



**Small Business Financing in the UK Four Years into the Current Financial Crisis**

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## Small Business Financing in the UK Four Years into the Current Financial Crisis

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

### Abstract

In this paper we use empirical evidence from the UK to consider how entrepreneurs demand for external finance changed as the economy continued to be mired in its third and fourth years of recession and whether or not external finance has become more difficult to access as the recession progressed. We find that 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 throughout the recession but banks were very unwilling to advance money to firms with a high risk rating or a record of any financial delinquency. We find that a maximum of 42,000 smaller firms were denied credit November 2011, which was significantly lower than the peak of 119,000 reported by Cowling, Liu and Ledger (2012) for the UK in the winter of 2009.

## 1. Introduction

The financial crisis, which began unfolding in September 2008, contributed to a fall of 6.4% in UK GDP in the subsequent six quarters that constituted the first official recession. This equates to around three years of post-war trend level economic growth for the UK economy (Cowling, Liu and Ledger, 2012). Even four and a half years into the recession, and in the early post-recession period, GDP is 3.31% lower than its pre-recession figure. As the crisis had its roots in the credit markets, in particular the investment banking sector, retail banks and credit institutions became increasingly unwilling to lend to the personal and business sector, particularly those financial institutions with investment divisions that were overexposed in riskier lending products and markets. 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 (BOE Trends in Lending, April 2011), and a further net repayment of £2.1bn in November 2012 (BOE Trends in Lending, January 2013). Loan to value rates declined considerably meaning that firms without surplus cash balances were quantity constrained, even when financial institutions were prepared to advance credit. Further, the cost of small firm credit initially increased to 4%, and then up to a current level of 4.7% even when base (interest) rates fell rapidly to 0.5 per cent where they have remained to date.

Banks have been accused of not lending to small and medium enterprises (SMEs, businesses with 0 to 249 employees) 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 to 45% of their 2007 volume, 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. Overlaid on top of the current recessionary environment

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2  
3 is the Basle III capital adequacy requirements placed on banks which may limit the pool of  
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5 money available to lend to the business sector.  
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8 In the UK, the Business Secretary Vince Cable announced on the 24th September 2012  
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10 the first steps in creating a Government-backed business bank, including new Government  
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12 funding of £1 billion. It will aim to attract private sector funding so that when fully  
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14 operational, it is predicted that the bank could support up to £10 billion of new and  
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16 additional business lending. The Government's aim is to build a single institution that will  
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18 address long-standing, structural gaps in the supply of finance. It will aim to bring together  
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20 in one place Government finance support for small and mid-sized businesses. The business  
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22 bank will also control the Government's interests in a new wholesale funding mechanism  
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24 which will be developed to unlock institutional investment to benefit SMEs. The decision to  
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26 undertake this level of policy intervention explicitly assumes that the case for banks unfairly  
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28 rationing the supply of credit to smaller businesses is proven. But this is not as clear cut as  
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30 assumed, particularly their assessment of the scale of the problem. For example, recent  
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32 evidence by Cowling, Liu and Minniti (2013) who, using a large-scale UK data set covering  
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34 the recession from 2008, found that whilst 55.6% of the total of 30,000 discouraged  
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36 borrowers (2.5% of the SME stock) would have probably received loans had they applied,  
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38 this only represents 17,000 loans. With an average credit facility of around £41,000 to the  
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40 SME sector this equates to £701m in potential lending. For term loans the average loan size  
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42 is around £60,000 which equates to £1.02bn. Importantly, 84% of UK overdraft facilities to  
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44 SMEs are for less than £50,000 and half for less than £10,000, and 78% of loans are for less  
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46 than £100,000 (BDRG Continental, 2012). More generally, Cowling, Liu and Ledger (2012),  
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48 using the same UK data set, found that in total 73,000 SMEs were refused loan requests in  
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50 2009/10. If all these loan requests that were turned down were mistakes by banks (i.e they  
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52 were good lending proposals and banks were making a Type 1 error), this would equate to  
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3 around £4.4bn. But this is not likely to be the case and the figure can be seen as representing  
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5 a maximum potential missing loan market if all lending propositions were put forward by  
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7 good quality entrepreneurs running low risk businesses. This is even more important given  
8  
9 the key finding from US work on SME financing by Cavalluzzo and Wolken (2005) which  
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11 found that differences in credit history explain most of the difference in [loan] denial rates.  
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14 With these issues in mind, it is important to understand not only how many smaller  
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16 businesses are denied access to credit when applying for loans or overdraft facilities  
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18 (commitment loans in the US), but what differentiates smaller firms who are granted loans  
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20 from those who are refused loans. And as the finally climbs out of the prolonged economic  
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22 recession, the dynamic nature of the banking sector and capital markets makes up-to-the  
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24 minute evidence more pertinent. It is the intention of this paper to use a unique 6 wave  
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26 longitudinal data set for the UK (BDRC Continental), which spans the period from July 2011  
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28 to March 2013 the 3<sup>rd</sup> and 4<sup>th</sup> years since the financial crisis in September 2008, to address 4  
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30 key questions;  
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- 33
- 34 • What is the current level of demand for credit from the small business sector and has  
35 this changed over time?  
36
  - 37 • What is the current level of supply of credit to the small business sector and has this  
38 changed over time?  
39
  - 40 • How many smaller firms have been denied credit and has this changed over time?  
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  - 42 • What differentiates smaller businesses that make successful loan applications from  
43 those who are unsuccessful?  
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51 In doing so, we hope to add to our general understanding of what really happens in the  
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53 market for small business financing 3-5 years into an economic downturn and in the early  
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55 post-recession period, from both a demand and supply perspective. This context is  
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57 particularly interesting and unique (see Fig 1) as economic recessions in the UK do not  
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3 normally last this long (NIESR, 2012). This will enable us to consider what the potential  
4 impacts of credit rationing on the small business sector are and also identify areas  
5 government action might be appropriate. We will also assess whether their plans for the  
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10 'Business Bank' stand up to the evidence.

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13 **Fig 1: UK economic recessions: How recessions compare**

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16 [INSERT FIG 1 HERE]

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19 Source: National Institute for Economic and Social Research, 2012.

## 20 21 22 **2. A Generic Review of Research on Small Business Finance**

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24  
25 The subject of financial constraints or credit rationing has been the focus of a  
26 considerable body of theoretical work, and the existence of credit rationing has been  
27 examined extensively (Berger and Udell, 1992; Cowling, 2010; Goldfeld, 1966; Jaffee, 1971;  
28 King, 1986; Slovin and Slushka, 1983; Sofianos et al., 1990). Previous literature generally  
29 focuses on the supply-side of the credit market and assumes that information based problems  
30 discourage banks from advancing as much credit as entrepreneurs with potentially viable  
31 investment opportunities demand even when they are willing to pay more for loans (this is  
32 classic Stiglitz and Weiss, 1981, credit rationing). This supply-side 'funding gap' has been  
33 excessively used to justify government intervention to increase lending, regardless of the  
34 creditworthiness of borrowers (De Meza and Webb, 2000; Nightingale et al, 2009).

