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Theories of Financing for Entrepreneurial Firms: A Review

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Abstract

This article provides an overview of literature related to capital structure theories for entrepreneurial firms. It identifies gaps and controversial areas in existing literature and also discusses potential directions for future research. Credit rationing, signalling by risk-bearing, the learning market demand idea, and the flexibility theory of capital structure are consistent with many patterns of financing of entrepreneurial firms. Credit rationing is the dominant area of research. Several directions have emerged that need answers such as for example which channel of credit rationing represents its main driving force. More empirical research is expected in signalling by risk-bearing. More theoretical and empirical research is expected regarding learning market demand and flexibility ideas. Pecking-order theory and trade-off theory play a significant role in large corporations but not so much in SMEs. More research is required investigating modified versions of each theory.

Keywords: entrepreneurial finance, small business financing, capital structure, credit rationing, signalling by risk-bearing, flexibility theory, learning market demand

JEL Codes: F30, G15, G18, G21, G24, G28, G32, G38, M13

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1. Introduction

This article provides a review of capital structure theories related to entrepreneurial firms.[2] The term "entrepreneurship" is used to describe the process of creating and running a small or medium-sized enterprise (SME) or business, including innovative firms as well as firms in traditional areas of business.[3] Financing is crucial for entrepreneurial firms (Hall, 2009; Wilson, 2015; Mach, 2014). Unlike large businesses, profits are typically small or exhibit inconsistent patterns so relying on profit as a permanent source of financing is difficult if not impossible. Since relying on external funds is often crucial, entrepreneurs should have a well thought out strategy of raising external funds. The most important question is the choice between debt (bank loans, loans from friends, peer-to-peer online lending, etc.) and equity financing (venture capital, own funds, angel financing, equity-based crowdfunding, etc.). By increasing debt, a firm commits itself to a strict schedule of payments. For entrepreneurial firms, this is often hard to maintain. Equity, on the other hand, requires that the founders give up a portion of the control of their company. New forms of financing have emerged in recent years including crowdfunding and tokens issues. In some cases they represent a form of either debt or equity financing but in some cases they differ quite significantly from the traditional forms of financing.

Capital structure choice for entrepreneurial firms is an interesting and important topic from both theory and practice point of view. First, capital structure is one of the most important but at the same time one of the most difficult and controversial areas in finance (see e.g. Brealey et al., 2016; or Graham and Harvey, 2001). Modigliani and Miller (1958) started the modern theory of

[2] We mostly focus on the ideas of entrepreneurial finance that focus on the choice between debt and equity, and in some cases on the choice between debt, equity and funds received from reward-based crowdfunding that is hard to classify as traditional debt or equity. We less focus on the models that separately analyze the features of some types of financing unless they provide broader implications.

[3] For a good discussion of the term "entrepreneurship" see e.g. Hébert and Link (1989).

capital structure suggesting that in a perfect market under rational decision-making capital structure is irrelevant. Ever since numerous theories have been developed illustrating the importance of capital structure under different types of market imperfections or (more recently) behavioural biases.[4] Despite the large number of available theories, the area remains controversial where a lot of contradictions exist between different theories including major theories, and divergence of opinion is observed between academics and practitioners (see e.g. Graham and Harvey, 2001). Second, a significant difference exists between large and small firms with regard to their capital structure choice. Factors and ideas that are significant for large firms are not always important for small firms and vice versa (see e.g. Ramalho and Da Silva, 2009; Serrasqueiro et al., 2011; and Atiyet, 2012). With regard to large firms, based on the amount of observed research, the major theories are the trade-off theory and the pecking order theory. However, a tax aspect (which is a key element of the trade-off theory) plays an important role in capital structure choice of large firms but not necessarily for small firms (Kashefi-Pour et al., 2010). Finally, research shows that financing of entrepreneurial firms is one of the most important topics for entrepreneurs; for instance, it is the main reason of their bankruptcies. A research for NESTA reveals that nearly 20% of high growth ventures consider access to funding to be the most important barrier to growth (compared to 13% for other firms) (Lee, 2011).

In this article we look at different theories and models of capital structure as related to entrepreneurial firms.[5] We discuss the theoretical ideas and compare theoretical predictions with

[4] For a review of capital structure theories see, for example, Harris and Raviv (1991), Klein et al. (2002) or Bajaj et al. (2021).

[5] Several papers analyze similar topics (see e.g. Abdulsaleh and Worthington, 2013). In addition to this literature our main focus is on reviewing theoretical articles and models related to SME financing. The closest to our paper is probably Kumar et al. (2020). They use bibliometric analysis when selecting articles for their analysis using keywords. However they include both capital structure and SMEs in their search criteria so the article selection does not include general capital structure papers that can be applied to both large and small companies. Although it is probably better from empirical papers analysis point of view since in empirical papers they usually mentioned SMEs anyway even if

empirical evidence. This helps to identify gaps and controversial areas. Below we discuss some major ideas about entrepreneurial finance (credit rationing, signalling by risk-bearing, flexibility, and learning market demand idea) and provide a general overview of the current situation in each area.

There are many problems associated with debt financing for SMEs. They do not typically have a long credit history or credit rating nor do they own a large amount of assets that can potentially be used as a collateral.[6] Potential creditors usually lack information or information credibility confirmation for entrepreneurial firms. So in general banks are often not willing to provide loans to them leading to a credit rationing problem (Jaffee and Modigliani, 1969; Stiglitz and Weiss, 1981) when loan is not provided even if a firm has a positive net-present-value (NPV) project. Credit rationing is often confirmed empirically. Among recent lines in literature we note the following. It is not clear whether asymmetric information or moral hazard problem is the major force behind credit rationing in real life situations (see e.g. Berger and Udell, 1992; and Banerjee and Duflo, 2014); many aspects of collateral used in debt contracts that is often suggested as a possible solution of the credit rationing problem are still not well understood (see e.g. Niinimäki, 2018).

