# Access to Bank Finance for UK SMEs in the Wake of the Recent Financial Crisis

Keywords: demand for finance; access to finance; credit rationing;

## Abstract

**Purpose:**

This paper investigates how entrepreneurs demand for external finance changed as the economy continued to be mired in its third and fourth years of the global financial crisis and whether or not external finance has become more difficult to access as the recession progressed.

**Design/methodology/approach:**

Using a large-scale survey data on over 30,000 UK SMEs between July 2011 and March 2013, we estimate a series of conditional probit models to empirically test the determinants of the supply of, and demand for external finance.

**Findings:**

Older firms and those with a higher risk rating, and a record of financial delinquency, were more likely to have a demand for external finance. The opposite was true for women-led businesses and firms with positive profits. In general finance was more readily available to older firms post-GFC, but banks were very unwilling to advance money to firms with a high risk rating or a record of any financial delinquency. It is estimated that a maximum of 42,000 smaller firms were denied credit, which was significantly lower than the peak of 119,000 during the financial crisis.

**Originality/value:**

This paper provides timely evidence that adds to our general understanding of what really happens in the market for small business financing 3-5 years into an economic downturn and in the early post-GFC period, from both a demand and supply perspective. This will enable us to consider what the potential impacts of credit rationing on the small business sector are and also identify areas where government action might be appropriate.

## 1. Introduction

Four and half years into the global financial crisis (GFC), starting from September 2008, the induced economic recession for a duration of six quarters and contributed to a fall of 6.4% in GDP, and the UK economy has still not recovered to its pre-GFC level. As a reflection to the credit crunch, regulators across the world have imposed more stringent capital adequacy requirements, which lead to an increasing unwillingness to lend to the personal and business sector during, and even after the crisis (Armstrong et al, 2013; Fraser et al, 2015). Small- and medium-sized enterprises (SMEs, businesses with 0 to 249 employees) are particularly prone to a contraction in credit supply given their high risk exposure (Bank of England, 2011, 2013 and 2015; Cowling et al, 2012). Even though financial institutions have recently shown an increased tendency to advance credit, firms without surplus cash balances were still quantity constrained as seen in the considerable decline in loan to value rates. Bank of England figures show that net monthly flows of small business lending fell from £7.4bn in 2007 to an overall net repayment of £3.9bn in 2009 (Bank of England, 2011), and a further net repayment of £2.1bn in November 2012 (Bank of England, 2013). Further, more SMEs were found to be discouraged from borrowing after the GFC, because of a potential mismatch between their perceptions on capital availability and the true supply of credit (Cowling, et al, 2016).

Banks have been accused of not lending to SMEs by the popular press and politicians of all parties since 2008 and this allegation remains a common feature of media and populist ire. It is true that gross lending facilities granted have fallen substantially since 2007(Armstrong et al, 2013; Cowling et al, 2012; Lee et al, 2014), but it is also true that businesses have been repaying outstanding loans to reduce their future interest repayments as cash flows have been squeezed by extended invoice payments periods and more generally by falling demand

(Crafts and Hughes, 2014). Overlaid on top of the current recessionary environment is the Basel III capital adequacy requirements placed on banks which may limit the pool of money available to lend to the business sector.

In the UK, the Business Secretary Vince Cable announced on the 24th September 2012 the first steps in creating a Government-backed business bank, including new Government funding of £1 billion. It will aim to attract private sector funding so that when fully operational, it is predicted that the bank could support up to £10 billion of new and additional business lending. The Government's aim is to build a single institution that will address long-standing, structural gaps in the supply of finance, and to diversify the sources of small business finance with greater choice of options and providers (van der Schans, 2015). It will aim to bring together in one place Government finance support for SMEs. The business bank will also control the Government's interests in a new wholesale funding mechanism which will be developed to unlock institutional investment to benefit SMEs. The decision to undertake this level of policy intervention explicitly assumes that the case for banks unfairly rationing the supply of credit to smaller businesses is proven, presently SMEs only have limited sources of external finance other than commercial banks. But this is not as clear cut as assumed, particularly their assessment of the scale of the problem. For example, recent evidence by Cowling et al (2016) who, using a large-scale UK data set covering the whole GFC, found that whilst 55.6% of the total of 30,000 discouraged borrowers (2.5% of the SME stock) would have probably received loans had they applied, this represents 17,000 loans. With an average credit facility of around £41,000 to the SME sector this equates to £701m in potential lending. For term loans the average loan size is around £60,000 which equates to £1.02bn. Importantly, 84% of UK overdraft facilities to SMEs are for less than £50,000 and half for less than £10,000, and 78% of loans are for less than £100,000 (BDRC Continental, 2012). More generally, Cowling, Liu and Ledger (2012), using the same UK

data set for an earlier period, found that in total 73,000 SMEs were refused loan requests in 2009/10. If all these loan requests that were turned down were mistakes by banks (i.e they were good lending proposals and banks were making a Type 1 error), this would equate to around £4.4bn. But this is not likely to be the case and the figure can be seen as representing a maximum potential missing loan market if all lending propositions were put forward by good quality entrepreneurs running low risk businesses. This is even more important given the key finding from US work on SME financing by Cavalluzzo and Wolken (2005) which found that differences in credit history explain most of the difference in (loan) denial rates.

But it is clear that the BBS has deliberately sought to move away from more traditional interventions modes, such as loan guarantees and early stage equity, which focused on encouraging existing private sector financial institutions to relax funding constraints, towards a goal of broadening the sources of funding available to smaller businesses. Indeed a large proportion of their capital investments have been focused on supporting innovative new forms of finance and financial institutions and platforms such as P2P, supply chain lending and more sophisticated mezzanine financing.

With these issues in mind, it is important to understand not only how many smaller business are denied access to credit when applying for loans or overdraft facilities (commitment loans in the US), but what differentiates smaller firms who are granted loans from those who are refused loans. And as the economy finally climbs out of the prolonged economic downturn, the dynamic nature of the banking sector and capital markets makes up-to-the minute evidence more pertinent. It is the intention of this paper to use a unique 6 wave longitudinal data set for the UK (by BDRC Continental), which spans the period from July 2011 to March 2013 the 3rd and 4th years since the financial crisis in September 2008, to address 4 key questions with reference to some recent empirical studies:

- What is the current level of demand for credit from the small business sector and has this changed since the GFC?
- What is the current level of supply of credit to the small business sector and has this changed since the GFC?
- How many smaller firms have been denied credit and has this changed since the GFC?
- What differentiates smaller businesses that make successful loan applications from those who are unsuccessful?

In doing so, we hope to add to our general understanding of what really happens in the market for small business financing 3-5 years into the GFC, from both a demand and supply perspective. This context is particularly interesting and unique (see Fig 1) as economic recessions in the UK do not normally last this long (NIESR, 2012). This will enable us to consider what the potential impacts of credit rationing on the small business sector are and also identify areas where government action might be appropriate. We will also assess whether their plans for the 'Business Bank' stand up to the evidence.

[INSERT FIG 1 HERE]

## 2. SME Credit Supply and Demand During a Recessionary Environment

The subject of financial constraints or credit rationing has been the focus of a considerable body of theoretical work, and the existence of credit rationing has been examined extensively (Berger and Udell, 1992; Cowling, 2010; Goldfeld, 1966; Jaffee, 1971; Jones-Evans, 2015; King, 1986; Slovin and Slushka, 1983; Sofianos et al, 1990). Previous literature generally focuses on the supply-side of credit market and assumes that information based problems discourage banks from advancing as much credit as entrepreneurs with potentially viable investment opportunities demand even when they are willing to pay more for loans (this is classic Stiglitz and Weiss, 1981, credit rationing). This supply-side 'funding

gap' has been excessively used to justify government intervention to increase lending, regardless of the creditworthiness of borrowers (Baldock and Mason, 2015; De Meza and Webb, 2000; Fraser et al, 2015; Jones-Evans, 2015; Nightingale et al, 2009). Whilst the UK market has seen a significant decline in the flow of external funding to SMEs during and in the aftermath of the financial crisis (Armstrong et al, 2013; Bank of England, 2011, 2013 and 2015; BIS, 2013; Cowling et al, 2012; Fraser et al, 2015; Lee et al, 2015), this may further limit the growth of the small business sector (Fraser et al, 2015).

The neglect of demand-side constraints in small business financing has resulted in our fairly limited understanding on the extent of 'true' credit rationing (Levenson and Willard, 2000), particularly given the evidence that small businesses have a clear pecking order of finance which favours debt (Hamilton and Fox, 1998), and the use of bootstrapping for rationed entrepreneurs (Irwin and Scott, 2010). Information asymmetry between lenders and borrowers may not necessarily lead to under-investment. Particularly under certain assumptions, the unobservable quality of entrepreneurs may indeed result in investment exceeding the optimal level (De Meza and Webb, 1987, 2000). On the other hand, informed financiers screening firms that are not commercially attractive out of the loan market may actually be a rational behaviour indicating an efficient market. In this sense, some firms are simply not 'investment ready' (Mason and Harrison, 2001). Conceptualising the small business finance problem from both supply and demand sides would produce a more systemic framework for developing future entrepreneurial policies. This more holistic market perspective would draw attention to the simultaneity problems associated with building a funding system of many complex component parts (Nightingale et al, 2009). The current economic environment and the high uncertainty and complexity inherent in it provide a unique context to investigate the co-ordination of supply and demand and its effect on the SME financing market.

The rest of this section reviews the key research on small business access to finance, based on which we formulate the main hypotheses of the paper.

### *2.1. Loan Supply*

The majority of SMEs rely on internal sources such as personal savings or retained earnings to fund their investment and only a small proportion have tried to obtain finance from external sources (Cosh et al, 2009; Cowling et al, 2012; Fraser, 2005). However, the supply of external finance to SMEs differs fundamentally from larger firms in the sense that private debt and equity markets are the only markets that SMEs have access to whilst larger firms have access to both private and public markets. As suggested in their seminal work on small business finance, Berger and Udell (1998) conceptualise the supply of capital as a dynamic process which changes given SMEs' needs and options, as well as the degree of information opacity between firms and fund suppliers. In this sense, internal funds, trade credit, and/or angel finance are more appropriate for seed and start-up firms with little finance need, while early-growth firms have more access to venture capital and bank finance, and finally private equity is more suitable for firms with sustained growth and the highest capital needs. However, a central tenet of Berger and Udell's model is the inter-connectedness between different sources of finance on a size/age/information continuum and sources of funding may be substitutes or complements, thus creating a 'funding escalator' from business formation to a successful market exit.

