an individual  $i$  is in the treatment group:

$$p_i(x) = Pr(D = 1|X = x) \quad (1)$$

Equation 1 is generally estimated by a probit regression. There are a number of ways by which PSM can proceed after the estimation of (1). Nearest neighbour matching will match an individual in the treatment group with the individual with the closest  $p_i(x)$  in the non-treated group. Other methods, such as nearest-multiple-neighbours matching and Kernel matching, will match a treatment firm to a number of control firms, weighting the control firms by the difference between their propensity score and that of the treatment firm.

Once treatment  $i$  have been matched using one of the methods above, the Average Treatment Effect on the Treated (ATT) is calculated as the weighted average of the difference in  $Y_i$  between treated and matched control  $i$ . Once the CIA is deemed to hold, this ATT is interpreted as the estimated causal effect of the treatment  $D$  on the outcome  $Y$ .

There are a number of ways to provide support for the CIA when using PSM. Most importantly, the researcher must test whether there are differences between  $T$  and  $C$  in the set of observables  $X$  used to calculate  $P_i(x)$ . In order for the CIA to hold, we must first be sure that, post-matching,  $x_t = x_c$  for all  $x$ , i.e. the mean values of each observable characteristic should not be significantly different between the treatment and control groups. Further, one can observe the distribution of the propensity score in  $T$  and  $C$  post-matching. For a match to have been effective, the propensity score should be similarly distributed across the two groups. PSM should also only be estimated for observations deemed to be “on common support”, which means that only observations that have a propensity score in the region

of overlap between the treated and non-treated groups' distributions should be used. When common support does not hold for some observations, researchers must be more careful in their interpretation of the ATT, which now becomes the Average Treatment Effect on the Treated who are on support. This poses particular concerns when the observations off-support have not randomly ended up in this state. In all results presented in the next section, all observations were in fact "on support", meaning that this issue did not pose problems to our methodology.

Section 4.3 covers our implementation of PSM vis-a-vis the issue of Irish SME credit demand and supply.

### 4.3 Results on Credit Supply

We use PSM not to estimate the effect of any particular policy change, but rather to look at the effect of a firm being Irish, controlling for observable characteristics of the firm, on credit supply and demand. On supply, this removes the effect that the riskiness of applicant firms has on credit decisions; assuming the CIA holds, the estimated effect is due solely to the nature of the Irish credit market. Similarly, when looking at credit demand, we attempt to quantify the difference in demand changes between Irish and comparable Eurozone countries not explained by firm characteristics.

We begin reporting results on credit supply. Our pool of firms is initially all firms in the sample. In the terminology of PSM, being an Irish firm is the treatment,  $T$ , and being from any other country is the non-treatment, or control,  $C$ . We estimate equation 1, where  $X$  comprises the following variables:

- Categorical variables for turnover, employment, independence, sector of activity, age, ownership.
- Variables indicating whether the following increased, decreased or remained unchanged in the previous six months: Turnover, labour costs, other costs, net interest expenses, profit, mark-ups.
- Variables indicating firms' perception of changes in the following: general economic outlook, access to public financial support, firm-specific outlook, firm's capital, firm's credit history.
- Dummy indicating survey wave.

In Table 13, we first report results where the pool of non-treated firms come from all sample countries apart from Ireland. Here we see that, depending on the matching method used (one nearest neighbour, two neighbours, four neighbours or kernel matching<sup>12</sup>), we find an Average Treatment Effect on the Treated (ATT) that lies between 15 and 18 percent. This effect is significant at the 1% level for all cases apart from single-neighbour matching, where it is significant at the 5% level. The interpretation of the coefficient is that a firm in Ireland has a 15 to 18 percent higher likelihood of being rejected when applying for a bank loan than a firm in another Eurozone country, and that this effect is not explained by firm-level characteristics and is rather due simply to the firm being in Ireland.

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<sup>12</sup>n(x) implies nearest neighbour matching with x neighbours.

Table 13: PSM results. Outcome variable:  $D_i = 1$  if firm rejected for a bank loan in previous six months. Non-treated group: All sampled Eurozone firms.

| ATT   | t-stat | $N_T$ | $N_C$ | Pseudo $R^2$ | Method |
|-------|--------|-------|-------|--------------|--------|
| .1471 | 2.05   | 102   | 4,538 | .1341        | n(1)   |
| .1666 | 2.72   | 102   | 4,538 | .1341        | n(2)   |
| .1568 | 2.78   | 102   | 4,538 | .1341        | n(4)   |
| .1837 | 3.64   | 102   | 4,538 | .1341        | Kernel |

We extend this exercise by comparing Irish firms to two subsets of the data. First we look only at countries in which a similar sovereign, economic and/or banking crisis has been felt since the onset of the global economic crisis. Intuitively, one would expect that the Irish banking system should not be rationing credit to a much larger degree than this set of countries, given that the effect of firms' characteristics is already controlled for by the methodology, and expectations in these countries regarding economic growth should not be significantly more optimistic. However, when looking at Irish firms compared to Greek, Spanish, Italian and Portuguese firms in Table 14, we still find a coefficient that ranges between 11 and 15 percent and is always significant at the 5% level.