Equity financing also yields problems for SMEs. The value of shares is hard to determine and therefore negotiations with potential investors are difficult. Investors may be interested in observing indirect signals about a firm's quality. This explains such ideas as signalling by risk-bearing (Leland and Pyle, 1977). Many patterns in financing of SMEs are consistent with these

they consider both but many general capital structure papers can also be applied to SMEs. Our analysis includes these papers.

[6] Debt/equity ratios are higher in firms with more tangible assets (Cosh et al., 2009).

ideas. For example, entrepreneurs in smaller size firms have to retain larger stakes of equity to strengthen the signal (Cosh et al., 2009; Fraser et al., 2015). The literature on tokens issues (see e.g. Chod and Lyandres, 2021) makes similar suggestions. Overall the number of papers analyzing signalling by risk-bearing is significantly smaller than credit rationing so more research is expected.

The uncertainty surrounding all the investment decisions of entrepreneurial firms is large. In addition, these firms constantly face a basic trade-off between profit and growth and they have to make a lot of difficult investment decisions. Hence usually these firms need a lot of flexibility. Excessive debt financing may reduce a firm's flexibility. It is therefore not surprising that innovative firms often rely on financing types that help to improve or mitigate the flexibility problem e.g. debt contracts with flexible payments (Barboni, 2017) or different sources of equity financing such as venture capital, angel investments and more recently equity-based crowdfunding and security-token offerings (STO) (Estrin et al., 2018; Vismara, 2016; 2018).[7]

Learning market demand and how this impacts the optimal financing design is a prominent direction in practice and research. New types of financing (different from traditional debt and equity) have been developed in recent years including reward-based crowdfunding, initial coin offerings (ICO) and initial exchange offerings (IEO). They have been quickly growing in popularity among innovative firms. The number of research papers in these areas is quickly growing and many of these articles (e.g. Strausz, 2017; Chemla and Tinn, 2020; Schwienbacher, 2018; Miglo, 2021) discuss the importance of market feedback during the financing process.

[7] See also Cumming and Johan (2009), Mann and Sanyal (2010), Coakley and Lazos (2021), and Miglo (2022).

The rest of the paper is organized as follows. Section 2 reviews credit rationing. Section 3 analyses signalling by risk-bearing. Section 4 analyses flexibility theory. Section 5 discusses learning market demand idea. Section 6 reviews other theories and Section 7 concludes.

2. Credit rationing

When potential investors/lenders do not have the same amount of information about a firm's project quality as insiders, the interest rate offered by lenders may be too high for good quality borrowers who will then leave the market. This will make banks uninterested to deal with just bad quality borrowers (similar to the lemon market problem in Akerlof, 1970). A similar scenario is possible when instead of asymmetric problems related to a project's quality, one considers an environment with moral hazard where a firm selects a project which is beneficial to the firm's shareholders but not necessarily to lenders.[8]

Either scenario can lead to the so called "credit rationing" phenomenon (Jaffee and Modigliani, 1969; Stiglitz and Weiss, 1981) when a firm does not receive a bank loan even if this firm has a positive NPV project available that in turn limits the firm's opportunities in managing its capital structure.[9] This is often the case for small, start-up and growing companies. Typically, banks and other potential investors have more information about large public companies and companies with stable business models.

[8] A formal presentation of theoretical ideas ("micromodels") behind credit rationing as well as other theories can be found in the Online Technical Appendix. See also Miglo (2022).
[9] Also see Jaffee and Russell (1976), Watson (1984), Bhattacharya and Thakor (1993), Aghion and Bolton (1997), Parker (2003), Arnold and Riley (2009), and Su and Zhang (2017).

Existing empirical literature usually confirms that SMEs face more barriers of finance compared to other firms and that SMEs with growth opportunities face more barriers than other SMEs. Earlier works include Slovin and Sushka (1983), King (1986), and Sofianos et al. (1990). Hashi and Toçi (2010) conduct credit rationing analysis in southern-European countries.[10]

Credit rationing models are also related to the interesting discussion about the connections between the likelihood of credit rationing and loan size or interest rate increases. A higher value of debt makes the firm riskier from a bank's point of view and makes credit rationing more likely to appear. An increase in debt value could happen for two reasons: either the loan size increases or the interest rate increases. Kirschenmann (2016) provides evidence on the extent of loan size rationing by linking the firms' requested amount to the bank's granted loan amount. Other literature includes Cheng and Degryse (2010), Becchetti et al. (2011), Puri et al. (2011), Jimenez et al. (2012), and Berg and Kirschenmann (2015).

Another implication is the interest rate stickiness. One of the reasons for why no equilibrium exists where banks provide loans is that banks are not able/willing to change interest rates in order to accommodate existing demand. Confirmations of stickiness are found in Berger and Udell (1992). They also mentioned that it is hard to know the exact source of interest rate stickiness. This can also be related to some developments in the banking industry (e.g. loan guarantees, relationship banking, etc.).

[10] Also see e.g. Binks and Ennew (1996), and Kaufman (1996).

Bester (1985; 1987) analyzes the role of collateral in dealing with problems of adverse selection. It is shown that instead of raising interest rates, lenders may use collateral as a self-selection and incentive mechanism.[11] Similar ideas exist in moral hazard-based models (see Boot and Thakor, 1991; 1994; and Holmstrom and Tirole, 1997).

