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**BIG  
INNOVATION  
CENTRE**

**Credit after the crisis  
Access to finance for innovative small firms  
since the recession**

**Working paper**

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The Big Innovation Centre is an initiative of The Work Foundation and Lancaster University. Launched in September 2011, it brings together a range of companies, trusts, universities and public bodies to research and propose practical reforms with the ambition of making the UK a global open innovation hub as part of the urgent task of rebalancing and growing the UK economy, and with the vision of building a world-class innovation and investment ecosystem by 2025. For further details, please visit [www.biginnovationcentre.com](http://www.biginnovationcentre.com).

## Executive summary

Since the 2008 financial crisis there has been a significant tightening in credit conditions, and a dramatic reduction in bank lending to small firms. Government policy – such as the new Business Bank – has been focused on addressing this problem. A consensus has emerged that access to finance to small firms is one of the key factors holding back the national economy.

Yet only a minority of small firms will actually drive the economic recovery – most small firms have little impact on job creation. In a time of limited resources, government policy needs to prioritise the needs of innovative small firms: firms which bring new products and processes to market and which are more likely to grow. The success of these firms will be vital for the long-term health of the UK economy.

However, despite the focus of policy and the media on access to finance, there is little evidence on how access to finance for *innovative* small firms have changed since the crisis. Two important questions remain unanswered: Do innovative small firms find it harder to access finance? And how has this changed since the crisis?

This paper uses a survey of almost 12,000 SME employers to investigate whether innovative small firms – defined as those who have introduced an entirely new product or process in the previous 12 months – find it harder to access finance, and whether these problems have worsened since the financial crisis. We separate the sample into firms which were investigated before the financial crisis (2007/8) and those after it (2010 and 2012).

The findings suggest that:

- **Innovative firms are more likely to apply for finance than other firms – and the gap has increased.** In 2007/8, 28.2 per cent of innovative firms applied for finance, compared to 22.8 per cent of all firms. In 2010/12, 34.7 per cent of innovative firms applied compared to just 24.9 per cent of other firms.
- **Yet innovative firms who apply are more likely to find it hard to access finance.** Overall, 44.3 per cent of innovative firms who try to obtain finance find it difficult to do so; 32.6 per cent of other firms do.
- **Since the recession, it has become harder for all firms to obtain finance.** In 2007/8 25.9 per cent of firms who applied for finance had trouble getting it from the first source. It was 52.2 per cent in 2010 and 48.8 per cent in 2012.
- **Innovative firms are more likely to fail to obtain finance now than before the recession.** In 2010/12, over a third of innovative firms who tried to access finance were unable to obtain any (37.8 per cent). This figure had doubled since 2007/8 when only 14 per cent of innovative firms who applied found it hard to obtain. This represents a percentage point increase of 23.8 per cent. For non-innovators, the

figure also doubled: from 11.5 to 22.2 per cent, a percentage point increase of almost 11 per cent.

- **However, this is because of a general worsening of credit conditions, not specific new problems for innovative firms.** While innovative small firms have experienced problems because of the banking crisis, the problem has not been specific to innovative firms.

**In short, access to finance for innovative small firms remains a significant problem.**

Innovative small firms find it harder to access finance than other small firms and there has been a systemic problem in the financial system which means small firms are now more likely to be turned down for finance.

Policy needs to enable access to finance for innovative firms, given their crucial role in raising productivity and creating jobs and growth.

- New initiatives such as the British Business Bank should focus on improving access to finance for innovative companies by promoting new forms of finance, including hybrid finance, and by creating an aggregating agency that can pool SME loans to facilitate access to public corporate bond markets for SMEs
- Alternative lending technologies that are needed that are more suited towards financing innovation, as suggested by the Breedon report published last year. In addition to this, the Big Innovation Centre has also developed a proposal for a new form of debt finance to improve access to finance for SMEs.<sup>1</sup>

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<sup>1</sup> Douglas, B. (2013) "Flexible Project Investments: A proposal for a new form of debt finance for SMEs", *Big Innovation Centre*

## Table of Contents

1. Introduction.....	6
2. Literature review .....	8
3. Access to finance for innovative firms.....	11
4. Innovative firms and the crisis.....	16
5. Credit after the crisis?.....	20
Acknowledgements.....	22
Contact details.....	23

# 1. Introduction

The 2008 financial crisis focused attention on access to finance for small and medium sized enterprises (SMEs). The roots of the crisis were in an opaque financial system, in which it was unclear who owned assets which were rapidly losing value. Lacking the confidence to lend and access to easy credit, banks restricted lending: the 'credit crunch'. Five years after the initial shock to the economy, bank lending has still not recovered – particularly for small firms. There is now a general consensus that this is holding back the economic recovery. For example, in 2011, David Cameron argued that:

“We've got to back the big business of tomorrow, not the big business of today.