The most common source of external funding is commercial (high street) banks (Colombo and Grilli, 2007; de Bettignies and Brander, 2007). Yet not all SMEs that apply for external credit are successful (Fairlie and Robb, 2007; Levenson and Willard, 2000; Shen, 2002; Cowling et al, 2012). This occurs for many reasons including lack of asset cover (Coco, 2000), poor information flows giving rise to moral hazard and adverse selection issues (Diamond, 1984; Myers, 1984; Myers and Majluf, 1984), non-viable projects, poor

management teams, and exogenous factors such as unfavourable economic conditions. The issue of 'unfair' credit rationing, that is not based on borrower quality (Stiglitz and Weiss, 1981), has been the focus of a large volume of literature (Cowling and Mitchell, 2003; Fraser, 2009), and has been used to justify government intervention in the form of loan guarantee programmes (Cowling and Clay, 1994; Cowling, 2010; Riding, 1997; Cowling and Siepel, 2013). The counter-argument, that banks are rational and efficient processors of information, given their sophisticated data and information processing systems and hundreds of thousands of SME account histories, is made by de Meza and Southey (1996), and, in a later paper (de Meza, 2004) who argues that over-lending is more typical of the SME credit market. Thus, for firms with high levels of information opacity and the subsequent agency problems, equity is a more appropriate form of finance especially for high-growth, high-risk new ventures (Berger and Udell, 1998; Gompers and Lerner, 1999, 2001a, 2001b; Keuschnigg and Nielsen, 2003, 2004; Mason, 2009; Maier and Walker, 1987).

Lenders in an imperfect market would adopt a wide range of criteria to bridge the information gap between banks and SME borrowers (see Cowling et al, 2012 for a comprehensive review) and as a result, they will charge higher prices (risk premiums) to compensate for the higher uncertainty and risk associated when investing in SMEs. These criteria vary from firm-level risk indicators such as size, age and performance, to entrepreneur characteristics, such as gender, ethnicity, education and prior experience. In particular, smaller, younger (start-ups) and high growth firms (Berger and Udell, 1998; Cassar, 2004; Cowling et al, 2012; Fraser et al, 2015; Van Caneghem and Van Campenhout, 2010), together with firms with relatively inexperienced, poorer educated and ethnic minority entrepreneurs (e.g. Blumberg, 2007; Cassar, 2004; del-Palacio et al, 2010; Fraser, 2009; Storey, 2004) are more likely to have difficulties in accessing external finance. Developments in information technology, especially online banking, have changed the

physical and psychological distance in the firm-bank relationship (Rao, 2004). This has facilitated, if not necessitated, the use of standardised means of evaluating credit applications, which may have arguably helped to lower the fixed costs of lending and reduce the reliance on collateral. However, recent evidence shows that financial delinquency measures, such as the availability of collateral and credit history, have again been reported as important criteria for loan approval during the crisis (Fraser, 2014).

Based on the above discussion, we formulate the following hypotheses regarding SME loan supply:

**$H_S1$:** Higher firm-level risk (as proxied by size, age, performance, etc.) and lower entrepreneurial human capital (as proxied by experience, education, qualification, etc.) will increase the likelihood of loan rejection after the financial crisis.

**$H_S2$**: SMEs with higher credit risk (as measured by Experian credit rating and the availability of collateral) are more likely to have their loan application rejected.

**$H_S3$:** SMEs with higher financial delinquency (e.g. missed repayments, bounced cheques, etc.) are less likely to get the loan sought in the post-crisis period.

*2.2. Loan Demand*

In a perfect market, enterprise value should be independent of capital structures chosen (Modigliani and Miller, 1958). However, the capital market is far from perfect and firms have varying preferences over different forms of external finance either due to tax considerations or information asymmetry (Myers, 2001). Since external finance is not costless, firms with financing needs will primarily look into internal sources of funds and only turn to external sources when internally generated funds cannot satisfy the firm's capital requirement (Myers, 1984; Myers and Majluf, 1984). The pecking-order theory (Myers, 1984; Myers and Majluf, 1984) based on the information asymmetry between investors and firm managers argues that when external finance is needed, debt is preferred to

equity because new equity issues, which would dilute shareholders' ownership of the firm and could be taken by potential investors as a signal that the existing stock is overvalued (Asquith and Mullins, 1986; Dierkens, 1991; Eckbo, 1986; Shyam-Sunder, 1991). Further, control aversion is particularly important for start-up entrepreneurial firms and the reluctance to relinquish control may affect their willingness to draw upon venture capital or other types of equity finance (Le Breton-Miller and Miller, 2013). Despite its importance, entrepreneurs' perception on control interest is to a large extent ignored in SME financing literature (Mueller, 2008). However, this finance sequence could be reversed if instead the informational advantage is on the investor side, especially in the case of entrepreneurial finance (Garmaise, 2007). Overall, empirical evidence on the financing decision of SMEs is in favour of the pecking order and agency theories (Michaelas et al, 1999), and more profitable SMEs (i.e. firms with greater internal finance) tend to use less external finance (Chittenden et al, 1999; Cosh et al, 2009).

**$H_D1$:** More profitable SMEs are less likely to seek bank finance.

**$H_D2$:** SMEs funded on own equity and therefore with higher owner control interests are more likely to seek bank finance.

The demand-side counterpart to the supply-side body of literature focuses on the small business financing life-cycle (Berger and Udell, 1998) and essentially relates age, size, and information availability to more sophisticated forms of capital alongside a continued demand for short and medium-term bank loans. The discussion then focuses on how entrepreneurs can overcome these information problems by building relationships (Bester, 1985; Behr and Gutler, 2007; Petersen and Rajan, 1994) or, in the absence of relationships, by offering collateral as security against loans (Coco, 2000; Cowling, 1999; Leeth and Scott, 1989). Given the widespread agreement that lack of credit can restrict the ability of entrepreneurs to invest and that this can reduce rates of innovation, job creation and other positive economic

externalities, it is perhaps surprising that relatively less attention has been paid to the determinants of the demand for credit from the entrepreneurial sector, particularly in a recessionary environment when many businesses are paying off debt. This is our theoretical contribution to the credit rationing debate, and complements earlier work by Cressy (1995) which identified owner control as a key element in the decision to apply for debt finance. Other authors have noted that entrepreneurs are more likely to be excessively optimistic and hence over-value their own ability and the predicted performance of their investments (de Meza and Southey, 1996; Coelho and de Meza, 2012), although there is evidence that differences in perceptions about banks willingness to supply loans can affect entrepreneurs loan application decisions (Kwong, Jones-Evans, and Thompson, 2012).

Relating to the latter issue, small businesses with potentially good investment opportunities can be discouraged from applying for external funding as they fear rejection – so called "discouraged borrowers" (Kon & Storey, 2003). Cowling et al (2016) find that discouraged borrowers represent 2.5% of the total UK small business population at the outburst of the financial crisis in 2008, whilst using a different dataset, Fraser (2014) show that the number almost quadrupled in 2009. Despite the difference, both studies have documented a significant increase in credit discouragement as compared to pre-crisis periods. The level of discouragement depends on entrepreneurs' perceived likelihood of loan application success, as opposed to the perceived costs of applying for finance, the latter of which would increase monotonically with the riskiness of the firm (Cowling et al, 2013; Fraser, 2014; Kon & Storey, 2003). This is consistent with empirical findings that smaller, younger and/or riskier firms are particularly likely to be discouraged (Cavalluzzo et al, 2002; Han et al, 2009; Xiang et al, 2014). Moreover, discouragement may induce SMEs to go down a pecking order and rely more on internal finance given the perception of low loan approval rate (Fraser et al, 2015).

During a prolonged economic downturn, with the general tightening of credit throughout the financial market and falling business confidence, SMEs tend to under-estimate the true supply of external finance and become (mistakenly) discouraged (Fraser, 2014). The underestimation of the odds of successful credit application, or overestimation of loan application costs, is more likely to happen for firms with higher information opacity (Kon & Storey, 2003), unsuccessful borrowing experience and poorer firm-bank relationship (Cowling et al, 2013). Again, the former may be proxied by firm-level risk measures such as size, age and performance, and the latter by financial delinquency measures in the form of credit histories. Further, as credit standards became more stringent as compared to pre-GFC periods, a 'rational' SME may be reluctant to apply even if the finance is available (North et al, 2013).

Based on the above discussion, we formulate the following hypotheses regarding small business loan demand:

**$H_D3$:** Higher firm-level risk (as proxied by size, age, performance, etc.) will reduce the likelihood of loan application after the GFC.

**$H_D4$:** Higher financial delinquency will reduce the likelihood of loan application after the GFC.

## 3. Data and Variables

### *3.1. Sample*

This section describes the data source for this study and the survey method from which the data is derived, followed by a discussion on both the dependent and independent variables used in the analysis.

The data corresponds to six waves of the SME Finance Monitor surveys conducted by BDRC Continental. The first survey wave was in July 2011, with subsequent waves carried out in November 2011, March 2012, May 2012, November 2012, and the most recent wave

in March 2013. In total this represents 30,183 completed surveys with SMEs. In order to qualify for interview, SMEs had to meet the following criteria in addition to the quotas by size, sector, and region:

- not 50%+ owned by another company
- not run as a social enterprise or as a not for profit organisation
- turnover of less than £25m
- The respondent was the person in charge of managing the business's finances. No changes have been made to the screening criteria in any of the waves conducted to date.

Quotas were set overall by size of business, by number of employees. The classic B2B sample structure over-samples the larger SMEs compared to their natural representation in the SME population, in order to generate robust sub-samples of these bigger SMEs. Fewer interviews were conducted with 0 employee businesses to allow for these extra interviews. Each quarter's sample matched the previous quarter's results as closely as possible. Quotas were set overall to reflect the natural profile by sector, but with some amendments to ensure that a robust sub-sample was available for each sector. Thus, fewer interviews were conducted in Construction and Property/Business Services to allow for interviews in other sectors to be increased, in particular for Agriculture and Hotels. The weighting regime was initially applied separately to each quarter. The six were then combined and grossed to the total of 4,548,843 SMEs, based on BIS SME data. This ensured that each individual wave is representative of all SMEs while the total interviews conducted are weighted to the total of all SMEs.

