The financial and real effects of credit availability for startup firms: Evidence from the recent financial crisis

By Tom Vanacker[*] and Marc Deloof[**]

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[*] Ghent University, Department of Accountancy and Corporate Finance, Sint-Pietersplein 7, 9000 Gent, Belgium, phone: +32-9-264 79 60, fax: +32-9-264 35 77, e-mail: tomr.vanacker@ugent.be.

[**] University of Antwerp, Department of Accounting and Finance, Prinsstraat 1, 2000 Antwerp, Belgium, phone: +32-3-265 41 69, e-mail: marc.deloof@uantwerpen.be.

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ABSTRACT

We study the financial and real effects of credit availability for startups using a data set that covers the complete set of business registrations in Belgium between 2006 and 2009. We trace the firm-level impact of the recent financial crisis, which represents a negative shock to the supply of financing. In crisis years, startups used less bank debt, had a higher likelihood to go bankrupt, realized lower revenues and invested less. These effects were stronger for startups in bank dependent industries and startups founded by financially constrained entrepreneurs. Similar results do not follow a negative demand shock in 2001-02 and a placebo crisis in 2006-07. (*JEL* G01, G21, G32)

1. Introduction

The recent financial crisis has increased concerns among finance scholars and policy makers about the financing and the success of business startups. While a limited set of papers have examined capital structure choices in startups (Cassar, 2004; Cumming, 2005; Robb and Robinson, 2012), to date, we lack empirical evidence on how credit availability at the time of founding determines how capital is allocated to startups and how this affects their success. In this study, we address these issues by investigating the effect of the recent financial crisis on startups using a new data set that covers the population of independent, non-financial, Belgian firms founded between 2006 and 2009.

The impact of credit availability on the financing and success of startups is ambiguous. On the one hand, theoretical models argue that market imperfections, such as information asymmetry, will prevent startups from accessing formal debt markets (Stiglitz and Weiss, 1981). Similarly, the financial growth cycle paradigm (Berger and Udell, 1998) suggests that startups will rely heavily on personal sources of financing and trade debt, while bank debt will often not be available. There are also indications that the limited supply of bank debt may not be problematic for entrepreneurs because those entrepreneurs seeking financing are often able to secure the requisite financing, although it may not be available in the form that they would like (Cosh, Cumming and Hughes, 2009). This suggests that credit availability will have a minimal effect on the financing and success of startups. On the other hand, recent empirical evidence by Robb and Robinson (2012) shows that US firms founded in 2004 relied extensively on external debt sources in their initial year of operation and that startups with greater levels of external capital were more successful. This suggests that credit availability will have a large effect on the financing and success of startups.

At least two hurdles have refrained scholars from studying the financial and real effects of credit availability for startups. First, the scarcity of data on startups explains why scholars to date have either been unable to study financing decisions at the very beginning of a firm's life cycle, or

have had to rely on limited cross-sectional survey data. In most countries, public firms are legally required to publish their financial statements, but private firms—including all new firms—are not generally required to publicly disclose their financial statements. Belgium, however, represents a rare exception. In Belgium, all non-financial firms have a legal obligation to annually file their financial statements. Second, the fundamental simultaneity occurring between supply and demand of credit requires an exogenous shock to the supply of credit to fully understand whether the supply of credit corresponds to a separate channel that is independent of the demand for credit (Lemmon and Roberts, 2010). The recent financial crisis is such an exogenous shock to the supply of credit to Belgian firms, because was not caused by a weakening of firm business fundamentals in Belgium, but by the subprime mortgage crisis which originated in the US.

We start by studying the financial effects of credit availability for startups, by comparing the financing choices of startups founded before and during the 2008-09 financial crisis. We find that bank debt is the most important source of financing for startups, but there is a significant drop in the amount of bank debt raised by startups in crisis years. Controlling for firm, human capital and industry characteristics, startups founded in the crisis years 2008-2009 raise 26.8% smaller amounts of bank debt, relative to startups founded in the pre-crisis years 2006-2007. Surprisingly, bank debt remains the single most important source of financing in crisis years. The restricted access to bank debt is not compensated by a significant increase in other sources of financing, such as trade debt, equity financing or insider debt. These findings are surprising in view of extant theories, such as the financial growth cycle theory, which suggest that startups will have limited access to bank debt.

Next, we investigate for which startups the financial effects of the crisis were stronger. A priori, we expect that reduced credit availability following the outbreak of the crisis will particularly affect those startups that are more dependent on bank financing. This is confirmed by our results. Specifically, we find that the decline in borrowing is greatest for startups that operate in industries that are more bank dependent, and startups that are founded by financially constrained entrepreneurs,

who do not fully invest committed equity capital. These findings are consistent with a causal effect of a credit supply shock on startup borrowing.

We then investigate the real effects of credit availability for startups. Several alternative explanations exist for a positive relationship between startups' use of bank debt and their success. Access to bank debt may increase startups' success, but the "best" entrepreneurial startups may also be the ones that are able to raise bank debt. In addition, unobserved factors may influence both startups' access to bank debt and their success. We use the exogenous impact of the financial crisis on startup borrowing as a quasi-natural experiment to provide evidence of a causal effect of credit availability on firm survival, revenue and investment. We find that the reduction in borrowing by startups in crisis years is accompanied by an increase in firm bankruptcies, a decrease in revenue and a decrease in investment, suggesting that startups founded in crisis years are more financially constrained. These real effects are particularly evident for startups operating in bank dependent industries and startups founded by financially constrained entrepreneurs.

To dig deeper into the question whether it is indeed the reduced supply of credit rather than a reduced demand for credit that is driving our results, we perform additional analyses on a sample of startups founded between 1999 and 2002. We examine whether a negative demand shock which occurred in 2001-2002 (e.g., Duchin, Ozbas and Sensoy, 2010) results in a similar set of findings as we find for the negative supply shock in 2008-2009. We do not find similar financial and real effects following the demand shock in 2001-2002. Additional evidence from a "placebo" (non-existent) crisis in 2006-07 provides further insight that, if anything, our regressions are biased away from finding the results we do for the 2008-09 financial crisis (i.e., *if* the placebo crisis has a significant effect it is in the opposite direction as we find for the 2008-09 financial crisis). Hence, our study provides strong evidence that the supply of capital corresponds to a separate channel, independent of the demand for capital. This is important for policy makers, who often focus implementing measures to stimulate the supply of financing, particularly for startups, in an effort to foster economic growth.

This paper relates and contributes to several branches of literature. First, we contribute to the entrepreneurial finance literature. To date, much of what we know about entrepreneurial finance is based on firms that already raised venture capital or angel finance (e.g., Cumming, 2005; Kerr, Lerner and Schoar, 2011) or more established entrepreneurial firms (e.g., Cosh, Cumming and Hughes, 2009). There is a dearth of research that studies the funding of newly founded firms. Cassar (2004) investigates the determinants of capital structure for a small, random sample (292 observations) of Australian startups, but he does neither consider the effects of credit availability on the funding of new firms nor does he consider the real effects of new firms' financial structure. Robb and Robinson (2012) provide a detailed analysis of financing decisions in US startups, using data from the Kauffman Firm Survey. However, their study is based on firms founded in one specific year (2004), while we are also able to investigate the financing decisions of new firms before and during the recent financial crisis and their implications for new firm success.

Second, we contribute to the finance and growth literature. While influential studies support the cross-country relation between credit availability and growth (e.g., King and Levine, 1993; Rajan and Zingales, 1998), empirical work at the firm level examining how financial conditions influence business startups is sparse. This is unfortunate because startups are often considered to be the engines of future growth in any modern economy. Most prior research in this field studies the effects of credit availability for public firms (e.g., Lemmon and Roberts, 2010) or for private firms that are older and larger (e.g., Bertrand, Schoar and Thesmar, 2007; Krishnan, Nandy and Puri, 2013). A small set of papers also focus on the impact of credit availability for entrepreneurial entry and exit (e.g., Black and Strahan, 2002; Kerr and Nanda, 2009) but these studies do not focus on the response of financing policies of entrepreneurs to changes in the supply of credit and their real implications.

Finally, we contribute to a growing literature that studies the financial and real effects of the recent financial crisis. Ivashina and Scharfstein (2010), for instance, show that new loans to large borrowers fell dramatically during the peak of the crisis, relative to the peak of the credit boom.

Duchin, Ozbas and Sensoy (2010), using a sample of US public firms, show that corporate investment declined following the onset of the crisis, especially for firms with limited cash reserves, firms that are financially constrained or firms that operate in industries that are highly dependent on external financing. Almeida, Campello, Laranjeira and Weisbenner (2012) find evidence that the crisis restricted the supply of credit to publicly held firms in the US, by considering the impact of the long-term debt maturity structure on new investments. Campello, Graham and Harvey (2010) survey Chief Financial Officers and find that financial constraints restricted the pursuit of attractive projects and even forced firms to cancel valuable investments. Our focus on the financial and real effects of the recent crisis for firms at the earliest stages of their life represents an important addition to this literature. Moreover, our study shows how a financial shock that originated in a particular country (i.e., the US), not only influences the financing of entrepreneurship in another country (i.e., Belgium) but also has real consequences for the success of entrepreneurial startups in that country.