Empirical literature usually confirms that collateral helps reduce the extent of credit rationing. Cressy and Toivanen (2001) report that 85% of UK loans require collateral. Fraser (2014) finds that the increase in collateral ratios at 2007-2008 (Financial Crisis) is consistent with signalling by lower risk businesses to obtain credit (as uncertainty increased). Rahman et al. (2017) explore the determinants of access to finance for SMEs in Central European countries. Their results indicate that small firms and firms owned and operated by women are experiencing a shortage of credits from banks. On the other hand, they found a positive relationship between the pledge of collateral and access to finance. Cowling et al. (2017) find a positive connection between collateral and loan amount.[12]

In a similar spirit to the idea of collateral, the purpose of government loan guarantee programs (for instance in Canada, UK) is to help SMEs deal with potential credit rationing problems (see e.g. Cowling, 2021). Bad-quality firms should not be able to obtain a government guarantee because the conditions of obtaining this guarantee are much more costly for low-quality firms.

The latest developments in credit rationing literature include the following. Anson et al. (2018) look at the history of credit markets. They study the Bank of England's (BoE) policy response to

[11] Also see Besanko and Thakor (1987a, 1987b), Chan and Thakor (1987) and Boot and Thakor (1991).
[12] See also Gama and Duarte (2015), Degryse and Van Cayseele (2000), Lehmann and Neuberger (2001), Agarwal and Hauswald (2010), and Berger et al. (2011).

the crisis of 1847 and find that credit rationing due to residual imperfect information à la Stiglitz and Weiss (1981) alone cannot be a convincing explanation for credit restrictions. They also show that "collateral" characteristics played an important role in the BoE's loan decisions. Zhang et al. (2018) conduct simulations of credit transactions using debt contracts between firms and banks and find that the relationship between enterprises and banks can ease the financing difficulty of small- and medium-sized firms. Beyhaghi et al. (2020) analyze how various forms of credit rationing emerge in the market that can be useful for regulators.

As was mentioned above, credit rationing can exist because of two different reasons: moral hazard or asymmetric information. Although most researchers agree on the importance of credit rationing in general, a debate exists regarding what channel is usually behind this phenomenon. Notable examples are Berger and Udell (1992), Banerjee and Duflo (2014), Arnold and Riley (2009) and Su and Zhang (2017). Ning and Ritchken (2021) analyze the effect of the latest developments in fintech to show that bank loans fully monitored by blockchain allow poor firms with low working capital to eliminate this agency cost and reduce credit rationing problems. More research related to fintech is expected in this area. Boadway and Keen (2004; 2006) analyze the effects of different types of asymmetric information on the Stiglitz-Weiss model. Kjenstad et al. (2015) created models that combine both types of imperfections. Jin and Zhang (2019) develop a model of credit rationing as a function of firm size by considering different bank screening technologies. Also note Eckbo et al. (2022). They construct a model to show that the use of non-interest terms in bank loans (including an up-front fee) can be employed to solve the credit rationing problem.

As mentioned, many studies find a negative relationship between interest rates and collateral. However some other studies report a positive relationship (e.g. Berger and Udell, 1992; Blackwell and Winters, 1997; Machauer and Weber, 1998; John et al., 2003; Brick and Palia, 2007; and Godlewski and Weill, 2011). Some papers argue that collateral may lead to borrowers' complacency. Niinimäki (2018) studies a model in which a borrower can pledge a personal asset as collateral and shows that in some cases collateral may have negative effects.

Table 1 contains some empirical papers on credit rationing, key variables used, and major findings.

Table 1. Empirical research related to credit rationing

Author(s)	**Year of publication**	**Key Independent variables**	**Key Dependent variables**	**Main findings**
Kirschenmann	2016	Number of loans, firm age	the ratio of the granted loan amount to the requested loan amount	Credit rationing is greater for opaque than transparent firms
Cosh et al.	2009	An ordered variable equal to 0 if a bank was approached but no finance offered, 1 if a bank was approached but offered less than the full amount, and 2 if a bank was approached and offered the full amount.	Completely New Start-ups/ yes or no	Banks are less likely to finance completely new startups
Berger and Udell	1992	Loan rate premium, proportion of new loans in bank portfolio	Real and nominal rate, loan commitment variable, collateral, floating rate yeas no	Rates are "sticky", the stickiness depends on contract variables; proportion of loans under commitment increases with rates
Jimenez et al.	2012	"loan granting", which equals one if the loan application by firm i at time t is approved by bank	the change in the Spanish 3-month interbank interest rate during the last year	higher short-term interest rates reduce the probability that a loan application is granted

Berger et al.	2011	a dummy variable that equals 1 if the loan is secured	Observed risk, unobserved risk	the ex-post theories of collateral are empirically dominant, although the ex-ante theories are also valid for customers with short borrower-lender relationships
Agarwal and Hauswald	2010	the likelihood of obtaining credit	distance between firm and bank; distance between a firm and the nearest competitor	distance erodes the lender's ability to collect proprietary intelligence so the requisite soft information is primarily local
Godlew-ski and Weill	2011	Risk Premium	Collateral, Information asymmetry	a greater degree of information asymmetries reduces the positive relationship between the presence of collateral and the risk premium
Hashi and Toçi	2010	the proportion of a firm's investment expenditure financed by the firm (i) internal funds and (ii) bank loans	Age, size, accounting method used, country dummy variable	financing constraints, credit rationing and financing obstacles exist for firms in SSE
Freel	2007	proportion of loan granted	Innovation proxies e.g. proportion of staff who are qualified scientists, engineers or technologist; Two dummy variables representing 'novel' and 'incremental' product innovation	the most innovative firms are less successful in loan markets than their less innovative peers
Van der Zwan	2016	an SME's ownership structure; Product innovation	Application success	public shareholders have considerably lower success rates than the other ownership categories; SMEs that adopt innovations have lower success rates in applying than SMEs that do not display innovative behavior.
Lee et al.	2015	Access to finance	Dummy variable equals to 1 if firm has introduced an entirely new product of process in previous 12 months; 0 if not.	innovative firms are more likely to be turned down for finance than other firms

