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THE TRADE-OFF BETWEEN BANK DEBT AND TRADE CREDIT FOR BUSINESS START-UPS: FINANCING COSTS VERSUS LIQUIDATION POLICY

NANCY HUYGHEBAERT • LINDA VAN DE GUCHT • CYNTHIA VAN HULLE

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by

Nancy Huyghebaert

Linda Van de Gucht

Cynthia Van Hulle

Katholieke Universiteit Leuven, Belgium*

* The authors are, respectively, Assistant Professor of Finance, Professor of Finance, and Professor of Finance, Department of Applied Economics, Katholieke Universiteit Leuven, Belgium.
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Corresponding author:
Nancy Huyghebaert, Department of Applied Economics, Katholieke Universiteit Leuven, Naamsestraat 69, 3000 Leuven, Belgium; tel.: +32-16-32 67 37, fax: +32-16-32 67 32, e-mail: nancy.huyghebaert@econ.kuleuven.ac.be

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Abstract

This paper investigates the trade-off between bank debt and trade credit for entrepreneurial start-ups. Specifically, we examine how the lower cost of bank debt is weighed against the more lenient liquidation policy adopted by suppliers. Both the riskiness of the venture and the entrepreneur's control rents influence this choice. Using unique data on 325 first-time business start-ups, we find that firms in industries with high historical failure rates and entrepreneurs who value private control benefits use less bank debt. These effects are even strengthened in case assets have a high liquidation value and thus banks are more likely to liquidate the firm following default.

INTRODUCTION

In most countries, business start-ups in traditional industrial sectors cannot access venture capital. Especially in Continental Europe, venture capitalists still largely finance firms in the growth rather than the start-up stage (e.g., Ooghe *et al.*, 1991). Also, the use of venture capital tends to be restricted to very specific industries, such as biotechnology, software and computers, telecommunications, etc. In the U.S., for example, studies investigating venture capital financing principally use databases of high-tech firms, such as firms established in Silicon Valley (e.g., Davila *et al.*, 2003). Entrepreneurs in traditional industries must thus finance their assets and operations mainly with debt. The two major sources of debt financing are bank loans and trade credit. Berger and Udell (1998), for instance, report that commercial banks and suppliers are the largest providers of debt financing for U.S. firms aged up to two years. Similar conclusions are obtained when examining start-ups in Continental Europe (e.g., Huyghebaert and Van de Gucht, 2002). Furthermore, Cook (1999) and Fisman and Love (2003) show that implicit borrowing in the form of trade credit constitutes an important source of funding for firms with difficult access to financial markets.

Trade credit, however, is considered to be an expensive financing source. The credit term most frequently adopted by suppliers is "2/10 net 30" (Ng *et al.*, 1999). This term represents a two-percent discount for payment within the ten-day discount period; the net period ends on day 30. The implicit interest rate on trade credit under this term amounts to 43.9%. Similarly, Cook (1999) reports that for small Russian firms, the average interest rate on trade loans amounts to 58%. Bank loans are typically a cheaper form of debt financing (e.g., Wilson and Summers, 2002). Based on the explicit cost alone, entrepreneurs should prefer bank financing. Yet, most firms use both forms of debt financing, and entrepreneurs use even more trade credit than established firms. Cunat (2002), for instance, documents that trade credit represents 34% of total debt in small-sized US firms; this percentage is even higher for small-sized UK firms. Also, Petersen and Rajan (1997) find that bank credit constrained small firms make up the shortage of funds by raising more trade

credit. These observations suggest that bank debt and trade credit differ not only with respect to cost but also on other dimensions.

This paper examines how entrepreneurial firms choose between bank debt and trade credit. Besides the cost differential, we take into account that a major difference between bank debt and trade credit is the liquidation policy that is followed by these lenders when borrowers encounter financial difficulties. Banks tend to follow strict liquidation policies when debtors get financially distressed: if upon default a firm's liquidation value exceeds its going concern value, banks will liquidate the firm (see also Diamond, 1991; Chemmanur and Fulghieri, 1994). Suppliers, on the other hand, earn rents from selling goods to their customers. If a customer is liquidated upon default, such supplier rents are lost. Thus, as argued by Petersen and Rajan (1997), suppliers have an implicit equity stake in their customers and therefore are more willing than banks to renegotiate their claims when debtors get into financial problems. In other words, suppliers may be willing to reorganize even when the firm's liquidation value exceeds its going concern value.[1] Similarly, Wilner (2000) argues that suppliers are more dependent on their customers than credit market lenders whereas Franks and Nyborg (1996) point out that sunk investments in the customer-buyer relationship also make suppliers more lenient towards financially distressed buyers.[2] For first-time business start-ups, which are the firms examined in this paper, this issue of differences in liquidation policy cannot be ignored. The reason is that these firms face relatively high failure rates, at least when compared to more established firms. Since these firms have no history, the driving forces behind their debt choice can also be disentangled more easily.