2. Research setting: The Belgian financial system and the recent financial crisis

In this section, we provide background information on the research setting. Belgium is a small, export-intensive economy located in the European Union. In Belgium, like other Continental European countries including Germany, France, Italy and Spain, banks play a leading role in mobilizing savings and allocating capital (Demirgüç-Kunt and Levine, 1999). Belgium experienced a significant wave of bank mergers in the period between 1997 and 2003, which resulted in a highly concentrated banking sector (e.g., Degryse, Masschelein and Mitchell, 2011). After this consolidation trend, the Belgian banking sector was dominated by four banks: Fortis Bank, KBC Group, Dexia and ING Belgium. In 2007, based on the book value of assets of all 110 banks active in Belgium, Fortis Bank had a market share of 43%, KBC Group of 17%, Dexia of 15% and ING Belgium of 10%. These four banks provided some 80% of total outstanding credit in Belgium. Contrary to the banking

sector, public equity and debt markets in Belgium are not well developed and are not accessible for the startup firms that we study in this paper.

The financial crisis, which originated in the US, subsequently hit financial markets around the world. Belgian banks in particular were strongly hit by the financial crisis.[1] By April 2008, the four dominant banks had to write down some 2.6 billion euro of their equity capital due to the credit crisis, which led to speculations about the solvency and liquidity of Belgian financial institutions. After the collapse of Lehman Brothers in September 2008, Fortis Bank had to be bailed out by the Belgian, Luxembourg, and Dutch governments. The Belgian entity of Fortis Bank was acquired by the Belgian government and afterwards sold to the French bank BNP Paribas. Dexia (today named Belfius) had to be bailed out by the Belgian, Luxembourg, and French government, and the KBC Group was bailed out by the Belgian government. The ING Group received a capital injection of 10 billion euro from the Dutch government in October 2008.

A deteriorated liquidity position, increasing costs and restricted ability of banks to access market financing contributed to a tightening of credit standards in Belgium. The bank lending survey of the European Central Bank (ECB) confirms that the crisis substantially reduced the provision of bank credit in the Euro area (which includes Belgium).[2] In April 2008, the ECB survey reported a 35% net tightening of credit standards for loans to SMEs. By October 2008, the ECB survey reported a 56% net tightening of credit standards. A survey conducted by the Belgian National Bank further analyzes the effect of the crisis on credit conditions for Belgian non-financial firms.[3] This survey reported a dramatic net tightening in credit volume and credit conditions in the 2008-09 period, relative to the 2006-07 period, as perceived by entrepreneurs.

[1] The Belgian housing market did not experience the significant decline in prices that occurred in the US and thus did not affect Belgian banks.

[2] The ECB bank lending survey is addressed to senior loan officers of a representative sample of Euro area banks and is conducted four times a year. Detailed information on the survey and its results are available at: http://www.ecb.int/stats/money/surveys/lend/html/index.en.html.

[3] More information on the survey is available at: http://www.nbb.be/DOC/DQ/kredObs/fr/data/KO_tarifs.htm.

3. Data

The data for this paper come from several sources. Balance sheet, income statement, social balance sheet (reporting the number of employees and composition of the workforce) and ownership information come from the Bel-first database, which is compiled by Bureau van Dijk (BvD), one of Europe's leading electronic publishers of business information. Reporting requirements imposed by the Belgian government require all firms—irrespective of their size and age—to annually file financial statements in a predefined format with the Belgian National Bank. When the financial statements are filed with the Belgian National Bank, they are processed and checked, and subsequently made available to the public. BvD collects these data to compile the Bel-first database. Bel-first includes not only data for active firms but also for firms that eventually go bankrupt. To collect current data on ownership and the status of firms, BvD uses a range of data sources, but most prominent is The Belgian Law Gazette. In the Belgian Law Gazette, Belgian firms are required to provide detailed information on their founding, capital increases and the like, and this official information is externally validated by a notary. We further obtain data on the firms that are involved in private equity and venture capital deals from the Zephyr database (also compiled by BvD), which we further updated with proprietary data from the Belgian Venture Capital and Private Equity Association and Business Angel networks.

Firms had to fulfill the following criteria to be part of our sample of Belgian startups. First, firms had to be legally founded in 2006, 2007, 2008 or 2009, respectively. Firms founded in 2006 and 2007 are founded before the financial crisis hit the Belgian banking sector, while 2008 and 2009 startups are founded at the height of the financial crisis in Belgium. Second, firms had to employ between 1 and 50 people in their initial year of operation. We use this selection criterion, because it is unlikely that firms starting with more than 50 employees in their initial year of operation are *de novo*

startups. Third, firms could not belong to a group structure. Specifically, firms could not be controlled by a shareholder with an equity stake of 50% or more (except for equity stakes of families, employees and directors) and could not have participations in other firms (ownership > 10%) in their initial year of operation. We focus on firms that are independent at startup, because firms which belong to a group structure may do much of their lending and borrowing within their group. Moreover, firms with participations in other firms in their initial year of operation are unlikely to be *de novo* startups. Fourth, firms could be active in a broad range of sectors but we excluded firms in the financial, educational and social sectors. The financing of firms in these sectors is influenced by regulatory and other issues. Finally, we eliminate firms that have missing data for any of the variables that are used in the first set of regressions estimated in Section 4. The final sample contains 14,846 firms which represents a close approximation of the full population of independent, non-financial, startups in the Belgian economy from between 2006 and 2009.

Using the Bel-first database, we additionally constructed a sample of all Belgian, non-financial, firms operational at some point between 2003 and 2010. We require that these firms employ at least 1 person. This results in a sample of 110,940 firms and 743,597 firm-year observations. We use this data set to construct multiple industry-level variables, including the 3-year median growth rate in total assets, the median ratio of bank debt to total assets and the median number of employees in the industry of our sample firms. We measure these variables using a four-digit industry classification code that is very similar to the SIC coding system in the US.

3.1. Definition of variables and summary statistics

Table 1 reports the definition, number of observations, mean, median, standard deviation, minimum and maximum for the variables used in subsequent analyses. To determine the financial effects of the crisis for startup firms, an issue we investigate in detail in Section 4, we focus on the use of bank debt (*Bank Debt > 0*), the proportion of bank debt to total financing sources raised (*Bank Debt / TFS*) and

the natural logarithm of the absolute amount of bank debt raised (*Ln Bank Debt*).[4] Some 73% of startups raise bank debt in their initial year of operation. The mean (median) ratio of bank debt on total financing sources raised equals 30 (25)%. The mean (median) startup raises €145,290 (30,840) in bank debt. When startups raise bank debt this is typically long-term bank debt with a maturity of over one year rather than short-term bank debt which matures within one year.[5]

*** Table 1 about here ***

To determine the real effects of the crisis for startup firms, an issue we investigate in detail in Section 5, we study three real outcome dependent variables, namely firm bankruptcy, revenue and investment. Some 4% of startups are declared bankrupt before the end of their second year of operation (*Bankrupt*). When firms go bankrupt this is recorded in The Belgian Law Gazette and subsequently incorporated in the Bel-first database. Mean (median) revenue of startups equals €816,420 (233,360). Unfortunately, revenue figures are bias towards larger startups, because smaller startups are not obliged to report their revenue, although they are required to report the other data needed for this study.[6] Next, we calculate the investments by startups (*Investment*) as capital expenditures in their second year of operation. Positive values represent investments, while negative

[4] As a robustness check, we also used bank debt to total assets as a dependent variable. Results remain robust.

[5] For comparison purposes, it is important to point out that the summary statistics for Belgian startups are broadly in line with evidence from US and Australian startups. Specifically, Zarutskie (2006) reporting statistics on US startups using the Statistics of Income (SOI) corporate tax files shows that nearly 60% of US startups attract outside sources of debt financing in their first year of operation and have a mean outside debt to total assets ratio equal to 35%. Cassar (2004) shows that on average 16.9% of the financing of startups is provided through bank financing and roughly half the sample used some form of long-term and bank financing.

[6] Belgian SMEs are allowed to report abbreviated financial statements when they comply with the following requirements. A firm should (1) employ less than 100 employees on average per year registered or (2) not meet two or more of the following criteria: (i) annual turnover > 6,250,000 euro, (ii) balance sheet total > 3,125,000 euro and (iii) average number of employees > 50. One major difference between abbreviated and complete financial statements is that revenues only have to be disclosed in complete financial statements. Note that our regressions using the natural logarithm of revenues plus one as a dependent variable to study the real effects of the crisis are biased against finding an effect of the financial crisis, because only larger startups—which are less likely to be financially constrained—are included in these regressions.

values represent de-investments. The mean (median) level of investments in the second year of operation equals €48,810 (10,970).

A key independent variable in our regression models is the dummy variable *Crisis*, which equals one for startup firms founded in 2008 or 2009 and zero for firms founded in 2006 or 2007.[7] As we described in more detail in Section 2, the crisis hit the Belgian banking sector only from early 2008 when banks had to write down significant amounts of their equity capital and the crisis became painstakingly visible for the general public with a series of bail outs of Belgian banks later in 2008. About 45% of startups in our sample are founded during crisis years.