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The negligence 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

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3 and borrowers may not necessarily lead to under-investment. Particularly under certain  
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5 assumptions, the unobservable quality of entrepreneurs may indeed result in investment  
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7 exceeding the optimal level (De Meza and Webb, 1987, 2000). On the other hand, informed  
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9 financiers screening firms that are not commercially attractive out of the loan market may  
10  
11 actually be a rational behaviour indicating an efficient market. In this sense, some firms are  
12  
13 simply not 'investment ready' (Mason and Harrison, 2001). Conceptualising the small  
14  
15 business finance problem from both supply and demand sides would produce a more  
16  
17 systemic framework for developing future entrepreneurial policy. This more holistic market  
18  
19 perspective would draw attention to the simultaneity problems associated with building a  
20  
21 funding system of many complex component parts (Nightingale et al, 2009). The current  
22  
23 economic environment and the high uncertainty and complexity inherent in it provide a  
24  
25 unique context to investigate the co-ordination of supply and demand and its effect on SME  
26  
27 financing market.  
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32 The rest of this section review the key studies on the supply as well as the demand of  
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34 small business finance, based on which we set out the main hypotheses of this paper.  
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### 37 38 2.1. *Loan Supply* 39

40 The majority of SMEs rely on internal sources such as personal savings or retained  
41  
42 earnings to fund their investment and only a small proportion have tried to obtain finance  
43  
44 from external sources (Cosh et al, 2009; Cowling et al, 2012; Fraser, 2005). However, the  
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46 supply of external finance to SMEs differs fundamentally from larger firms in the sense that  
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48 private debt and equity markets are the only markets SMEs have access to whilst larger firms  
49  
50 have access to both private and public markets (Berger and Udell, 1998). As suggested in  
51  
52 their seminal work on small business finance, Berger and Udell (1998) conceptualised the  
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54 supply of capital as a dynamic process which changes given SMEs' needs and options, as  
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56 well as the degree of information opacity between firms and fund suppliers. In this sense,  
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3 internal funds, trade credit, and/or angel finance are more appropriate for seed and start-up  
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5 firms with little finance need, while early-growth firms have more access to venture capital  
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7 and bank finance, and finally private equity is more suitable for firms with sustained growth  
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9 and the highest capital needs. However, a central tenet of Berger and Udell's model is the  
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11 inter-connectedness between different sources of finance on a size/age/information  
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13 continuum and sources of funding may be substitutes or complements, thus creating a  
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15 'funding escalator' from business formation to a successful market exit.  
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19 The most common source of external funding is commercial (high street) banks  
20  
21 (Colombo and Grilli, 2007; de Bettignies and Brander, 2007). Yet not all SMEs that apply  
22  
23 for external credit are successful (Fairlie and Robb, 2007; Levenson and Willard, 2000; Shen,  
24  
25 2002; Cowling, Liu and Ledger, 2012). This occurs for many reasons including lack of asset  
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27 cover (Coco, 2000), poor information flows giving rise to moral hazard and adverse  
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29 selection issues (Diamond, 1984; Myers, 1984; Myers and Majluf, 1984), non-viable  
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31 projects, poor management teams, and exogenous factors such as unfavourable economic  
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33 conditions. The issue of 'unfair' credit rationing, that is not based on borrower quality  
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35 (Stiglitz and Weiss, 1981), has been the focus of a large volume of literature (Cowling and  
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37 Mitchell, 2003; Fraser, 2009), and has been used to justify government intervention in the  
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39 form of loan guarantee programmes (Cowling and Clay, 1994; Cowling, 2010; Riding, 1997;  
40  
41 Cowling and Siepel, 2013). The counter-argument, that banks are rational and efficient  
42  
43 processors of information, given their sophisticated data and information processing systems  
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45 and hundreds of thousands of SME account histories, is made by de Meza and Southey  
46  
47 (1996), and, in a later paper (de Meza, 2004) who argues that over-lending is more typical of  
48  
49 the SME credit market. Thus, for firms with high levels of information opacity and the  
50  
51 subsequent agency problems, equity is a more appropriate form of finance especially for  
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53 high-growth, high-risk new ventures (Berger and Udell, 1998; Gompers and Lerner, 1999,  
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2001a, 2001b; Keuschnigg and Nielsen, 2003, 2004; Mason, 2009; Maier and Walker, 1987).

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

**H<sub>s1</sub>:** Early- and later-stage SMEs (SMEs more than 2 years old) are more likely to be successful in bank loan application.

**H<sub>s2</sub>:** SMEs with higher risks and financial delinquency are less likely to get the loan sought.

**H<sub>s3</sub>:** SMEs' loan applications supported by collateral are more likely to be successful.

## 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). With regard to external finance, given the tax deductibility of interests on debt, managers tend to take advantage of this tax shield until the benefit is fully offset by the possible cost of financial distress or credit downgrading caused by higher leverage level (MacKie-Mason, 1990; Graham, 1996). This trade-off theory is supplemented by the pecking-order theory (Myers, 1984; Myers and Majluf, 1984) based on the information asymmetry between investors and firm managers. According to this theory, debt is preferred to equity because new equity issues, which would delude shareholders' ownership of the firm, 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). Therefore, investors with inferior information would require a higher

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3 return for equities. However, this sequence could be reversed if instead the informational  
4  
5 advantage is on investor side, especially in the case of entrepreneurial finance (Garmaise,  
6  
7 2000).  
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10 The demand-side counterpart to this supply-side body of literature focuses on the small  
11  
12 business financing life-cycle (Berger and Udell, 1998) and essentially relates age, size, and  
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14 information availability to usage of more sophisticated forms of capital alongside a  
15  
16 continued demand for short and medium-term bank loans. The discussion then focuses on  
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18 how entrepreneurs can overcome these information problems by building relationships  
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20 (Bester, 1985; Behr and Gutler, 2007; Petersen and Rajan, 1994) or, in the absence of  
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22 relationships, by offering collateral as security against loans (Coco, 2000; Cowling, 1999;  
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24 Leeth and Scott, 1989). Given the widespread agreement that lack of credit can restrict the  
25  
26 ability of entrepreneurs to invest and that this can reduce rates of innovation, job creation  
27  
28 and other positive economic externalities, it is perhaps surprising that relatively less attention  
29  
30 has been paid to the determinants of the demand for credit from the entrepreneurial sector,  
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32 particularly in a recessionary environment when many businesses are paying off debt. This is  
33  
34 our theoretical contribution to the credit rationing debate, and complements earlier work by  
35  
36 Cressy (1995) which identified owner control as a key element in the decision to apply for  
37  
38 debt finance. Other authors have noted that entrepreneurs are more likely to be excessive  
39  
40 optimists and hence over-value their own ability and the predicted performance of their  
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42 investments (de Meza and Southey, 1996; Coelho and de Meza, 2012), although there is  
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44 evidence that differences in perceptions about banks willingness to supply loans can affect  
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46 entrepreneurs decisions (Kwong, Jones-Evans, and Thompson, 2012).  
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52 In line with classic credit rationing theories, when loans are not forthcoming to  
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54 entrepreneurs with viable investment opportunities then lending is at a sub-optimal level and  
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56 banks suffer from lower profit, some of which could be used for future lending. On the  
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3 demand-side, when entrepreneurs with viable investment opportunities do not access loans  
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5 which they would have received, then there is a sub-optimal level of investment (under-  
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7 investment) from the entrepreneurial sector, and this can result in lower returns to  
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9 entrepreneurial ability (human capital) at the micro level and lower rates of innovation,  
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11 fewer jobs created, and generally lower levels of economic growth at the macro level.  
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14 In the context of our study, what happens in the market for small business finance when  
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16 an economy has entered a deep and persistent economic recession, which the UK did in  
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18 September 2008, is of great importance. Lown and Morgan (2006) examined how banks  
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20 credit standards (non-price loan contract features) impact on future credit rationing. The  
21  
22 overarching question posed was, 'To what extent do banks allocate business loans by  
23  
24 changing standards compared to loan rates?' Their evidence shows that the credit cycle and  
25  
26 the business cycle act in opposite ways as far as loan supply is concerned. They conclude  
27  
28 that credit standards are more informative about future lending than are loan rates, i.e. loans  
29  
30 are rationed via changes in standards not rates. In a related paper, Hanousek and Filer (2004)  
31  
32 argue that the way that banks allocate loanable funds is the main cause of credit rationing for  
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34 small firms, as investment generally flows to industries (not explicitly firms) with the  
35  
36 greatest profit potential.  
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40 Thus there appears to be a gap in our knowledge in terms of what really happens to  
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42 SMEs' lending from the demand-side (as well as a supply-side) when an economic downturn  
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44 occurs and persists for a number of years. This is important as loan applications are not  
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46 costless and involve collating financial information and formalising an investment focused  
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48 business plan with cash-flows forecasts and revenue projections. Further, these costs are  
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50 likely to vary substantially across entrepreneurs, with relatively inexperienced entrepreneurs  
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52 incurring the highest application costs. Thus we focus on the demand for credit from  
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54 entrepreneurs and how this is affected by dynamics on the supply-side of the credit market in  
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3 a prolonged recessionary environment. This is outside of the more traditional focus of credit  
4 rationing theories which focus on lenders (suppliers of credit) inability to accurately assess  
5 (entrepreneurs) risk due to information problems.  
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9 Based on the above discussion, we formulate the following hypotheses regarding small  
10 business loan demand:  
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13 **H<sub>D1</sub>**: More profitable SMEs are less likely to seek bank finance.