Table 14: PSM results. Outcome variable:  $D_i = 1$  if firm rejected for a bank loan in previous six months. Non-treated group: Greek, Italian, Spanish, Portuguese firms.

| ATT   | t-stat | $N_T$ | $N_C$ | Pseudo $R^2$ | Method |
|-------|--------|-------|-------|--------------|--------|
| .1471 | 2.06   | 102   | 2,494 | .1315        | n(1)   |
| .1372 | 2.21   | 102   | 2,494 | .1315        | n(2)   |
| .1127 | 1.97   | 102   | 2,494 | .1315        | n(4)   |
| .1119 | 2.17   | 102   | 2,494 | .1315        | Kernel |

We finally compare Irish firms' credit supply with firms in countries other than the four crisis countries studied in Table 14. The results from this sample will give us a comparison with countries which are closer to a "normal" stable equilibrium in their financial sector. The results in Table 15 reveal that when compared to these countries, Irish firms appear to be 26 to 30 percent more likely to be rejected for a loan.

Table 11 showed that Irish firms appeared to be getting rejected more often than firms in other Eurozone countries when applying for bank loans. The results of Tables 13, 14 and 15 indicate that this cannot simply be explained by the composition of firms applying for loan financing. When matching Irish firms to comparable firms across the Eurozone, we see that there seems to be a large effect unexplained by the characteristics of applying firms. This effect, explained solely by the fact that the firm is Irish,

Table 15: PSM results. Outcome variable:  $D_i = 1$  if firm rejected for a bank loan in previous six months. Non-treated group: All firms apart from Greek, Italian, Spanish, Portuguese firms.

| ATT   | t-stat | $N_T$ | $N_C$ | Pseudo $R^2$ | Method |
|-------|--------|-------|-------|--------------|--------|
| .2941 | 3.94   | 102   | 2,004 | .2405        | n(1)   |
| .2549 | 3.89   | 102   | 2,004 | .2405        | n(2)   |
| .2647 | 4.39   | 102   | 2,004 | .2405        | n(4)   |
| .2731 | 4.96   | 102   | 2,004 | .2405        | Kernel |

is interpreted as evidence of significant credit rationing on behalf of the Irish banking sector relative to other European countries.

We can test the robustness of the results to definitions of what it means to be “rejected” for a loan. Firstly, we redefine “successful” firms to also include firms that receive a portion of the amount of financing they requested. We replicate the PSM model with the same observables as the previous three tables. Table 16 reports results for the three separate samples of the previous three tables, reporting only the results of four-nearest-neighbours matching. When comparing Irish firms to all firms, and to PIIGS only firms, we see similar coefficients to the more strict definition of rejection applied above, with ATT of 15 and 12 per cent respectively. When comparing Irish firms to all non-PIIGS firms, however, we find that the effect of being Irish on rejection falls from 26-30 percent to 17 percent.

Table 16: PSM results. Outcome variable:  $D_i = 1$  if firm rejected for a bank loan in previous six months. “Successful” firms redefined to include firms receiving part of the requested amount.

| Non-treateed  | ATT   | t-stat | $N_T$ | $N_C$ | Pseudo $R^2$ | Method |
|---------------|-------|--------|-------|-------|--------------|--------|
| All firms     | .1519 | 3.09   | 102   | 4,538 | .1342        | n(4)   |
| PIIGS         | .1201 | 2.38   | 102   | 2,494 | .1315        | n(4)   |
| All non-PIIGS | .1667 | 3.20   | 102   | 2,004 | .2405        | n(4)   |

In the last two survey rounds (H1 and H2 2010), firms were asked to be more specific when referring to partial success in their loan applications. We redefine “successful” firms as those receiving 75 percent or more of their requested amount, and keep those receiving less than 75 percent in the “rejected” sample. We then repeat the exercise as in Table 16 with results reported in Table 17. We now see that with this more precise definition of rejected firms, albeit for a slightly smaller sample, that the baseline results seem to hold, with Irish firms 29 percent more likely than comparable non-PIIGS countries to have been rejected for a loan by our new definition.