In this paper, we argue that entrepreneurs trade off the lower cost of bank debt against the more lenient liquidation policy of suppliers. We hypothesize that this trade-off is influenced by three factors: the quality of the venture, the entrepreneur's private benefits of control and the liquidation value of firm assets. Entrepreneurs with ventures that have a high probability of success

[1] An alternative way to look at this issue is that, because of supplier rents, the going concern value of the firm is higher to the supplier than to the bank. As a result, suppliers are more lenient with financially distressed firms.

are less likely to default and thus are primarily interested in minimizing debt expenses. These entrepreneurs therefore predominantly raise bank debt at the moment of start-up. Entrepreneurs with risky ventures, on the other hand, restrict their bank debt so as to avoid defaulting on their bank loan. These entrepreneurs are willing to accept the higher trade credit rates so as to benefit from the supplier's lenient liquidation policy and reduce the chance of liquidation once financial distress occurs. This trade-off is further influenced by the entrepreneur's private benefits of control, i.e. the various non-pecuniary aspects related to managing one's own firm. In the case of liquidation, entrepreneurs lose these private control rents. Thus, entrepreneurs with higher private benefits of control are more reluctant to expose their firm to the bank's strict liquidation policy and adjust their choice of debt instruments accordingly. Finally, the trade-off is determined by the firm's liquidation value. If assets have a high liquidation value, the firm's liquidation value is more likely to exceed its going concern value following default. Then, banks will liquidate the firm, which entrepreneurs of lower quality ventures and entrepreneurs who value private benefits of control take into account when determining their mix of bank and trade credit at start-up.

We examine these conjectures using a unique sample of 325 Belgian entrepreneurial start-ups. These firms are first-time business start-ups in traditional manufacturing industries, established in 1992. We study these firms' debt choice during the first operating year. Our dataset is unique in that it contains financial and accounting data of first-time entrepreneurial firms. In most countries, accounting data on privately held firms is scarce, and is usually restricted to the larger firms such as in the Federal Reserve Board's National Survey of Small Business Finances (NSSBF), so that these datasets are not representative for start-ups firms (e.g., Ang *et al.*, 2000). We find that entrepreneurs in industries with high historical start-up failure rates and entrepreneurs who highly value private benefits of control use less bank debt. We show that these effects are even stronger when the start-up firm is likely to have a high liquidation value. In sum, these results

[2] For newly established entrepreneurial ventures, the latter argument does not apply at the moment of start-up, but is likely to become more important over time, as the supplier-buyer relationship is being developed.

support the argument that entrepreneurs trade off the lower cost of bank debt against the more lenient liquidation policy of the supplier.

This paper proceeds as follows. First, we discuss the choice between bank debt and trade credit from the point of view of entrepreneurs who wish to minimize their financing expenses and simultaneously retain control over their firm. Second, we describe our sample of entrepreneurial business start-ups. Thereafter, we discuss our empirical results on the determinants of the debt mix and offer our conclusions.

THE TRADE-OFF BETWEEN BANK DEBT AND TRADE CREDIT

The external financing sources available to entrepreneurial firms are typically restricted to bank loans and supplier credit. Of these two alternatives, bank debt is the cheapest while suppliers adopt more lenient liquidation policies.