That means opening up access to finance, creating an attractive environment for venture capital funding, getting banks lending to small businesses again and insisting that a far greater proportion of government procurement budgets are spent with small and medium sized firms.”

David Cameron, 25th October 2011

While policymakers like to talk in general terms about enterprise and small firms, not all firms will drive the economic recovery. The majority of SMEs create few jobs, with a tiny minority of SMEs having a disproportionate impact on the national economy. In particular, innovative small firms – those introducing new products, processes or business models – are most likely to create new markets, achieve rapid growth, and help the economy recover. To do this, innovative small firms need finance to invest and grow.

Yet it is innovative small firms which often find it the hardest to obtain finance. They may have risky business models, which are important for new markets but difficult for banks to value. And they are often more reliant on intangible assets, rather than physical property. But intangibles are difficult to value and hard to use as collateral. Because of this, the most important firms for the economy are often those which find it hardest to obtain finance. However, while there is good evidence of a general problem in access to finance in the economy, we know little about how the credit crunch and its aftermath has impacted access to finance for innovative small firms in particular.<sup>2</sup>

This report investigates these issues using the Small Business Survey – a government survey of over 11,000 SME employers – in 2007/8, 2010 and 2012. This is the most up to

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<sup>2</sup> See Mina, A., Lahr, H. & Hughes, A. (2011), 'The demand and supply of external capital to innovative firms', *FINNOV DP 3.5*

date survey of small firms available, and gives rich data on firm characteristics including innovation and applications for finance. We use a combination of simple quantitative analysis and advanced econometrics to investigate these issues. We also suggest the implications of the research for policymakers.

The remainder of this paper is structured as follows:

- **Section two** – shows why access to finance is a major issue and why innovative firms may find it harder to get credit.
- **Section three** – describes the Small Business Survey and how we define access to finance and innovation.
- **Section four** – shows that innovative SMEs are more likely to apply for finance but find it harder to obtain.
- **Section five** – uses advanced econometric methods to investigate this issue further.
- **Section six** – suggests what these findings mean for policy.

## 2. Access to finance, innovation and SMEs

### 2.1 Why is it important for SMEs to have access to finance?

SMEs have an important role in the economy. They can help drive innovation, encourage a process known as 'productive churn', and also by stimulating stronger competition.<sup>3</sup> Yet not all small firms are job creators. Only a small proportion of these firms will actually introduce significant innovations and create new jobs. An important aim of government policy should be enabling these firms to bring new innovations to market and grow the economy.

The ability of SMEs to access finance is important for funding business investment and ensuring businesses reach their growth potential. However, due to weak demand caused by poor growth prospects for the UK economy, innovative firms face greater cash flow constraints. A lack of finance can constrain cash flow and hamper businesses' survival prospects<sup>4</sup> and can also slow growth and prevent innovations diffusing into the economy

### 2.2 Evidence of credit constraints facing SMEs

SMEs face greater challenges in accessing finance than larger firms.<sup>5</sup> In start-ups, for instance, where problems of asymmetric information are greater, banks still finance debt, but provide a smaller fraction<sup>6</sup> – this reduces their risk of exposure to potential losses, but allows them to build a relationship with the firm, which may pay off in the longer term. Nevertheless, this leaves firms with a shortfall in funding. One way that banks try to mitigate against imperfect information is to ask for collateral; one-fifth of SMEs having difficulties raising finance cited insufficient collateral as the reason they were rejected for finance<sup>7</sup>. Rather than being rewarded on the basis of merit, finance for many SMEs is based on banks trying to minimise exposure to unknown risks, a clear instance of market failure.

High-growth firms – those experiencing growth of 20 per cent or more for three consecutive years - face a particular disadvantage. Because it is hard to value the risky and erratic business models of these firms, they are often undervalued by banks. High-growth SMEs are more likely than other firms to cite cash flow as an obstacle to success<sup>8</sup>.

Innovative firms also often find it harder to access finance than other firms. Intellectual

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<sup>3</sup> BIS (2010) "Internationalisation of Innovative and High Growth SMEs" BIS Economics Paper No. 5

<sup>4</sup> BIS, (2012) "SME Access to External Finance", BIS Economics paper No. 16

<sup>5</sup> Coluzzi, C., Ferrando, A. and Martinez-Carrascal, C. (2009), "Financing Obstacles and Growth: An Analysis for Euro Area Non-Financial Corporations", European Central Bank Working Paper, p15

<sup>6</sup> Franck, T. and Huyghebaert, N. (2009), "Financing of Business Start-Ups: A Topic of Great Relevance for Firm Performance, Growth and Survival", in Balling M., Bernet, B. and Gnan, E. (eds) *Financing SMEs in Europe*, Vienna: SUERF Studies, p22