We expect the effects of the crisis to depend on the relative bank dependence of startups and founder financing constraints. We measure the dependence of startups on bank loans (*Bank Dependence*) by calculating the 4-digit industry median ratio of bank debt to total assets (e.g., Cetorelli and Strahan, 2006).

To proxy for financing constraints experienced by founders, we use the ratio of uncalled equity to paid-in equity (*Uncalled Equity*). In Belgium, as in several other countries, founders are not required to fully invest the amount of committed equity in the first year of operation. Founders who do not fully invest committed equity are likely to be financially constrained (Huyghebaert and Van de Gucht, 2007). An alternative explanation is that founders are not financially constrained, but simply wait to invest the additional amount of equity until the new firm needs the investment. This explanation is unlikely, however, for at least three reasons. First, we find evidence that startup firms founded by founders who do not fully invest the amount of equity committed in the first year of operation are more likely to raise bank debt and raise larger amounts of bank debt ($p < 0.01$). This suggests these startups need more, not less, financing. Second, we find evidence that those firms where a part of committed equity is uncalled are those firms where committed equity is low and close

[7] Our regression models also include year dummies, where 2006 is the reference category and 2008 is excluded to avoid perfect multicollinearity with the Crisis variable. Removing the year dummies from our regression models provides qualitatively similar results to those reported in the paper.

to the legal minimum. Hence, startups which are most likely undercapitalized are the firms where part of committed equity is uncalled. Because Belgian legislation requires founders to commit an amount of equity that is needed during the first two years after startup (when this is not the case limited liability can be removed), the deliberate undercapitalization of startups is a risky strategy. Third, we find that in startups where founders do not fully invest committed equity, the use of insider debt is also less likely ($p < 0.01$). This suggests that entrepreneurs who do not fully invest committed equity capital do not compensate their reduced equity investment with insider debt that could be considered to be a preferred equity investment.

Several other variables are included in the multivariate regressions, including the four major determinants of capital structure, as highlighted by prior research (e.g., Brav, 2009; Rajan and Zingales, 1995). These four variables are profitability, tangibility, growth and size. Mean profitability in the first year of operation equals -1% (*Profitability*).[8] The ratio of property, plant and equipment on total assets is on average 33% (*Tangibility*). While prior research has proxied for growth opportunities by using the market-to-book ratio, such a measure is not available for private firms. Other common proxies, including growth in sales or total assets are also unavailable for startups because these firms have no operational history. We therefore proxy the growth opportunities of a startup by using the median 3-year growth rate in total assets for firms in the same 4-digit industry as the sample firm (*Growth*).[9] Firm size is measured as the total financing sources raised in the first year

[8] The length of the first year of operation is not necessarily equal to 12 months for all startups due to the reporting requirements imposed by Belgian legislation. We therefore transformed all flow variables by dividing these variables by the number of months of the first year of operation and multiplying by 12 to obtain comparable figures on a 12 month basis.

[9] The use of the median 3-year industry growth rate in sales as an alternative measure to proxy for growth opportunities provides qualitative similar results. Belgian firms, however, are only required to report sales data when they exceed a certain size threshold. This explains our preference for the growth opportunity proxy based on industry growth in total assets.

of operation (*TFS*). The average (median) startup raises €432,966 (€159,367) of total financing sources.[10]

In Belgium, limited liability firms can choose among several legal forms. NV limited liability firms faces higher equity requirements than BVBA limited liability firms, but BVBA firms can only issue registered shares, which cannot be publicly issued and which can be transferred only after approval of the other shareholders. NV firms cannot only issue registered shares but also bearer shares, which can be transferred without any restrictions. New firms that are founded as NV are generally regarded as more prestigious. We constructed a dummy variable (*NV*) which equals one when a firm is founded as an NV limited liability firm and zero otherwise. Some 8% of the startups in our sample are NV firms, while 92% are BVBA firms.

The creditworthiness of a firm is often proxied by ratings offered by agencies such as Standard & Poor's and Moody's. The startup firms in our sample, however, do not have such a rating. We calculate the FiTo score, which is a default risk indicator from Graydon. In Belgium, Graydon is the market leader in commercial and marketing information, and credit and debt management. The FiTo score lies between 0 (financially distressed firm) and 1 (financially healthy firms). Dummies are created to classify startups into three categories according to their default risk. The bottom 25% of startups are classified as firms with a high default risk (*Low Creditworthiness*). Startups with a low default risk (or high creditworthiness) are those situated above the 25rd percentile (*High Creditworthiness*). Finally, the reference category is startups with a medium default risk (and medium creditworthiness) which are firms with a FiTo score between the 25rd and 75th percentile.

We include several other variables which relate to the composition of a startup's workforce. Note that a large number (46.7%) of our startup "firms" consist of only one employee, most likely the founder. Hence, the terms "firm" and "workforce" should be interpreted in a broad sense and are

[10] As a robustness test, we also used total number of employees (in full time equivalents) as an alternative size measure. Results remained broadly consistent with what we report below.

likely to include only the founder(s). Prior research indicates that firms founded by females generally use less outside sources of financing and that firms founded by entrepreneurs who are college educated or are advanced degree holders use considerably more startup capital—which primarily comes from the owner (Robb, Fairlie and Robinson, 2009). Increased human capital may not only influence the financing of startups, but also provides entrepreneurs with a greater ability to create and manage viable firms (Åstebro and Bernhardt, 2003). In our sample, on average 55% of employees are male (*Prop Male Empl*) and 10% of employees have a university (or equivalent) degree (*Prop Highly Edu Empl*).

Finally, the industry structure might influence the financing and success of startups (e.g., Åstebro and Bernhardt, 2003; Cosh et al., 2009). Besides including industry fixed effects in all our regression models, we proxy for scale economies in an industry by measuring the median number of employees of firms operating in the same 4-digit industry as the sample firm (*Size of Industry Peers*). The mean firm operating in the same 4-digit industry as our sample firms employs on average 3.92 people. We further proxy for industry competition (e.g., Cosh, Cumming and Hughes, 2009) by including the number of firms that operate in the same 4-digit industry as the sample firm (*Nmbr of Industry Peers*). The mean number of peers operating in the same 4-digit industry as our sample firms is on average 1,533.

4. The financial effects of credit availability for startup firms

4.1. Descriptive statistics

We start by presenting descriptive evidence on the financial effects of the crisis for startups. For this purpose, Table 2 provides a detailed snapshot of the financial structure of startups by founding year. We make a broad distinction between debt and equity financing.

Empirical studies of capital structure often treat debt as uniform, but firms simultaneously use multiple debt types (e.g., Rauh and Sufi, 2010). To take this into account, we make a further distinction between insider debt, bank debt, trade debt and other sources of non-bank debt. Insider debt represents the amount of money entrepreneurs (and other insiders) lent to their own firm.[11] Insider debt, however, could be viewed as preferred equity rather than debt financing, because insiders are unlikely to voluntarily file for bankruptcy when the debt service payments on insider debt cannot be met. Bank debt represents loans from banks and we make a distinction between short-term and long-term bank debt using a one-year dividing line. Bank debt includes financial leasing but only 1.6% of total assets are leased, making it unlikely that financial leasing is driving our results.[12] Trade debt represents trade payables. Other sources of non-bank debt represent debt related to payroll or social security, taxes and the like.

Equity financing raised generally represents inside equity financing and although firms may raise external equity financing at founding, we find that this is only the case for a very limited set of startups. For all firms in our sample we checked whether they raised venture capital or angel financing in the Zephyr database and proprietary databases from the Belgian Venture Capital and Private Equity Association and Business Angel Networks. We found only 12 new firms (or 0.08% of the sample) that raised external equity financing from venture capital or angel investors in their initial year of operation. Our findings correspond with Puri and Zarutskie (2012), who show that 0.10% of new firms in the US receive venture capital financing. That the percentage of firms raising venture capital is somewhat lower in our sample is not surprising since the venture capital market in Belgium is not as developed as its US counterpart.

[11] As a proxy for insider debt, we use the "other loans" category on the balance sheet. The category "other loans" may also include loans from affiliated firms. However, all startups in our study are independent, which suggests these loans will be non-existent.

[12] Firms may also use operational leases to finance their startup activities. Operational leases are booked off-balance sheet and are hence excluded from our calculations.

*** Table 2 about here ***

Table 2 shows the sources of funding for new firms founded in 2006, 2007, 2008 and 2009, respectively. Several interesting findings emerge. First, bank debt is the single most important source of financing in terms of the median amount of financing raised by startups. Besides bank debt, trade debt is a particularly important source of financing used by nearly all startups in our sample. Surprisingly, equity financing is only the third most important source of financing. Our finding that bank debt is an important source of financing for startups is surprising in view of the financial growth cycle paradigm (Berger and Udell, 1998) which states that startups will mainly rely on inside financing and trade credit (maybe also angel financing if firms have sufficiently high growth ambitions). In the financial growth cycle, startups are expected to experience significant difficulties in obtaining intermediated financing, such as bank debt. The importance of bank debt for new firms is unlikely to be unique to the Belgian context, however. Indeed, Robb and Robinson (2012) recently showed that US startups founded in 2004 also heavily rely on outside sources of debt financing, including bank debt.