Specifically, banks operate in a highly competitive market. To illustrate, the net interest margin in Europe decreased by 8.73% during the eighties and by 31.67% between 1990 and 1998 (OECD, 2001). This increased competition was mainly caused by deregulation (e.g., Remolona and Wulfekuhler, 1992; Benink and Llewellyn, 1994). As a result, banks earn only small margins on their loan portfolios and thus have only a limited 'implicit equity stake' in firms that default. This likely explains why bank loans are difficult to renegotiate and banks pursue strict liquidation policies. According to Carey *et al.* (1998), banks develop a reputation for being a tough creditor, which enables them to reduce adverse selection problems, i.e. reduce the number of low-quality firms that apply for a bank loan. By adopting strict liquidation policies, banks can protect their reputational capital. Also, if banks can reduce adverse selection problems by being a tough creditor, the likelihood that banks will be held liable by other creditors for having given a false signal about firm quality is reduced.

Suppliers, on the other hand, tend to be more lenient towards financially distressed firms. Consistent with this argument, Franks and Sussman (2000) find that banks are very harsh in debt

renegotiations with distressed SMEs while suppliers expand the amount of credit during the period of distress, even when it ends in formal bankruptcy. Evans (1998) further finds that trade creditors grant more concessions to customers in financial distress than banks do. In the literature, different arguments have been put forward to explain why suppliers tend to be more lenient. Petersen and Rajan (1997), for instance, argue that suppliers have an implicit equity stake in their customers and therefore are more willing than banks to renegotiate their claims when debtors get into financial problems. For unlike banks, suppliers have a product market relationship with the entrepreneur. Consequently, if the reorganization is successful, suppliers earn profits on the future goods sold to the reorganized firm. Similarly, Wilner (2000) argues that suppliers are more dependent on their customers than credit market lenders whereas Franks and Nyborg (1996) point out that sunk investments in the customer-buyer relationship also make suppliers more lenient towards financially distressed buyers. Because suppliers follow more lenient liquidation policies, trade credit is riskier than bank loans. This argument likely explains why trade credit is also more expensive (see also Cunat (2002), who argues that trade credit is more expensive because it includes a default premium). In the next section, we develop testable hypotheses based on the above arguments relating to the trade-off between bank debt and trade credit.

HYPOTHESES

Central in all definitions of entrepreneurship is that an entrepreneur is someone who assumes risks (e.g., Bruyat and Julien, 2001). Not surprisingly, business start-ups face high failure rates. Dun & Bradstreet (1994), for instance, document that approximately 50% of all firms that failed in 1993 did so in the first five years of their existence. Likewise, of all Belgian firms that went bankrupt in 2002, 41.04% was younger than five years. When deciding on their financing mix, entrepreneurs likely take the perceived quality of their venture into account, as we argue hereafter.

High-quality entrepreneurial firms have a high probability that they will be able to generate the required cash flows to pay off their debt outstanding. Entrepreneurs with high-quality ventures thus are unlikely to default on their debt and hence unlikely to lose their private control benefits. To finance their assets and operations at start-up, these entrepreneurs therefore choose the cheapest debt alternative, which is a bank loan.

Entrepreneurs with low-quality ventures, on the other hand, are more likely to default on their debt. If these entrepreneurs finance their assets and operations entirely with bank debt, they are likely to lose their control rents once the cash flows are insufficient to cover the debt payments. For these entrepreneurs, the loss of private control benefits thus poses a real threat, which they cannot ignore. Hence, these entrepreneurs limit the size of their bank loan. To at least partially benefit from the lower bank cost, they still raise some bank debt at start-up and determine the size of the bank loan such that the bank debt can still be paid off even when the firm's performance turns out the be poor. Then, the entrepreneurial firm will default only on its trade credit and might be able to survive temporary cash flow problems. The reason is that the trade debt is more likely to be renegotiated following default. These arguments lead to the following hypothesis:

Hypothesis 1: Entrepreneurs of high-quality ventures prefer to finance more with bank debt, ceteris paribus.

It is commonly accepted that entrepreneurs typically enjoy significant private benefits of control. Hamilton (2000), for instance, finds that some entrepreneurs enter and persist in business despite lower earnings and earnings growth than in paid employment, from which he concludes that the non-pecuniary benefits of self-employment can be considerable. Examples of such non-pecuniary benefits include the prestige and status that comes with ownership as well as the power to decide on the business strategy of the firm, the feeling of having one's own future in hands and independence from superiors (e.g., Mueller, 2003). However, there may still be quite some variability in the level

of control rents enjoyed by first-time entrepreneurs. Some entrepreneurs may have few alternatives when their venture fails whereas others may have easier access to alternative employment. Entrepreneurs who highly value control rights, as a result, are likely to worry more about the liquidation of their firm following default. We therefore expect these entrepreneurs to limit their bank debt at the time of start-up.