Binks and Ennew	1996	a self-reported perceived constraint scored on a five-point scale, with higher scores indicating a higher perceived constraint	two dummy variables were included for actual (AGROW) and expected (EGROW) growth rates as reported by respondents. These took the value 0 for firms which were declining or growing by less than 5% per year and 1 for firms growing or expecting to grow at a rate of more than 5% per year.	growth firms may still experience a credit constraint as a consequence of their relative youth
Lehmann and Neuber-ger	2001	Credit availability	Age, duration of relationship between firm and bank	The probability to get no credit is highest in the absence of a credit relationship.
Yu and Fu	2021	Labour productivity	Strong credit rationing, weak credit rationing	weak and strong credit rationing hamper firm productivity through the innovation channel. The negative effect of credit rationing is more obvious for firms with no real estate investment or less investment willingness
Rahman et al.	2017			a positive relationship between the pledge of collateral and access to finance

Also note Cowling et al. (2020) who study the role of local finance in mitigating credit rationing problems and Van der Zwan (2016) who finds that the degree of innovation may be negatively correlated with the likelihood of loan approval for SMEs. Kgoroeadira et al. (2019) argue that credit rationing and asymmetric information play an important role in loans for small businesses and in debt-based crowdfunding while the latter is more affected by signals regarding entrepreneurs' personal characteristics rather than business features of their firms.

3. Signaling by risk-bearing

The entrepreneur's own investments serve as a signal of private information. Leland and Pyle (1977) show that the good quality entrepreneur would keep a higher fraction of shares in his/her company than the low-quality entrepreneur.

The signaling idea is often the case for government funding or different grants for entrepreneurial firms: it often requires the owner to keep a significant fraction of the firm's equity or make additional investments in the firm's equity. It can be used as a signal of an entrepreneurial idea's quality. Many examples of grants cited in Cumming and Hellmann (2013) require dual contribution (government and entrepreneur). In a similar spirit, Conti et al. (2013) find that the entrepreneur's own investment has a positive impact on business angel investment.

The empirical results of the analysis of initial public offerings (IPO)[13] in Downes and Heinkel (1982) are consistent with the entrepreneurial ownership retention idea. Similarly, Keloharju and Kulp (1996) find that the original shareholders signal the quality of their firm by their willingness to retain equity.[14] On the other hand, Ritter (1984) argues that the evidence is ambiguous with respect to the signaling idea (see also Krinsky and Rotenberg, 1989).

[13] IPO is an important stage of development for many entrepreneurial firms. For many entrepreneurs it is part of their exit strategy (see e.g. Leach and Melicher, 2015) and for many firms it is part of their high-growth development stage.
[14] See also Sum (1991).

Grinblatt and Hwang (1989) extend Leland and Pyle's idea to incorporate underpricing. Underpricing is a well-recognized phenomenon related to the issues of new shares including IPOs (see e.g. Ritter and Welch, 2002; Liao et al., 2017). They develop a model with two signals to explain new issue underpricing. Both the fraction of the new issue retained by the issuer and its price offering convey to investors the unobservable "intrinsic" value of the firm and the variance of its cash flows. Many of the model's comparative statics results are consistent with the existing empirical evidence on new issues. Bustamante (2012) argues that firms with better investment prospects issue a lower fraction of shares to avoid imitation by low-quality firms. Also it predicts that IPO activity, underpricing, the fraction of shares issued and the number of issuing firms depend on macroeconomic conditions (cold markets and hot markets).[15]

More recent developments include the following. Some papers analyze entrepreneurs' signalling opportunities related to the stock lock-up period.[16] The idea is that in many cases investors like the fact that entrepreneurs do not have an intention to sell their shares of businesses. Brau et al. (2005) present a model that argues that lockups can signal a firm's quality. Arthurs et al. (2009) find that a longer lockup period acts as a substitute signal to venture capital (VC) and prestigious underwriter backing. They also find that ventures which have a going concern issue can reduce the amount of underpricing at the time of the IPO by accepting a longer lockup period. Mohd-Rashid et al. (2017) find that in Malaysia, most firms usually lock-up a higher portion of their shareholding than what is legally required. Despite allegations that mandatory lock-up provision results in a loss of its signaling property, the presence of the voluntary element in its

[15] See also Sundarasen et al. (2021) and Mulchandani et al. (2021).
[16] Lock-up period means a provision that restricts insiders from selling or disposing of a certain portion of their shares for a prescribed period.

actual conduct suggests that the lock-up could still serve as an effective signaling mechanism for issuers. Yahya and Rahim (2019) examine the moderating effect of information asymmetry on the relationship between parameters of lockup provision and flipping activity of Malaysian initial public offerings (IPOs).[17] They find that IPO size, lock-up period and lock-up ratio signal firm quality.

Ahlers et al. (2015) show that the Leland and Pyle idea can be applied to equity-based crowdfunding. Analyzing data from ASSOB (the Australian Small Scale Offerings Board), they found that the fraction of equity retained by the entrepreneur serves as a quality signal and significantly contributes to the project's success. Miglo and Miglo (2019) suggest a model where reward-based crowdfunding with a required threshold[18] can signal a firm's project quality. Low-quality firms will avoid mimicking this strategy because of the high risk of failure due to the presence of a threshold. In the case of reward-based crowdfunding, the entrepreneur's fraction of equity remains unchanged as opposed to equity-based crowdfunding. Rossi et al. (2021) offer insights into 3,576 initial equity crowdfunding offerings in the UK and US markets from 2012 to 2019. They investigate the factors influencing three outcomes: the success of the offering, the fundraising target, and matching between entrepreneurial ventures and crowdfunding platforms. In all markets, higher equity retention by original entrepreneurs positively affects the chances of success of the offerings and amount of capital raised.