Second, although bank debt is the single most important source of financing for startup firms, and this irrespective of their founding year, the median amount of bank debt raised by startups that are founded in crisis years is significantly lower, relative to the median amount of bank debt raised by startups that are founded in pre-crisis years. The median amount of bank debt raised by 2006 startups equals €34,794 and drops to €26,335 for 2009 startups, which represents a decline of over 32%. Moreover, while 70% of 2006 startups raised long-term bank debt, this is only 65% for 2009 startups. The drop in the median amount of debt financing raised by new firms founded in crisis years, relative to new firms founded in pre-crisis years was not compensated by a significant increase in the use of other sources of financing. Specifically, through time the median amount of trade debt decreases,

although the decrease is less strong as compared to bank debt.[13] The amount of equity financing raised remains quite stable for new firms founded in different years. As a result, while the median amount of total financing sources remained relatively stable in 2006-07, it dropped to €156,794 in 2008 (a decrease of 5.2% compared with 2007) and 149,653 in 2009 (a further decrease of 4.6% compared with 2008).

In sum, this subsection provides initial evidence that firm borrowing decreases significantly for startups founded in crisis years relative to startups founded in pre-crisis years. However, the descriptive analysis does not control for other factors that may have been driving startups' usage of bank debt, including shifts in the composition of startups. We now proceed with a more systematic testing of the financial effects of credit availability in a regression framework.

4.2. The financial effects of the crisis

In the previous section we provided descriptive statistics which provided initial evidence on a decrease in firm borrowing for startups founded in crisis years, relative to startups founded in pre-crisis years. We now study whether this initial finding holds when we control for firm, human capital and industry characteristics. We first examine the impact of the recent financial crisis on startup firm borrowing, without distinguishing among startups that are likely to have been more affected by the crisis. In particular, we estimate the following regression using ordinary least squares (OLS):

$$Y = \beta_0 + \beta_1\, Crisis + \beta_2\, Profitability + \beta_3\, Tangibility + \beta_4\, Growth + \beta_5\, TFS + \beta_6\, NV + \beta_7\, Low\ Creditwortiness + \beta_8\, High\ Creditworthiness + \beta_9\, Prop\ male\ empl + \beta_{10}\, Prop\ Highly\ Edu\ Empl + \beta_{11}\, Size\ of\ Industry\ Peers + \beta_{12}\, Nmbr\ of\ Industry\ Peers + \beta_{YEAR}\, Year + \beta_{IND}\, Industry. \quad (1)$$

[13] Unreported statistics further indicate that trade receivables also gradually decrease from a median amount of €29,496 in 2006 to €26,545 in 2009.

If borrowing by startups decreases as a consequence of the limited supply of credit in crisis years, relative to pre-crisis years, we expect that the *Crisis* dummy variable will be negative and significant. We estimate Eq. (1) for nine dependent variables. We consider total bank debt, long-term bank debt and short-term bank debt, investigating the use of bank debt, the ratio of bank debt to total financing sources raised and the natural logarithm of the absolute amount of bank debt raised by firms in their initial year of operation. Table 3 reports the estimated coefficients and robust standard errors for each of the nine specifications. The first three models consider total bank debt. In Model 1 the dependent variable is the use of bank debt (*Bank Debt > 0*), in Model 2 it is the amount of bank debt relative to total financing sources raised (*Bank Debt / TFS*), and in Model 3 it is the natural logarithm of the amount of bank debt raised (*Ln Bank Debt*).[14] Similarly, we consider long-term bank debt in Models 4, 5 and 6, and short-term bank debt in Models 7, 8 and 9.

*** Table 3 about here ***

Turning to Model 1, we see that controlling for firm, human capital and industry characteristics, startups founded in crisis years were 2.0 percentage points less likely to raise bank debt, relative to startups founded in pre-crisis years. Similarly, Model 2 shows that the ratio of bank debt to total financing sources raised was 1.6 percentage points lower for startups founded in crisis years, relative to startups founded in pre-crisis years. Model 3 shows that for startups founded in crisis years the amount of bank debt raised dropped by 26.8%, relative to the amount of bank debt raised by startups founded in pre-crisis years.

[14] The results for the regressions with a dependent variable that is a dummy variable should be interpreted within the context of a Linear Probability Model. Out of sample predictions were extremely rare in our data, which suggests that the Linear Probability Model performed acceptably. Probit regressions provide similar results but the interpretation of these models becomes more complicated when there are interactions between variables.

Turning to Models 4, 5 and 6, we see that the results for total bank debt are driven by a decreased use of long-term bank debt, a lower ratio of long-term bank debt to total financing sources raised and a lower amount of long-term bank debt raised. Specifically, startups founded in crisis years were 2.9 percentage points less likely to raise long-term bank debt, relative to startups founded in pre-crisis years. The ratio of bank debt to total financing sources raised was 1.6 percentage points lower for startups founded in crisis years, relative to startups founded in pre-crisis years. Moreover, for startups founded in crisis years the amount of long-term bank debt raised dropped by 31.4% relative to the amount of bank debt raised by startups founded in pre-crisis years. Models 7, 8 and 9, however, suggest that there is no difference in the use of short-term bank debt, the ratio of short-term bank debt to total financing sources raised and the amount of short-term debt raised for startups founded in crisis years, relative to startups founded in pre-crisis years.

In sum, we find that the financial crisis had a statistically and economically significant effect on the financing of startups. Specifically, during crisis years with limited credit availability, startups use significantly less (long-term) bank debt.

Given our limited understanding of financial decision making in startups, the results for the firm, human capital and industry characteristics in Table 3 are interesting in their own respect. In all specifications, we find a strong *positive* correlation between bank debt and profitability. This is surprising given that the negative relationship between leverage ratios and profitability is the single most cited fact in support of the pecking order theory (Harris and Raviv, 1991; Rajan and Zingales, 1995). Our findings, however, are consistent with Rauh and Sufi (2010) who show there exists significant heterogeneity in the relationship between different types of debt and profitability and find a positive correlation between bank debt and profitability for established US firms. We further find a strong positive correlation between bank debt and tangibility, except for the amount of short-term bank debt relative to total financing sources raised, where we find a negative correlation. This is consistent with the view that tangible assets are more easily collateralizable. For startups, growth

opportunities are negatively related with the amount of long-term debt relative to total financing sources raised. This relationship is reversed for short-term debt relative to total financing sources raised where we find a positive correlation with growth opportunities. These findings are consistent with Myers (1977). Firm size is positively correlated with bank debt.

Bank debt is negatively correlated with the NV legal form, which is not surprising since an NV has higher equity requirements. We further find that startups with high creditworthiness are less likely to use bank debt, have lower ratios of bank debt to total financing sources raised and raise smaller amounts of bank debt. However, to understand the relationship between creditworthiness and bank debt it is important to distinguish between long-term and short-term bank debt. Diamond (1991) predicts that both firms with low creditworthiness and firms with high creditworthiness will prefer short-term debt over long-term debt. Consistent with this model both startups with low and high creditworthiness are less likely to use long-term bank debt. Furthermore, startups with low creditworthiness are more likely to use short-term debt. However, contrary to Diamond's prediction, startups with high creditworthiness are less likely to use short-term debt.

The human capital variables are also correlated with bank debt. Specifically, firms with a larger proportion of male employees are more likely to use (long-term) bank debt. This finding relates to prior research that argues that female owners are less likely to use outside sources of financing (e.g., Robb, Fairlie and Robinson, 2009). Firms with a higher proportion of highly educated employees are less likely to raise (long-term) bank debt and raise lower amounts of (long-term) bank debt both in absolute terms and relative to total financing sources raised. Given that it is unlikely that banks discriminate against firms with a higher proportion of highly educated employees, it appears that firms with a higher proportion of highly educated employees self-select against having bank loans. This finding is consistent with Åstebro and Bernhardt (2003) who show that US startups

founded by entrepreneurs with higher levels of education and work experience self-select against bank loans.[15]

Finally, several industry characteristics also correlate with bank loans. The median size of industry peers is negatively related with the use of long-term bank loans. The size of industry peers is negatively correlated with the ratio of (long-term) bank debt to total financing sources raised and the absolute amount of long-term bank debt raised. The number of industry peers is positively related with the use of long-term bank debt. Moreover, startups operating in industries with more peers have higher ratios of (long-term) bank debt to total financing sources raised and raise larger amounts of (long-term) bank debt. This is consistent with Cosh, Cumming and Hughes (2009) who show that entrepreneurial firms operating in industries with more competitors are more likely to apply for external financing from banks.

4.3. The impact of bank dependence and financially constrained founders

Some startups are likely to have been more affected by the financial crisis than others. In this section, we investigate whether the impact of the crisis on bank financing is affected by the startups' dependence on bank financing and the extent to which the founders of startups are financially constrained.