Hypothesis 2: Entrepreneurs with higher private benefits of control prefer to finance more with trade credit, ceteris paribus.

If the firm has a high liquidation value, the bank is more likely to liquidate the venture upon default on its debt. The reason is that in that case, the firm's liquidation value is likely to exceed its value as a going concern. Given that the implicit equity stake of banks in debtors is limited, banks put the lowest value on firms continuing as a going concern following default. For entrepreneurs with low-quality ventures or large private benefits of control, this is particularly worrisome. As a result, these entrepreneurs are even more reluctant to finance exclusively with bank debt at start-up. These arguments result in the following conjecture:

Hypothesis 3: Entrepreneurs of firms with a high liquidation value prefer to finance partly with trade credit, especially when the quality of their venture is low or control rents are highly valued.

SAMPLE DESCRIPTION

This section empirically investigates the determinants of the debt mix for business start-ups as set forth in the above hypotheses. For this purpose, we use data on a unique sample of newly established entrepreneurial ventures in Belgium. We were able to construct this data set of entrepreneurial start-ups because of the reporting requirements imposed by the Belgian

government. Most countries do not require unlisted firms to make their financial statements available to the public. For the U.S., the Federal Reserve Board's National Survey of Small Business Finances provides financial information on 4,637 privately held firms, but Ang *et al.* (2000) report that mean firm age in this database is 17.6 years. As a result, NSSBF is not representative for start-up firms. In Belgium, however, all limited liability firms – except for financial institutions, insurance companies, exchange brokers and hospitals – are legally required to file annual accounts with the National Bank as of start-up. In addition, these firms have to publish an abstract from their foundation charter in the Government Newspaper (*Staatsblad*). Each firm receives a unique and chronologically accorded Value Added Tax number the first time it registers with the tax authorities. This VAT number allowed us to identify newly established firms and their financial statements in the database of the National Bank. We also collected the financial statements of the incumbent firms in the corresponding four-digit NACE industry.

We identified 652 limited liability firms, founded in the manufacturing industry in 1992. This sector was selected because of its higher optimal scale of operations; entrepreneurs in this sector may therefore lack the personal financial resources to fully finance all assets and operations at start-up. This sample was subsequently cleaned to remove all firms that were not entrepreneurial start-ups. Using the foundation charter, "true" business start-ups could be distinguished from newly established subsidiaries of existing firms, split-ups, spin-offs, etc. Firms arising from the incorporation of a previously self-employed activity, identified through follow-up phone calls, were also removed from the sample. Lastly, firms with missing values for the variables used in the regression models were also deleted. The final sample consists of 325 business start-ups, which are active in 97 different manufacturing industries, based on their four-digit NACE code. The industry distribution of the sample firms is reported in Table 1.

Table 2 provides some descriptive statistics for the sample firms. The average firm has total financing sources of €258,257 in the start-up year. Since total assets on average are less than total financing sources, the average firm incurs accounting losses during the start-up year. The start-ups

are highly levered: on average, 69.97% of the initial financing sources are raised as external debt (median of 78.21%).[3] Debt is hereby defined as the sum of long-term debt and current liabilities. Bank debt on average represents 33.60% of total debt, whereas trade credit accounts for 31.07%.[4] Given the importance of trade credit, it is not surprising that the majority of debt is short-term: 62.67% of total debt matures within one year. On average, 22.21% of bank debt matures within one year. Finally, initial ownership is highly concentrated: the average number of shareholders is 2.42 whereas the average Herfindahl shareholder concentration index amounts to 64.80%.

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Insert Tables 1 and 2
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METHODOLOGY AND VARIABLE CONSTRUCTION

In this section, we investigate how the variable *Debt mix* (= bank debt/total debt) depends upon the variables discussed above: 1) quality of the entrepreneurial venture, 2) private benefits of control, and 3) the firm's liquidation value. Following Houston and James (1996) and Johnson (1998) who also investigate the fraction of debt that consists of bank loans, we include variables that control for growth opportunities, profitability and firm size. To take into account that the dependent variable might be censored, we use Tobit regression analysis.