Similar ideas can be applied to token issues (see e.g. Chod and Lyandres, 2021). The authors develop a theory of financing of entrepreneurial ventures via an initial coin offering (ICO). Pre-

[17] Flipping in the IPO is when an investor resells shares in the first days or weeks after an IPO.
[18] It's called "all-or-nothing" (AON). We will provide more discussion about crowdfunding theories in Section 5.

selling a venture's output by issuing tokens allows the entrepreneur to transfer part of the venture risk to diversified investors without diluting the entrepreneur's control rights.

As a general observation we note that the total amount of research related to signalling by risk-bearing is significantly smaller than that on credit rationing although many interesting lines exist in this area. So more research is expected including both theoretical and empirical research.

Table 2 contains some empirical papers on signalling by risk-bearing, key variables used and major findings.

Table 2. Empirical research related to signalling by risk-bearing

Author(s)	Year of publication	Independent variables	Dependent variables	Main findings
Ahlers et al.	2015	Funding Amount	Equity offering, Certification	the importance of financial roadmaps and risk factors, as well as internal governance, for successful equity crowdfunding
Bruns and Fletcher	2008	Likelihood of granting a loan	Share of borrowers' investment	features that reduce the risk to the bank and shift the risk to the borrower have the largest impact
Arthurs et al.	2009	lockup period, the amount of underpricing	patent intensity, venture capital backing, risk	Lockup period is a signal of firm quality
Czaja and Röder	2022	collected funds during the token sale	the share of tokens distributed to the public during the ICO	Negative effect of the share of token on ICO success
Rossi et al.	2021	The campaign target, funding amount	equity retention by original entrepreneurs	Higher equity stake of entrepreneur is a positive signal of quality (success)
Mohd-Rashid et al.	2017	Initial IPO return	voluntary lock-up ratio	a higher voluntary lock-up ratio signals firm quality
Yahya and Rahim	2019	the percentage of opening day trading volume	lockup period, lockup ratio	the lockup period and ratio restrict the amount of flipping and signal the firm quality

More broadly speaking, some authors analyze risk-taking by entrepreneurs in a slightly different context (still related to the financing choice). For example, Laffey et al. (2021) argue that crowdfunding is generally a more risky way of raising funds compared to for example bank financing. So one could assume that under asymmetric information, crowdfunding can be selected as a signalling device in a similar spirit as the traditional signalling by risk-bearing idea. Daskalakis and Yue (2018) study the role of risk of firms that use crowdfunding from an investor point of view and find that this plays an important role. This may be a promising idea for future research.

Bouvard (2014) examines the financing of innovation in the presence of adverse selection in the capital market and generates some predictions that are in line with empirical evidence on venture capital contracts, and on the impact of internal financing and risk taking. This paper argues that cash holdings of the entrepreneur accelerate investment and increase risk-taking. Implications from venture capital contracts are similar to the ones we discussed (vesting period, etc.).

As a final example, Philippi et al. (2021) study signalling vehicles for technological capabilities that determine the fundraising success of initial coin offerings.

4. Flexibility theory

Flexibility theory suggests that if a firm with investment opportunities has too much debt it may create problems with undertaking its projects, raising additional funds etc. (Myers, 1977).[19] Firms therefore preserve debt capacity or hold back on issuing debt because they want to maintain flexibility.

Flexibility models often imply that expected performance of the firm's projects increases the chances that the firm values flexibility more and will not use debt.[20] Usually this prediction finds support in empirical literature for SMEs: see e.g. Ramalho and Da Silva (2009), Degryse et al. (2009), Sogorb-Mira (2005), Hall et al. (2004), Chittenden et al. (1996), Michaelas et al. (1999), Psillaki and Daskalakis (2008) and Cassar and Holmes (2003).

[19] See also Diamond (1991).
[20] See Technical Appendix for details.

Uncertainty about future projects also increases the chances that the firm will not use debt. If flexibility is viewed as an option, its value will increase when there is greater uncertainty about future projects; thus, firms with predictable capital expenditures should value flexibility less. Caglayan and Rashid (2014) find that the leverage of non-public firms is negatively related to firm's risk and that these firms are more sensitive than their public counterparts. Forte et al. (2013) find that riskier SMEs in Brazil are less leveraged. Lambrinoudakis et al. (2019) find that leverage decreases in anticipation of an increase in expectations about future firm-specific investment.

Higher risk of a high cost of capital due to low debt also increases chances that the firm will not use debt. When the cost of equity remains significantly higher relative to the cost of debt (for example due to the situation in the stock market) when debt is low, firms should value flexibility less.

Baldwin et al. (2002) focused on the financing of successful new firms—the 20% that are able to stay in business for ten years. Successful new firms in knowledge-intensive environments rely less on debt financing than other firms, which is consistent with the flexibility theory.

Government support of innovations by SMEs is also consistent with the idea of flexibility. In many countries this practice is very popular e.g. in UK and Canada.[21]

[21] See e.g. https://www.vennershipley.co.uk/wp-content/uploads/2020/07/Government_support_for_SMEs.pdf

Ferrando et al. (2017) use a very large sample of European private and public firms to show that financial flexibility attained through a conservative leverage policy is more important for private, small-medium-sized, and young firms, and also for firms in countries with less access to credit and weaker investor protection.

Also note Wang et al. (2012). They argue that the entrepreneur prudently uses debt, lowers consumption, and scales back portfolio investment in the stock market in order to preserve liquid wealth to buffer productivity shocks.

Byoun (2011) examines how the demand for financial flexibility affects firms' capital structure decisions. The paper suggests that there is an inverted-U relation between leverage ratio and the demand for financial flexibility: developing firms have low leverage by issuing external equity in order to build up financial flexibility for future growth opportunities, while mature firms maintain moderate leverage by replacing debt with internal funds in order to recharge their financial flexibility. The paper finds evidence that is consistent with this idea.