First, we expect that the decline in borrowing for startups founded in crisis years will be particularly severe for startups that are founded in industries that are historically more dependent on bank debt (e.g., Cetorelli and Strahan, 2006). Using OLS, we estimate the following regression:

$$Y = \beta_0 + \beta_1 Crisis + \beta_2\, Bank\ Dependence + \beta_3\, Bank\ Dependence * Crisis + \beta_4\, Profitability +$$

$$\beta_5\, Tangibility + \beta_6\, Growth + \beta_7\, TFS + \beta_8\, NV + \beta_9\, Low\ Creditworthiness +$$

[15] As a robustness check, we rerun all regressions using only single employee "firms", where the employee is most likely to represent the founder, and as such may have a more direct influence on financial decision making. We find similar results as those reported before.

$$\beta_{10}\, High\ Creditworthiness + \beta_{11}\, Prop\ Male\ Empl + \beta_{12}\, Prop\ Highly\ Edu\ Empl +$$
$$\beta_{13}\, Size\ of\ Industry\ Peers + \beta_{14}\, Nmbr\ of\ Industry\ Peers + \beta_{YEAR}\, Year + \beta_{IND}\, Industry. \quad (2)$$

Table 4, Panel A, reports the estimated coefficients and robust standard errors for the nine dependent variables. In Models 1, 2 and 3 we see that startups operating in bank dependent industries do not have a significantly higher likelihood of using bank debt, but they do have a higher ratio of bank debt to total financing sources raised and they raise larger absolute amounts of bank debt. In crisis years, however, the relationship between bank dependence and a startup's ratio of bank debt to total financing sources raised becomes significantly weaker. This suggests that in crisis years, startups which operate in industries that are highly dependent on bank loans raise smaller amounts of bank debt to total financing sources, relative to pre-crisis years. When we focus on long-term bank debt in Models 4, 5 and 6 we find similar results. For short-term bank debt, we find some weak evidence that startups which operate in industries that are highly dependent on bank loans raise larger amounts of short-term bank debt to total financing sources raised. The coefficient of the bank dependence * crisis interaction variable is positive and statistically significant at the 10% level.

*** Table 4 about here ***

We further expect that that the reduction in borrowing by startups founded in crisis years will be more severe for startups founded by entrepreneurs who are financially constrained (i.e., firms where founders do not fully invest committed equity in the initial year of operation). When entrepreneurs are financially constrained, other sources of financing such as bank debt become more important for their firms. Yet, banks that tightened their credit standards as a consequence of the crisis are less likely to provide funding to financially constrained entrepreneurs and their firms. Again using OLS, we estimate the following regression:

$$Y = \beta_0 + \beta_1 Crisis + \beta_2\, Uncalled\ Equity + \beta_3\, Uncalled\ Equity * Crisis + \beta_4\, Profitability +$$
$$\beta_5\, Tangibility + \beta_6\, Growth + \beta_7\, TFS + \beta_8\, NV + \beta_9\, Low\ Creditworthiness +$$
$$\beta_{10}\, High\ Creditworthiness + \beta_{11}\, Prop\ Male\ Empl + \beta_{12}\, Prop\ Highly\ Edu\ Empl +$$
$$\beta_{13}\, Size\ of\ Industry\ Peers + \beta_{14}\, Nmbr\ of\ Industry\ Peers + \beta_{YEAR}\, Year + \beta_{IND}\, Industry. \quad (3)$$

Table 4, Panel B, reports the estimated coefficients and robust standard errors for Eq. (3). Turning to Models 1, 2 and 3 we see that startups with a larger portion of equity capital that is not paid-in use more bank debt and raise larger amounts of bank debt, both in absolute terms and relative to total financing sources raised. However, we also find that in crisis years, startups with uncalled equity are less likely to raise debt financing and the absolute amount of debt financing raised is also smaller. This suggests that when entrepreneurs are financially constrained and do not full invest committed capital in the initial year of operation, their startup firms are less likely to raise bank debt and raise smaller amounts of bank debt during crisis years, relative to pre-crisis years. These findings are confirmed by Models 4, 5 and 6 for long-term bank debt.

Taken together, our results suggest that startup firm borrowing declined significantly for startups founded in crisis years, relative to startups founded in pre-crisis years. Consistent with the causal effect of a negative supply of credit, this decline is stronger for startups that are more dependent on bank loans and for startups founded by financially constrained entrepreneurs who do not fully invest committed equity in the startup year.

5. The real effects of credit availability for startups

We now analyze whether the financial effects of the crisis that we observe in Section 4 are accompanied by changes in firm bankruptcy, revenues and investment. Startups founded in crisis years may be more likely to go bankrupt than startups founded before the crisis, since startups founded in crisis years receive less bank debt and therefore are more likely to be financially

constrained. Financial constraints may also negatively affect the ability of startups founded in crisis years to generate revenues and to subsequently finance investments. We therefore investigate the impact of the crisis for three real outcome dependent variables: firm bankruptcy, revenues and investment. We use regression analysis to determine the real outcomes of the financial crisis, controlling for firm, human capital and industry characteristics. These controls are in line with prior research (Åstebro and Bernhardt, 2003; Brav, 2009; Zarutskie, 2006).

In Table 5 we first consider the impact of the crisis on the three outcome variables: Bankruptcy (Model 1), Ln Revenue (Model 2) and Investment (Model 3). In Model 1, we see that startups founded in crisis years have a 4.0 percentage point higher probability of going bankrupt before the end of their second year of operation. This suggests that the lower borrowing of startups founded in crisis years led to a higher probability of going bankrupt. The results for the other variables suggest that more profitable startups and startups with more tangible assets have a lower probability of going bankrupt. Not surprisingly, startups with low (high) creditworthiness have a higher (lower) likelihood of going bankrupt, relative to startups of average creditworthiness. We fail to find a significant impact of human capital on the likelihood of startups going bankrupt. Finally, for general industry characteristics, we show that startups in industries with more peers have a higher likelihood of going bankrupt. Turning to Model 2 and 3, we see that the revenues generated by startups and their investments are not different for startups founded in crisis years, relative to startups founded in pre-crisis years.

*** Table 5 about here ***

As previously shown, the reduction in startup borrowing in crisis years was stronger for the startups operating in more bank dependent industries. This implies that the real effects of the crisis may also be more pronounced for startups operating in more bank dependent industries. Table 6,

Panel A, reports estimated coefficients and robust standard errors for Eq. (2) when the dependent variables are the three real outcome measures. Table 6, Panel A, is analogous to Table 4, Panel A, and exploits variation in bank dependence. We see that startups that are founded in crisis years and operate in industries that are more bank dependent, have a significantly higher probability of going bankrupt (Model 1) and realize lower revenues (Model 2). In Model 3, we find a statistically insignificant relationship between startups founded in crisis years that operate in more bank dependent industries and subsequent firm investment.

*** Table 6 about here ***

In addition, we found that the reduction in borrowing during crisis years was stronger for startups founded by financially constrained entrepreneurs. Hence, the real effects of the crisis may also be more pronounced for these startups. Table 6, Panel B, reports estimated coefficients and robust standard errors for Eq. (3). The dependent variables are again the three real outcome measures Bankruptcy (Model 1), Ln Revenue (Model 2) and Investment (Model 3). Startups founded by financially constrained entrepreneurs in crisis years have a significantly higher probability of going bankrupt (Model 1), they realize significantly lower revenues (Model 2), and they invest significantly less (Model 3).

Overall, our results suggest that the lower borrowing of startups founded in crisis years translated in a higher probability of going bankrupt, decreased revenues and decreased investment and this particularly for startups operating in industries that are more bank dependent and for startups founded by financially constrained entrepreneurs. Our findings suggest that startups founded in crisis years were more financially constrained as a consequence of reduced credit availability.

6. Alternative explanations and robustness checks

A reason for concern is that our findings may not be driven by a decreased supply of credit in crisis years, but by a simultaneous decrease in demand for credit during the financial crisis. To rule out this alternative explanation, we collected additional data on the complete set of startups founded between 1999 and 2002, which includes a negative demand shock caused by September 11, 2001 (e.g., Duchin, Ozbas and Sensoy, 2010). For this purpose, we used similar procedures as those described in Section 3. In Belgium, the consumer confidence indicator plummeted between September and November 2001. Moreover, the period 1999-2002 is interesting to compare with the period 2006–2009, because the pattern of gross fixed capital formation by Belgian enterprises is similar for both periods. Specifically, in the 1999-2002 period gross fixed capital formation by Belgian enterprises increased by 2.9% in 2001 but decreased by 3.8 % in 2002, while in the 2006-2009 period, gross fixed capital formation increased by 3.8 % in 2008 and decreased by 7.5 % in 2009.

Table 7 summarizes the financial effects of the 2001-02 demand crisis. Table 7, Panel A, considers the overall effect of the demand crisis on bank debt. Consistent with the argument that there was an important negative demand shock in 2001-2002, we find that the use of bank debt by startups significantly decreases for startups founded in 2001-2002, relative to startups founded in pre-crisis years. We also find that during the 2001-02 demand crisis, startups decreased their reliance on both long-term and short-term bank debt, while for the 2008-09 financial crisis we only found a significant effect on long-term bank debt. However, with respect to bank dependence, Panel B of Table 7 shows that startups which operate in industries that are highly dependent on bank debt are *more* likely to raise bank debt in 2001-2002, relative to pre-crisis years, which contradicts our findings for the financial crisis in 2008-2009. The only finding that is consistent with the financial effects of the 2008-09 crisis is that startups which are more bank dependent have lower ratios of (long-term) bank debt to total financing sources in crisis years, relative to pre-crisis years. Table 7, Panel C, shows no evidence of reduced borrowing for startups founded by more financially constrained entrepreneurs

during a demand side crisis. This is again different from our findings on the financial effects of the 2008-09 crisis (See Table 4, Panel B).