Table 17: PSM results. Outcome variable:  $D_i = 1$  if firm rejected for a bank loan in previous six months. “Successful” firms redefined to include firms receiving more than 75% of requested amount.

| Non-treated   | ATT   | t-stat | $N_T$ | $N_C$ | Pseudo $R^2$ | Method |
|---------------|-------|--------|-------|-------|--------------|--------|
| All firms     | .1752 | 3.14   | 97    | 4,125 | .1379        | n(4)   |
| PIIGS         | .1186 | 2.08   | 97    | 2,173 | .1321        | n(4)   |
| All non-PIIGS | .2989 | 4.22   | 97    | 1,952 | .2463        | n(4)   |

#### 4.4 Credit Demand

Many commentators claim that a fall-off in credit demand is the reason behind the decrease in credit provided to the Irish SME sector. As mentioned in the introduction, little can be said about the *absolute* changes in credit demand among Irish SMEs using the SAFE survey. We can however use a similar set of PSM models to examine whether Irish firms’ credit demand has been falling more than similar European firms over 2009-10. The set of observable characteristics used to calculate the propensity score is identical to that listed above for the bank loan rejection models. The outcome variable is now a dummy taking a 1 if a firm’s loan demand fell in the previous six months, and taking a 0 if demand remained unchanged or increased.

The results of Tables 18 to 20 suggest that, if anything, Irish firms appear to be 5 to 7 percent less likely to have decreased their demand for credit than similar firms in the Eurozone. The results are significant when comparing Irish firms to the whole sample and to the sample of crisis countries, but not when looking at non-crisis countries only. At all points, the sign on our outcome variable is negative, indicating that over 2009 and 2010 we cannot find any evidence of a fall in Irish SME credit demand relative to similar firms in the Eurozone.

Table 18: PSM results. Outcome variable:  $D_i = 1$  if firm’s demand for bank loans decreased in previous six months. Non-treated group: All sampled Eurozone firms.

| ATT    | t-stat | $N_T$ | $N_C$  | Pseudo $R^2$ | Method |
|--------|--------|-------|--------|--------------|--------|
| -.0561 | -2.00  | 517   | 12,644 | .1798        | n(1)   |
| -.0591 | -2.43  | 517   | 12,644 | .1798        | n(2)   |
| -.0483 | -2.19  | 517   | 12,644 | .1798        | n(4)   |
| -.0407 | -2.11  | 517   | 12,644 | .1798        | Kernel |

Table 19: PSM results. Outcome variable:  $D_i = 1$  if firm's demand for bank loans decreased in previous six months. Non-treated group: Greek, Italian, Spanish, Portuguese firms.

| ATT    | t-stat | $N_T$ | $N_C$ | Pseudo $R^2$ | Method |
|--------|--------|-------|-------|--------------|--------|
| -.0735 | -2.51  | 517   | 5,907 | .1768        | n(1)   |
| -.0677 | -2.69  | 517   | 5,907 | .1768        | n(2)   |
| -.0508 | -2.21  | 517   | 5,907 | .1768        | n(4)   |
| -.0503 | -2.46  | 517   | 5,907 | .1768        | Kernel |

Table 20: PSM results. Outcome variable:  $D_i = 1$  if firm's demand for bank loans decreased in previous six months. Non-treated group: All firms apart from Greek, Italian, Spanish, Portuguese firms.

| ATT    | t-stat | $N_T$ | $N_C$ | Pseudo $R^2$ | Method |
|--------|--------|-------|-------|--------------|--------|
| -.0522 | -1.68  | 517   | 6,737 | .2679        | n(1)   |
| -.0416 | -1.52  | 517   | 6,737 | .2679        | n(2)   |
| -.0328 | -1.31  | 517   | 6,737 | .2679        | n(4)   |
| -.0264 | -1.18  | 517   | 6,737 | .2679        | Kernel |

## 5 Conclusion

This paper focuses on the issue of credit access to SMEs in Ireland since the onset of the global economic crisis. The aim is to provide an objective set of conclusions on movements in demand and supply of Irish SME credit. In doing so we have exploited two data sources: the CSO's Access to Finance survey and the European Central Bank's SAFE survey.