Of the 5,000 interviews conducted per quarter (by CATI using the quota sampling method), each respondent firm is allocated a Dun & Bradstreet and Experian credit risk rating and this is added to the data set on a case by case basis. The weighting system is quite

complex and includes a general weighting to reflect the actual UK SME population by size, sector and region. An additional size class weight is also applied, and a rim weight for region. Further a start-up weighting is also calculated based on UK SME age structure statistics. In our analysis we use the weighted data.

### *3.2. Dependent variables*

Panel A of Table 1 shows the definition of dependent variables, which capture SMEs' demand for, and banks supply of, external finance in the form of term loan and overdraft[1]. Both variables are binary variables and static in nature. Demand for finance (*SOUGHT*) is defined as whether firm owners reported having sought/applied for finance for their businesses in the previous twelve months. Supply of finance (*GOT*) is defined as whether the firm obtained (all or part of) the finance required. On average between July 2011 and March 2013, 17.4% of smaller firms had sought debt finance.

### *3.3. Explanatory variables*

Independent variables in this study can be classified into five groups: firm characteristics, owner characteristics, time indicators, firm-level risk indicators and financial delinquency measures. As discussed in the previous section, these variables are related to the development stage of the firm and the degree of information opacity between the firm and its finance suppliers, which have been shown to be significant in explaining the supply of and demand for finance by prior studies. Panel B of Table 1 defines the explanatory variables by these four groups.

Firm characteristics include size, legal status, sector, firm age, and performance. Firm size is measured by sales turnover. This is grouped into 9 bands with an upper limit of £9.99m. Legal status is defined by four categories including sole trader, partnership, LLP

[1] Here we only consider the most two common sources of external finance for SMEs. Other types of finance, such as invoice financing and equity-type finance, only form a relatively small proportion of SME finance in total.

and Limited liability. Sector is defined as nine one-digit SIC codes. Age is defined in six categories from <12 months old to >15 years old. We have two measures of performance available to us. Firstly, we have a profit dummy variable and secondly a fast-growth variable.

Owner characteristics or human capital measures consist of gender, (highest) formal educational qualification, prior business experience, and whether or not the owner holds a financial qualification.

We use Experian risk classification to measure credit risk and financial delinquency measures include non-payment of loans, unauthorised overdraft borrowing, bouncing cheques, County Court Judgements, late payment of tax, and trade credit restrictions.

We also consider additional control variables regarding the firm's source of finance, business activities and possible credit support provided for finance application. Regarding the source of finance, we look at whether a firm has any other loans outstanding at the time of application or use own equity to fund the firm. Business activities concern firms' operating behaviours including innovation, the development of new process and products, and the degree of internationalisation (whether the firm exports products overseas). The availability of business plans and collateral is used as a proxy for financial security or credit support for the firm's application. Finally, we include the types of loan applied for (term loan versus overdraft) and an indicator of first-time applicants (*NEWAPP*) to examine the lenders' preference on the products provided to SMEs in the post-GFC era.

[INSERT TABLE 1 HERE]

### *3.4. Descriptive statistics*

Table 2 reports the descriptive statistics of dependent and independent variables. The data for loan demand (*SOUGHT*) shows that on average over the period measured 17.4% of business owners had sought bank loans. The lowest level of demand was in November 2011

when only 10.5% of firms applied for funds. This is approximately half the level recorded in May 2012 when 21.0% applied for funds. In an earlier study on the finance of UK SMEs between 2008 and 2010, which covered the whole duration of the official recession (Cowling, Liu and Ledger, 2012), loan demand is found to be higher (24%), though the study was based on a different sample of SMEs. It is difficult to find a plausible explanation for this trend. It is possibly a sign that there is a lag between when the crisis hit the credit market, and when SMEs' perception on credit supply adjust accordingly.

[INSERT TABLE 2 HERE]

Among those requiring finance, on average 83.3% were successful in raising a loan. This is lower than the pre-recession figure of almost 90%, but higher than the 70% success rate reported for UK SMEs in the 2008-2010 period (Cowling, Liu and Ledger, 2012). Again there is variation over time. Here we note that the lowest success rate for loan applications was 67.5% in November 2011, and the highest success rate was 89.8% in March 2012. Amongst the SMEs that obtained the finance required, some of them only acquired part of the finance sought so are still subject to credit rationing to some extent. On average 6% of the firms that applied were only offered partial access to the finance required during the sample period. The dynamics on the distribution of partial rationed firms is similar to the general supply of loans. By excluding them from the firms that have general access to bank loans, it can be shown that the percentage of SMEs with full access to finance has remained relatively stable since March 2012. Figure 2 and Figure 3 illustrates the changing dynamics of loan demand and supply during the sample period (between July 2011 and March 2013). Further in Appendix A of this paper, we report the variation of credit demand and supply across the 12 UK regions in the sample.

[INSERT FIG 2 HERE]

[INSERT FIG 3 HERE]

The two key dynamics in terms of both loan demand and loan supply are (a) that they rose over time as more loans were requested and a higher proportion were granted, and, (b)that both demand and supply became more stable and less subject to variation quarter to quarter. This suggests that the market is moving back onto a stable equilibrium path after the obvious mismatch between supply and demand for loans in the immediate aftermath, and in the first two years after the GFC (as identified in Cowling, Liu and Ledger, 2012). It is worth noting that the equivalent figures for 2007, when the UK economy was in a boom were demand at 26.8% of SMEs and supply of loans had an 89.3% application success rate. This evidence poses questions about the scale of any lending shortfalls assumed by the UK Government's "Business Bank" proposal, although it is too early to factor in the effects of the Basel III capital adequacy requirements on credit availability.

## 4. Multivariate regression results

Here we econometrically model the demand for and supply of external debt finance between July 2011 and March 2013, the third and fourth years after the latest crisis. By definition, the outcome of a finance application is only recorded if a firm actually sought finance (Cosh et al, 2009). As both of the dependent variables are by construction binary variables, a probit model with selection[2] is used and the maximum likelihood coefficient estimates are shown in Table 3. We use this econometric method, to test for sample selection effects given the possible non-randomness of loan application decisions. We are particularly interested in how demand and supply changes when the economy moves deeper into a prolonged downturn so we are particularly interested in the time dynamics. For the identification to be valid, the model requires that the selection (i.e. demand) equation includes at least one variable that is not included in the main probit (i.e. supply) equation.

[2] See Van de Ven and Van Pragg (1981) for an introduction of the model.

Here we use 12 geographical region indicators as the demand-specific variables in the model as they are found to be significantly associated with loan demand but have no explanatory power for loan supply. Moreover, we analysed both the full sample of SMEs (Models 1 and 2) and a subsample excluding zero-employee firms (Models 3 and 4): the findings are reasonably similar.

Model 1 of Table 3 is our primary regression for credit demand and supply. The correlation coefficient between the selection and main equations is -0.79 and is significant at 1 per cent level, indicating the existence of selection bias and the validity of our model. However, the negative value implies that loan applicants have a *lower* chance to get the loan than either a random business or a non-applicant. On the one hand, it is possible that higher-quality firms underestimate the true supply of credit during the economic downturn and thus choose to scale down their investment activities. On the other hand, this could be a sign of credit market inefficiency as loan suppliers have failed to create a self-selection mechanism through which lower-quality businesses are discouraged from borrowing in the first place. Prior performance is found to have different effects on the demand for finance. Here we find that profitable firms had a lower demand for finance, in line with an increased ability to self-finance and more broadly with pecking order theories (Cosh et al, 2009), which is consistent with $H_D1$. In terms of firm-level risk indicators, it can be seen that the demand for debt finance is increasing monotonically with firm size (measured by sales turnover) and firm age. Thus $H_D3$ is also supported. At the sector level we see the highest level of demand for loans amongst manufacturers. Moreover, limited liability companies have lower credit demand because the (mandatory) disclosure (of poor performance during the GFC) discouraged them from doing so.

Consistent with earlier research (Carter and Shaw, 2006; Coleman and Cohn, 2000; Cowling et al, 2012), female entrepreneurs are less likely to seek external finance than male

entrepreneurs. This suggests that risk aversion based theories might help explain why women appear more reluctant to borrow than men. Interestingly, loan demand approximated an inverted 'U' shape for both owners business experience and owners education, peaking amongst owners with 10-15 years of experience and amongst owners with school and lower level vocational qualifications, suggesting that less knowledgeable entrepreneurs may have misinterpreted market information regarding the true credit supply. In terms of the time dynamics of loan demand, we observe an inverted 'U' shape with demand low at the start of the period in July 2011 and the end of the period, March 2013. The local peak in loan demand was in May 2012.

Our key findings here relate to risk and financial delinquency. If more risky firms and firms with a track record of financial delinquency are more likely to seek loans, then it should not be a public policy issue if they fail to receive them. This would be behaviours consistent with banks acting rationally. The results show quite clearly that loan demand is increasing with the risk (as measured by the Experian credit rating) of a firm. In short the less creditworthy a firm is, the more likely they are to ask for a loan. This is a sign that SMEs with higher credit risks in an economic downturn may have a shifting investment focus despite the lack of economically viable projects in the market. The risk-shifting theory in the corporate finance literature (Galai and Masulis, 1976; Jensen and Meckling, 1976) argues that in the presence of agency costs between debtors and shareholders, higher leverage or credit risk may induce firms to undertake excessively riskier projects at the cost of debt investors. This possibly explains why SMEs with lower credit ratings actually had a higher finance demand. In addition, we find that firms that have unauthorised overdraft are also more likely to request a loan, as is the case for firms with late tax payments who have a higher probability of seeking a loan. In contrast, firms that are bouncing cheques (having

them re-presented to the bank due to insufficient funds) have a lower probability demanding a loan. Therefore, $H_D4$ is only partly supported.

Adding further controls to the model reduces the correlation between the selection and main equations, but it is still significant at 10% level. Firms with no loans outstanding at time of application prefer to remain unlevered, whilst SMEs financed using own equity are more likely to apply for bank finance, implying that entrepreneurs with control interests are reluctant to give up their controls so they prefer debt to equity finance ($H_D2$). Businesses that introduced new processes are more likely to apply for finance but the odds of firms with new products applying for finance are on the other hand, lower. Loan demands are higher for firms with formal business plans, which is usually an essential prerequisite for banks to process the firms' applications.