<sup>7</sup> Department for Business, Innovation and Skills (2012), "SME Access to External Finance", BIS Economics Paper No.16, p9

<sup>8</sup> Lee, N. (2012), "Free to grow? Assessing the obstacles faced by actual and potential high growth firms", NESTA / Big Innovation Centre, p30



property or R&D cannot easily be used as collateral and most inputs to the innovative process are firm-specific or specific to the product developed. Innovative investments are often risky with the value unclear. As a consequence an external financier cannot expect to recover a significant share of the investment in case of an unsuccessful project.<sup>9</sup>

### 2.3 Impact of the financial crisis on access to finance for SMEs

Since the financial crisis of 2008, lending to small firms has declined. There are fewer lenders as foreign institutions have left the market, while existing banks have become risk averse.<sup>10</sup> Different criteria are often used for lending, with firm size an increasingly important determinant of lending and micro business in particular being restricted in their access to capital.<sup>11</sup> Using standard risk assessment measures used by banks, SMEs are now considered, on average, more risky investments than before the crisis – according to Fraser, the percentage of high risk SMEs increased from 4.4% to 21.7% between 2004 and 2008.<sup>12</sup> However, these measures favour mature mid-cap firms with long track records. Most high growth firms are young companies with little or no track record.<sup>13</sup>

A consultation by HMT and the Small Business Service showed a particular gap in funding for firms seeking equity investments of between £250,000 and £1m.<sup>14</sup> The latest BIS estimates put the ceiling at between £2m and £5m, noting that “very few private sector Venture Capitalists now invest below £5m”<sup>15</sup>. The effect is particularly stark for sectors where R&D or capital expenditure is high, where the equity gap may be as high as £15m. For many SMEs, therefore, even in normal market conditions a structural equity gap remains and equity finance is effectively out of reach. Since the crisis, this gap has only widened.

On the debt side, one government-commissioned report estimates the lending gap for small businesses at between £26bn and £59bn over five years.<sup>16</sup> A recent report evaluating the changes in bank lending since the crisis reveals that SMEs have faced a more challenging environment for accessing credit after the financial crisis. Using bank lending data they find that, even after controlling for risk factors, rejection rates for overdrafts and term loans were significantly higher following the crisis.<sup>17</sup>

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<sup>9</sup> Myers, S. and Majluf, NS. (1984) “Corporate financing and investment decisions when firms have information that investors do not have”, *Journal of Financial Economics* (13), pp. 187 -221.

<sup>10</sup> Mason, C. (2013) *Access to finance. A think-piece for the North East LEP.*

<sup>11</sup> Cowling, M., Liu, W., Ledger, A., (2012) “Small Business Financing in the UK Before and During the Current Financial Crisis”. *International Small Business Journal* November 2012 30: 778-800

<sup>12</sup> Fraser, S. (2009), “Small Firms in the Credit Crisis: Evidence from the UK Survey of SME Finances”, Warwick Business School, University of Warwick, p27

<sup>13</sup> Sameen, H and Gareth Quedest (2013) “Systemic barriers to access to external finance for innovative firms”, *Big Innovation Centre*, forthcoming.

<sup>14</sup> Her Majesty’s Treasury and Small Business Service (2003), “Bridging the Finance Gap: Next Steps in Improving Access to Growth Capital for Small Businesses”, p6

<sup>15</sup> Department for Business, Innovation and Skills (2012), “SME Access to External Finance”, BIS Economics Paper No.16, p11

<sup>16</sup> Industry Taskforce (2012), “Boosting Finance Options for Business”, Department for Business, Innovation and Skills

<sup>17</sup> Angus Armstrong, Philip David, Iana Liadze and Cinzia Rienzo (2013), “Evaluating changes in bank lending to UK SMEs over 2001 – 2012, London: BIS.

New financial service regulations (Basel 3) require banks to hold more capital against certain types of assets. Combined with the added effects of banks becoming more risk averse due to the crisis and firms becoming increasingly risky, this has seen lending to firms shrink. Although a higher proportion of SMEs applying for finance are rejected (21% in 2010, up from 8% in 2007/8), it is not just supply that has contracted – demand has also fallen. Demand for overdrafts and term loans fell by 15 and 20% respectively between 2001-2004 and 2005-2008 according to a survey of SMEs<sup>18</sup>.

The evidence suggests that a clear structural market failure exists in the provision of debt and finance to SMEs due to asymmetric information between the lender/investor and the business. These effects are likely to disproportionately affect innovative or young firms compared to other SMEs due to the lack of information available about such firms and the inability to value their business models.

