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Analysis of the capital structure of startups in light of the tradeoff and pecking order theories

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Abstract

Purpose: Startups have significant differences compared to other companies**.** They have many intangible assets (e.g., team tenure and experience of founders), are risky, and tend not to generate profits in their initial years (Heirman & Clarysse, 2007; Weber & Zulehner, 2009). Does the startups' financing choice also differ from that of traditional companies? We analyzed the capital structure of startups in their first years of life based on the classic tradeoff and pecking order theories. **Methodology/approach**: We collected data on 40 startups in the city of Ribeirão Preto, São Paulo, Brazil, through a questionnaire on the profiles of the founders, company characteristics, bottom-line performance and financing sources. The data collected covered the year of founding and the three subsequent years. **Findings**: The results indicated that these startups mainly financed themselves through the founders' capital in all four years covered. Only in the third year did they start using resources generated internally, indicating pecking order adherence. However, the presence of angel investors and government subsidies contrasted with the absence of bank debt. In line with the tradeoff theory, bank debt was not a viable financing option in the early years of these firms since they had low profitability and high risk. **Theoretical/methodological contributions**: We offer a theoretical contribution by analyzing the adequacy of traditional financial theories in the specific context of startups**. Originality**: The finance literature about startups is scarce, and few studies have analyzed these companies from the capital structure theoretical perspective. **Social contributions / for management**: We provide a panorama of the financing of startups to support their financial planning regarding fundraising.

Keywords: Startup, Tradeoff, Pecking Order, Fundraising.

Análise da estrutura de capital de startups à luz das teorias de tradeoff e pecking order

Resumo

Objetivo: As startups apresentam diferenças significativas em relação às organizações tradicionais. Elas têm muitos ativos intangíveis, são arriscadas e tendem a não gerar lucros em seus anos iniciais (Heirman & Clarysse, 2007; Weber & Zulehner, 2009). A escolha de financiamento das *startups* também seria diferente das empresas tradicionais? Nosso objetivo é analisar a estrutura de capital de *startups* em seus primeiros anos de vida com base nas teorias clássicas de *tradeoff* e *pecking order*. **Metodologia/abordagem**: Coletamos dados de 40 startups na cidade de Ribeirão Preto, São Paulo, Brasil, por meio de um questionário sobre o perfil dos fundadores, características das empresas, desempenho financeiro e fontes de financiamento. Os dados coletados abrangeram o ano de fundação da empresa e os três anos subsequentes. **Resultados**: Os resultados indicaram que as *startups* analisadas se financiaram principalmente por meio de capital dos fundadores em todos os quatro anos analisados. Somente no terceiro ano elas passaram a utilizar os recursos gerados internamente, indicando uma adesão à *pecking order*. No entanto, a presença de investidores-anjo e recursos subsidiados contrastou com a ausência de dívida bancária. Em consonância com a teoria do *tradeoff*, a dívida bancária não era uma opção viável de financiamento nos primeiros anos dessas empresas por apresentarem baixa rentabilidade e alto risco. **Contribuições teóricas/metodológicas**: Oferecemos uma contribuição teórica analisando a adequação das teorias financeiras tradicionais ao contexto específico das *startups***. Originalidade**: A literatura de finanças sobre *startup* é escassa e poucos estudos analisaram essas empresas sob a ótica das teorias de estrutura de capital. **Contribuições sociais / para gestão**: Fornecemos um panorama do financiamento de startups para apoiar seu planejamento financeiro no que tange à obtenção de recursos.

Palavras-chave: *Startup*, *Tradeoff*, *Pecking Order*, Financiamento.

INTRODUCTION

How companies finance their investments is a key topic in the financial literature. One of the main works is Modigliani and Miller (1958). According to them, the choice of the capital structure theoretically cannot alter a firm's value when assuming the presence of perfect financial markets and the absence of taxes. In such a framework, a firm's value is determined only by the return the assets are able to generate.

Subsequently, factors present in the real economy were added to the model, such as taxes, whose impact was examined by Modigliani and Miller (1963), along with agency costs and costs of default, financial distress and information asymmetry, with varied findings by researchers around the world (e.g., Ross, 1977; Leland & Pyle, 1977; Myers, 1984; Myers & Majluf, 1984). These studies led to the proposal of some theories to support firms' capital structure decisions, chief among them the tradeoff and pecking order theories.