Here we consider the supply of loans (*GOT*) conditional upon the firm applying in the first place. The first points of note are that firm-level risk indicators such as size and sector did not appear to play a major role in the determination of whether or not a loan application was granted. The latter finding contradicts the argument of Hanousek and Filer (2004) that credit flows to industries with the greatest profit potential. It also questions the role that firm size has in reducing information asymmetries, achieving economies of scale in lending, and reducing transactions costs (Berger and Udell, 1998; Cassar, 2004; Titman and Wessels, 1988; Wald, 1999). But it was also the case that there was a positive and significant effect of firm age on the probability of being offered a loan, having applied. The finding is in line with the conventional wisdom that banks are less likely to provide finance to seed or start-up firms given their risk, thus providing support for $H_S1$. The results also show that fast growth firms are marginally less likely to secure loans which might suggest that banks prefer incremental (managed) growth than the risk of accelerated growth. The finding is also consistent with the finding of Cowling et al (2012) that banks no longer take the growth

orientation of the business into account in the post-GFC period. Previous profitability also had no bearing on the banks loan decision. But women entrepreneurs had a higher loan approval rate, despite a lower general demand for loans.

Perhaps surprisingly, entrepreneurial experience and educational qualifications were not found to influence the banks' loan decision but entrepreneurs with financial qualifications were more likely to be granted loans. The latter effect suggests that banks respond favourably to evidence of formal human capital which manifests itself through more sophisticated, and possibly realistic, financial projections in loan applications. The partial support for $H_S1$ suggests that the early UK recession findings that banks moved to a smaller set of key risk indicators including firm age when there was uncertainty in the economy (Cowling, Liu and Ledger, 2012) still hold over the entire and prolonged economic turmoil.

On risk per se, the results strongly suggest that banks dislike any level of risk above the most minimal. The predicted success rate for firms with a minimal risk credit rating is 97.3%, but for firms with above average risk this declines to 60.1%. We also find that our measures of financial delinquency, with the notable exception of late tax payments, all reduced the probability of loan requests being granted. In order of importance problems with accessing trade credit was the most limiting factor for banks, followed by County Court Judgements (CCJs), bouncing cheques, and then unauthorised overdraft facilities and missing loan repayments. Therefore, $H_S2$ is fully supported.

Some of the additional control variables are also found to be significantly associated with the likelihood of loan approval. Firms with no loan outstanding and thus a lower credit risk are more likely to get the finance required. On the other hand, firms financed using own equity have a lower probability of success in loan applications. This finding is generally in line with traditional corporate control theories, where the cost of monitoring (shareholders' behaviours) is an important concern for debt investors. Interestingly, firms that export

overseas during an economic downturn have lower odds of successful application, probably because of the higher cost and therefore higher risks associated with such activities. This finding warrants an interesting future research topic that links SMEs recessionary business strategy with entrepreneurial finance. Consistent with $H_S3$, the availability of collateral increases the chance of securing the needed finance. Moreover, we find that SMEs that apply for longer-term finance (term loans) are significantly less likely to succeed, indicating that banks have a strong preference towards the provision of short-term finance. Lastly, first-time applicants are significantly more likely to be rejected than firms applying for loan renewal, indicating that information asymmetry is less acute for returning borrowers.

[INSERT TABLE 3 HERE]

As a robustness check, we further differentiate loan application outcomes by dividing successful applicants into those that got all the finance required (fully financed) and those only securing part of the finance needed (partially rationed). We use multinomial logit model to compare the characteristics of non-applicants, fully rationed (failed), partially rationed and fully financed applicants, with fully financed applicants as the base category (results reported in Appendix B). Using multinomial logit regression ignores the obvious and significant conditionality between loan supply and demand, so the results should be viewed with caution. Our main finding here, is that there is no systematic difference between firms that got all and part of the finance sought. The only criterion that differentiates partially rationed firms from their 'more successful' counterparts is the degree of financial delinquency: SMEs with records of unauthorised overdraft and/or problems in getting trade credit are less likely to get the full amount of finance required. Other than that, the findings are generally in line with our main empirical models.

## 5. Discussion

We find that that even in the economic downturn after the GFC the majority of firms that seek bank loans receive them. It is very clear that banks take any evidence of risk and financial delinquency very seriously and this forms a huge part of their decision to lend or not to lend when presented with a loan application. Stability and track record, captured in older firms, also gives banks a greater sense of security when deciding to lend or not. Further re-assurance is gained when a key member of the ownership team has a financial qualification. But it is also clear that high risk and/or low quality firms who seek funding are increasingly less likely to get loans.

Our findings have two implications theoretically. First, given the more stringent capital requirement imposed by Basel III and other financial regulations, banks have become more cautious when making lending decisions to minimise the credit risk of the loans. On the other hand, it suggests that information problems between firms and financiers are still acute especially in an economic downturn, and banks have found themselves unable to distinguish high and low quality firms through the common risk indicators such as size, age or performance. As a result, banks can only rely on a small set of direct measures of credit risk, whilst 'ignoring' the majority of business and owner characteristics that would otherwise signal a viable investment.

So where do the mismatches occur between firms seeking loans and banks supplying them? And is there evidence that some investment-worthy firms are not getting loans or is it simply that too many lower quality firms are applying for loans. The former would be evidence in support of the UK governments 'Business Bank' and the latter evidence in favour of banks acting rationally, and diligently, in the face of huge liquidity issues and the implementation of the Basel III regime in Europe.

We do find evidence of a deterrent effect in the market as the firms and entrepreneurs least likely to get offered a loan do not apply in the first place. This suggests that information

based problems may not be as acute as assumed. But this is confounded by our evidence that loan demand is strongly increasing in firm risk whilst loan supply is strongly decreasing in firm risk. This is supportive of the de Meza and Southey (1996) over-optimism arguments. The evidence also points to the fact that firms with a record of financial delinquency also have a higher demand for loans but are also less likely to receive them, which is generally supportive of the argument that banks are efficient and rational processors of information, especially with the wider use of a more centralised/standardised and computerised loan evaluation system after the GFC given the cost-cutting needs for major banks. This presents an interesting quandary. Firstly, we could simply say that banks are being perfectly rational in denying firms with a bad track record of financial delinquency loans. But we could also argue that if the underlying quality of the firm makes it a viable investment by banks, and they are simply experiencing cash flow problems in the recession, then denying loans to such firms is exacerbating these short-term problems.

What is also clear, as we enter the fifth year after the GFC, is that loans are more widely available in general, particularly when compared to earlier empirical evidence. In this sense it could be argued that the case for public intervention, certainly on the scale proposed by the UK Government for the "Business Bank", is debatable. In terms of predicted total numbers of SMEs denied loans we calculate that it is around 40,000 firms currently. But if we exclude the very highest risk class of firms, this estimate falls to around 30,000 firms out of a total SME sector of 1.21m firms (Fig 4). Note that this estimate excludes single self-employed individuals and their firms which represent 74.53% of the total UK stock.

[INSERT FIG 4 HERE]

So what are the policy implications of our research? First, this study offers further justification for government interventions in the financial market especially some recent policy initiatives. Empirical evidence in this study suggests a significant tightening of loan

standard given the importance of credit rating and credit history against other criteria. Also banks' reluctance to provide long-term, risk capital needed for investment has certainly become a concern for many growth-oriented entrepreneurs wishing to recover from the recession. Therefore, government interventions aiming at closing the structural gaps in the small business capital market should go beyond the traditional focus such as bank loans or early-stage equity finance. It is important that credit-worthy but young firms yet to establish a strong credit history and thus ineligible for bank finance are offered alternative sources of capital. In this sense, the British Business Bank's effort in encouraging the development of non-bank, innovative new forms of finance and financial institutions and platforms, is justified.

In terms of difficulties of SMEs in accessing debt capital, (partial) credit guarantee schemes are the most widely used, and long-standing, public policy supporting mechanism worldwide (Cowling and Siepel (2013) provide a review on several international loan guarantee schemes) given the commonly existed credit rationing in small firm loan market (Cowling and Mitchell, 2003; Honaghan, 2008; Klapper et al, 2006; Riding, 1998). The objective of such schemes is almost unanimously to provide loan security to SMEs who would not otherwise be able to obtain debt finance through conventional means (Cowling and Clay, 1995; Riding, 1998). Our findings show that the rationale for loan guarantee schemes continues to hold in an economic downturn, when the availability of collateral appears to be one of the few variables other than measures or proxies for credit risk that is important in lenders' loan supply decisions.

However, empirical evidence regarding the effectiveness of loan guarantee schemes remains mixed (Cowling and Siepel, 2013) and it is still a major policy challenge to ensure that public interventions actually assist small firms, not subsidise risky firms (Astebro and Bernhardt, 2003; Riding, 1998). In the UK, the Small Firm Loan Guarantee (SFLG)

programme has been the Government's primary debt finance instrument over the past decades until it was replaced by the Enterprise Finance Guarantee (EFG) programme in 2009. Recently, there has been a series of empirical studies that evaluate the effectiveness and performance of the programme (Cowling, 2007a, 2007b, 2008, 2010; Cowling and Mitchell, 2003; Cowling and Siepel, 2013). Generally speaking, empirical evidence suggests that the rationale for public intervention is justified in the sense that SFLG has allowed certain types of small firm borrowers to access bank funding (Cowling, 2010) and/or improved supported firms' performance (Cowling and Siepel, 2013).

Never the less, with SFLG's primary focus on addressing the supply-side gap in the small business credit market, the true extent of credit rationing and thus the rationale for SFLG is found to be inconclusive (Cowling, 2010) and its ability to correct for capital market imperfections limited (Cowling and Mitchell, 2003). The EFG was introduced as a replacement for SFLG in order to improve the availability of capital to a wider range of businesses in the current economic context yet it is too early to assess the appropriateness of this response. The EFG was formally evaluated in 2013 (see Allinson, Robson, and Stone, 2013), and found that deadweight was very low in absolute terms and compared to earlier evaluations of SFLG. This was driven by the increasingly restrictive demands for collateral from banks when lending. It was also the case that EFG related lending formed a much larger part of the firms' total funding package than was the case previously, confirming that banks were also making it more difficult per se to access loans in this period.