However, there also appears to be a cyclical impact on lending and investment due the credit crisis. Innovative firms are less likely to be affected by the cyclical fall away in lending due to the fact that they are much more likely to smooth their spending on innovative activities over the business cycle. This is because, as innovative SME 50 per cent or more of their R&D investment on paying for highly qualified experts<sup>19</sup>, laying off these innovative resources implies the firm loses its knowledge base through which future profits are to be generated. The high adjustment costs faced by innovative firms due to the nature of their business models make them more likely to smooth their investments over time compared to other firms, making them less susceptible to the business cycle.

Our paper will provide evidence on whether the structural market failure is greater for innovative firms and whether this has gotten worse since the financial crisis.

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<sup>18</sup> Fraser, S. (2009), "Small Firms in the Credit Crisis: Evidence from the UK Survey of SME Finances", Warwick Business School, University of Warwick, p6

<sup>19</sup> Hall, Bronwyn and Josh Lerner (2009) "The Financing of R&D and Innovation", *NBER working paper 15325*, Cambridge MA

### 3. Defining innovative SMEs and finance gaps

#### 3.1 The Small Business Survey

For this study we use three waves of the Small Business Survey, a government dataset of Small and Medium Sized Enterprises (SMES) - firms with fewer than 250 employees. We amalgamate data from before the recession (2007/8) and the two waves since (2010 and 2012). We also only include firms which employ people ('SME Employers'), giving a final sample of 11,970 firms.<sup>20</sup>

#### 3.2 Identifying innovative firms

Our measure of innovation is whether a firm has introduced a new product or process in the previous 12 months, where the innovation is new to the market, not just new to the firm. In total, 1,507 of 11,985 firms are innovative (a weighted 11.1 per cent of the sample).

**Table 1. Descriptive results, Sample sizes**

	Per centage of firms (Weighted)	Total firms (unweighted) All	2007/8	2010 / 12
Innovators	11.1	1,507	1,011	496
Non-innovators	88.9	10,478	6,749	3,729
Total	100	11,985	7,760	4,225

This measure has the advantage of being relatively tightly defined, as it does not include firms who simply introduce innovations from elsewhere<sup>21</sup>. For example, a manufacturing firm which simply copies a product produced elsewhere will not be included in this measure – but one which develops an entirely new product will be. The alternative would be using patenting as a measure of innovation. However only 4 per cent of innovation active firms are involved

<sup>20</sup> Note that we only include firms in our statistics which provide information on all

<sup>21</sup> Lee, N. and Rodríguez-Pose, A. (2013) Original innovation, learnt innovation and cities: Evidence from UK SMEs. Urban Studies, DOI: doi: 10.1177/0042098012470395

in patenting. Similarly, research and development (R&D) spending is likely to have a distinct sectoral bias. But our measure is also wide enough to include firms who introduce organisational innovations, innovations which are not patented but which represent new products or services, or other 'soft' innovations.<sup>22</sup>

The measure has two main limitations. First, we cannot account for the significance of new products or processes – a significant new drug will seem the same as a more prosaic new product. Second, the results may be biased by sector because of this problem. We can deal with this statistically, however, by controlling for sector in our regressions.

### **3.3 Identifying problems in accessing finance**

We use four measures of both the incidence and severity of credit constraints. In the SBS, firms are asked first whether they apply for finance. We use the SBS question, "Have you tried to obtain finance for your business in the past 12 months?" Firms which answer yes, and have applied for finance, are asked a second question, "Did you have difficulties obtaining this finance from the first source?"

This gives three potential levels of difficulty for firms which have applied for finance:

- Firms which had trouble getting finance from the first source they tried
- Firms which did not get all the finance they needed
- Firms which did not manage to get any finance

These are not mutually exclusive, so firms which are in the final category will also be included in the previous two.

Finally, our fourth variable accounts for whether firms, having not obtained finance from the first source go on to obtain no finance from any other source.

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<sup>22</sup> Bronwyn Hall, Christian Helmers, Mark Rogers and Vania Sena (2013) The importance (or not) of patents to UK firms. NIESR Discussion Paper 410.

### 3. Access to finance for innovative firms

The results suggest that innovative firms are more likely to apply for finance than other firms. Table 2 gives summary statistics for innovative SMEs and their ability to obtain finance. Of the total sample, just over 30 per cent of innovative firms apply for finance in a given year, compared to 23.5 per cent of other firms.