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15 **H<sub>D2</sub>**: SMEs with higher owner control interests are less likely to seek bank finance.

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17 **H<sub>D3</sub>**: In a recessionary environment, SMEs are more likely to incorrectly assess firm-  
18 level risks so more risky SMEs are more likely to apply for bank finance.  
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22 **H<sub>D4</sub>**: SMEs with higher credit support and lower financial delinquency are more likely  
23 to have a higher demand for bank finance.  
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### 25 26 27 2.3. *Rationale, Practices and Effectiveness of Government Support Initiatives* 28

29 Lerner (1999) suggests that the rationales for public intervention to improve SMEs'  
30 ability to access to private financing are twofold. First, the spillover hypothesis argues that  
31 SMEs are able to generate positive externalities, by creating new jobs, new ideas, and new  
32 abilities that other industries and the economy as a whole may enjoy (Cressy and Olofsson  
33 1997; Cressy, 2002; Lerner, 1999). The second rationale for government intervention is the  
34 existence of market failures, such as the presence of asymmetric information in terms of  
35 adverse selection and moral hazard (Hyytinen and Väänänen, 2006). Thus, the availability of  
36 risk capital for small and highly innovative companies, young enterprises, and firms located  
37 in depressed areas has been a key policy issue for the government in order to promote not  
38 only the growth of these SMEs, but also the whole economy (Lawton, 2002).  
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52 In terms of difficulties of SMEs in accessing debt capital, (partial) credit guarantee  
53 schemes are the most widely used, and long-standing, public policy supporting mechanism  
54 worldwide (Cowling and Siepel (2013) provide a review on several international loan  
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3 guarantee schemes) given the commonly existed credit rationing in small firm loan market  
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5 (Cowling and Mitchell, 2003; Honaghan, 2008; Klapper et al., 2006; Riding, 1998). The  
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7 objective of such schemes is almost unanimously to provide loan security to SMEs who  
8  
9 would not otherwise be able to obtain debt finance through conventional means (Cowling  
10  
11 and Clay, 1995; Riding, 1998).  
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14  
15 However, empirical evidence regarding the effectiveness of loan guarantee schemes  
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17 remains mixed (Cowling and Siepel, 2013) and it is still a major policy challenge to ensure  
18  
19 that public interventions actually assist small firms, not subsidise risky firms (Astebro and  
20  
21 Bernhardt, 2003; Riding, 1998). In terms of the UK experience, the Small Firm Loan  
22  
23 Guarantee (SFLG) programme has been the Government's primary debt finance instrument  
24  
25 over the past decades until it was replaced by the Enterprise Finance Guarantee (EFG)  
26  
27 programme in 2009. The aim of SFLG is to assist viable, debt-appropriate businesses that  
28  
29 lack sufficient collateral to access loan finance in the market (Graham, 2004). Recently,  
30  
31 there has been a series of empirical studies that evaluate the effectiveness and performance  
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33 of the programme (Cowling, 2007a, 2007b, 2008, 2010; Cowling and Mitchell, 2003;  
34  
35 Cowling and Siepel, 2013). Generally speaking, empirical evidence suggests that the  
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37 rationale for public intervention is justified in the sense that SFLG has allowed certain types  
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39 of small firm borrowers to access bank funding (Cowling, 2010) and/or improved supported  
40  
41 firms' performance (Cowling and Siepel, 2013). However, the true extent of credit rationing  
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43 and thus the rationale for SFLG is found to be inconclusive (Cowling, 2010) and its ability to  
44  
45 correct for capital market imperfections limited (Cowling and Mitchell, 2003). Further,  
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47 Graham (2004) questioned the effectiveness and relevance of SFLG under the current  
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49 economic context. EGF was introduced as a Government response to Graham  
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51 recommendations in order to improve the availability of capital to a wider range of  
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53 businesses yet it is too early to assess the appropriateness of this response.  
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### 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

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3 sectors to be increased, in particular for Agriculture and Hotels. The weighting regime was  
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5 initially applied separately to each quarter. The six were then combined and grossed to the  
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7 total of 4,548,843 SMEs, based on BIS SME data. This ensured that each individual wave is  
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9 representative of all SMEs while the total interviews conducted are weighted to the total of  
10  
11 all SMEs.  
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### 13 14 3.2. *Dependent variables*

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16 Panel A of Table 1 shows the definition of dependent variables, which capture SMEs'  
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18 demand for, and banks supply of, external finance. Both variables are binary variables and  
19  
20 static in nature. Demand for finance is defined as whether firm owners reported having  
21  
22 sought/applied for finance for their businesses in the previous twelve months. Supply of  
23  
24 finance is defined as whether the firm obtained (all or part of) the finance required. On  
25  
26 average between July 2011 and March 2013, 17.4% of smaller firms had sought debt finance.  
27  
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### 29 30 3.3. *Explanatory variables*

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32 Independent variables in this study can be classified into four groups: firm  
33  
34 characteristics, owner characteristics, time indicators, and firm-level risk indicators. As  
35  
36 discussed in the previous section, these variables are related to the development stage of the  
37  
38 firm and the degree of information opacity between the firm and finance suppliers, which  
39  
40 have been shown to be significant in explaining the supply of and demand for finance by  
41  
42 prior studies. Panel B of Table 1 defines the explanatory variables by these four groups.  
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45  
46 Firm characteristics include size, legal status, sector, firm age, and performance. Firm  
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48 size is measured by sales turnover. This is grouped into 9 bands with an upper limit of  
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50 £9.99m. Legal status is defined by four categories including sole trader, partnership, LLP  
51  
52 and Limited liability. Sector is defined as nine one-digit SIC codes. Age is defined in six  
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54 categories from <12 months old to >15 years old. We have two measures of performance  
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56 available to us. Firstly, we have a profit dummy variable and secondly a fast-growth variable.  
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3 Owner characteristics or human capital measures consist of gender, (highest) formal  
4 educational qualification, prior business experience, and whether or not the owner holds a  
5 financial qualification.  
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10 Firm-level risk indicators include the Experian risk classification and six independent  
11 measures of financial delinquency including non-payment of loans, unauthorised overdraft  
12 borrowing, bouncing cheques, County Court Judgements, late payment of tax, and trade  
13 credit restrictions.  
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18 We also consider additional control variables regarding the firm's source of finance,  
19 business activities and possible credit support provided for finance application. Regarding  
20 the source of finance, we look at whether a firm has any other loans outstanding at the time  
21 of application or use own equity to fund the firm. Business activities concern firms'  
22 operating behaviours including innovation, the development of new process and products,  
23 and the degree of internationalisation (whether the firm exports products overseas). The  
24 availability of business plans and collateral is used as a proxy for financial security or credit  
25 support for the firm's application.  
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37 [INSERT TABLE 1 HERE]  
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#### 40 3.4. Descriptive statistics 41