*** Table 7 about here ***

Table 8 summarizes the real effects of the 2001-02 demand crisis. Besides the finding that startups have a higher likelihood to go bankrupt when they are founded during a demand crisis (Panel A), in all other regressions we fail to find any evidence consistent with the real effect of the 2008-09 financial crisis. While firm revenue is 13.2% lower for startups founded during a demand crisis, relative to startups founded before the demand crisis, the real effect of a demand crisis is not stronger for startups that are more dependent on bank debt and startups founded by financially constrained entrepreneurs. In sum, the evidence from the 2001-02 demand crisis is not consistent with our findings from the 2008-09 financial crisis, which suggests that our main findings are unlikely to be explained by a demand effect.

*** Table 8 about here ***

To provide further confidence that our results are not spuriously driven by some mechanical factor, we also collected data on the complete set of startups founded between 2004 and 2005, which we combined with data from startups founded between 2006 and 2007. In the 2004-2007 period there were no economy-wide shocks comparable to the financial crisis or September 11. We tested the effect of a placebo crisis in 2006-07. The estimates from this placebo crisis (unreported due to space considerations) suggest that, if anything, our regressions are biased away from finding the results we reported earlier on the financial and real effects of the 2008-09 financial crisis.

Another alternative explanation for our findings is that decreased borrowing by startups in crisis years is an artifact of less or different startups being created in crisis years, relative to pre-crisis years. There are several reasons why this alternative story is unlikely to drive our findings. First, it is unclear why the creation of fewer startups would lead to a reduction in borrowing by startups. Decreased competition for a given set of bank loans should increase the availability of bank debt for such a smaller group of startups. In addition, in all regression we control for firm, human capital and industry characteristics, which should capture differences in the quality of firms and general firm characteristics for startups founded in different years. Second, prior research indicates that liquidity constraints do not matter much for the creation of entrepreneurial firms (Hurst and Lusardi, 2004). Table 2 indeed shows that the number of startups founded in 2008 does not decrease significantly relative to pre-crisis years. The significant drop in the number of startups founded in 2009 is most likely a consequence of the economic crisis that emerged at that time. Specifically, in 2008, annual GDP growth rate was still positive at 0.99% in Belgium and gross fixed capital formation increased by 3.8%. In 2009, however, economic activity decreased dramatically; the annual growth rate of GDP was -2.78% and gross fixed capital formation decreased by 7.5%. As a robustness check, we reran all regressions excluding startups founded in 2009, thereby only focusing on startups founded in 2008 as startups founded during the recent financial crisis. These additional regressions (unreported due to space considerations) confirm that our results remain qualitatively similar compared to the ones we reported before.

7. Conclusions

This paper uses a novel data set to study the financial and real effects of credit availability for startups. Towards this end, we trace the firm-level impact of the recent financial crisis, which represents a negative shock to the supply of financing. While the use of trade debt and insider debt

remained fairly constant over the period considered, the use of bank debt decreased dramatically for startups founded in crisis years, relative to startups founded in pre-crisis years. However, bank debt remains the single most important source of financing for startups, even when these startups are founded during the height of the crisis. This is surprising in light of current theoretical models arguing that market imperfections, such as information asymmetry, will prevent startups—arguably the most informationally opaque firms—from accessing formal debt markets (e.g., Stiglitz and Weiss, 1981). Our evidence on the importance of bank debt is consistent with evidence from US firms founded in 2004 (Robb and Robinson, 2012). We further extent this research by showing that the importance of bank financing for startups reflects a broader pattern for startups founded in a different institutional setting outside the US and fundamentally different credit market conditions.

In addition, our data show that the financial effects of the crisis were particularly strong for startups that are highly dependent on bank debt and startups founded by financially constrained entrepreneurs. This is consistent with the causal effect of a negative supply of credit on new firm borrowing. Results further suggest that the lower borrowing by startups founded in crisis years translated in a higher probability of going bankrupt, decreased revenues and decreased investment and this especially for startups that are more bank dependent or startups founded by financially constrained entrepreneurs. Overall, this evidence is consistent with startups founded in crisis years being more financially constrained, relative to startups founded in pre-crisis years. We further show that similar results do not follow the negative demand shock caused by September 11, 2001 or a placebo crisis.

This study has important ramifications for theory and practice. The important role of bank debt in the financing of startups, even during the height of the recent crisis—a financial crisis of historic breadth and depth—calls for additional theory development on the role of bank debt in the earliest stages of a firm's life cycle. The study further shows how the supply of credit, operates as a separate channel, independent of the demand for credit. Specifically, a limited supply of credit

reduces startup borrowing, which hampers firm success. For policy makers, this study suggests that they can influence the success of business startups, the future engines of economic growth, through the implementation of policies that guarantee the availability of credit to startups.

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Table 1: Variable definitions and descriptive statistics

This table provides definitions and descriptive statistics for several key variables. The sample is based on the complete set of business registration for Belgium from January 1, 2006 to December 31, 2009 and includes 14,846 startups. The descriptive statistics of the variables with a * represent descriptive statistics on the untransformed variables for ease of interpretation; in subsequent multivariate regressions the natural logarithm (plus one) of these variables is used. All euro values are inflation adjusted using the Belgian consumer price index.

	Description	*N*	Mean	Median	Std. dev.	Min	Max
Dependent Variables							
Financial Effects							
Bank Debt > 0	= 1 if firm raised bank debt in founding year, else 0	14,846	0.73	—	—	0.00	1.00
LT Bank Debt > 0	= 1 if firm raised long-term (maturing in more than one year) bank debt in founding year, else 0	14,846	0.67	—	—	0.00	1.00
ST Bank Debt > 0	= 1 if firm raised short-term (maturing within one year) bank debt in founding year, else 0	14,846	0.25	—	—	0.00	1.00
Bank Debt / TFS	Bank debt to total financing sources raised in founding year	14,846	0.30	0.25	0.28	0.00	0.98
LT Bank Debt / TFS	Long-term bank debt to total financing sources raised in founding year	14,846	0.27	0.20	0.27	0.00	0.98
ST Bank Debt / TFS	Short-term bank debt to total financing sources raised in founding year	14,846	0.03	0.00	0.09	0.00	0.98
Ln Bank debt *	Natural logarithm of absolute amount of bank debt raised in founding year plus 1	14,846	145.29	30.84	522.04	0.00	26,400.00
Ln LT Bank debt *	Natural logarithm of absolute amount of long-term bank debt raised in founding year plus 1	14,846	128.02	24.42	461.11	0.00	22,500.00
Ln ST Bank debt *	Natural logarithm of absolute amount of short-term bank debt raised in founding year plus 1	14,846	17.27	0.00	171.86	0.00	12,300.00
Real Effects							
Bankrupt	= 1 if firm goes bankrupt before the end of the second year of operation, else 0	14,846	0.04	—	—	0.00	1.00
Ln Revenue	Natural logarithm of revenue (in 000 EUR) realized in the first year of operation plus 1	2,943	816.42	233.36	4,401.82	0.19	145,000.00
Investment	Capital expenditures (in 000 EUR) in the second year of operation	13,851	48.81	10.97	115.35	-25.00	783.30

	Description	*N*	Mean	Median	Std. dev.	Min	Max
Independent Variables							
Crisis	= 1 if firm is founded in 2008 or 2009, else 0	14,846	0.45	—	—	0.00	1.00
Bank Dependence	Median ratio of bank debt to total assets in 4-digit industry measured in non-crisis years	14,846	0.22	0.21	0.08	0.00	0.75
Uncalled Equity	The ratio of uncalled equity to paid-in equity capital	14,843	0.68	0.00	0.89	0.00	4.32
Firm Characteristics							
Profitability	EBIT on total assets	14,846	-0.01	0.04	0.38	-1.98	0.70
Tangibility	Property, plant and equipment on total assets	14,846	0.33	0.26	0.27	0.00	1.00
Growth	Median growth in total assets of firms in 4-digit industry measured as a moving average in the three years before founding	14,846	1.16	1.16	0.12	0.94	1.49
TFS *	Natural logarithm of total financing sources raised (in 000 EUR) plus 1	14,846	432.97	159.37	1,322.93	5.57	65,508.90
NV	= 1 if firm is founded as "NV" legal form, else 0	14,846	0.08	—	—	0.00	1.00
Low Creditworthiness	= 1 if firm has an unlevered FiTo-score that is in bottom 25%	14,846	0.25	—	—	0.00	1.00
High Creditworthiness	= 1 if firm has an unlevered FiTo-score that is in top 25%	14,846	0.25	—	—	0.00	1.00
Human Capital Characteristics							
Prop Male Empl	Proportion of male employees	14,846	0.55	0.67	0.44	0.00	1.00
Prop Highly Edu Empl	Proportion of employees with university (or equivalent) education	14,846	0.10	0.00	0.28	0.00	1.00
Industry Characteristics							
Size of Industry Peers *	Natural logarithm of the median number of employees of firms in 4-digit industry plus 1	14,846	3.92	3.00	3.88	1.00	232.00
Nmbr of Industry Peers *	Natural logarithm of the median number of firms in 4-digit industry plus 1	14,846	1,533.18	984.00	1,587.00	1.00	5,646.00

Table 2: Sources of financing for startups by founding year

The sample is based on the complete set of business registrations for Belgium from January 1, 2006 to December 31, 2009 and includes 14,846 startups. The median, in euro, for all firms is reported in the first column. The second column reports the median, in euro, for only firms with positive amounts of that source of financing. The percentage of firms that use a particular source of financing is reported in the third column. All euro values are inflation adjusted using the Belgian consumer price index.