## 6. Conclusion

This paper investigates how entrepreneurs' demand for external debt finance changed as the economy continued to be mired in its third and fourth years into the GFC and whether or not external finance has become more difficult to access given the prolonged recovery of

UK economy to the pre-recession peak. Using a large data set of over 30,000 UK SMEs covering a two-year period immediately after the latest global financial crisis, we find an increasing trend for loan demand the further away from the recession. The characteristics of loan seekers are generally in line with previous studies, that i) smaller firms follow a pecking order in their financing decision-making; and ii) SMEs with lower firm-level risk and better credit history are more likely to apply for finance. However, we also find that higher credit risk (measured by Experian credit ratings) leads to higher loan demand in our sample period, providing support for the risk-shifting hypothesis.

With respect to the supply of bank finance, we find that even during the economic turmoil, most firms that apply for finance are successful but banks have substantially tightened their credit standard during the period. We conclude that banks have obviously become more cautious when making lending decisions. This is evident as lenders have shifted away from informal human capital criteria (e.g. experience) towards more direct measures of credit risk including credit ratings and instances of financial delinquency. In addition, firm age is also important with older firms deemed less risky to lend to. Financial constraints are evident during the recession but they are not observed consistently across all periods. It is also clear that business cycle theories of investment and financing have a great deal of empirical support and traction in recessionary environments.

This study provides further evidence and insight into small business finance in the early post-GFC period. Our findings have important implications on governments' small business policies, especially in the context of the recently established British Business Bank by the UK Government. Given the exploratory nature of our study, a natural extension for future research is to conduct in-depth studies on the effect of a particular set of variables, for example how business strategies influence both credit demand and supply. Another

interesting future research area would be to look at the access to finance for certain kinds of SMEs, such as high-tech or innovative firms.

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# Table 1

# Variable definitions

| Panel A: Dependent variables | | |
|---|---|---|
| Group | Variable Name | Definition |
| **Demand for finance** | *SOUGHT* | = 1 if applying finance (bank loans and overdrafts) in the past 12 months; 0 otherwise |
| **Supply of finance** | *GOT* | = 1 if firm receive at least part of the finance applied for; 0 otherwise |
| **Panel B: Independent variables** | | |
| Group | Variable Name | Definition |
| **Firm-characteristics** | | |
| Size | *SALES_BAND* | 1=<£25,000, 2=£25-49,999, 3=£50,000-74, 999, 4=£75,000-99,999, 5=£100,000-499,999, 6=£500,000-999,999, 7=£1m-1.99m, 8=£2m-4.99m, 9=£5m-9.99m |
| Legal status | *LEGAL* | 1= Sole Proprietor, 2=Partnership, 3= Limited Liability Partnership, 4= Limited Liability |
| Industry sector | *SECTOR* | 1=Primary, 2= Manufacturing, 3=Construction, 4=Wholesale/Retail, 5=Hotels/Catering, 6=Transport & Communications, 7=Business Services, 8=Health, 9=Other Community |
| Age | *FIRM_AGE* | 1= <12 months, 2= 1-2 years, 3= 2-5 years, 4=6-9 years, 5=10-15 years, 6=>15 years |
| Performance | *PROFIT* | =1 if firm broke even or made a profit |
| | *FAST_GROWTH* | =1 if firm grew by 30% or more; 0 otherwise |
| **Owner characteristics** | | |
| Gender | *WLED* | = 1 if firm is a women-led business; 0 otherwise |
| Education | *ONWER_EDUC* | 1=None, 2=GCSE, 3= A level, 4= HNC, 5=BTEC, 6=Professional, 7=Degree, 8=Post-graduate Degree, 9=Other |
| Prior experience | *OWNER_EXP* | 1= <12 months, 2= 1-3 years, 3= 4-6 years, 4=7-9 years, 5=10-15 years, 6=>15 years |
| Financial Qualification | *FIN_QUAL* | =1 if owner has a financial qualification; 0 otherwise |
| **Time indicators** | *WAVE1* | = 1 if July-2011 Survey; 0 otherwise |
| | *WAVE2* | = 1 if November-2011Survey; 0 otherwise |
| | *WAVE3* | = 1 if March-2012 Survey; 0 otherwise |
| | *WAVE4* | = 1 if May-2012 Survey; 0 otherwise |
| | *WAVE5* | = 1 if November-2012 Survey; 0 otherwise |
| | *WAVE6* | = 1 if March-2013 Survey; 0 otherwise |
| **Risk indicators** | | |
| Experian Credit Rating | *RISK* | = 1if minimal, 2 if low risk, 3 if average risk and 4 if above average risk |
| **Financial Delinquency** | | |
| Missed loan repayment | *FD_LR* | = 1 if missed loan repayment; 0 otherwise |
| Unauthorised overdraft facility | *FD_OD* | = 1 if had unauthorised overdraft facility; 0 otherwise |
| Bounced cheques | *FD_BC* | = 1 if bounced cheques; 0 otherwise |
| County court judgement | *FD_CCJ* | = 1 if has County Court Judgement; 0 otherwise |
| Late tax | | |
| Trade credit restrictions | *FD_TAX* | = 1 if missed tax payments; 0 otherwise |
| None | *FD_TCR* | = 1 if has trade credit restrictions; 0 otherwise |
| | *FD_NONE* | = 1 if no financial delinquency; 0 otherwise |
| **Additional Control Variables** | | |
| Source of funds | *NO_OTHER_LOAN* | = 1 if no other outstanding loans; 0 otherwise |
| | *OWN_EQUITY* | = 1 if entrepreneur uses own equity; 0 otherwise |
| Business activities | *INNOVATOR* | = 1 undertook innovation activities; 0 otherwise |
| | *NEW_PROCESS* | = 1if introduced new or significantly improved process; 0 otherwise |
| | *NEW_PRODUCTS* | = 1 if introduced new or significantly improved products; 0 otherwise |
| | *EXPORTER* | = 1 if business export products or services overseas; 0 otherwise |
| Credit support | *BUSINESS PLAN* | = 1 if has a formal written business plan; 0 otherwise |
| | *COLLATERAL* | = 1if provided security/collateral; 0 otherwise |
| Loan type | *TERM LOAN* | = 1 if apply for long-term loans; 0 otherwise |
| | *NEWAPP* | = 1 if apply for finance for the first time; 0 otherwise |

## Table 2

## Variable Descriptive Statistics

| **Panel A: Dependent variables** | | | |
|---|---|---|---|
| Group | Variable Name | Mean | Std Dev |
| **Demand for finance** | | | |
| | *SOUGHT* | 0.1735 | 0.3787 |
| **Supply of finance** | | | |
| | *GOT* | 0.8489 | 0.3582 |
| **Panel B: Independent variables** | | | |
| Group | Variable Name | | |
| **Firm-characteristics** | | | |
| Size | *SALES_BAND* | | |
| | <£25,000 | 0.3683 | |
| | £25,000 - £49,999 | 0.2153 | |
| | £50,000 - £74,999 | 0.0971 | |
| | £75,000 - £99,999 | 0.0539 | |
| | £100,000 - £499,999 | 0.1203 | |
| | £500,000 - £999,999 | 0.0350 | |
| | £1m - £1.99m | 0.0176 | |
| | £2m - £4.9m | 0.0092 | |
| | £5m - £9.9m | 0.0034 | |
| Legal status | *LEGAL* | | |
| | Sole proprietorship | 0.6740 | |
| | Partnership | 0.0486 | |
| | Limited liability partnership (LLP) | 0.0149 | |
| | Limited liability(LTD) | 0.2624 | |
| Industry sector | *SECTOR* | | |
| | Primary | 0.0431 | |
| | Manufacturing | 0.0657 | |
| | Construction | 0.2271 | |
| | Wholesale / retail | 0.1207 | |
| | Hotels / catering | 0.0329 | |
| | Transport & communications | 0.0688 | |
| | Business services | 0.2604 | |
| | Health | 0.0615 | |
| | Other community | 0.1198 | |
| Age | *FIRM_AGE* | | |
| | <12 months | 0.0958 | |
| | 1-2 years | 0.1051 | |
| | 2-5 years | 0.2482 | |
| | 6-9 years | 0.1644 | |
| | 10-15 years | 0.1378 | |
| | 15+ years | 0.2487 | |
| Performance | *PROFIT* | 0.6798 | 0.4666 |
| | *FAST_GROWTH* | 0.1249 | 0.3307 |
| **Owner characteristics** | | | |
| Gender | *WLED* | 0.2546 | 0.4357 |
| Education | *ONWER_EDUC* | | |
| | None | 0.1271 | |
| | GCSE | 0.1370 | |
| | A level | 0.0799 | |
| | HNC | 0.0625 | |
| | BTEC | 0.1906 | |
| | Professional qualification | 0.1128 | |

| | | | |
|---|---|---|---|
| | Degree | 0.1395 | |
| | Post graduate degree | 0.0930 | |
| | Other | 0.0108 | |
| Prior experience | *OWNER_EXP* | | |
| | <12 months | 0.0549 | |
| | 1-2 years | 0.1528 | |
| | 2-5 years | 0.1460 | |
| | 6-9 years | 0.0984 | |
| | 10-15 years | 0.1551 | |
| | 15+ years | 0.3837 | |
| Financial Qualification | *FIN_QUAL* | 0.3861 | 0.4869 |
| Time indicators | *WAVE1* | 0.1691 | |
| | *WAVE2* | 0.1689 | |
| | *WAVE3* | 0.1674 | |
| | *WAVE4* | 0.1678 | |
| | *WAVE5* | 0.1671 | |
| | *WAVE6* | 0.1597 | |
| **Risk indicators** | | | |
| Experian Credit Rating | *RISK* | | |
| | Minimal | 0.0451 | |
| | Low | 0.0999 | |
| | Average | 0.2693 | |
| | Above average | 0.4377 | |
| | Not known | 0.1480 | |
| **Financial Delinquency** | | | |
| Missed loan repayment | *FD_LR* | 0.0152 | 0.1225 |
| Unauthorised overdraft facility | *FD_OD* | 0.0684 | 0.2525 |
| Bounced cheques | *FD_BC* | 0.0550 | 0.2280 |
| County court judgement | *FD_CCJ* | 0.0123 | 0.1101 |
| Late tax | *FD_TAX* | 0.0493 | 0.2165 |
| Trade credit restrictions | *FD_TCR* | 0.0322 | 0.1766 |
| None | *FD_NONE* | 0.8368 | 0.3695 |
| **Additional Controls** | | | |
| Source of funds | *NO_OTHER_LOAN* | 0.8331 | |
| | *OWN_EQUITY* | 0.0948 | |
| Business activities | *INNOVATOR* | 0.4774 | |
| | *NEW_PROCESS* | 0.3041 | |
| | *NEW_PRODUCTS* | 0.2094 | |
| | *EXPORTER* | 0.1214 | |
| Credit support | *BUSINESS PLAN* | 0.4248 | |
| | *COLLATERAL* | 0.2571 | |
| Loan type | *TERM LOAN* | 0.2109 | |
| | *NEWAPP* | 0.1661 | |

Note: N = 30,183, except for *COLLATERAL, TERMLOAN and NEWAPP* (N = 7,840), where data is only collected for firms that applied for finance.