42 Table 2 reports the descriptive statistics of dependent and independent variables. The  
43 data for loan demand (*SOUGHT*) shows that on average over the period measured 17.4% of  
44 business owners had sought external finance. The lowest level of demand was in November  
45 2011 when only 10.5% of firms applied for funds. This is approximately half the level  
46 recorded in May 2012 when 21.0% applied for funds. In an earlier study on the finance of  
47 UK SMEs between 2008 and 2010, which covered the whole duration of the official  
48 recession (Cowling, Liu and Ledger, 2012), loan demand is found to be higher (24%),  
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3 though the study was based on a different sample of SMEs. This may imply the  
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5 improvement of UK SMEs' average cash position in the post-recession periods, which  
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7 serves to reduce firms' demand for external sources of capital.  
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10 Among those requiring finance, on average 83.3% were successful in raising a loan.  
11  
12 This is lower than the pre-recession figure of almost 90%, but higher than the 70% success  
13  
14 rate reported for UK SMEs in the 2008-2010 period (Cowling, Liu and Ledger, 2012). Again  
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16 there is variation over time. Here we note that the lowest success rate for loan applications  
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18 was 67.5% in November 2011, and the highest success rate was 89.8% in March 2012.  
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20 Figure 2 and Figure 3 illustrates the changing dynamics of loan demand and supply during  
21  
22 the next phase of the recession (between July 2011 and March 2013).  
23  
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25  
26 **Fig 2: Loan Demand**

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28 [INSERT FIG 2 HERE]  
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32 **Fig 3: Loan Supply**

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34 [INSERT FIG 3 HERE]  
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39 The two key dynamics in terms of both loan demand and loan supply are (a) that they  
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41 rose over time as more loans were requested and a higher proportion were granted, and,  
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43 (b) that both demand and supply became more stable and less subject to variation quarter to  
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45 quarter. This suggests that the market is moving back onto a stable equilibrium path after the  
46  
47 obvious mismatch between supply and demand for loans in the immediate aftermath of the  
48  
49 financial crisis and the first two years of recession (as identified in Cowling, Liu and Ledger,  
50  
51 2012). It is worth noting that the equivalent figures for 2007, when the UK economy was in  
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53 a boom were demand at 26.8% of SMEs and supply of loans had an 89.3% application  
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55 success rate. This evidence poses questions about the scale of any lending shortfalls assumed  
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3 by the UK Government's "Business Bank" proposal, although it is too early to factor in the  
4 effects of the Basle III capital adequacy requirements on credit availability.  
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#### 7 8 **4. Multivariate regression results** 9

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11 Here we econometrically model the demand for and supply of external debt finance  
12 between July 2011 and March 2013, the third and fourth years of the current economic  
13 recession. The demand-side variable is named *SOUGHT*, and is coded 1 if a business sought  
14 external finance and 0 otherwise. The supply-side variable is named *GOT*, and is coded 1 if  
15 the business who sought external finance was successful in securing at least part of the  
16 finance and 0 if they were unsuccessful. By definition, the outcome of a finance application  
17 is only recorded if a firm actually sought finance (Cosh et al., 2009). As both of the  
18 dependent variables are by construction binary variables, a probit model with selection<sup>1</sup> is  
19 used and the maximum likelihood coefficient estimates are shown in Table 3<sup>2</sup>. We use this  
20 econometric method, to test for sample selection effects given the possible non-randomness  
21 of loan application decisions. We are particularly interested in how demand and supply  
22 changes when the economy moves deeper into a prolonged recession so we are particularly  
23 interested in the time dynamics. For the identification to be valid, the model requires that the  
24 selection (i.e. demand) equation includes at least one variable that is not included in the main  
25 probit (i.e. supply) equation. Here we use 12 geographical region indicators as the demand-  
26 specific variables in the model as they are found to be significantly associated with loan  
27 demand but have no explanatory power for loan supply.  
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50 Model 1 of Table 3 is our primary regression for credit demand and supply. The  
51 correlation coefficient between the selection and main equations is -0.79 and is significant at  
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56 <sup>1</sup> See Van de Ven and Van Pragg (1981) for an introduction of the model.

57 <sup>2</sup> As an alternative, we also fitted the data using the logit model and the results are not significantly different  
58 from the probit estimations.  
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3 1 per cent level, indicating the existence of selection bias and the validity of our model.  
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5 However, the negative value implies that loan applicants have a *lower* chance to get the loan  
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7 than either a random business or a non-applicant. On the one hand, it is possible that higher-  
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9 quality firms underestimate the true supply of credit during the recession thus choose to  
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11 scale down their investment activities. On the other hand, this could be a sign of credit  
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13 market inefficiency as loan suppliers have failed to create a self-selection mechanism  
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15 through which lower-quality businesses are discouraged from borrowing in the first place. It  
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17 can be seen that the demand for debt finance is increasing in a monotonic way in firm size  
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19 (measured by sales turnover). Demand is also positively related to firm age. Prior  
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21 performance is found to have different effects on the demand for finance. Here we find that  
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23 profitable firms had a lower demand for finance, in line with an increased ability to self-  
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25 finance and more broadly with pecking order theories (Cosh et al., 2009), which is consistent  
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27 with  $H_{D1}$ . But fast growth firms had a marginally higher demand for external debt  
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29 (significant at the 10% level). Legal form was found to differentiate between firms. Here  
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31 partnerships had the highest loan demand and LLP's the lowest demand. At the sector level  
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33 we see the highest level of demand for loans amongst manufacturers. Consistent with earlier  
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35 research (Carter and Shaw, 2006; Coleman and Cohn, 2000; Cowling, Liu and Ledger, 2012),  
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37 female entrepreneurs are less likely to seek external finance than male entrepreneurs. This  
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39 suggests that risk aversion based theories might help explain why women appear more  
40  
41 reluctant to borrow than men. Interestingly, loan demand approximated an inverted 'U'  
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43 shape for both owners business experience and owners education, peaking amongst owners  
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45 with 10-15 years experience and amongst owners with school and lower level vocational  
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47 qualifications. In terms of the time dynamics of loan demand, we observe an inverted 'U'  
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49 shape with demand low at the start of the period in July 2011 and the end of the period,  
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51 March 2011. The local peak in loan demand was in May 2012.  
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3 Our key findings here relate to risk and financial delinquency. If more risky firms with  
4 a track record of financial delinquency are more likely to seek loans, then it should not be a  
5 public policy issue if they fail to receive them. This would be behaviours consistent with  
6 banks acting rationally. The results show quite clearly that loan demand is increasing with  
7 the risk (as measured by the Experian credit rating) of a firm. In short the less creditworthy a  
8 firm is, the more likely they are to ask for a loan. This is a sign that SMEs in an economic  
9 downturn appear to be over-optimistic and incorrectly assess their risk, thus providing  
10 support for H<sub>D3</sub>. In addition, we find that firms that have unauthorised overdraft are also  
11 more likely to request a loan, as is the case for firms with late tax payments who have a  
12 higher probability of seeking a loan. In contrast, firms that are bouncing cheques (having  
13 them re-presented to the bank due to insufficient funds) have a lower probability demanding  
14 a loan. Therefore, H<sub>D4</sub> is only partly supported.

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16 Adding further controls to the model reduces the correlation between the selection and  
17 main equations, but it is still significant at 10% level. Firms with no loans outstanding at  
18 time of application prefer to remain unlevered, whilst SMEs financed using own equity are  
19 more likely to apply for bank finance, implying that entrepreneurs with control interests are  
20 reluctant to give up their controls so they prefer debt to equity finance (H<sub>D2</sub>). Businesses that  
21 introduced new process are more likely to apply for finance but the odds of firms with new  
22 products applying for finance are on the other hand, lower. Loan demands are higher for  
23 firms with formal business plans, which is usually an essential prerequisite for banks to  
24 process the firms' applications.