**Table 2. Share of firms applying for finance and finding it hard to obtain**

	Applied for finance (%)	Share of all firms applying which:			
		(1) Had trouble obtaining finance from first source	(2) Did not get all finance needed from first source	(3) Did not get any finance from first source	(4) Did not get finance from any source
Innovator	30.1	44.3	35.2	27.8	21.8
Non-innovator	23.5	32.6	24.6	19.6	15.4
Total	24.3	34.2	26.0	20.7	16.3
P=	0.000	0.000	0.000	0.000	0.000

*P stat given from simple probit regression (with weights)*

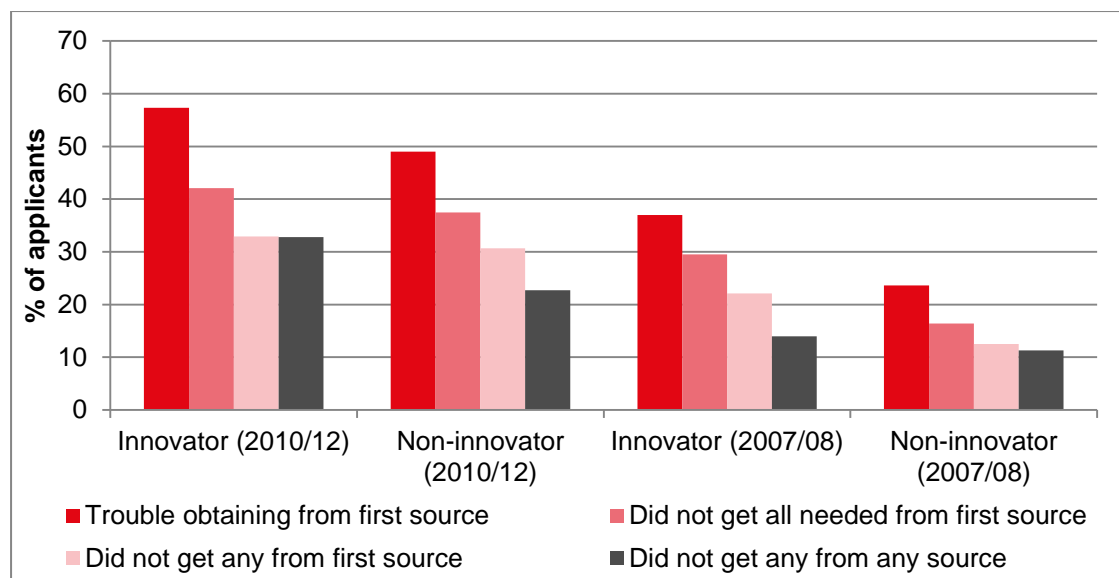
However, while innovative firms are more likely to apply for finance they are also more likely to have trouble finding the finance they need. Of those firms which apply, around 34 per cent have trouble obtaining finance from the first source. While only 33 per cent of non-innovative firms have trouble, however, over 44 per cent of innovative firms do. So while they are more reliant on the financial system, as they need the finance to grow, innovative firms are more likely to come away with less finance than they need or nothing at all.

**Table 3. Has access to finance worsened for innovative firms?**

	Applied for finance (%)	Share of all firms which apply:			
		(1) Had trouble obtaining finance from first source	(2) Did not get all finance needed from first source	(3) Did not get any finance from first source	(4) Did not get any finance from any source
Innovator (2010/12)	34.7	56.8	44.7	37.8	37.7
Innovator (2007/8)	28.2	37.9	30.3	22.7	14.0
Non-innovator (2010/12)	24.9	47.9	38.4	31.6	22.2
Non-innovator (2007/08)	22.8	23.9	16.7	12.8	11.5
All firms (2010/12)	25.3	50.4	41.1	34.6	24.9
All firms (2007/8)	23.5	25.9	18.6	20.7	11.9
Total	24.4	38.7	30.4	24.9	18.7

Has the problem of access to finance for innovative firms, as shown in table 2, worsened since the recession? Table 3 splits the results according to whether innovative firms are before the recession (from the 2007/8 survey) or after it (from either the 2010 or 2012 surveys).

**Figure 1. Has access to finance worsened for innovative firms?**



**Innovative firms are slightly more likely to apply for finance now than before the recession**, with 34.7 per cent applying in the latter period compared to 28.2 per cent beforehand. This reflects a general trend, with applications slightly higher for non-innovative firms.

**The share of innovative firms finding obtaining finance hard to obtain has worsened since the crisis.** In the period after the recession, 57 per cent of innovative firms who seek finance had trouble obtaining, compared to only 38 per cent beforehand – a jump of almost 20 percentage points. This points to a significant problem faced by innovative firms since the crisis, with a steep increase in the share finding access to finance hard to obtain.

**The percentage of innovative firms who get no finance from any source has more than doubled.** Before the recession, 14 per cent of innovative firms who sought finance were unable to obtain anything. Since the recession, this figure has reached 38 per cent. In simple regressions, this is statistically significant ( $p=0.001$ ). We can also see that almost all innovative firms that don't get any finance from the first source don't get any finance from any other source either.