Baños-Caballero et al. (2016) analyze the effect of a firm's financing strategy with regard to working capital on firm performance. They find that a suitable financing strategy can help firms improve their performance and that this relation depends on a firm's financial flexibility. For example, the level of short-term debt is negatively correlated with firm performance when firms finance a high percentage of their working capital with short-term bank debt.

Barboni (2017) studies the impact of repayment flexibility in microfinance contracts using a model based on asymmetric information. The author shows that a separating equilibrium exists where lenders simultaneously offer a rigid and a flexible repayment schedule that leads to a higher profit for lenders compared to the case of rigid contracts. Simulations with Indian microentrepreneurs confirm the model predictions. These results are consistent with the idea that SMEs value flexibility with regard to their financing arrangements.

Table 3 presents some empirical papers on the flexibility idea, key variables used and major findings.

Table 3. Empirical research related to the flexibility idea

Author(s)	Year of publication	Independent variables	Dependent variables	Main findings
Lambrinoudakis et al.	2019	Leverage	Risk-neutral moments (expecta-tions of investment shocks)	Expectatations of investment shoks negatively affect leverage
Baños-Caballero et al.	2016	ROE	Short-term debt	Negative effect of debt on flexibility and firm performance when firms finance a high percentage of their working capital with short-term bank debt
Trovato and Alfo	2006	Leverage	Risk	Risk has negative impact on leverage
Forte et al.	2013	Leverage, Long-term leverage	Age, size, risk	Risk is negatively associated with leverage
Hall et al.	2004	Debt	Expected performance	negative correlation between debt and expected performance
Psillaki and Daskalakis	2008	Leverage	Profitability, risk	Risk and profitability have negative effect on leverage
Ferrando et al.	2017	Capital expenditrues relative to stock	Low debt dummy variable	financial flexibility attained through a conservative leverage policy is more important for private, small-medium-sized, young firms and also for firms in countries with less access to credit and weaker investor protection
Byoun	2011	Leverage	Demand for financial flexibility	developing firms have low leverage; growth firms have high leverage; mature firms have moderate leverage

5. Learning market demand

The learning market demand ("crowd wisdom") idea is mostly related to crowdfunding (especially reward-based crowdfunding) and token issues. Both of these areas are parts of FinTech that refers to various financial technologies used to automate processes in the financial sector (Allen et al., 2021; Das, 2019).[22] Usually the models based on this idea imply that the likelihood of crowdfunding increases when uncertainty regarding market demand increases.

Schwienbacher (2018) analyzes the firm's choice between (reward-based) crowdfunding and venture capital financing. One of the firm's risks is related to market demand uncertainty. Reward-based crowdfunding offers a signal about market potential of the firm's product. Venture capital financing (e.g. in the form of equity financing) does not offer the same informational feedback, since investors' decisions in this case are mostly based on the assessment of the overall profitability of the project and not on consumption. Schwienbacher (2018) also finds that crowdfunding is more likely when demand uncertainty is higher.

Similar ideas are used in Miglo (2021) with regard to ICO analysis. Entrepreneurs learn information about market demand by observing the price of tokens issued during ICO. The paper argues that ICO will be preferred to STO if the degree of demand uncertainty is relatively large. Although this prediction has not been tested directly, it is consistent with the spirit of Amsden and

[22] For a review of literature related to crowdfunding and token issues, including basic definitions and terminology, see e.g. Catalini and Gans (2018), Cumming et al. (2020), Myalo (2019), Ofir and Sadeh (2020), and Miglo (2022).

Schweizer (2018). They show in their sample of 1,009 projects between 2015 and 2017 that ICO projects are characterized by a very high degree of market uncertainty.

Also as discussed in the Technical Appendix, crowdfunding (reward-based crowdfunding) should be the preferred strategy for relatively small investment projects, consistent with some empirical findings, e.g. in Mollick (2014). Chemla and Tinn (2020) predict that small/short campaigns have higher probability of success. Mollick and Kuppuswamy (2014) also argue that crowdfunding provides entrepreneurs with different benefits including the benefit of learning about the market.

Among other theoretical predictions we note the following. Strausz (2017) considers a model of firm choice between crowdfunding and traditional bank financing and argues that the firm should use crowdfunding when opportunities to learn information are neither too large nor too small. Roma et al. (2018) consider a model of crowdfunding that may be followed by a venture capital financing. It predicts that entrepreneurs should use crowdfunding either when it is highly informative or when it is not informative at all. In Catalini and Gans (2018) an ICO allows an entrepreneur to generate buyer competition for the token, which, in turn, provides information about consumer value. Xu and Ni (2022) develop and estimate a model of crowdfunding demand and entrepreneurs' product-launch decisions. They find that the information entrepreneurs collect during crowdfunding campaigns affects the product-launch decisions. Using an entrepreneurs' survey, Brown et al. (2015) argue that equity-based crowdfunding provides intangible benefits to entrepreneurs in terms of firm valuation and product validation. Xu et al. (2020) build a model to compare bank financing and crowdfunding. They find that the firm's strategy depends critically

on the market uncertainty. Ellman and Hurkens (2019) consider a model where consumers have different valuations of firm products/services. The authors suggest that crowdfunding and traditional debt finance should be complements when the fixed costs are large.

The papers containing the empirical evidence related to the learning market demand idea are summarized in Table 4.

Table 4. Empirical research related to the learning market demand idea

Author(s)	Year of publication	Independent variables	Dependent variables	Main findings
Xu	2018	Subsequent decision	Pledged amount, project target	More positive feedback from the crowd increases entrepreneurs' chances to continue. Entrepreneurs launch riskier projects when the opportunity cost of crowdfunding increases.
Chemla and Tinn	2020	Target/pledge ratio	Industry	Firms in idustries with more uncertainty raise more funds
Xu and Ni	2022	Product launch decision	pledge-option attribute coefficients	Information about demand affects product-launch decision

6. Other theories

There is a large variety of capital structure theories. The objective of this paper is to focus on small firms as opposed to large public firms. The theories of financing that were discussed earlier are considered very important for SMEs, whereas other theories exist that are either relatively new or apply more to large companies.