25  
26 Here we consider the supply of loans (*GOT*) conditional upon the firm applying in the  
27 first place. The first points of note are that firm size and sector did not appear to play a major  
28 role in the determination of whether or not a loan application was granted. The latter finding  
29 contradicts the argument of Hanousek and Filer (2004) that credit flows to industries with

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3 the greatest profit potential. It also questions the role that firm size has in reducing  
4 information asymmetries, achieving economies of scale in lending, and reducing transactions  
5 costs (Berger and Udell, 1998; Cassar, 2004; Titman and Wessels, 1988; Wald, 1999). But it  
6 was also the case that there was a positive and significant effect of firm age on the  
7 probability of being offered a loan, having applied. The finding is in line with the  
8 conventional wisdom that banks are less likely to provide finance to seed or start-up firms  
9 given their risk, thus providing support for H<sub>5</sub>1. It suggests that the early UK recession  
10 findings that banks moved to a smaller set of key risk indicators including firm age when  
11 there was uncertainty in the economy (Cowling, Liu and Ledger, 2012) still hold over the  
12 entire and prolonged recessionary cycle. Legal status was also important with limited  
13 liability firms having the highest probability of being granted a loan, which offers support  
14 for credibility and legitimacy theories.  
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30 The results also show that fast growth firms are marginally less likely to secure loans  
31 which might suggest that banks prefer incremental (managed) growth than the risk of  
32 accelerated growth. Previous profitability also had no bearing on the banks loan decision.  
33 But women entrepreneurs had a higher loan approval rate, despite a lower general demand  
34 for loans. Perhaps surprisingly, entrepreneurial experience was not found to influence the  
35 banks' loan decision but entrepreneurs with financial qualifications were more likely to be  
36 granted loans. The latter effect suggests that banks respond favourably to evidence of formal  
37 human capital which manifests itself through more sophisticated, and possibly realistic,  
38 financial projections in loan applications. This finding does not appear to hold for more  
39 general formal human capital captured by educational qualifications. In fact the results  
40 suggest that mid-range, vocational, qualifications (e.g HNC, BTEC and professional  
41 qualifications) reduce the probability of loan applications being granted.  
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3 On risk per se, the results strongly suggest that banks dislike any level of risk above the  
4 most minimal. The predicted success rate for firms with a minimal risk credit rating is  
5 97.3%, but for firms with above average risk this declines to 60.1%. We also find that our  
6 measures of financial delinquency, with the notable exception of late tax payments, all  
7 reduced the probability of loan requests being granted. In order of importance problems with  
8 accessing trade credit was the most limiting factor for banks, followed by County Court  
9 Judgements (CCJs), bouncing cheques, and then unauthorised overdraft facilities and  
10 missing loan repayments. Therefore, H<sub>5</sub>2 is fully supported.  
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21 We also estimated the same general model but replaced the individual financial  
22 delinquency variables with a single count variable of the number of instances of financial  
23 delinquency for each firm. We also allowed for a squared term for this count variable to  
24 capture any non-linear structure to the effects. The predicted effect on loan supply is quite  
25 dramatic in that any financial delinquency reduces loan supply. But the key feature is that for  
26 any financial delinquency count over two instances, the probability of a loan request being  
27 granted is increasingly unlikely.  
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37 It is very clear that banks take any evidence of risk and financial delinquency very  
38 seriously and this forms a huge part of their decision to lend or not to lend when presented  
39 with a loan application. Stability and track record, captured in older firms, also gives banks a  
40 greater sense of security when deciding to lend or not. Further re-assurance is gained when a  
41 key member of the ownership team has a financial qualification. It is also clear that even in  
42 recession the majority of firms that seek bank loans receive them. But it is also clear that  
43 high risk and/or low quality firms who seek funding are increasingly less likely to get loans  
44 in a prolonged recession.  
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55 Some of the additional control variables are also found to be significantly associated  
56 with the likelihood of loan approval. Firms with no loan outstanding and thus a lower credit  
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3 risk are more likely to get the finance required. On the other hand, firms financed using own  
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5 equity have a lower probability of success in loan applications. This finding is generally in  
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7 line with traditional corporate control theories, where the cost of monitoring (stockholders'  
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9 behaviours) is an important concern for debt investors. Interestingly, firms that introduce  
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11 new products or export overseas during an economic downturn have lower odds of  
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13 successful application, probably because of the higher cost and therefore higher risks  
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15 associated with such activities. This finding warrants an interesting future research topic that  
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17 links SMEs recessionary business strategy to entrepreneurial finance. Finally, the availability  
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19 of collateral increases the chance of securing the needed finance (H<sub>S3</sub>). Business plan has a  
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21 counter-intuitive effect on loan supply ( $\beta = -0.097$ ), although the coefficient estimate is only  
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23 significant at 10 per cent level.  
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28 As a robustness check, we further differentiate loan application outcomes by dividing  
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30 successful applicants into those that got all the finance required (fully financed) and those  
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32 only securing part of the finance needed (partially rationed). We use the multinomial logit  
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34 model to compare the characteristics of non-applicants, fully rationed (failed), partially  
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36 rationed and fully financed applicants, with fully financed applicants as the base category  
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38 (results reported in the Appendix). Using multinomial logit regression ignores the obvious  
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40 and significant conditionality between loan supply and demand, so the results should be  
41  
42 viewed with caution. Our main finding here, is that there is no systematic difference between  
43  
44 firms that got all and part of the finance sought. The only criterion that differentiates  
45  
46 partially rationed firms from their 'more successful' counterparts is the degree of financial  
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48 delinquency: SMEs with records of unauthorised overdraft and/or problems in getting trade  
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50 credit are less likely to get the full amount of finance required. Other than that, the findings  
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52 are generally in line with our main empirical models.  
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## 57 **5. Discussion and conclusion**

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3 It is very clear that banks take any evidence of risk and financial delinquency very  
4 seriously and this forms a huge part of their decision to lend or not to lend when presented  
5 with a loan application. Stability and track record, captured in older firms, also gives banks a  
6 greater sense of security when deciding to lend or not. Further re-assurance is gained when a  
7 key member of the ownership team has a financial qualification. It is also clear that even in  
8 recession the majority of firms that seek bank loans receive them. But it is also clear that  
9 high risk and/or low quality firms who seek funding are increasing less likely to get loans in  
10 a prolonged recession.  
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21 So where do the mismatches occur between firms seeking loans and banks supplying  
22 them? And is there evidence that some good firms are not getting loans or is it simply that  
23 too many bad quality firms are applying for loans. The former would be evidence in support  
24 of the UK governments 'Business Bank' and the latter evidence in favour of banks acting  
25 rationally, and diligently, in the face of huge liquidity issues and the implementation of the  
26 Basle III regime in Europe.  
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35 We do find evidence of a deterrent effect in the market as the firms and entrepreneurs  
36 least likely to get offered a loan do not apply in the first place. This suggests that information  
37 based problems may not be as acute as assumed. But this is confounded by our evidence that  
38 loan demand is strongly increasing in firm risk whilst loan supply is strongly decreasing in  
39 firm risk. This is supportive of the de Meza and Southey (1996) over-optimism arguments.  
40 The evidence also points to the fact that firms with a record of financial delinquency also  
41 have a higher demand for loans but are also less likely to receive them, which is generally  
42 supportive of the argument that banks are efficient and rational processors of information.  
43 This presents an interesting quandary. Firstly, we could simply say that banks are being  
44 perfectly rational in denying firms with a bad track record of financial delinquency loans.  
45 But we could also argue that if the underlying quality of the firm is good, and they are  
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3 simply experiencing cash flow problems in the recession, then denying loans to such firms is  
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5 exacerbating these short-term problems.  
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8 What is also clear, as we enter the fifth year of recession, is that loans are more widely  
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10 available in general, particularly when compared to the first two years of recession. In this  
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12 sense it could be argued that the case for public intervention, certainly on the scale proposed  
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14 by the UK Government for the “Business Bank”, is debatable. In terms of predicted total  
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16 numbers of SMEs denied loans we calculate that it is around 40,000 firms currently. But if  
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18 we exclude the very highest risk class of firms, this estimate falls to around 30,000 firms out  
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20 of a total SME sector of 1.21m firms (Fig 4). Note that this estimate excludes single self-  
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22 employed individuals and their firms which represent 74.53% of the total UK stock.  
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26 **Fig 4: Predicted total number of firms denied loans**