The following Tobit model is estimated:

$$\text{Debt mix} = \beta_0 + \beta_1 \text{ venture quality} + \beta_2 \text{ private benefits of control} + \beta_3 \text{ liquidation value} + \beta_4 \text{ growth opportunities} + \beta_5 \text{ profitability} + \beta_6 \text{ firm size} \quad (1)$$

[3] Huyghebaert (2000) argues that the loans entrepreneurs extend to their firm resemble preferred equity rather than debt financing. Entrepreneurs are unlikely to voluntarily file for bankruptcy when only the debt service payments on their own loans can no longer be met. Unlike the U.S., the Belgian bankruptcy law is creditor oriented, so that debtors have no incentive to seek protection under it.

[4] The other important component of debt is current wages. In Belgium, it is uncommon for employees to file for bankruptcy once their wages are not paid.

The explanatory variables are not directly observable and hence must be proxied. The variable measurements are especially complicated by the nature of the sample firms. Using firm level data from the start-up year might lead to an endogeneity problem. For instance, firms that are able to show high growth figures as of start-up may be the ones that have had easier access to bank debt. Likewise, firms with a high liquidation value may have been those that used more of the cheaper bank debt to finance their assets. To avoid this type of endogeneity problem, other studies often use the firm specific variables observed in the previous year. However, for first-time business start-ups, there simply are no data prior to the start-up year. Hence, we must resort to industry variables for some of the proxies.

Individual venture quality is unobservable at the time of start-up. We therefore assume that venture quality is industry specific and related to the success of prior start-ups. Average venture quality is calculated per four-digit industry as the proportion of start-up firms founded in 1988-1991 that survived within the first three years after start-up.

Private benefits of control are difficult to measure. Studies on listed firms (e.g., Demsetz and Lehn, 1985; Agrawal and Nagarajan, 1990) usually measure them by the firm's ownership structure and more specifically by the level of managerial stockholdings. These studies thus assume that when ownership is highly concentrated in the hands of the firm's management, the latter has a larger influence on the firm's decisions and strategy. However, and as already shown in Table 2, in the case of start-ups shareholdings are all highly concentrated in the hands of the original founder and his family, and hence exhibit little cross-sectional variability. This study, therefore, must use another measure for control rents. To ensure that our conclusions do not depend on a measure that has not been well validated yet, we construct three proxy variables. First, we use the 1991 unemployment rate in the corresponding four-digit industry to proxy for private benefits of control. In industries where the unemployment rate is relatively high, entrepreneurs who fail in their venture may have a hard time in finding a new job. These entrepreneurs, therefore, are likely to attribute a higher value to managing their own firm. Second, we use industry-adjusted

entrepreneurial wages. Entrepreneurs who pay themselves wages above the industry norm are likely to have more impact on the firm's decisions and strategy, resulting in larger private benefits of control. Since the income statement only reports total wages, we use the average wage per employee. To control for industry effects, we divide by the corresponding industry average for 1991.[5] Third, we construct a (firm level) dummy variable that reflects the type of incorporation. In Belgium, limited liability firms can choose among several legal forms. One of these forms, N.V. structure, grants entrepreneurs more contractual freedom regarding board structure and dividend policy, and is considered to be more prestigious by owners. Entrepreneurs who choose the N.V. corporate form at start-up, therefore, likely enjoy higher control rents. The dummy variable equals one when the firm is founded as an N.V. and zero otherwise.

The liquidation value of firm assets is measured by the ratio of tangible assets to total assets, averaged across all industry incumbents in 1991. When assets are highly tangible, they are less likely to be very firm specific and thus tend to have a higher market value. Growth opportunities again must be measured in the year prior to start-up; they are captured by the average industry sales growth rate over the period 1988-1991. Profitability is measured by EBITDA over total assets, averaged across all incumbents in the corresponding four-digit NACE industry in 1991. Finally, firm size is proxied by log(total financing sources).

Table 3 provides summary information on these proxy variables. To limit the influence of extreme observations upon our results, all explanatory variables, except for the dummy variables, are winsorized at the 5%-95% level. Finally, to control for other industry determinants not captured by our model, we add industry dummy variables to the model of equation (1). We construct an industry dummy variable for each four-digit industry with more than ten start-ups. As is customary in the literature, the reported results do not show the corresponding parameter estimates for these industry dummy variables.

[5] Another approach could have been to look at the dividends that were paid out. However, less than 5% of the firms distribute dividends in the start-up year.