	2006 Startups (N = 3,892)			2007 Startups (N = 4,302)			2008 Startups (N = 3,812)			2009 Startups (N = 2,840)		
	Median	Median if > 0	% of firms	Median	Median if > 0	% of firms	Median	Median if > 0	% of firms	Median	Median if > 0	% of firms
Equity	€ 17,460	€ 17,460	100%	€ 16,709	€ 16,709	100%	€ 16,709	€ 16,709	100%	€ 16,360	€ 16,360	100%
Insider Debt	€ 9,784	€ 22,381	75%	€ 9,290	€ 22,458	74%	€ 10,614	€ 23,436	76%	€ 9,851	€ 21,992	75%
Bank Debt	€ 34,794	€ 63,429	75%	€ 32,810	€ 70,581	73%	€ 27,316	€ 62,262	72%	€ 26,335	€ 63,831	71%
LT Bank Debt	€ 28,154	€ 61,530	70%	€ 24,945	€ 67,964	68%	€ 22,624	€ 60,995	66%	€ 20,975	€ 61,863	65%
ST Bank Debt	€ 0	€ 11,829	25%	€ 0	€ 11,453	27%	€ 0	€ 11,131	25%	€ 0	€ 9,841	24%
Trade Debt	€ 26,265	€ 27,366	98%	€ 25,550	€ 26,227	98%	€ 24,322	€ 25,082	98%	€ 23,041	€ 23,716	98%
Other Types of Non-Bank Debt	€ 11,692	€ 12,347	97%	€ 11,871	€ 12,367	97%	€ 11,151	€ 11,691	97%	€ 11,499	€ 11,944	97%
Total Financing Sources	**€ 162,071**	**€ 162,071**	**100%**	**€ 165,357**	**€ 165,357**	**100%**	**€ 156,794**	**€ 156,794**	**100%**	**€ 149,653**	**€ 149,653**	**100%**

Table 3: Credit availability and financial effects

Coefficients in all specifications are estimated using OLS. Robust standard errors are reported in brackets. All specifications include a constant, 2-digit industry dummies and year dummies (not reported due to space considerations). Each specification is estimated using 14,846 observations, based on the complete set of business registrations for Belgium from January 1, 2006 to December 31, 2009. ***, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.

	Bank Debt > 0 (1)	Bank Debt/TFS (2)	Ln Bank Debt (3)	LT Bank Debt > 0 (4)	LT Bank Debt/TFS (5)	Ln LT Bank Debt (6)	ST Bank Debt > 0 (7)	ST Bank Debt/TFS (8)	Ln ST Bank Debt (9)
Crisis	-0.020**	-0.016***	-0.268***	-0.029***	-0.016***	-0.314***	0.004	-0.001	0.004
	[0.009]	[0.006]	[0.099]	[0.010]	[0.005]	[0.103]	[0.010]	[0.002]	[0.095]
Firm characteristics									
Profitability	0.068***	0.048***	0.820***	0.081***	0.031***	0.798***	0.049***	0.017***	0.716***
	[0.012]	[0.006]	[0.119]	[0.011]	[0.006]	[0.120]	[0.012]	[0.003]	[0.113]
Tangibility	0.481***	0.462***	6.061***	0.564***	0.477***	6.908***	0.062***	-0.015***	0.346**
	[0.013]	[0.009]	[0.143]	[0.014]	[0.008]	[0.150]	[0.014]	[0.003]	[0.135]
Growth	0.001	-0.038	-0.216	-0.007	-0.061**	-0.333	0.088	0.023**	0.973*
	[0.055]	[0.030]	[0.582]	[0.055]	[0.028]	[0.590]	[0.056]	[0.012]	[0.534]
TFS	0.107***	0.061***	1.828***	0.116***	0.053***	1.804***	0.047***	0.007***	0.655***
	[0.003]	[0.002]	[0.035]	[0.003]	[0.002]	[0.037]	[0.003]	[0.001]	[0.032]
NV	-0.136***	-0.092***	-1.555***	-0.142***	-0.086***	-1.618***	-0.065***	-0.006*	-0.526***
	[0.014]	[0.007]	[0.161]	[0.014]	[0.007]	[0.166]	[0.014]	[0.003]	[0.149]
Low creditworthiness	-0.010	-0.008	-0.138	-0.061***	-0.049***	-0.746***	0.163***	0.041***	1.772***
	[0.009]	[0.006]	[0.100]	[0.010]	[0.005]	[0.106]	[0.011]	[0.003]	[0.106]
High creditworthiness	-0.035***	-0.018***	-0.365***	-0.020**	-0.001	-0.182**	-0.116***	-0.017***	-1.133***
	[0.008]	[0.005]	[0.087]	[0.009]	[0.005]	[0.090]	[0.008]	[0.001]	[0.074]
Human capital characteristics									
Prop male empl	0.022**	-0.011**	0.139	0.021**	-0.009*	0.163*	-0.001	-0.002	-0.022
	[0.009]	[0.005]	[0.091]	[0.009]	[0.005]	[0.094]	[0.009]	[0.002]	[0.082]
Prop highly edu empl	-0.066***	-0.025***	-0.746***	-0.070***	-0.021***	-0.777***	-0.022	-0.004	-0.224*
	[0.014]	[0.007]	[0.152]	[0.014]	[0.007]	[0.154]	[0.013]	[0.003]	[0.129]
Industry characteristics									
Size industry peers	-0.015	-0.020***	-0.146	-0.028**	-0.016**	-0.224*	-0.016	-0.003	-0.198
	[0.012]	[0.007]	[0.130]	[0.012]	[0.007]	[0.134]	[0.013]	[0.002]	[0.124]
Nmbr of industry peers	0.005	0.008***	0.076*	0.008*	0.006***	0.088**	-0.003	0.001*	0.001
	[0.004]	[0.002]	[0.042]	[0.004]	[0.002]	[0.043]	[0.004]	[0.001]	[0.039]
Industry and year dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R-squared	0.215	0.324	0.341	0.253	0.344	0.351	0.061	0.062	0.086

Table 4: Credit availability, bank dependence, financially constrained entrepreneurs, and financial effects

Coefficients in all specifications are estimated using OLS. Robust standard errors are reported in brackets. All specifications include firm, human capital and industry characteristics, a constant, 2-digit industry dummies and year dummies (not reported due to space considerations). Each specification is

estimated using 14,843 observations, based on the complete set of business registrations for Belgium from January 1, 2006 to December 31, 2009. ***, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.

Panel A: Bank dependence	**Bank Debt > 0**	**Bank Debt/TFS**	**Ln Bank Debt**	**LT Bank Debt > 0**	**LT Bank Debt/TFS**	**Ln LT Bank Debt**	**ST Bank Debt > 0**	**ST Bank Debt/TFS**	**Ln ST Bank Debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Crisis	0.002	0.010	0.021	-0.001	0.018	0.107	0.009	-0.008*	-0.005
	[0.021]	[0.012]	[0.227]	[0.022]	[0.011]	[0.232]	[0.021]	[0.004]	[0.204]
Bank dependence	0.052	0.243***	1.940**	0.109	0.248***	2.418***	-0.009	-0.005	0.058
	[0.083]	[0.048]	[0.888]	[0.085]	[0.046]	[0.911]	[0.088]	[0.017]	[0.833]
Bank dependence * Crisis	-0.102	-0.120**	-1.297	-0.127	-0.152***	-1.891**	-0.023	0.031*	0.041
	[0.083]	[0.048]	[0.885]	[0.084]	[0.046]	[0.907]	[0.086]	[0.017]	[0.815]
Firm, human capital and industry characteristics, industry and year dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R-squared	0.215	0.325	0.341	0.253	0.345	0.351	0.061	0.062	0.086
Panel B: Financially constrained entrepreneurs	**Bank Debt > 0**	**Bank Debt/TFS**	**Ln Bank Debt**	**LT Bank Debt > 0**	**LT Bank Debt/TFS**	**Ln LT Bank Debt**	**ST Bank Debt > 0**	**ST Bank Debt/TFS**	**Ln ST Bank Debt**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Crisis	-0.010	-0.013**	-0.166	-0.018*	-0.012**	-0.205*	-0.001	-0.001	-0.046
	[0.011]	[0.006]	[0.113]	[0.011]	[0.006]	[0.118]	[0.011]	[0.002]	[0.108]
Uncalled equity	0.023***	0.027***	0.275***	0.021***	0.023***	0.249***	0.019***	0.004***	0.168***
	[0.005]	[0.003]	[0.054]	[0.005]	[0.003]	[0.055]	[0.006]	[0.001]	[0.051]
Uncalled equity * Crisis	-0.016**	-0.006	-0.159**	-0.017**	-0.006	-0.169**	0.006	0.000	0.068
	[0.007]	[0.004]	[0.077]	[0.008]	[0.004]	[0.079]	[0.008]	[0.002]	[0.072]
Firm, human capital and industry characteristics, industry and year dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R-squared	0.216	0.329	0.342	0.253	0.348	0.352	0.063	0.063	0.087

Table 5: Credit availability and real effects

Coefficients in all specifications are estimated using OLS. Robust standard errors are reported in brackets. All specifications include a constant, 2-digit industry dummies and year dummies (not reported due to space considerations). The first specification is estimated using 14,846 observations, the second specification is estimated using 2,943 observations and the third specification is estimated using 13,851 observations, based on the complete set of business registrations for Belgium from January 1, 2006 to December 31, 2009. ***, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.