# Table 3

## Probit Models with Sample Selection: Credit Demand and Supply

| | | Model 1 (Full Sample) | | | | Model 2 (Full Sample) | | | | Model 3 (Excluding Self-employed) | | | | Model 4 (Excluding Self-emplyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Independent variables** | | GOT\|SOUGHT | | SOUGHT | | GOT\|SOUGHT | | SOUGHT | | GOT\|SOUGHT | | SOUGHT | | GOT\|SOUGHT | | SOUGHT | |
| Group | Variable Name | Coefficient | Std Error | Coefficient | Std Error | Coefficient | Std Error | Coefficient | Std Error | Coefficient | Std Error | Coefficient | Std Error | Coefficient | Std Error | Coefficient | Std Error |
| **Firm Characteristics** | | | | | | | | | | | | | | | | | |
| Size | *SALES_BAND* | | | | | | | | | | | | | | | | |
| | £25,000 - £49,999 | -0.062 | 0.080 | 0.154*** | 0.038 | 0.041 | 0.104 | 0.111*** | 0.042 | 0.078 | 0.1261 | 0.051 | 0.0586 | 0.073 | 0.142 | 0.027 | 0.064 |
| | £50,000 - £74,999 | -0.227** | 0.092 | 0.388*** | 0.043 | -0.094 | 0.116 | 0.293*** | 0.048 | -0.042 | 0.135 | 0.327*** | 0.059 | 0.012 | 0.141 | 0.231*** | 0.065 |
| | £75,000 - £99,999 | -0.075 | 0.111 | 0.457*** | 0.047 | 0.191 | 0.140 | 0.315*** | 0.053 | 0.135 | 0.1544 | 0.377*** | 0.061 | 0.322* | 0.158 | 0.259*** | 0.067 |
| | £100k - £499,999 | -0.209** | 0.088 | 0.590*** | 0.036 | -0.009 | 0.110 | 0.409*** | 0.041 | -0.003 | 0.1343 | 0.519*** | 0.0502 | 0.123 | 0.129 | 0.357*** | 0.056 |
| | £500k - £999,999 | -0.130 | 0.100 | 0.498*** | 0.042 | 0.027 | 0.124 | 0.317*** | 0.047 | 0.07 | 0.1412 | 0.433*** | 0.0547 | 0.170 | 0.141 | 0.281*** | 0.061 |
| | £1m - £1.99m | -0.183* | 0.106 | 0.697*** | 0.043 | 0.067 | 0.132 | 0.389*** | 0.048 | 0.018 | 0.1518 | 0.625*** | 0.0557 | 0.194 | 0.147 | 0.342*** | 0.062 |
| | £2m - £4.9m | -0.052 | 0.121 | 0.751*** | 0.045 | 0.307** | 0.154 | 0.451*** | 0.051 | 0.151 | 0.1698 | 0.683*** | 0.058 | 0.412* | 0.164 | 0.409*** | 0.065 |
| | £5m - £9.9m | -0.104 | 0.143 | 0.747*** | 0.054 | 0.241 | 0.182 | 0.409*** | 0.061 | 0.101 | 0.1872 | 0.689*** | 0.0648 | 0.344 | 0.189 | 0.377*** | 0.072 |
| Legal | *LEGAL* | | | | | | | | | | | | | | | | |
| status | Partnership | 0.077 | 0.076 | 0.227*** | 0.033 | 0.252*** | 0.097 | 0.162*** | 0.036 | 0.188** | 0.0908 | 0.161*** | 0.0376 | 0.309** | 0.101 | 0.120** | 0.041 |
| | LLP | 0.468*** | 0.141 | -0.293*** | 0.049 | 0.416** | 0.185 | -0.303*** | 0.055 | 0.484*** | 0.1532 | -0.277*** | 0.0539 | 0.403* | 0.179 | -0.287*** | 0.060 |
| | LTD | 0.006 | 0.053 | -0.029 | 0.026 | 0.022 | 0.071 | -0.090*** | 0.029 | 0.069 | 0.0658 | -0.077** | 0.0319 | 0.045 | 0.078 | -0.115** | 0.035 |
| Industry | *SECTOR* | | | | | | | | | | | | | | | | |
| sector | Manufacturing | -0.014 | 0.097 | -0.365*** | 0.041 | 0.016 | 0.127 | -0.303*** | 0.046 | -0.084 | 0.1253 | -0.422*** | 0.046 | -0.016 | 0.139 | -0.365*** | 0.052 |
| | Construction | 0.089 | 0.088 | -0.410*** | 0.037 | -0.068 | 0.116 | -0.318*** | 0.041 | 0.051 | 0.1171 | -0.466*** | 0.0435 | -0.071 | 0.133 | -0.385*** | 0.048 |
| | Wholesale / retail | 0.183* | 0.099 | -0.301*** | 0.040 | 0.167 | 0.127 | -0.246*** | 0.045 | 0.095 | 0.1259 | -0.364*** | 0.0464 | 0.085 | 0.143 | -0.303*** | 0.051 |
| | Hotels / catering | -0.149 | 0.100 | -0.396*** | 0.042 | -0.223* | 0.127 | -0.339*** | 0.047 | -0.19 | 0.1298 | -0.448*** | 0.0478 | -0.218 | 0.138 | -0.386*** | 0.053 |
| | Transport & com | -0.062 | 0.097 | -0.303*** | 0.042 | -0.143 | 0.125 | -0.252*** | 0.046 | -0.162 | 0.1264 | -0.333*** | 0.0488 | -0.214 | 0.140 | -0.291*** | 0.054 |
| | Business services | 0.053 | 0.089 | -0.345*** | 0.037 | 0.029 | 0.117 | -0.333*** | 0.041 | -0.039 | 0.1155 | -0.358*** | 0.0427 | -0.107 | 0.132 | -0.361*** | 0.047 |
| | Health | 0.061 | 0.105 | -0.326*** | 0.043 | 0.065 | 0.135 | -0.323*** | 0.048 | -0.044 | 0.1303 | -0.346*** | 0.0488 | -0.031 | 0.146 | -0.332*** | 0.054 |
| | Other community | 0.032 | 0.099 | -0.434*** | 0.040 | -0.002 | 0.130 | -0.436*** | 0.045 | -0.018 | 0.1275 | -0.485*** | 0.0454 | -0.011 | 0.140 | -0.464*** | 0.050 |
| Age | *FIRM_AGE* | | | | | | | | | | | | | | | | |
| | 1-2 years | 0.027 | 0.111 | 0.057 | 0.065 | 0.024 | 0.144 | 0.058 | 0.074 | -0.106 | 0.1606 | 0.217** | 0.088 | -0.134 | 0.181 | 0.171 | 0.099 |
| | 2-5 years | 0.400*** | 0.122 | 0.066 | 0.059 | 0.420*** | 0.149 | 0.126* | 0.067 | 0.312* | 0.1745 | 0.231*** | 0.0794 | 0.202 | 0.180 | 0.229* | 0.090 |
| | 6-9 years | 0.574*** | 0.136 | 0.174*** | 0.060 | 0.615*** | 0.165 | 0.243*** | 0.068 | 0.516*** | 0.1939 | 0.321*** | 0.0806 | 0.399* | 0.191 | 0.349*** | 0.091 |
| | 10-15 years | 0.560*** | 0.140 | 0.235*** | 0.060 | 0.591*** | 0.169 | 0.322*** | 0.068 | 0.470** | 0.199 | 0.402*** | 0.0802 | 0.331 | 0.193 | 0.436*** | 0.090 |
| | 15+ years | 0.568*** | 0.138 | 0.238*** | 0.059 | 0.585*** | 0.168 | 0.328*** | 0.067 | 0.548*** | 0.1983 | 0.371*** | 0.0787 | 0.405* | 0.193 | 0.411*** | 0.089 |
| Performance | *PROFIT* | 0.019 | 0.018 | 0.070*** | 0.008 | 0.178*** | 0.056 | 0.005 | 0.022 | 0.102* | 0.0543 | 0.066*** | 0.0226 | 0.185** | 0.061 | 0.039 | 0.025 |
| | *FAST_GROWTH* | -0.098* | 0.054 | 0.043 | 0.025 | -0.030 | 0.071 | 0.019 | 0.028 | -0.094 | 0.0629 | 0.018 | 0.028 | -0.005 | 0.075 | -0.000 | 0.031 |
| **Owner Characteristics** | | | | | | | | | | | | | | | | | |
| Gender | *WLED* | 0.095** | 0.046 | -0.046*** | 0.020 | 0.079 | 0.061 | -0.063*** | 0.023 | 0.082 | 0.0533 | -0.023 | 0.0227 | 0.056 | 0.063 | -0.056* | 0.025 |
| Education | *ONWER_EDUC* | | | | | | | | | | | | | | | | |
| | GCSE | -0.132* | 0.074 | 0.254*** | 0.034 | -0.084 | 0.097 | 0.219*** | 0.038 | -0.082 | 0.0913 | 0.274*** | 0.0399 | -0.032 | 0.103 | 0.233*** | 0.044 |
| | A level | 0.032 | 0.093 | 0.226*** | 0.040 | 0.165 | 0.123 | 0.155*** | 0.044 | 0.043 | 0.1113 | 0.273*** | 0.0451 | 0.127 | 0.126 | 0.173*** | 0.050 |
| | HNC | -0.245*** | 0.088 | 0.231*** | 0.043 | -0.192* | 0.117 | 0.129*** | 0.048 | -0.263** | 0.105 | 0.322*** | 0.0494 | -0.196 | 0.123 | 0.167** | 0.055 |
| | BTEC | -0.176** | 0.074 | 0.193*** | 0.035 | -0.161 | 0.098 | 0.150*** | 0.039 | -0.157* | 0.0944 | 0.256*** | 0.0429 | -0.134 | 0.109 | 0.196*** | 0.047 |
| | Professional | -0.186** | 0.077 | 0.210*** | 0.035 | -0.171 | 0.103 | 0.170*** | 0.039 | -0.11 | 0.0946 | 0.263*** | 0.0393 | -0.079 | 0.111 | 0.201*** | 0.044 |