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Insert Table 3
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EMPIRICAL RESULTS

The results of the Tobit estimations are presented in Table 4. The various models in Panels A and B differ only with respect to the measurement of private benefits of control: the unemployment rate in Model 1, the industry-adjusted wage ratio in Model 2, and the legal form dummy in Model 3. To test our third hypothesis, we add an interaction term between venture quality, respectively control rents and liquidation value in Panel B.

The results in Panel A show that entrepreneurs in industries with high historical failure rates raise a lower fraction of bank debt as of start-up, ceteris paribus. This negative sign is consistent with Hypothesis 1 and confirms that entrepreneurs of lower quality ventures wish to raise a lower proportion of bank debt at start-up in order to minimize the liquidation probability. Alternatively, entrepreneurs of high-quality ventures raise a larger fraction of bank debt to minimize their financing expenses.

Entrepreneurs with larger control rents significantly reduce the fraction of total external debt that is raised as bank debt, ceteris paribus. A comparison of Models 1 through 3 shows that this conclusion holds for all proxies of private benefits of control. These results thus support our second hypothesis: entrepreneurs who highly value private benefits of control consider not only the cheaper price of bank debt, but also take into account the stricter bank liquidation policy when deciding on their debt mix at start-up.

When the liquidation value of firm assets is high, it is more likely to exceed the firm's going concern value following default. Firms with a high asset liquidation value, therefore, are more likely to be liquidated by their bank following default. The results in Panel A, however, indicate that the relation between the liquidation value, measured by the industry average of tangible assets/total assets, and the proportion of bank debt is not significant. In our third hypothesis, we

argue that especially entrepreneurs of low-quality ventures and entrepreneurs who highly value private benefits of control are concerned about liquidation following default. Consistent with this argument, the results in Panel B show that the interaction term between start-up failure rate and liquidation value is significant at the 10% level. Likewise, the interaction term between control rents and liquidation value is negative and significant. This table also indicates that venture quality only significantly influences the debt choice for start-up firms with high liquidation values since we find that the single term measuring venture quality (i.e., the start-up failure rate) is no longer significant in Panel B. Entrepreneurs with high private benefits of control use significantly less bank debt, and this effect is even stronger for those firms with high liquidation values. In sum, these findings thus support our third hypothesis.

Finally, we find that growth opportunities as measured by the industry sales growth rate do not affect the debt mix. This result contrasts with the negative relation found by Houston and James (1996) for firms with single banking relationships. They interpret their finding as showing that especially firms with large growth opportunities may suffer from bank hold-up problems, which high-growth firms circumvent by limiting the proportion of bank debt in their financing structure. A potential explanation for our diverging results could be that Houston and James use a sample of large, publicly quoted firms. These firms can more easily access alternative financing sources, such as public debt, to finance available growth opportunities than the entrepreneurial firms in our sample, resulting in a negative relation between growth opportunities and bank debt in their sample. Next, in industries with high internal cash flow generation, start-up firms raise a larger amount of bank debt, ceteris paribus. This relation is consistent with the literature (e.g., John, 1998; Carey *et al.*, 1999), but in our sample it is unclear whether this relation is driven by entrepreneurs in highly profitable industries having a greater confidence in their venture's quality (demand driven) or by banks that are prepared to finance a larger fraction of assets and operations in industries with large, stable cash flows (supply driven). Lastly, we find that firm size is positively and significantly related to the proportion of external debt that consists of bank loans.

The positive sign again is inconsistent with the literature on large, publicly quoted firms, which obtain easier access to public debt markets as they grow larger and realize more stable cash flows.

We conclude this section with an important caveat, which was already hinted at in the previous paragraph: our paper essentially looks at demand driven determinants of the debt mix structure in entrepreneurial start-ups. Of course, supply side considerations will also influence the debt mix that is ultimately observed and some of the relations we document could also result from such supply side factors. Take the example of the negative relation between the start-up failure rate and the debt mix. Another explanation, based on a supply side argument, for this negative relation is that banks are only willing to finance a limited fraction of the assets and operations of start-ups in industries with relatively high default risk. This argument is further elaborated on in Huyghebaert and Van de Gucht (2002). Nevertheless, the negative relation between the various proxies for entrepreneurial control rents and the fraction of debt that consists of bank loans is unlikely to be driven by such a supply side argument. Therefore, our paper is the first to show that the entrepreneur's motivations and concerns affect the financing decisions of business start-ups, a side of the decision that has been ignored in the (empirical) finance literature up till now.