Using the CSO survey, we have found a mild drop-off in credit demand among Irish SMEs, coupled with a substantial drop in credit supply, measured by rejection rates of firms applying for financing. The increase in loan rejection rates appears unparalleled in any EU country apart from Bulgaria, and is higher than rejection rates to high-risk firms in the UK in 2008 and rejection rates in crisis-stricken Baltic states in 2009. We use firm-level production data from the CSO to test whether this contraction in credit supply might be deemed a "rational allocation" of credit, in that there is a separating rather than a pooling equilibrium. We do this by looking at the performance of firms that have been allocated credit versus those that have been refused. In a separating equilibrium, we would expect to find that accepted firms are those that are performing better, in terms of sales, growth and labour productivity. The data provide us with no evidence of such a separating equilibrium.

The SAFE data allows us to compare Irish firms' credit supply and demand changes in the 2009-10

period to matched Eurozone comparator firms. On credit supply, we find that an Irish firm is 11-14 percent more likely to be refused credit than a matched PIIGS firm, and 25-29 percent more likely to be refused credit than a matched firm from a non-PIIGS Eurozone country. This suggests that significant credit rationing is present in the Irish SME credit market at present. On credit demand, we find no evidence that Irish firms have experienced any more of a decline than comparable firms across the Eurozone.

Given that this study uses relatively small samples of the Irish SME population, its results should not be interpreted as final and conclusive. The provision of more detailed information on the financing and debt positions of the population (or a large sample thereof) of Irish firms is needed to allow such work to take place. Information on Irish SMEs' debt positions and property investments would add hugely to studies such as this, as the property-related over-leverage of Irish SMEs is one potential explanation for a portion of the "Irish rejection premium". Despite this caveat, the work on two separate datasets presented here points very much in the same direction, with the broad conclusion being that Irish SMEs are facing considerable difficulties in accessing credit relative to European peers. A re-correction towards an equilibrium in which a larger share of firms can access credit is a crucial component of Irish economic recovery.

## References

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## A Supplementary tables

Table 21: Productivity and Growth by Loan Outcome, partially and fully successful firms grouped together.

|                          | Unsuccessful | Successful<br>/Partial | p-value | <i>N</i> |
|--------------------------|--------------|------------------------|---------|----------|
| Labour Productivity 2008 | 11.68        | 11.73                  | 0.78    | 178      |
| LP % of Frontier, 2008   | 0.75         | 0.74                   | 0.63    | 178      |
| log Sales, 2008          | 8.25         | 8.30                   | 0.83    | 178      |
| Sales growth, %, 2008    | -.073        | 2.57                   | 0.66    | 129      |

Table 22: Eurostat Access to Finance surveys. 2007 breakdown across EU

|                | Accept | Partial | Reject |
|----------------|--------|---------|--------|
| Finland        | 98.1   | 1.9     | 0      |
| Ireland        | 96.9   | 2.1     | 1      |
| France         | 94.5   | 3.6     | 2      |
| Malta          | 94.3   | 5.7     | 0      |
| Cyprus         | 93.2   | 6.8     | 0      |
| Belgium        | 92.4   | 5.4     | 2.2    |
| Poland         | 91.9   | 4.3     | 3.7    |
| Denmark        | 91.8   | 4.5     | 3.7    |
| Slovakia       | 89.3   | 7       | 3.7    |
| Lithuania      | 89.2   | 9       | 1.8    |
| Latvia         | 89     | 6.7     | 4.3    |
| United Kingdom | 88.4   | 6.1     | 5.6    |
| Greece         | 87.6   | 11.7    | 0.7    |
| Spain          | 87.3   | 9.7     | 3      |
| Bulgaria       | 87     | 9.9     | 3.1    |
| Italy          | 86.6   | 12.2    | 1.2    |
| Germany        | 85.3   | 8       | 6.7    |
| Netherlands    | 84.3   | 8.9     | 6.8    |
| Sweden         | 84.2   | 7       | 8.7    |
| Luxembourg     | 78.8   | 15.2    | 6      |

Table 23: Eurostat Access to Finance surveys. 2010 breakdown across EU

|                | Accept | Partial | Reject |
|----------------|--------|---------|--------|
| Finland        | 95.9   | 3.9     | 0.2    |
| Malta          | 91.3   | 6.5     | 2.2    |
| Poland         | 85.4   | 10.3    | 4.3    |
| France         | 83.3   | 9.7     | 7      |
| Belgium        | 83.1   | 11.2    | 5.7    |
| Sweden         | 79.7   | 14.1    | 6.1    |
| Italy          | 78.4   | 16.7    | 4.9    |
| Cyprus         | 76.7   | 19.1    | 4.2    |
| Slovakia       | 76.1   | 14.7    | 9.2    |
| Germany        | 75.9   | 15.9    | 8.2    |
| Luxembourg     | 68.4   | 20.9    | 10.7   |
| United Kingdom | 64.6   | 14.7    | 20.8   |
| Latvia         | 63.5   | 10.1    | 26.4   |
| Netherlands    | 61.3   | 16.2    | 22.5   |
| Denmark        | 59.8   | 21.7    | 18.5   |
| Greece         | 59.6   | 29.6    | 10.8   |
| Spain          | 59.1   | 27.8    | 13.2   |
| Lithuania      | 58.4   | 20.4    | 21.2   |
| Ireland        | 53.2   | 20.2    | 26.6   |
| Bulgaria       | 42.5   | 22      | 35.5   |