## 4. Innovative firms and the crisis

The results above may be driven by other firm characteristics, with innovative firms more likely to aim to grow or having other, different characteristics. To test this, we estimate a probit regression model for whether firms have difficulty obtaining finance.<sup>23</sup>

### 4.1 Is finance harder to obtain for innovative firms?

Innovative firms are more likely to find it hard to obtain finance than firms which do not innovate, even controlling for relevant factors such as size and sector. Table 5 gives the results of basic regressions for whether a firm finds it hard to access finance. Innovative firms are likely to find it significantly harder to obtain finance, and are less likely to obtain all the finance they need. We also find that they are more likely to come away with no finance. **Our results suggest that the inability to finance innovative firms appears to be a structural problem across the financial system.**

The evidence also suggests that firms in 2010/12 are more likely to be turned down for credit than those in 2007/8. Credit conditions have worsened in the period for all firms, even controlling for whether they are innovative or not, reflecting the cyclical impact of the crisis. As discussed earlier, innovative firms are less likely to be impacted by the cyclical impact of the crisis due to the fact that they smooth their spending over the business cycle as they face higher adjustment costs.

However, there has been a general worsening of credit conditions not only for innovative firms. The interaction effect for after the recession is not significant. **This suggests there are systemic issues in the banking system which have made access to finance worse for all firms after the crisis, rather than specific issues for innovative firms.**

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<sup>23</sup> Note that we estimate these models on a slightly reduced sample of the data- as we exclude cases with missing values for one or all of the variables necessary.



Table 5: Probit regression results: Problems accessing finance

VARIABLES	(1) Had trouble accessing finance	(2) Had trouble accessing finance	(3) Didn't get all finance needed	(4) Didn't get all finance needed	(5) Didn't get any finance	(6) Didn't get any finance	(7) Didn't get any finance from any source	(8) Didn't get any finance from any source
Innovator	0.276*** (0.0786)	0.299*** (0.0950)	0.301*** (0.0870)	0.364*** (0.105)	0.270*** (0.0947)	0.325*** (0.115)	0.195** (0.0994)	0.151 (0.126)
2010/12	0.362*** (0.0569)	0.372*** (0.0609)	0.358*** (0.0625)	0.386*** (0.0672)	0.378*** (0.0676)	0.401*** (0.0728)	0.258*** (0.0694)	0.240*** (0.0750)
Innovator * 2010/12		-0.0715 (0.165)		-0.193 (0.181)		-0.160 (0.195)		0.125 (0.206)
Micro (1-9)	0.0891* (0.0507)	0.0896* (0.0507)	0.0872 (0.0559)	0.0884 (0.0559)	0.0289 (0.0613)	0.0301 (0.0613)	0.0903 (0.0643)	0.0897 (0.0644)
Small (10 – 49)	-0.0660 (0.0734)	-0.0650 (0.0735)	-0.0226 (0.0802)	-0.0190 (0.0803)	-0.0582 (0.0885)	-0.0550 (0.0885)	-0.0928 (0.0995)	-0.0947 (0.0998)
Female led	0.0705 (0.0819)	0.0700 (0.0819)	0.153* (0.0870)	0.151* (0.0869)	0.111 (0.0925)	0.110 (0.0924)	0.00874 (0.101)	0.0100 (0.100)
Ethnic led	0.124 (0.0973)	0.123 (0.0972)	0.170* (0.102)	0.168* (0.102)	0.119 (0.111)	0.116 (0.111)	0.0830 (0.115)	0.0841 (0.115)
Qualified	0.194*** (0.0702)	0.194*** (0.0702)	0.200** (0.0798)	0.202** (0.0797)	0.212** (0.0883)	0.213** (0.0883)	0.0887 (0.0939)	0.0879 (0.0940)
Number of directors	0.0342** (0.0141)	0.0339** (0.0141)	0.0212 (0.0132)	0.0206 (0.0132)	0.0118 (0.0156)	0.0112 (0.0156)	0.0408** (0.0175)	0.0412** (0.0175)
Aims to grow	0.246*** (0.0669)	0.247*** (0.0669)	0.211*** (0.0731)	0.212*** (0.0732)	0.226*** (0.0796)	0.227*** (0.0797)	0.263*** (0.0849)	0.262*** (0.0849)
Turnover increasing	-0.0138 (0.0656)	-0.0140 (0.0657)	-0.0881 (0.0728)	-0.0881 (0.0730)	-0.0271 (0.0809)	-0.0274 (0.0811)	-0.136 (0.0846)	-0.135 (0.0845)
Turnover decreasing	0.278*** (0.0706)	0.278*** (0.0705)	0.304*** (0.0766)	0.304*** (0.0766)	0.379*** (0.0830)	0.378*** (0.0829)	0.263*** (0.0877)	0.264*** (0.0876)
10 year +	-0.260*** (0.0925)	-0.260*** (0.0924)	-0.295*** (0.100)	-0.296*** (0.100)	-0.212* (0.112)	-0.213* (0.112)	-0.222* (0.117)	-0.221* (0.117)
5 – 10 years	-0.0109 (0.100)	-0.0107 (0.100)	-0.0365 (0.109)	-0.0371 (0.109)	0.0865 (0.121)	0.0860 (0.121)	0.0394 (0.129)	0.0404 (0.129)
Constant	-1.769*** (0.189)	-1.773*** (0.188)	-2.013*** (0.222)	-2.024*** (0.222)	-2.380*** (0.266)	-2.389*** (0.266)	-2.202*** (0.244)	-2.197*** (0.244)
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,441	10,441	10,441	10,441	10,441	10,441	10,462	10,462
Pseudo R2	0.0630	0.0631	0.0712	0.0717	0.0740	0.0744	0.0589	0.0592