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28 [INSERT FIG 4 HERE]  
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31 We conclude that banks have obviously become more cautious when making lending  
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33 decisions. This is evident as lenders have shifted away from informal human capital criteria  
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35 (e.g. experience) towards more direct measures of credit risk including credit ratings and  
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37 instances of financial delinquency. In addition, firm age is also important with older firms  
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39 deemed less risky to lend to. Financial constraints are evident during the recession but they  
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41 are not observed consistently across all periods. It is also clear that business cycle theories of  
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43 investment and financing have a great deal of empirical support and traction in recessionary  
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45 environments.  
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**Table 1**  
**Variable definitions**

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

**Table 2**  
**Variable Descriptive Statistics**

<b>Panel A: Dependent variables</b>			
Group	Variable Name	Mean	Std Dev
<b>Demand for finance</b>	<i>SOUGHT</i>	0.1735	0.3787
<b>Supply of finance</b>	<i>GOT</i>	0.8489	0.3582
<b>Panel B: Independent variables</b>			
Group	Variable Name		
<b>Firm-characteristics</b>			
Size	<i>SALES_BAND</i>		
	<£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	<i>LEGAL</i>		
	Sole proprietorship	0.6740	
	Partnership	0.0486	
	Limited liability partnership (LLP)	0.0149	
	Limited liability(LTD)	0.2624	
Industry sector	<i>SECTOR</i>		
	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	<i>FIRM_AGE</i>		
	<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	<i>PROFIT</i>	0.6798	0.4666
	<i>FAST_GROWTH</i>	0.1249	0.3307
<b>Owner characteristics</b>			
Gender	<i>WLED</i>	0.2546	0.4357
Education	<i>ONWER_EDUC</i>		
	None	0.1271	

1			
2			
3		GCSE	0.1370
4		A level	0.0799
5		HNC	0.0625
6		BTEC	0.1906
7		Professional qualification	0.1128
8		Degree	0.1395
9		Post graduate degree	0.0930
10		Other	0.0108
11			
12	Prior experience	<i>OWNER_EXP</i>	
13		<12 months	0.0549
14		1-2 years	0.1528
15		2-5 years	0.1460
16		6-9 years	0.0984
17		10-15 years	0.1551
18		15+ years	0.3837
19	Financial	<i>FIN_QUAL</i>	0.3861
20	Qualification		0.4869
21	Time indicators		
22		<i>WAVE1</i>	0.1691
23		<i>WAVE2</i>	0.1689
24		<i>WAVE3</i>	0.1674
25		<i>WAVE4</i>	0.1678
26		<i>WAVE5</i>	0.1671
27		<i>WAVE6</i>	0.1597
28			
29	<b>Risk indicators</b>		
30	Experian Credit Rating	<i>RISK</i>	
31		Minimal	0.0451
32		Low	0.0999
33		Average	0.2693
34		Above average	0.4377
35		Not known	0.1480
36			
37	<b>Financial Delinquency</b>		
38	Missed loan repayment	<i>FD_LR</i>	0.0152
39	Unauthorised overdraft facility	<i>FD_OD</i>	0.0684
40	Bounced cheques	<i>FD_BC</i>	0.0550
41	County court judgement	<i>FD_CCJ</i>	0.0123
42	Late tax	<i>FD_TAX</i>	0.0493
43	Trade credit restrictions	<i>FD_TCR</i>	0.0322
44	None	<i>FD_NONE</i>	0.8368
45			0.3695
46	<b>Additional Controls</b>		
47	Source of funds	<i>NO_OTHER_LOAN</i>	0.8331
48		<i>OWN_EQUITY</i>	0.0948
49	Business activities	<i>INNOVATOR</i>	0.4774
50		<i>NEW_PROCESS</i>	0.3041
51		<i>NEW_PRODUCTS</i>	0.2094
52		<i>EXPORTER</i>	0.1214
53	Credit support	<i>BUSINESS PLAN</i>	0.4248
54		<i>COLLATERAL</i>	0.2571

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

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**Table 3**  
**Loan Demand and Supply Probit Models with Sample Selection**

		Model 1				Model 2			
Independent variables		GOT SOUGHT		SOUGHT		GOT SOUGHT		SOUGHT	
Group	Variable Name	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
<b>Firm Characteristics</b>									
Size	<i>SALES_BAND</i>								
	£25,000 - £49,999	-0.062	0.080	0.154***	0.038	0.005	0.103	0.111***	0.042
	£50,000 - £74,999	-0.227**	0.092	0.388***	0.043	-0.073	0.119	0.293***	0.048
	£75,000 - £99,999	-0.075	0.111	0.457***	0.047	0.179	0.142	0.315***	0.053
	£100,000 - £499,999	-0.209**	0.088	0.590***	0.036	-0.022	0.115	0.409***	0.041
	£500,000 - £999,999	-0.130	0.100	0.498***	0.042	0.030	0.127	0.317***	0.047
	£1m - £1.99m	-0.183*	0.106	0.697***	0.043	0.051	0.135	0.389***	0.048
	£2m - £4.9m	-0.052	0.121	0.751***	0.045	0.250*	0.156	0.451***	0.051
	£5m - £9.9m	-0.104	0.143	0.747***	0.054	0.206	0.182	0.409***	0.061
Legal	<i>LEGAL</i>								
status	Partnership	0.077	0.076	0.227***	0.033	0.214**	0.096	0.162***	0.036
	LLP	0.468***	0.141	-0.293***	0.049	0.403**	0.177	-0.303***	0.055
	LTD	0.006	0.053	-0.029	0.026	0.027	0.070	-0.090***	0.029
Industry	<i>SECTOR</i>								
sector	Manufacturing	-0.014	0.097	-0.365***	0.041	-0.018	0.126	-0.303***	0.046
	Construction	0.089	0.088	-0.410***	0.037	-0.053	0.116	-0.318***	0.041
	Wholesale / retail	0.183*	0.099	-0.301***	0.040	0.171	0.125	-0.246***	0.045
	Hotels / catering	-0.149	0.100	-0.396***	0.042	-0.278**	0.131	-0.339***	0.047
	Transport & com	-0.062	0.097	-0.303***	0.042	-0.166	0.125	-0.252***	0.046
	Business services	0.053	0.089	-0.345***	0.037	0.021	0.117	-0.333***	0.041
	Health	0.061	0.105	-0.326***	0.043	0.016	0.136	-0.323***	0.048
	Other community	0.032	0.099	-0.434***	0.040	-0.023	0.131	-0.436***	0.045
Age	<i>FIRM_AGE</i>								
	1-2 years	0.027	0.111	0.057	0.065	0.062***	0.145	0.058	0.074
	2-5 years	0.400***	0.122	0.066	0.059	0.493***	0.152	0.126*	0.067
	6-9 years	0.574***	0.136	0.174***	0.060	0.703***	0.172	0.243***	0.068
	10-15 years	0.560***	0.140	0.235***	0.060	0.686***	0.177	0.322***	0.068
	15+ years	0.568***	0.138	0.238***	0.059	0.663***	0.176	0.328***	0.067
Performance	<i>PROFIT</i>	0.019	0.018	-0.070***	0.008	0.176***	0.055	0.005	0.022
	<i>FAST_GROWTH</i>	-0.098*	0.054	0.043	0.025	-0.048	0.070	0.019	0.028
<b>Owner Characteristics</b>									
Gender	<i>WLED</i>	0.095**	0.046	-0.046***	0.020	0.102*	0.059	-0.063***	0.023
Education	<i>ONWER_EDUC</i>								
	GCSE	-0.132*	0.074	0.254***	0.034	-0.088	0.097	0.219***	0.038
	A level	0.032	0.093	0.226***	0.040	0.204*	0.122	0.155***	0.044
	HNC	-0.245***	0.088	0.231***	0.043	-0.193*	0.114	0.129***	0.048
	BTEC	-0.176**	0.074	0.193***	0.035	-0.144	0.097	0.150***	0.039
	Professional	-0.186**	0.077	0.210***	0.035	-0.187*	0.101	0.170***	0.039
	Degree	-0.106	0.076	0.169***	0.034	-0.015	0.101	0.112***	0.038
	Postgraduate	-0.063	0.087	0.103***	0.038	-0.001	0.113	0.067	0.043
	Other	-0.073	0.219	0.348***	0.099	-0.088	0.256	0.205*	0.113