	Bankruptcy	**Ln Revenue**	**Investment**
	(1)	**(2)**	**(3)**
Crisis	0.040***	0.059	2.640
	[0.004]	[0.041]	[8.885]
Firm characteristics			
Profitability	-0.029***	0.602***	29.866***
	[0.008]	[0.075]	[7.381]
Tangibility	-0.033***	-0.900***	29.239*
	[0.006]	[0.067]	[14.988]
Growth	0.031	0.081	184.166*
	[0.028]	[0.251]	[98.512]
TFS	0.002	0.679***	43.549***
	[0.001]	[0.016]	[6.651]
NV	-0.007	-0.021	70.573***
	[0.006]	[0.073]	[23.663]
Low creditworthiness	0.031***	-0.240***	5.819
	[0.005]	[0.047]	[9.606]
High creditworthiness	-0.010***	0.091***	7.212
	[0.003]	[0.035]	[5.246]
Human capital characteristics			
Prop male empl	-0.004	0.142***	-10.042
	[0.004]	[0.039]	[8.691]
Prop highly edu empl	-0.004	-0.112	-14.013
	[0.005]	[0.071]	[11.278]
Industry characteristics			
Size industry peers	0.010*	0.122*	1.692
	[0.006]	[0.064]	[13.714]
Nmbr of industry peers	-0.001	0.056***	8.602**
	[0.002]	[0.018]	[3.754]
Industry and year dummies	Y	Y	Y
Adjusted R-squared	0.027	0.630	0.054

Table 6: Credit availability, bank dependence, financially constrained entrepreneurs and real effects

Coefficients in all specifications are estimated using OLS. Robust standard errors are reported in brackets. All specifications include a constant, 2-digit industry dummies and year dummies (not reported due to space considerations). The first specification is estimated using 14,846 observations, the second specification is estimated using 2,943 observations and the third specification is estimated using 13,851 observations, based on the complete set of business registrations for Belgium from January 1, 2006 to December 31, 2009. ***, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.

Panel A: Bank dependence	**Bankruptcy**	**Ln Revenue**	**Investment**
	(1)	**(2)**	**(3)**
Crisis	0.024**	0.293***	-34.972
	[0.009]	[0.107]	[35.977]
Bank dependence	-0.040	0.312	-78.405
	[0.035]	[0.368]	[184.524]
Bank dependence * Crisis	0.072*	-1.057**	169.043
	[0.040]	[0.431]	[145.097]
Firm, human capital and industry characteristics, industry and year dummies	Y	Y	Y
Adjusted R-squared	0.027	0.630	0.054
Panel B: Financially constrained entrepreneurs			
Crisis	0.035***	0.102**	9.975
	[0.005]	[0.048]	[10.976]
Uncalled equity	0.003	0.054***	17.553**
	[0.002]	[0.020]	[8.117]
Uncalled equity * Crisis	0.007**	-0.064**	-11.426*
	[0.004]	[0.031]	[6.679]
Firm, human capital and industry characteristics, industry and year dummies	Y	Y	Y
Adjusted R-squared	0.028	0.630	0.055

Table 7: The financial effects of the 2001-02 demand shock

Coefficients in all specifications are estimated using OLS. Robust standard errors are reported in brackets. All specifications include firm characteristics, a constant, 2-digit industry dummies and year dummies (not reported due to space considerations). Each specification is estimated using 12,631 observations, based on the complete set of business registrations for Belgium from January 1, 1999 to December 31, 2002. ***, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.

Panel A	**Bank Debt > 0** **(1)**	**Bank Debt/TFS** **(2)**	**Ln Bank Debt** **(3)**	**LT Bank Debt > 0** **(4)**	**LT Bank Debt/TFS** **(5)**	**Ln LT Bank Debt** **(6)**	**ST Bank Debt > 0** **(7)**	**ST Bank Debt/TFS** **(8)**	**Ln ST Bank Debt** **(9)**
Crisis	-0.059***	-0.013**	-0.199***	-0.054***	-0.011*	-0.188***	-0.077***	-0.003	-0.176***
	[0.010]	[0.006]	[0.042]	[0.010]	[0.005]	[0.044]	[0.011]	[0.002]	[0.038]
Firm characteristics, industry dummies and year dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R-squared	0.190	0.335	0.446	0.222	0.361	0.426	0.039	0.030	0.106
Panel B									
Crisis	-0.098***	0.016	-0.182*	-0.084***	0.016	-0.112	-0.036	0.000	-0.083
	[0.022]	[0.012]	[0.098]	[0.023]	[0.012]	[0.100]	[0.025]	[0.005]	[0.085]
Bank dependence	0.088	0.195***	1.618***	0.135	0.185***	1.989***	0.139	0.011	0.229
	[0.084]	[0.047]	[0.383]	[0.088]	[0.045]	[0.391]	[0.095]	[0.020]	[0.355]
Bank dependence * Crisis	0.157**	-0.114**	-0.055	0.122	-0.103**	-0.286	-0.160*	-0.011	-0.365
	[0.076]	[0.046]	[0.333]	[0.080]	[0.045]	[0.341]	[0.087]	[0.018]	[0.289]
Firm characteristics, industry dummies and year dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R-squared	0.190	0.336	0.447	0.223	0.362	0.427	0.039	0.030	0.106
Panel C									
Crisis	-0.063***	-0.014**	-0.200***	-0.060***	-0.013**	-0.203***	-0.081***	-0.001	-0.190***
	[0.011]	[0.006]	[0.049]	[0.011]	[0.006]	[0.051]	[0.013]	[0.003]	[0.045]
Uncalled equity	0.003	0.020***	0.064***	0.000	0.016***	0.038	0.010	0.004***	0.029
	[0.006]	[0.003]	[0.023]	[0.006]	[0.003]	[0.024]	[0.007]	[0.002]	[0.022]
Uncalled equity * Crisis	0.007	0.000	-0.002	0.011	0.002	0.023	0.007	-0.003	0.022
	[0.008]	[0.005]	[0.033]	[0.008]	[0.005]	[0.034]	[0.009]	[0.002]	[0.030]
Firm characteristics, industry dummies and year dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R-squared	0.190	0.338	0.447	0.222	0.363	0.426	0.039	0.031	0.106

Table 8: The real effects of the 2001-02 demand shock

Coefficients in all specifications are estimated using OLS. Robust standard errors are reported in brackets. All specifications include a constant, 2-digit industry dummies and year dummies (not reported due to space considerations). The first specification is estimated using 12,631 observations, the second specification is estimated using 5,007 observations and the third specification is estimated using 11,790 observations, based on the complete set of business registrations for Belgium from January 1, 1999 to December 31, 2002. ***, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.

	Bankruptcy	**Ln Revenue**	**Investment**
Panel A	**(1)**	**(2)**	**(3)**
Crisis	0.008**	-0.132***	-1.788
	[0.004]	[0.038]	[5.084]
Firm characteristics, industry and year dummies	Y	Y	Y
Adjusted R-squared	0.020	0.562	0.420
Panel B			
Crisis	0.000	-0.102	3.608
	[0.010]	[0.084]	[11.874]
Bank dependence	-0.022	0.159	-22.125
	[0.035]	[0.349]	[58.655]
Bank dependence * Crisis	0.034	-0.117	-21.215
	[0.034]	[0.286]	[43.776]
Firm characteristics, industry and year dummies	Y	Y	Y
Adjusted R-squared	0.020	0.562	0.420
Panel C			
Crisis	0.007*	-0.147***	0.281
	[0.004]	[0.042]	[6.107]
Uncalled equity	-0.002	-0.016	9.650***
	[0.002]	[0.020]	[2.397]
Uncalled equity * Crisis	0.002	0.025	-3.698
	[0.003]	[0.029]	[3.500]
Firm characteristics, industry and year dummies	Y	Y	Y
	0.019	0.562	0.421