Probit model estimated with standard errors 13 sector dummies included. Age = Less than 1 year and ACT = Agriculture, hunting and forestry. Weights applied.

## 4.2 Results controlling for selection

One problem is that firms with particular characteristics are more likely to apply for finance (firms which do not apply for finance cannot be refused). To deal with this, we use a Heckman selection model to correct for the probability of firms applying for finance. This essentially estimates two models. The first estimates the probability of a firm applying for finance, based on observable characteristics. The estimated probability of applying is then used to 'correct' the second model which estimates whether a firm finds it hard to obtain finance. Table 6 presents the results.

As before, once we control for selection effects innovative firms are more likely to find it hard to access finance. This result is significant for all our variables for problems in discouragement, except column 8 when an interaction term is used to investigate whether innovative firms are now more likely to obtain no finance from any source than before the recession. Note, however, that the sample size is relatively small for these firms and given the complexity of the estimation methodology the lack of significance needs to be viewed with caution.

**Table 6: Probit regression results, with heckman selection**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Had trouble accessing finance		Didn't get all finance needed		Didn't get any finance		Didn't get any finance from any source	
Innovator	0.313*** (0.101)	0.330*** (0.123)	0.327*** (0.107)	0.393*** (0.128)	0.287** (0.116)	0.351** (0.139)	0.186* (0.0980)	0.134 (0.127)
2010/12	0.578*** (0.134)	0.588*** (0.144)	0.504*** (0.108)	0.528*** (0.122)	0.522*** (0.113)	0.549*** (0.130)	0.277*** (0.0698)	0.256*** (0.0759)
Innovator * 2010/12		-0.0567 (0.217)		-0.211 (0.228)		-0.192 (0.249)		0.149 (0.210)
Aims to grow	0.179 (0.118)	0.178 (0.120)	0.147 (0.102)	0.156 (0.101)	0.154 (0.120)	0.158 (0.123)	0.267*** (0.0865)	0.265*** (0.0867)
Micro (1-9)	-0.0421 (0.129)	-0.0431 (0.133)	-0.00861 (0.106)	0.000527 (0.108)	-0.0864 (0.130)	-0.0813 (0.138)	0.0886 (0.0639)	0.0872 (0.0641)
Small (10 – 49)	-0.303 (0.228)	-0.304 (0.234)	-0.180 (0.170)	-0.160 (0.174)	-0.230 (0.203)	-0.218 (0.216)	-0.0959 (0.0982)	-0.100 (0.0988)
Female led	0.137 (0.119)	0.138 (0.120)	0.229* (0.128)	0.224* (0.128)	0.165 (0.129)	0.164 (0.129)	-0.00434 (0.104)	-0.00485 (0.104)
Ethnic led	0.202 (0.134)	0.202 (0.134)	0.247* (0.139)	0.240* (0.137)	0.177 (0.151)	0.172 (0.149)	0.118 (0.117)	0.118 (0.117)
No. of Directors	0.0376** (0.0192)	0.0374* (0.0193)	0.0206 (0.0180)	0.0209 (0.0179)	0.00367 (0.0222)	0.00345 (0.0226)	0.0486*** (0.0187)	0.0490*** (0.0185)
Turnover increasing	-0.0751 (0.0978)	-0.0759 (0.0988)	-0.153 (0.101)	-0.148 (0.101)	-0.0707 (0.112)	-0.0691 (0.114)	-0.135 (0.0856)	-0.134 (0.0856)
Turnover decreasing	0.341*** (0.0955)	0.340*** (0.0956)	0.351*** (0.0983)	0.344*** (0.0976)	0.463*** (0.107)	0.458*** (0.107)	0.262*** (0.0879)	0.265*** (0.0877)
Age 10 +	-0.284** (0.126)	-0.285** (0.126)	-0.314** (0.127)	-0.313** (0.126)	-0.183 (0.143)	-0.185 (0.142)	-0.194 (0.119)	-0.193 (0.119)
Age 5 – 10	-0.0433 (0.138)	-0.0434 (0.138)	-0.0677 (0.139)	-0.0637 (0.138)	0.113 (0.155)	0.113 (0.154)	0.0431 (0.132)	0.0419 (0.132)
Qualified	0.200** (0.0910)	0.199** (0.0913)	0.192* (0.0989)	0.190* (0.0974)	0.208* (0.112)	0.206* (0.111)	0.0663 (0.0962)	0.0683 (0.0966)
Constant	-1.682*** (0.421)	-1.682*** (0.431)	- (0.345)	-1.997*** (0.333)	- (0.417)	- (0.421)	-2.248*** (0.249)	-2.239*** (0.249)
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes		
Observations	10,406	10,406	10,406	10,406	10,406	10,406	10,442	10,442