1										
2										
3										
4	Prior	<i>OWNER_EXP</i>								
5	experience	1-2 years	-0.119	0.154	0.177**	0.082	-0.001	0.206	0.230**	0.095
6		2-5 years	-0.046	0.157	0.170**	0.082	0.060	0.210	0.207**	0.094
7		6-9 years	-0.210	0.160	0.162**	0.084	-0.109	0.214	0.193**	0.096
8		10-15 years	-0.142	0.155	0.254***	0.080	-0.004	0.208	0.270***	0.093
9		15+ years	0.006	0.154	0.213***	0.079	0.143	0.208	0.259***	0.091
10		<i>FIN_QUAL</i>	0.096	0.044	0.002	0.019	0.161	0.056	-0.048**	0.021
11		<b>Time Indicators</b>								
12		<i>WAVE2</i>	0.010	0.063	-0.143***	0.030	-0.017	0.083	-0.122***	0.035
13		<i>WAVE3</i>	0.144**	0.073	0.310***	0.028	0.153	0.108	0.548***	0.032
14		<i>WAVE4</i>	0.195***	0.076	0.336***	0.028	0.267**	0.119	0.582***	0.032
15		<i>WAVE5</i>	0.032	0.067	0.301***	0.028	0.024	0.101	0.521***	0.032
16		<i>WAVE6</i>	0.163**	0.071	-0.017	0.034	0.037	0.096	0.263***	0.039
17		<b>Risk Indicators</b>								
18		<b>Experian</b>								
19		<i>RISK</i>								
20	Credit Rating	Low	-0.201**	0.084	0.232***	0.029	-0.173	0.110	0.188***	0.032
21		Average	-0.273***	0.082	0.327***	0.028	-0.245**	0.108	0.258***	0.032
22		Above average	-0.383***	0.083	0.357***	0.031	-0.359***	0.109	0.265***	0.035
23		Not known	-0.382***	0.095	0.316***	0.038	-0.388***	0.123	0.257***	0.043
24		<b>Financial Delinquency</b>								
25		<i>FD_LR</i>	-0.187*	0.105	0.062	0.070	-0.204	0.130	0.027	0.077
26		<i>FD_OD</i>	-0.172***	0.066	0.345***	0.039	-0.097	0.084	0.271***	0.043
27		<i>FD_BC</i>	-0.213***	0.068	-0.092**	0.040	-0.318***	0.086	-0.109**	0.044
28		<i>FD_CCJ</i>	-0.369***	0.113	-0.064	0.071	-0.411***	0.142	-0.141*	0.079
29		<i>FD_TAX</i>	-0.019	0.065	0.114***	0.040	-0.021	0.081	0.047	0.044
30		<i>FD_TCR</i>	-0.501***	0.076	0.007	0.045	-0.586***	0.099	-0.090*	0.050
31		<i>FD_NONE</i>	0.343***	0.067	-0.284***	0.040	0.271***	0.085	-0.180***	0.044
32		<b>Additional Control Variables</b>								
33		<b>Source of funds</b>								
34		<i>NO_OTHER_LOAN</i>					1.095***	0.192	-1.694***	0.023
35		<i>OWN_EQUITY</i>					-0.355***	0.069	0.316***	0.030
36		<b>Business activities</b>								
37		<i>INNOVATOR</i>					-0.040	0.138	0.046	0.055
38		<i>NEW_PROCESS</i>					-0.072	0.128	0.108**	0.051
39		<i>NEW_PRODUCTS</i>					-0.123*	0.068	-0.061**	0.028
40		<i>EXPORTER</i>					-0.252***	0.077	-0.025	0.031
41		<b>Credit support</b>								
42		<i>BUSINESS PLAN</i>					-0.097*	0.053	0.142***	0.020
43		<i>COLLATERAL</i>					1.454***	0.132		
44		<b>Regression Diagnostics</b>								
45		<i>N Obs</i>	30,183					30,160		
46		<i>Censored</i>	23,043					23,025		
47		<i>Uncensored</i>	7,140					7,135		
48		<i>Wald <math>\chi^2</math> (64)</i>	599.45					1,172.09		
49		<i>Prob &gt; <math>\chi^2</math></i>	0.00001					0.00001		
50		<i><math>\rho</math></i>	-0.793					-0.457		
51		<i>LR Test if Independence <math>\chi^2</math> (1)</i>	7.620					2.810		
52		<i>Prob &gt; <math>\chi^2</math></i>	0.006					0.094		
53										
54										

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

## Appendix

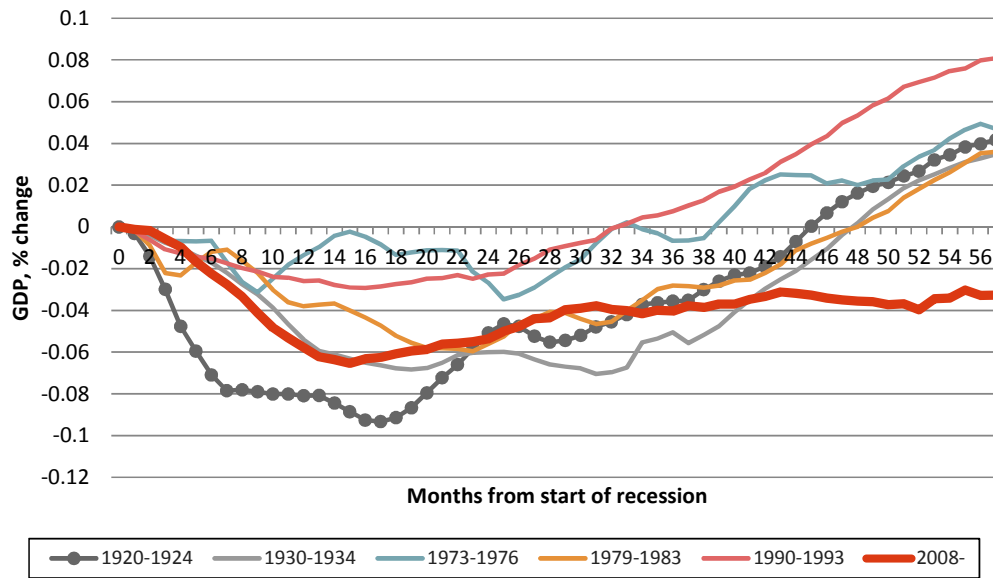
**Multinomial Logit Regression: Loan Application Outcomes**  
(Base category = fully financed applicants)

Independent variables		Non-Applicants		Partial Rationing		Full Rationing	
		(N = 23,043)		(N = 237)		(N = 716)	
Group	Variable Name	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
<b>Firm-characteristics</b>							
Size	<i>SALES_BAND</i>						
	<£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
Legal status	<i>LEGAL</i>						
	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	<i>SECTOR</i>						
	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
Age	<i>FIRM_AGE</i>						
	<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
Performance	15+ years	-0.278	0.188	-0.186	0.489	-1.280***	0.246
	<i>PROFIT</i>	-0.096	0.061	-0.087	0.158	-0.319***	0.100
	<i>FAST_GROWTH</i>	-0.045	0.077	-0.064	0.199	0.133	0.133
<b>Owner characteristics</b>							
Gender	<i>WLED</i>	0.138**	0.062	0.083	0.161	-0.176	0.111
Education	<i>ONWER_EDUC</i>						
	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