Usually one of the assumptions of pecking-order theory (Myers and Majluf, 1984) is that firms have the ability to freely issue debt and equity. This is not the case for most SMEs. So pecking-

order has less support among SMEs than among large firms (see, for example, Frank and Goyal, 2003).

Taxes play a significant role in trade-off theory of capital structure (e.g. Kraus and Litzenberger, 1973), explaining the behavior of large firms but not the behavior of SMEs (Pettit and Singer, 1985; Michaelas et al., 1999; Kashefi-Pour et al., 2010; Miglo, 2020). Overall the evidence regarding whether the trade-off theory works for entrepreneurial firms is mixed (also see Serrasqueiro et al., 2011; Coleman and Robb, 2012; and Atiyet, 2012).[23]

The importance of agency problems for financing decisions has been well recognized since the seminal papers by Jensen and Meckling (1976), Jensen (1986), and others. There are two types of agency problems. One is the owners-managers conflict and the second is the creditors-owners conflict. With regard to the owners-managers conflict, the idea is to make sure that the manager works in the interest of the firm's owners. This problem is more important for large public firms where ownership and management are often separated. For SMEs this problem is usually the one between an entrepreneur (manager) and outside shareholders. So it usually applies to companies with outside equity financing like, for example, venture capital financed firms (Admati and Pfleiderer, 1994; Gompers, 1995; Neher, 1999; Hart and Moore, 1994; Bergemann and Hege, 1998; Fluck, Holtz-Eakin and Rosen, 1998; Landier, 2003; De Bettignies and Brander, 2007; and Winton and Yerramilli, 2008). In order to provide incentives for the entrepreneur his fraction of equity needs to be sufficiently high. On the other hand, venture capitalists also contribute to the success of the firm and therefore there is a conflict for capital structure policy: on one hand

[23] Among recent theoretical models we note DeAngelo et al. (2011) that combines the trade-off theory model with flexibility ideas.

providing equity to the VC increases his incentives but on the other hand, it reduces the incentives of the entrepreneur. There exists a branch of the literature that studies the importance of convertible securities in resolving this conflict (Hellmann, 2006; Schmidt, 2003).

Amit, Brander and Zott (1997) find a negative correlation between the VC stake of equity in the firm and the firm's performance. It is not necessarily consistent with the idea that VC should be interested in investing in the company or providing higher effort. Cumming (2005) does not confirm that convertible securities are the dominant type of securities used in venture capital financing or that there is any convergence and learning towards using these securities more intensely. On the other hand Cumming (2005) finds some support for the idea that financing strategies are used to mitigate agency problems. The focus is mostly on the argument that convertible preferred equity often serves as an optimal financing contract but the results are stronger for American firms than for Canadian firms. For example, high-tech firms are 6.1% more likely to be financed with convertible preferred equity, which is consistent with the view that convertible preferred shares mitigate pronounced agency problems of bilateral moral hazard and window dressing in high-tech firms, as conjectured in theoretical literature. In the case of buyouts, the moral hazard problem could be considered to be more unilateral. Buyouts require a significant amount of effort on behalf of the entrepreneur to buyout the particular product line or company, but relatively less effort by the VC (Macdonald, 1992). Consistent with this idea, Cumming (2005) finds that a greater proportion of contracts with at least some debt will be observed among buyout stage VC investments. Buyouts are 2.7% more likely to be financed with straight debt.

With regard to the creditors-owners conflict the main ideas are asset substitution and debt overhang. The debt overhang problem usually applies to financially distressed firms that pass up profitable finance opportunities because they have too much debt in their capital structure. Asset-substitution or the risk-shifting problem consists of financially troubled firms involved in non-optimal investment activities (Jensen and Meckling, 1976). Green (1984) suggested that the use of convertible securities can mitigate this problem. Cumming (2005) tested this idea for turnaround Canadian venture firms and did not find any support. Cumming (2005) also finds some support for the idea that the risk-shifting problem can be more pronounced in innovation-based and knowledge-based firms and therefore they are more likely to use convertible securities. As was discussed in Section 2, one of the reasons for credit rationing is a moral hazard problem that is often similar to the asset-substitution idea. We have also mentioned that a debate exists among researchers whether the main reason for credit rationing is moral hazard or the asymmetric information problem. Among recent papers in this area see e.g. Kjenstad et al. (2015) and Ning and Ritchken (2021).

A relatively new line of research suggests that social preferences and lifestyle factors may play a role in financing strategies of SMEs. See e.g. Lee and Perrson (2015), Bertrand and Schoar (2006), Collins et al. (2010), Guérin et al. (2012), Robb and Robinson (2014), Belenzon and Zarutskie (2012), Romano et al. (2001), LeCornu et al. (1996), Wiklund et al. (2009), Vos et al. (2007), Schindehutte et al. (2006), Bell and Vos (2009) and Diener and Seligman (2004). Further research is expected here given that it is a growing area of interest.

Literature that suggests that firms can use information-sensitive securities to help investors

reveal information about firms (Fulghieri and Lukin, 2001; Inderst and Mueller, 2006) has not been largely applied to SMEs although a recent paper by Yang and Zeng (2019) applies to entrepreneurial firms. This direction of research can be promising for new forms of financing such as crowdfunding since, as was mentioned above, crowdfunding has the advantage of providing feedback to firms regarding the quality of their products.

Harris and Raviv (1988), Aghion and Bolton (1992) and Hart (1995) argue that firms issue debt as a tool of establishing an appropriate control structure. Aghion and Bolton (1992) and Hart (1995) are based on incomplete contracts between firm claimholders. In an environment where complete contracts are impossible to write, the question of ownership is crucial because the ownership establishes the residual decision-maker. Issuing debt establishes an efficient control structure by giving control to debtholders when the firm is in financial distress. More theoretical papers are still expected. With regard to SMEs, these ideas have been mostly used to study contracts between entrepreneurs and venture capitalists and also to study the efficiency of exit outcomes for venture firms.