| | Degree | -0.106 | 0.076 | 0.169*** | 0.034 | -0.013 | 0.102 | 0.112*** | 0.038 | -0.08 | 0.0917 | 0.212*** | 0.039 | 0.008 | 0.107 | 0.139** | 0.044 |
| | Postgraduate | -0.063 | 0.087 | 0.103*** | 0.038 | 0.017 | 0.116 | 0.067 | 0.043 | -0.017 | 0.103 | 0.144*** | 0.0429 | 0.093 | 0.122 | 0.092 | 0.048 |
| | Other | -0.073 | 0.219 | 0.348*** | 0.099 | 0.016 | 0.269 | 0.205* | 0.113 | 0.022 | 0.2683 | 0.452*** | 0.1177 | 0.164 | 0.298 | 0.274* | 0.132 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior | *OWNER_EXP* | | | | | | | | | | | | | | | | |
| experience | 1-2 years | -0.119 | 0.154 | 0.177** | 0.082 | -0.123 | 0.205 | 0.230** | 0.095 | -0.041 | 0.2682 | 0.309** | 0.1223 | 0.143 | 0.310 | 0.413** | 0.140 |
| | 2-5 years | -0.046 | 0.157 | 0.170** | 0.082 | -0.084 | 0.208 | 0.207** | 0.094 | -0.047 | 0.2652 | 0.334*** | 0.12 | 0.122 | 0.305 | 0.393** | 0.138 |
| | 6-9 years | -0.210 | 0.160 | 0.162** | 0.084 | -0.242 | 0.213 | 0.193** | 0.096 | -0.251 | 0.2634 | 0.347*** | 0.1208 | -0.088 | 0.308 | 0.410** | 0.139 |
| | 10-15 years | -0.142 | 0.155 | 0.254*** | 0.080 | -0.114 | 0.206 | 0.270*** | 0.093 | -0.193 | 0.2596 | 0.423*** | 0.1176 | 0.026 | 0.300 | 0.462*** | 0.135 |
| | 15+ years | 0.006 | 0.154 | 0.213*** | 0.079 | -0.001 | 0.205 | 0.259*** | 0.091 | -0.035 | 0.2606 | 0.396*** | 0.1163 | 0.129 | 0.299 | 0.454*** | 0.134 |
| | *FIN_QUAL* | 0.096*** | 0.044 | 0.002 | 0.019 | 0.151*** | 0.057 | -0.048** | 0.021 | 0.106** | 0.0514 | -0.011 | 0.0213 | 0.131* | 0.060 | -0.055* | 0.024 |
| **Time Indicators** | | | | | | | | | | | | | | | | | |
| | *WAVE2* | 0.010 | 0.063 | -0.143*** | 0.030 | -0.013 | 0.083 | -0.122*** | 0.035 | 0.021 | 0.074 | -0.138*** | 0.0327 | 0.014 | 0.085 | -0.116** | 0.038 |
| | *WAVE3* | 0.144** | 0.073 | 0.310*** | 0.028 | 0.059 | 0.100 | 0.548*** | 0.032 | 0.176** | 0.0896 | 0.291*** | 0.0317 | 0.040 | 0.096 | 0.507*** | 0.036 |
| | *WAVE4* | 0.195*** | 0.076 | 0.336*** | 0.028 | 0.170 | 0.108 | 0.582*** | 0.032 | 0.211** | 0.0944 | 0.326*** | 0.0316 | 0.077 | 0.100 | 0.560*** | 0.036 |
| | *WAVE5* | 0.032 | 0.067 | 0.301*** | 0.028 | -0.088 | 0.094 | 0.521*** | 0.032 | 0.038 | 0.0811 | 0.278*** | 0.0319 | -0.137 | 0.090 | 0.479*** | 0.036 |
| | *WAVE6* | 0.163** | 0.071 | -0.017 | 0.034 | -0.045 | 0.097 | 0.263*** | 0.039 | 0.255*** | 0.0907 | -0.148*** | 0.0406 | 0.020 | 0.107 | 0.152*** | 0.046 |
| **Risk Indicators** | | | | | | | | | | | | | | | | | |
| Experian | *RISK* | | | | | | | | | | | | | | | | |
| Credit | Low | -0.201** | 0.084 | 0.232*** | 0.029 | -0.181 | 0.111 | 0.188*** | 0.032 | -0.169* | 0.0907 | 0.254*** | 0.0302 | -0.141 | 0.109 | 0.201*** | 0.034 |
| Rating | Average | -0.273*** | 0.082 | 0.327*** | 0.028 | -0.223** | 0.109 | 0.258*** | 0.032 | -0.230** | 0.0901 | 0.374*** | 0.0305 | -0.187 | 0.107 | 0.289*** | 0.034 |
| | Above average | -0.383*** | 0.083 | 0.357*** | 0.031 | -0.331*** | 0.111 | 0.265*** | 0.035 | -0.364*** | 0.0913 | 0.413*** | 0.0339 | -0.326** | 0.109 | 0.305*** | 0.038 |
| | Not known | -0.382*** | 0.095 | 0.316*** | 0.038 | -0.356*** | 0.126 | 0.257*** | 0.043 | -0.312*** | 0.1105 | 0.349*** | 0.0448 | -0.236 | 0.132 | 0.274*** | 0.050 |
| **Financial Delinquency** | | | | | | | | | | | | | | | | | |
| | *FD_LR* | -0.187* | 0.105 | 0.062 | 0.070 | -0.154 | 0.131 | 0.027 | 0.077 | -0.073 | 0.1343 | -0.018 | 0.0835 | -0.046 | 0.151 | -0.046 | 0.090 |
| | *FD_OD* | -0.172*** | 0.066 | 0.345*** | 0.039 | -0.134* | 0.082 | 0.271*** | 0.043 | -0.160** | 0.0807 | 0.347*** | 0.0439 | -0.126 | 0.086 | 0.256*** | 0.048 |
| | *FD_BC* | -0.213*** | 0.068 | -0.092** | 0.040 | -0.289*** | 0.084 | -0.109** | 0.044 | -0.250*** | 0.0854 | -0.148*** | 0.0448 | -0.285** | 0.090 | -0.158** | 0.049 |
| | *FD_CCJ* | -0.369*** | 0.113 | -0.064 | 0.071 | -0.370*** | 0.140 | -0.141* | 0.079 | -0.429*** | 0.1398 | -0.104 | 0.0798 | -0.360* | 0.149 | -0.208* | 0.089 |
| | *FD_TAX* | -0.019 | 0.065 | 0.114*** | 0.040 | -0.009 | 0.082 | 0.047 | 0.044 | -0.036 | 0.0751 | 0.112** | 0.0438 | -0.044 | 0.086 | 0.059 | 0.048 |
| | *FD_TCR* | -0.501*** | 0.076 | 0.007 | 0.045 | -0.529*** | 0.096 | -0.090* | 0.050 | -0.488*** | 0.0931 | -0.044 | 0.0499 | -0.461*** | 0.102 | -0.135* | 0.055 |
| | *FD_NONE* | 0.343*** | 0.067 | -0.284*** | 0.040 | 0.292*** | 0.086 | -0.180*** | 0.044 | 0.295*** | 0.0803 | -0.300*** | 0.0449 | 0.253** | 0.092 | -0.178*** | 0.049 |
| **Additional Control Variables** | | | | | | | | | | | | | | | | | |
| Source of | *NOOTHERLOAN* | | | | | 0.911*** | 0.219 | -1.694*** | 0.023 | | | | | 0.984*** | 0.180 | -1.620*** | 0.025 |
| funds | *OWN_EQUITY* | | | | | -0.344*** | 0.076 | 0.316*** | 0.030 | | | | | -0.328*** | 0.074 | 0.331*** | 0.031 |
| Business | *INNOVATOR* | | | | | -0.128 | 0.154 | 0.046 | 0.055 | | | | | -0.174 | 0.158 | 0.027 | 0.061 |
| activities | *NEW_PROCESS* | | | | | -0.042 | 0.142 | 0.108** | 0.051 | | | | | 0.141 | 0.145 | 0.113* | 0.056 |
| | *NEWPRODUCTS* | | | | | -0.068 | 0.074 | -0.061** | 0.028 | | | | | -0.100 | 0.077 | -0.048 | 0.031 |
| | *EXPORTER* | | | | | -0.277*** | 0.083 | -0.025 | 0.031 | | | | | -0.236*** | 0.087 | -0.028 | 0.033 |
| Credit | *BUSINESS PLAN* | | | | | -0.057 | 0.054 | 0.142*** | 0.020 | | | | | -0.006 | 0.063 | 0.129*** | 0.023 |
| support | *COLLATERAL* | | | | | 1.535*** | 0.128 | | | | | | | 1.452*** | 0.137 | | |
| Loan type | *TERM LOAN* | | | | | -0.661*** | 0.060 | | | | | | | -0.684*** | 0.069 | | |
| | *NEWAPP* | | | | | -0.994*** | 0.073 | | | | | | | -0.910*** | 0.089 | | |
| **Regression Diagnostics** | | | | | | | | | | | | | | | | | |
| | *N Obs* | 30,183 | | | | 30,160 | | | | 22,460 | | | | 22,438 | | | |
| | *Censored* | 23,043 | | | | 23,025 | | | | 16,561 | | | | 16,544 | | | |
| | *Uncensored* | 7,140 | | | | 7135 | | | | 5,899 | | | | 5,894 | | | |
| | *Wald $\chi 2$ (64)* | 599.45 | | | | 1,270.37 | | | | 410.24 | | | | 1016.90 | | | |
| | *Prob >$\chi 2$* | 0.00001 | | | | 0.00001 | | | | 0.00001 | | | | 0.00001 | | | |
| | $\rho$ | -0.793 | | | | -0.492 | | | | -0.697 | | | | -0.685 | | | |
| | $\chi^2$ ($\rho = 0$) | 7.620 | | | | 2.890 | | | | 4.640 | | | | 6.750 | | | |
| | *Prob >$\chi 2$* | 0.006 | | | | 0.089 | | | | 0.031 | | | | 0.009 | | | |

* $p < .10$; ** $p < .05$; *** $p < .01$. Asymptotic robust standard errors reported.