1								
2								
3								
4		BTEC	-0.128	0.113	0.443	0.292	0.142	0.180
5		Professional qualification	-0.325***	0.106	0.035	0.295	-0.009	0.186
6		Degree	-0.213**	0.106	-0.283	0.304	-0.284	0.185
7		Post graduate degree	-0.136	0.118	0.359	0.306	-0.204	0.213
8		Other	-0.838***	0.281	0.510	0.587	-0.492	0.501
9	Prior experience	<i>OWNER_EXP</i>						
10		<12 months						
11		1-2 years	-0.352	0.269	-0.269	0.642	0.021	0.342
12		2-5 years	-0.307	0.265	-0.273	0.630	-0.184	0.346
13		6-9 years	-0.295	0.268	-0.870	0.660	0.123	0.353
14		10-15 years	-0.387	0.257	-0.374	0.618	-0.095	0.335
15		15+ years	-0.355	0.254	-0.617	0.610	-0.369	0.330
16	Financial	<i>FIN_QUAL</i>	0.065	0.058	0.245	0.152	-0.240**	0.105
17	Qualification							
18	Time indicators	<i>WAVE1</i>						
19		<i>WAVE2</i>	0.236***	0.079	0.063	0.229	0.226	0.142
20		<i>WAVE3</i>	0.185**	0.084	0.444**	0.225	0.118	0.157
21		<i>WAVE4</i>	0.031	0.082	0.252	0.220	-0.144	0.153
22		<i>WAVE5</i>	0.221***	0.083	0.339	0.224	0.367***	0.144
23		<i>WAVE6</i>	0.662***	0.110	0.499*	0.295	0.697***	0.175
24								
25								
26	<b>Risk indicators</b>							
27	Experian Credit Rating	<i>RISK</i>						
28		Minimal						
29		Low	-0.255***	0.083	0.268	0.271	0.216	0.223
30		Average	-0.286***	0.083	0.195	0.269	0.324	0.213
31		Above average	-0.251***	0.092	0.485*	0.277	0.506**	0.216
32		Not known	-0.129	0.120	0.444	0.349	0.717***	0.244
33								
34	<b>Financial Delinquency</b>							
35	Missed loan repayment	<i>FD_LR</i>	0.175	0.217	-0.132	0.440	0.308	0.244
36	Unauthorised overdraft	<i>FD_OD</i>	-0.302***	0.117	0.545***	0.217	0.092	0.145
37	Bounced cheques	<i>FD_BC</i>	0.398***	0.121	0.288	0.232	0.713***	0.148
38	County court judgement	<i>FD_C CJ</i>	0.561**	0.232	-0.418	0.549	1.009***	0.252
39	Late tax	<i>FD_TAX</i>	-0.221*	0.118	0.155	0.219	-0.175	0.149
40	Trade credit restrictions	<i>FD_TCR</i>	0.479***	0.141	1.006***	0.238	1.343***	0.161
41	None	<i>FD_NONE</i>	0.188	0.121	-0.275	0.244	-0.417***	0.158
42								
43	<b>Additional Control Variables</b>							
44	Source of funds	<i>NO_OTHER_LOAN</i>	3.930***	0.053	0.230	0.162	0.093	0.106
45		<i>OWN_EQUITY</i>	-0.653***	0.076	0.314*	0.168	0.238**	0.121
46	Business activities	<i>INNOVATOR</i>	0.040	0.150	-0.025	0.356	0.066	0.258
47		<i>NEW_PROCESS</i>	-0.310**	0.138	-0.287	0.315	0.001	0.235
48		<i>NEW_PRODUCTS</i>	0.092	0.074	0.505***	0.189	0.185	0.124
49		<i>EXPORTER</i>	0.124	0.080	0.025	0.218	0.541***	0.139
50	Credit support	<i>BUSINESS PLAN</i>	-0.275***	0.055	0.083	0.150	0.045	0.098
51								
52	<b>Regression Diagnostics</b>							
53		<i>N Obs</i>	30,183					
54		<i>Log likelihood</i>	-8,609.464					
55		<i>Pseudo R<sup>2</sup></i>	0.4234					
56		<i>Wald <math>\chi^2</math> (64)</i>	12,644.57					
57								
58								
59								
60								

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

Fig 1: UK economic recessions: How recessions compare



Source: National Institute for Economic and Social Research, 2012.

Fig 2: Loan Demand Dynamics

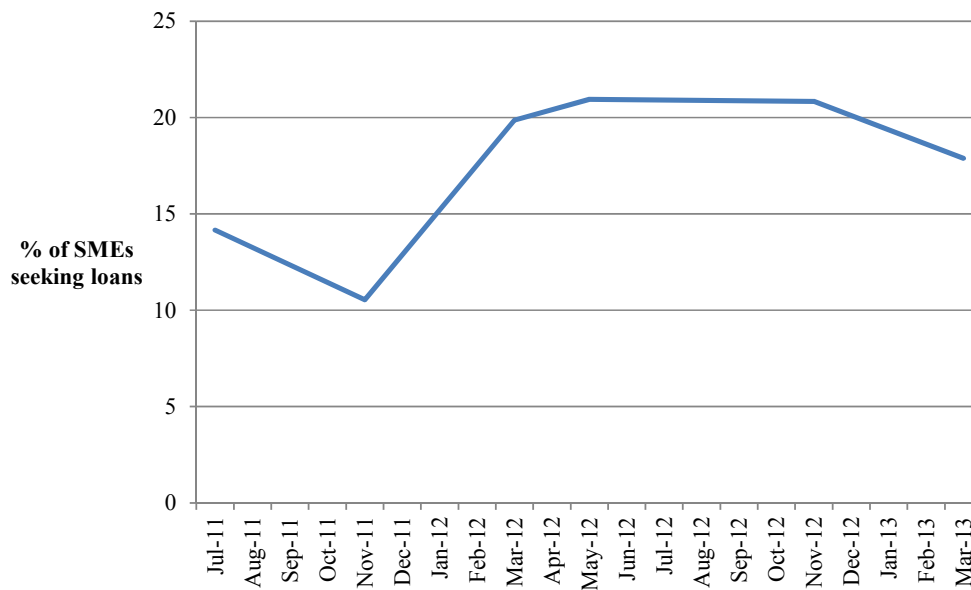


Fig 3: Loan Supply Dynamics

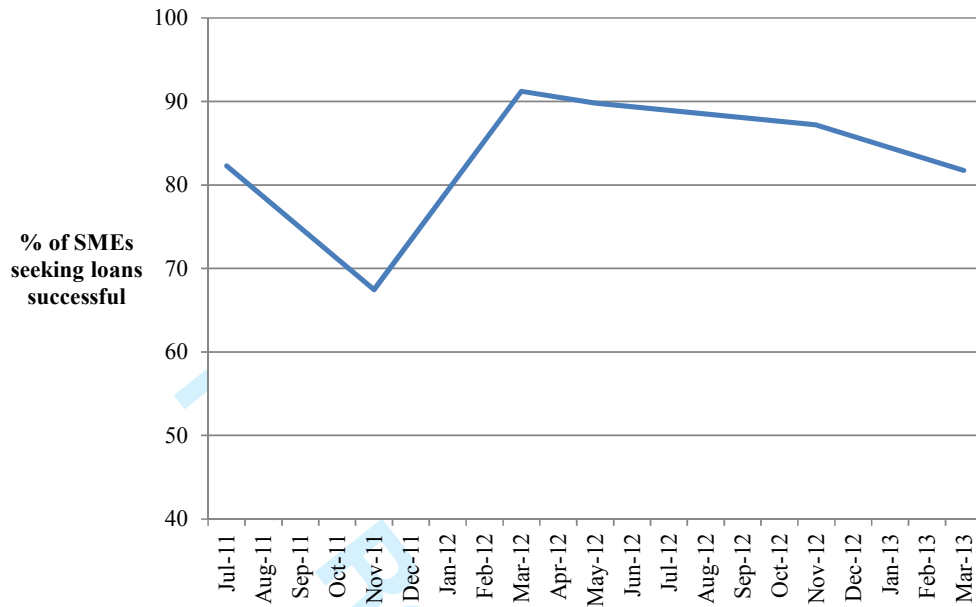


Fig 4: Predicted total number of firms denied loans