Table 24: Eurostat Access to Finance surveys. Change in ranking according to acceptance rates, 2007-2010.

|                | Rank 2007 | Rank 2010 |
|----------------|-----------|-----------|
| Belgium        | 6         | 5         |
| Bulgaria       | 15        | 20        |
| Cyprus         | 5         | 8         |
| Denmark        | 8         | 15        |
| Finland        | 1         | 1         |
| France         | 3         | 4         |
| Germany        | 17        | 10        |
| Greece         | 13        | 16        |
| Ireland        | 2         | 19        |
| Italy          | 16        | 7         |
| Latvia         | 11        | 13        |
| Lithuania      | 10        | 18        |
| Luxembourg     | 20        | 11        |
| Malta          | 4         | 2         |
| Netherlands    | 18        | 14        |
| Poland         | 7         | 3         |
| Slovakia       | 9         | 9         |
| Spain          | 14        | 17        |
| Sweden         | 19        | 6         |
| United Kingdom | 12        | 12        |

Figure 3: Change in rejection rate versus change in output.

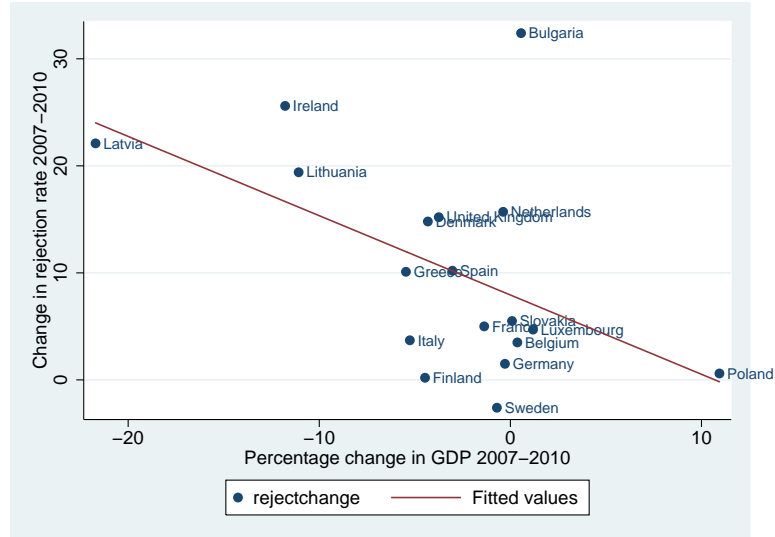


Table 25: SME Loan Rejection Rates in UK

|               | 2001-2004 | 2005-2008 | 2008 |
|---------------|-----------|-----------|------|
| All Firms     | 6.1       | 9.4       | 16.3 |
| By Employment |           |           |      |
| Size 0        | 10.4      | 11.4      | 19.2 |
| Size 1-9      | 2.5       | 6.6       | 14.5 |
| Size 10-49    | 2.4       | 2.5       | 6.5  |
| Size 50-249   | 2.9       | 0.6       | 1.4  |
| By Risk Level |           |           |      |
| Min Risk      | 0         | 2.8       | 15.5 |
| Low Risk      | 9.3       | 3.7       | 7.2  |
| Av Risk       | 2.1       | 5.3       | 16.5 |
| High Risk     | 3.7       | 13.3      | 13.5 |

Source: Frazer (2010)

Table 26: Comparison to Eastern Europe

| Country    | Year | Rejected for loan |        | N   |
|------------|------|-------------------|--------|-----|
|            |      | No (%)            | Yes(%) |     |
| Latvia     | 2005 | 95                | 5      | 184 |
|            | 2009 | 79                | 21     | 87  |
| Estonia    | 2005 | 97                | 3      | 198 |
|            | 2009 | 88                | 12     | 107 |
| Hungary    | 2005 | 99                | 1      | 558 |
|            | 2009 | 93                | 7      | 75  |
| Czech Rep. | 2005 | 96                | 4      | 314 |
|            | 2009 | 86                | 14     | 88  |

Source: World Bank/EBRD BEEPS surveys, own calculations.