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Insert Table 4
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CONCLUSIONS

The main conclusion of this paper is that entrepreneurs who contract debt to finance their venture at start-up not only consider the price of the different credit types; they also take into account the differences in liquidation policy of banks and suppliers. We argue and show that especially entrepreneurs of low-quality ventures and entrepreneurs who highly value private benefits of control determine their debt mix such as to avoid a later default on their bank debt; i.e., they use less bank debt. For these entrepreneurs, the loss of control rents following default does

not offset the lower financing expenses when borrowing exclusively from the bank. Furthermore, we show that in industries with highly tangible assets, these effects are even stronger. The latter finding is consistent with the idea that especially when the liquidation value of the firm exceeds its going concern value, banks are going to liquidate the firm following default. Further research could now link the results of our study to the post-entry survival of entrepreneurial start-ups, taking into account the conditions under which banks tend to follow strict liquidation policies. Up till now, studies investigating post-entry survival (e.g., Huyghebaert *et al.*, 2000) have documented that both start-ups that are largely bank debt financed and firms that raise more trade credit at start-up have higher failure rates. The results of this paper could help to refine the driving forces behind the relation between start-up financing and subsequent failure.

Table 1: Industry distribution of manufacturing start-ups

This table displays the industry distribution of the start-up firms, based on their four-digit NACE industry code. All sample firms are incorporated in Belgium and start their operations in the manufacturing industry in 1992. The sample is constructed from the Belgian National Bank database. Based on the foundation charter and follow-up phone calls, only true entrepreneurial start-ups are retained in the sample.

NACE code	description	number of firms
2200-2299	Production and preliminary processing of metals	1
2300-2399	Extraction of minerals other than metalliferous and energy-producing minerals; peat extraction	1
2400-2499	Manufacture of non-metallic mineral products	7
2500-2599	Chemical industry	5
3100-3199	Manufacture of metal articles (except for mechanical, electrical and instrument engineering and vehicles)	16
3200-3299	Mechanical engineering	8
3400-3499	Electrical engineering	13
3600-3699	Manufacture of other means of transport	4
3700-3799	Instrument engineering	15
4100-4299	Food, drink and tobacco industry	51
4300-4399	Textile industry	19
4400-4499	Leather and leather goods industry (except footwear and clothing)	4
4500-4599	Footwear and clothing industry	26
4600-4699	Timber and wooden furniture industries	34
4700-4799	Manufacture of paper and paper products; printing and publishing	97
4800-4899	Processing of rubber and plastics	6
4900-4999	Other manufacturing industries	18
TOTAL		**325 firms**

Table 2: Summary statistics of firm characteristics in the start-up year

This Table presents summary statistics on variables that represent firm start-up size, initial financial structure and ownership structure for the sample of 325 firms that were founded in 1992. Firm *start-up size* is measured as total financing sources, respectively total assets. *Leverage* is the ratio of external debt to total financing sources. Initial financing sources do not incorporate the operational results realized of the first year, whereas loans provided by the entrepreneurs to their firm are considered as equity. *Short-term debt* consists of debt maturing within one year, and *shareholder concentration* is measured by the Herfindahl shareholder concentration index.

Variable	Mean	Median	Minimum	Maximu	Std. dev
START-UP SIZE					
Total financing sources (€)	258,257	106,322	4,908	8,505,103	611,214
Total assets (€)	246,326	105,528	2,454	8,505,896	596,021
INITIAL FINANCIAL STRUCTURE					
Leverage	0.6997	0.7821	0	0.9930	0.2418
Bank debt/total debt	0.3360	0.3213	0	1.0000	0.2962
Trade credit/total debt	0.3107	0.2491	0	1	0.2626
Short-term debt/total debt	0.6267	0.6388	0	1	0.3077
Short-term bank debt/bank debt	0.2221	0	0	1	0.3402
OWNERSHIP STRUCTURE					
Number of shareholders	2.4244	2	1	9	1.1584
Shareholder concentration	0.6480	0.5008	0.1534	1	0.2704