Probit Heckman selection model estimated with robust standard errors. Selection variables: Legal structure and region. Reference categories: Age = Less than 4 years; Size: Medium (50 – 249 employees). Weights applied.

## 5. Credit after the crisis?

### 5.1 Finance for innovative firms

In the wake of a major financial crisis, there are concerns that access to finance is a significant barrier to business growth. This is particularly concerning if it is stopping innovative firms from accessing the finance they need to bring innovative products and processes to market, grow and create jobs in the recovery. This paper has shown that innovative firms find it harder to access finance than other firms, but that the worsening in the availability of credit over the past two years has been systemic, for all firms, rather than specifically for innovative SMEs.

Firms do not have a 'right' to access to finance, and if most firms are not receiving credit this is not necessarily a problem.<sup>24</sup> However, our results suggest that problems remain for innovative small firms. In particular, there is a risk that such low levels of lending may result in a 'discouraged economy' with innovative firms being discouraged from applying for the finance they need to invest in new products and processes and grow. Research by Will Hutton and Paul Nightingale has suggested that banks are failing to lend to firms in the highest risk categories, rather than charging higher interest rates.<sup>25</sup> The result is underinvestment in the firms which are most likely to drive economic growth. Further government action will be needed to address this.

### 5.2 Policy implications

To date, there has been no evidence of reallocation of resources from unproductive firms to more innovative businesses. Our research suggests that the systemic issues within the banking system are preventing this from occurring, although the data does reveal that credit conditions of innovative firms may be improving relative to all other firms.

This is why new initiatives such as the British Business Bank should focus on improving access to finance for innovative companies, given the clear market failure in financing innovative firms demonstrated in this paper. In a 2012 speech by Vince Cable, he explains that "in the UK such a bank could operate through alternative providers such as the new challenger banks and non-bank lenders boosting their lending capacity as well as corralling existing provision such as co-investment and guarantees to support business expansion."<sup>26</sup>

New alternative lending such as the one proposed in our paper<sup>27</sup> published earlier this year, are also potential ways to address this market failure. The Business Bank is already focusing

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<sup>24</sup> See Mason, C. (2013) Access to finance. A thought-piece for the North East LEP.

<sup>25</sup> Will Hutton and Paul Nightingale (2011) *The Discouraged Economy*, London: Big Innovation Centre.

<sup>26</sup> Vince Cable Speech (2012) "Industrial Strategy: Cable outlines vision for future of British industry"

<sup>27</sup> Douglas, Brett (2013) "Flexible Project Investments: A proposal for a new form of debt finance for SMEs", *Big Innovation Centre*, forthcoming.

on non-bank lending to improve access to finance for young innovative companies, but more needs to be done here. Banks could also examine ways in which the decision-making process could be timelier. For relatively large investments, delays can occur through the centralised nature of decision-making in a central credit decision-making unit.<sup>28</sup> It is important that policy makers consider additional training and focused support programmes with SME owners on the ways to approach banks, informational requirements and work closely with banks to provide additional advice and support to SMEs seeking to gain access to finance.

SMEs may also be able to use government funds or university grants for developing prototypes or carrying out feasibility studies. Increasingly, business angels are seen as a vital link in the financing chain at the early stage of business development, as they bring business experience to the table as well as their own capital. Governments should look at whether government technical support can be used generate the emergence of business angels and to make the existing business angel systems operate more efficiently. Policy makers should aim to improve awareness among entrepreneurs of the range of financing options available to them from officials, private investors and banks.

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<sup>28</sup> Deakins D, North D, Baldock R and Whittam G. (2008) "SMEs' Access to Finance: Is there still a debt finance gap?" Paper to the Institute of Small Business and Entrepreneurship conference, Belfast 5-7<sup>th</sup> November<sup>34</sup> (2006) "Financing SMEs and Entrepreneurs"

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