# Appendix

## Multinomial Logit Regression: Loan Application Outcomes

(Base category = fully financed applicants)

| | | Non-Applicants | | Partial Rationing | | Full Rationing | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | | (N = 23,043) | | (N = 237) | | (N = 716) | |
| Group | Variable Name | Coefficient | Std Error | Coefficient | Std Error | Coefficient | Std Error |
| **Firm-characteristics** | | | | | | | |
| Size | *SALES_BAND* | | | | | | |
| | <£25,000 | | | | | | |
| | £25,000 - £49,999 | -0.016 | 0.135 | 0.355 | 0.372 | -0.108 | 0.195 |
| | £50,000 - £74,999 | -0.604*** | 0.142 | 0.288 | 0.381 | -0.185 | 0.205 |
| | £75,000 - £99,999 | -0.540*** | 0.153 | -0.060 | 0.440 | -0.581** | 0.246 |
| | £100,000 - £499,999 | -0.770*** | 0.120 | 0.145 | 0.336 | -0.536*** | 0.182 |
| | £500,000 - £999,999 | -0.867*** | 0.135 | 0.307 | 0.372 | -0.588*** | 0.219 |
| | £1m - £1.99m | -0.849*** | 0.138 | 0.041 | 0.387 | -0.874*** | 0.232 |
| | £2m - £4.9m | -1.059*** | 0.144 | -0.038 | 0.406 | -1.315*** | 0.270 |
| | £5m - £9.9m | -0.984*** | 0.165 | 0.075 | 0.450 | -1.383*** | 0.333 |
| Legal status | *LEGAL* | | | | | | |
| | Sole proprietorship | | | | | | |
| | Partnership | -0.422*** | 0.098 | -0.409 | 0.283 | -0.523*** | 0.178 |
| | LLP | 0.142 | 0.148 | -0.702 | 0.506 | -0.904*** | 0.355 |
| | Limited liability(LTD) | 0.183** | 0.082 | 0.144 | 0.216 | -0.037 | 0.133 |
| Industry sector | *SECTOR* | | | | | | |
| | Primary | | | | | | |
| | Manufacturing | 0.866*** | 0.123 | -0.581 | 0.379 | 0.494** | 0.229 |
| | Construction | 0.859*** | 0.110 | 0.203 | 0.298 | 0.695*** | 0.200 |
| | Wholesale / retail | 0.531*** | 0.117 | -0.055 | 0.326 | 0.015 | 0.235 |
| | Hotels / catering | 0.809*** | 0.126 | 0.544* | 0.318 | 1.039*** | 0.218 |
| | Trans. & com. | 0.754*** | 0.125 | 0.135 | 0.341 | 0.856*** | 0.218 |
| | Business services | 0.864*** | 0.108 | 0.132 | 0.299 | 0.508** | 0.206 |
| | Health | 0.657*** | 0.126 | 0.087 | 0.352 | 0.414** | 0.247 |
| | Other community | 0.827*** | 0.118 | 0.068 | 0.329 | 0.537** | 0.225 |
| Age | *FIRM_AGE* | | | | | | |
| | <12 months | | | | | | |
| | 1-2 years | 0.069 | 0.213 | 0.119 | 0.537 | -0.025 | 0.253 |
| | 2-5 years | 0.150 | 0.190 | 0.317 | 0.485 | -0.588** | 0.239 |
| | 6-9 years | -0.088 | 0.193 | 0.184 | 0.493 | -1.193*** | 0.255 |
| | 10-15 years | -0.281 | 0.192 | -0.282 | 0.500 | -1.270*** | 0.254 |
| | 15+ years | -0.278 | 0.188 | -0.186 | 0.489 | -1.280*** | 0.246 |
| Performance | *PROFIT* | -0.096 | 0.061 | -0.087 | 0.158 | -0.319*** | 0.100 |
| | *FAST_GROWTH* | -0.045 | 0.077 | -0.064 | 0.199 | 0.133 | 0.133 |
| **Owner characteristics** | | | | | | | |
| Gender | *WLED* | 0.138** | 0.062 | 0.083 | 0.161 | -0.176 | 0.111 |
| Education | *ONWER_EDUC* | | | | | | |
| | None | | | | | | |
| | GCSE | -0.508*** | 0.105 | 0.069 | 0.294 | -0.132 | 0.177 |
| | A level | -0.348*** | 0.120 | -0.295 | 0.344 | -0.595*** | 0.219 |
| | HNC | -0.435*** | 0.129 | -0.160 | 0.359 | -0.102 | 0.211 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | BTEC | -0.128 | 0.113 | 0.443 | 0.292 | 0.142 | 0.180 |
| | Professional qualification | -0.325*** | 0.106 | 0.035 | 0.295 | -0.009 | 0.186 |
| | Degree | -0.213** | 0.106 | -0.283 | 0.304 | -0.284 | 0.185 |
| | Post graduate degree | -0.136 | 0.118 | 0.359 | 0.306 | -0.204 | 0.213 |
| | Other | -0.838*** | 0.281 | 0.510 | 0.587 | -0.492 | 0.501 |
| Prior experience | *OWNER_EXP* | | | | | | |
| | <12 months | | | | | | |
| | 1-2 years | -0.352 | 0.269 | -0.269 | 0.642 | 0.021 | 0.342 |
| | 2-5 years | -0.307 | 0.265 | -0.273 | 0.630 | -0.184 | 0.346 |
| | 6-9 years | -0.295 | 0.268 | -0.870 | 0.660 | 0.123 | 0.353 |
| | 10-15 years | -0.387 | 0.257 | -0.374 | 0.618 | -0.095 | 0.335 |
| | 15+ years | -0.355 | 0.254 | -0.617 | 0.610 | -0.369 | 0.330 |
| Financial Qualification | *FIN_QUAL* | 0.065 | 0.058 | 0.245 | 0.152 | -0.240** | 0.105 |
| Time indicators | *WAVE1* | | | | | | |
| | *WAVE2* | 0.236*** | 0.079 | 0.063 | 0.229 | 0.226 | 0.142 |
| | *WAVE3* | 0.185** | 0.084 | 0.444** | 0.225 | 0.118 | 0.157 |
| | *WAVE4* | 0.031 | 0.082 | 0.252 | 0.220 | -0.144 | 0.153 |
| | *WAVE5* | 0.221*** | 0.083 | 0.339 | 0.224 | 0.367*** | 0.144 |
| | *WAVE6* | 0.662*** | 0.110 | 0.499* | 0.295 | 0.697*** | 0.175 |
| **Risk indicators** | | | | | | | |
| Experian Credit Rating | *RISK* | | | | | | |
| | Minimal | | | | | | |
| | Low | -0.255*** | 0.083 | 0.268 | 0.271 | 0.216 | 0.223 |
| | Average | -0.286*** | 0.083 | 0.195 | 0.269 | 0.324 | 0.213 |
| | Above average | -0.251*** | 0.092 | 0.485* | 0.277 | 0.506** | 0.216 |
| | Not known | -0.129 | 0.120 | 0.444 | 0.349 | 0.717*** | 0.244 |
| **Financial Delinquency** | | | | | | | |
| Missed loan repayment | *FD_LR* | 0.175 | 0.217 | -0.132 | 0.440 | 0.308 | 0.244 |
| Unauthorised overdraft | *FD_OD* | -0.302*** | 0.117 | 0.545*** | 0.217 | 0.092 | 0.145 |
| Bounced cheques | *FD_BC* | 0.398*** | 0.121 | 0.288 | 0.232 | 0.713*** | 0.148 |
| County court judgement | *FD_CCJ* | 0.561** | 0.232 | -0.418 | 0.549 | 1.009*** | 0.252 |
| Late tax | *FD_TAX* | -0.221* | 0.118 | 0.155 | 0.219 | -0.175 | 0.149 |
| Trade credit restrictions | *FD_TCR* | 0.479*** | 0.141 | 1.006*** | 0.238 | 1.343*** | 0.161 |
| None | *FD_NONE* | 0.188 | 0.121 | -0.275 | 0.244 | -0.417*** | 0.158 |
| **Additional Control Variables** | | | | | | | |
| Source of funds | *NO_OTHER_LOAN* | 3.930*** | 0.053 | 0.230 | 0.162 | 0.093 | 0.106 |
| | *OWN_EQUITY* | -0.653*** | 0.076 | 0.314* | 0.168 | 0.238** | 0.121 |
| Business activities | *INNOVATOR* | 0.040 | 0.150 | -0.025 | 0.356 | 0.066 | 0.258 |
| | *NEW_PROCESS* | -0.310** | 0.138 | -0.287 | 0.315 | 0.001 | 0.235 |
| | *NEW_PRODUCTS* | 0.092 | 0.074 | 0.505*** | 0.189 | 0.185 | 0.124 |
| | *EXPORTER* | 0.124 | 0.080 | 0.025 | 0.218 | 0.541*** | 0.139 |
| Credit support | *BUSINESS PLAN* | -0.275*** | 0.055 | 0.083 | 0.150 | 0.045 | 0.098 |
| **Regression Diagnostics** | | | | | | | |
| | *N Obs* | 30,183 | | | | | |
| | *Log likelihood* | -8,609.464 | | | | | |
| | *Pseudo* $R^2$ | 0.4234 | | | | | |
| | *Wald* $\chi 2$ *(64)* | 12,644.57 | | | | | |

* $p < .10$; ** $p < .05$; *** $p < .01$. Asymptotic robust standard errors reported.