Table 3: Summary statistics of the explanatory variables

This Table presents the summary statistics of the explanatory variables. *Start-up failure rate* is the proportion of prior start-ups that failed within the first three years after start-up, calculated per four-digit industry over the period 1988-1991. *Unemployment rate* is the unemployment rate in the corresponding four-digit industry for 1991, the year prior to start-up. *Industry-adjusted wage ratio* is the ratio of the wage per employee at the firm level relative to the average wage in the corresponding industry. *Legal form dummy* equals one if the type of incorporation is N.V. and zero otherwise. *Tangible assets/total assets* is the percentage of total assets that is property, plant and equipment, averaged across industry incumbents for 1991. *Growth opportunities* are measured by the average industry sales growth rate over the period 1988-1991. *Profitability* is measured as 1991 EBITDA to total assets per four-digit NACE industry. *Firm size* is the logarithm of total financing sources (in thousands) in the start-up year.

Variable	Mean	Median	Minimum	Maximum	Std. dev
VENTURE QUALITY					
Start-up failure rate	0.0568	0.0516	0	0.5	0.0484
PRIVATE BENEFITS OF CONTROL					
Unemployment rate	0.1030	0.0851	0.0222	0.4262	0.0629
Industry-adjusted wage ratio	0.8540	0.7847	0.1610	2.0419	0.9508
Legal form dummy	0.3232	0	0	1	0.4695
LIQUIDATION VALUE					
Tangible assets/total assets	0.7089	0.7171	0.2752	0.8767	0.1303
CONTROL VARIABLES					
Growth opportunities	0.1781	0.1520	-0.4619	1.1986	0.1691
Profitability	0.3727	0.4250	0.0010	0.1239	0.1744
Firm size	8.3508	8.3563	4.5951	12.7459	1.2392

Table 4: Tobit regression results on start-up financial structure

The dependent variable *Debt mix* is the proportion of total external debt that consists of bank loans. Models 1 through 3 differ with respect to the proxy used for control rents: the unemployment rate in Model 1, the industry-adjusted wage ratio in Model 2, the legal form dummy in Model 3. The explanatory variables are defined in Table 3.

PANEL A						
	Model 1 (unemployment rate)		**Model 2 (ind-adj. wage ratio)**		**Model 3 (legal form dummy)**	
	parameter estimate	*p*-value	parameter estimate	*p*-value	parameter estimate	*p*-value
Intercept	-0.5032	0.0479	-0.6460	0.0062	-0.9561	0.0001
Start-up failure rate	-1.1585	0.0233	-1.0595	0.0322	-0.9859	0.0450
Control rents	-0.6683	0.0587	-0.1764	0.0003	-0.2365	0.0001
Liquidation value	-0.1490	0.3942	-0.0980	0.5580	-0.1378	0.4086
Growth Opportunities	0.0733	0.5573	0.0931	0.4445	0.1263	0.2983
Profitability	0.3390	0.0118	0.3766	0.0045	0.2844	0.0311
Firm size	0.0970	0.0001	0.1149	0.0001	0.1452	0.0001
Log-likelihood		*-162.6341*		*-157.9346*		*-153.7728*
PANEL B						
	Model 1 (unemployment rate)		**Model 2 (ind.-adj. wage ratio)**		**Model 3 (legal form dummy)**	
	parameter estimate	*p*-value	parameter estimate	*p*-value	parameter estimate	*p*-value
Intercept	-0.6611	0.0077	-0.5907	0.0123	-1.0432	0.0001
Start-up failure rate	-0.5686	0.2774	-0.5549	0.2898	-0.4547	0.3731
Start-up failure rate * Liquidation value	-7.3985	0.0651	-7.4211	0.0647	-7.7648	0.0651
Control rents	-0.7102	0.0399	-0.1766	0.0002	-0.2013	0.0001
Control rents * Liquidation value	-0.2639	0.0001	-0.0113	0.0378	-0.2078	0.0001
Liquidation value	0.1804	0.3244	0.0825	0.6363	0.1500	0.4010
Growth Opportunities	0.0764	0.5292	0.0773	0.5246	0.1310	0.2724
Profitability	0.3534	0.0068	0.3555	0.0066	0.2995	0.0206
Firm size	0.1112	0.0001	0.1107	0.0001	0.1490	0.0001
Log-likelihood		*-152.49*		*-152.90*		*-146.72*

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