With regard to the former it has been argued that control rights and cash flow rights are often established separately (Kaplan and Strömberg, 2003) and that convertible preferred equity is often an optimal contract (Hellmann, 2006; Kaplan and Strömberg, 2003). More research involving SMEs in different countries is required in this area since most results concerning convertible securities are based on US-firms. For example, in Canada the dominance of convertible preferred equity among venture firms is not observed. Canadian firms rather use a variety of different contracts.

With regard to connections between control structure, financing structure and exit outcomes we note the following. Berglöf (1994) and Bascha and Walz (2001) argue that convertible securities can be used in order to implement the convergence of entrepreneur and venture capitalist interests when selecting optimal exit decisions. Hellmann (2006) explains the role of convertible securities in efficient exit decisions. Cumming and Johan (2008a) and Cumming (2008) use European data and Cumming and Johan (2008b) use Canadian data and find several interesting results regarding financing strategies of firms that use venture capital (VC) financing, analyze the connections of these strategies to firm exit strategy and compare these results with theoretical ideas. For example, stronger VC-control rights are associated with a higher likelihood of acquisitions while stronger entrepreneurial control is associated with a higher probability of an IPO. Cumming and Johan (2008a) also find that stronger VC control rights are associated with higher probability of issuing convertible securities. The results are consistent with agency and contracting theories. Furthermore, Cumming and Johan (2008b) find that when VC financing reduces information asymmetries and agency costs faced by the firm, it is more likely to have a successful exit outcome (see also Cumming and MacIntosh, 2003).

The reluctance to relinquish control and the desire for independence are often cited examples of attitudes that small firm owners exhibit (Bolton Report, 1971; and Ang, 1992). Lucey and Mac an Bhaird (2006) examine 299 Irish SMEs and find the desire for independence and control to be important in SME capital structure decisions while Degryse et al. (2009), and Psillaki and Daskalakis (2008) mention independence and control as a possible explanation of their findings related to profitability.

Other topics include the connection between the macroeconomic situation and capital structure choice; the role of confidentiality for financing decisions; and the role of narratives in attracting funds. Small business finance is also vulnerable to the positive and negative changes affecting the macroeconomy. With regard to macroeconomic shocks, public equity market disruptions, public policy changes or monetary policy shocks, such as those transmitted through the two interest rate effects-propagating breaches of the credit mechanism — the bank-lending channel and the balance sheet channel — may lessen the funding for small enterprises. See among others Papadimitriou and Mourdoukoutas (2002), Tucker and Lean (2003), Berger and Udell (1998), Cumming (2006), and Agrawal et al. (2013). Nguyen and Pacheco (2022) measure the confidentiality strictness in loan contracts using textual analysis that captures the appearance of confidentiality-related words and the length of confidentiality provision. Wuillaume and Janssen (2020) analyze the role of narratives in establishing the legitimacy of entrepreneurial businesses which can be especially important for firms with high uncertainty and firms using crowdfunding.

7. Conclusion

Credit rationing and the flexibility theory of financing represent intuitive and practical ideas of explaining different SME financing patterns. These ideas generate many predictions, most of which have significant empirical evidence. However, some aspects of these theories need more testing. It is not clear whether asymmetric information or moral hazard issues are behind credit rationing in real life situations and consequently, some aspects of collateral use are not yet well understood. Signalling by risk-bearing has fewer theoretical papers compared to the other main theories of capital structure, though their theoretical predictions usually find empirical support. More theoretical ideas can probably be expected in this area including new areas of entrepreneurial

financing such as crowdfunding.[24] Flexibility theory is popular among entrepreneurs and has been actively investigated lately along with closely related areas such as credit constraints or cash constraints, credit rating-based theories of financing, the zero-debt policy puzzle and some other areas. It seems like the number of empirical papers outweighs the number of theoretical papers. More theoretical papers that will further distinguish the flexibility idea from related ideas such as, for example, debt overhang, may be expected.

With regard to traditional theories such as the pecking–order theory and trade-off theory, the focus should be shifted (which is also mentioned in some empirical papers) on creating modified versions of these theories related to SMEs or testing some existing modified versions of these theories since it is unlikely that traditional theories will explain the behavior of entrepreneurial firms well. A similar situation exists with traditional agency theories of financing. More papers are expected in such areas of financing for entrepreneurial firms as stage-based theories including experimentation, life cycle theories, control-based theories and social-value based or personal-value based theories.

Theories of crowdfunding and token issues are on the rise but the structure of this field is still not established clearly. A significant gap exists between theoretical and empirical articles like in no other area of entrepreneurial financing literature. Many theoretical papers lack empirical support. Furthermore, most of them have not been tested directly. Also theoretical research on debt-based crowdfunding and donation-based crowdfunding is behind that on reward-based crowdfunding and equity-based crowdfunding. So more research is expected in the first two

[24] See, for example, Miglo and Miglo (2019).

mentioned areas especially given that, in terms of volume, debt-based crowdfunding is the most popular type of crowdfunding. Also more research on ICO, STO and IEO is expected in the near future.

In terms of public policies it is expected that theoretical papers will contain more policy application ideas based on their findings. A few avenues seem to be promising. Most researchers suggest, for example, stronger requirements for listing on exchanges for SMEs. These will help in developing the venture capital segment. More support (grants, legislation etc.) is required for new areas such as crowdfunding and social finance.

In conclusion, we believe the current review will help researchers to find the relevant literature when entering the rapidly developing field of entrepreneurial finance theories, and will help practitioners to become aware of the latest theoretical developments.

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