Myers (1984; 2001) described these two theories. The tradeoff theory posits that the choice of the capital structure is related to the balance of costs and benefits from debt versus equity financing (Myers, 1984). While on the one hand, a higher proportion of debt generates a larger cash flow due to tax writeoff of interest expenses, increasing the firm's value, on the other hand it increases the risks, and hence the potential costs of financial distress, with the opposite effect on value. Thus, firms' managers seek an optimal debt level to maximize value.

Despite its importance, the literature criticized the tradeoff theory for its low power to explain financing strategies (Myers, 1984). Although it was possible to find examples of successful financing strategies based on the taxation regime, the empirical literature generally did not find a systematic effect (Myers, 2001). Against this backdrop, the pecking order theory emerged.

According to the pecking order theory, in choosing the capital structure, firms tend to prioritize the sources of capital that are least sensitive to information asymmetry. For this reason, to satisfy their need for capital, the first option should be to use resources generated internally. Furthermore, when choosing external resources, companies tend to prioritize those resources that are less sensitive to information (i.e., those that have lower volatility or price variation in response to changes in available information). The issuance of shares is thus the last alternative to pursue (Myers, 2001).

Although these two theories are consolidated in the financial literature, both arose in a different context from recent years, when new forms of organization are spreading and gaining importance and attention. Therefore, doubts and questions may arise regarding the analysis of the capital structure in light of these two theories.

In this respect, startups are gaining space in the economy. According to Blank and Dorf (2014, p. 19), a startup is "a temporary organization in search of a scalable, recurring and profitable business model." Data from the Brazilian Association of Startups (Abstartups) reveal that in 2020 alone there were some 12 thousand new startups registered in the country, 20 times the number in 2011[1]. For Ries (2011), startups are organizations that develop new products or services under conditions of great uncertainty, be it technological, financial, market-related and/or macroeconomic, among others. Other characteristics of startups are their large intangible assets (e.g., team tenure and experience of founders), high risk, and tendency not to generate profits in their initial years (Heirman & Clarysse, 2007; Weber & Zulehner, 2009; Sá, 2017).

According to Weiblen and Chesbrough (2015), there are clear distinctions between startups and other companies. Unlike well-established firms, startups do not have large resources, economies of scale or delineated processes to operate efficiently. They stand out, on the other hand, for having promising ideas, organizational agility and willingness to assume risks in search of rapid growth (Sá, 2017; Rompho, 2018).

Therefore, given the idiosyncrasies of startups and the significant differences in relation to traditional organizations, the aim of this study is to analyze the capital structure of startups based on the tradeoff and pecking order theories. The study is exploratory in nature, focused on startups present in a high-tech business park located in the city of Ribeirão Preto, state of São Paulo, in 2019. We carried out a field survey with an online questionnaire directed to the founders of the startups in question. This enabled the development of a database with information on the profile of the founders, size of the firms, and sources and amount of financing received.

Previous studies have focused on analyzing the theory that best explains the capital structure of companies. Specifically in Brazil, Bastos, Nakamura and Basso (2009), Correa, Basso and Nakamura (2013), Iglesias et al. (2021) and Rocha and Camargos (2023) investigated which of the theories (tradeoff or pecking order) explain the capital structure of established companies. However, when it comes to startups, this is still an open question.

With this study, we aim to contribute to the literature by analyzing the adequacy of traditional financial theories in the specific context of startups, a topic still little explored in the financial literature. Besides contributing to the literature, we believe our results are relevant to startups' founders and potential funders. We provide a panorama of the financing of startups to support the financial planning regarding fundraising of these firms. Finally, this study can contribute as a source of information for development agencies to define policies to encourage innovation.

THEORETICAL FRAMEWORK

Startups' capital sources

Startups are organizations that develop and market new products and/or services under conditions of significant uncertainties of technical, financial, market-related, or macroeconomic natures, among others (Ries, 2011). Therefore, the context of uncertainties, characteristic of startups, may be related to the high mortality rate of this type of firm. The mortality percentage of startups is around 90%, largely due to the difficulty obtaining financial resources (Patel, 2015; Krishna et al., 2016). Information asymmetry contributes to this difficulty in obtaining resources, since potential investors in startups find it hard to analyze the quality of the business due to the low level of information available (Huyghebaert, 2003).

High uncertainty, information asymmetry, and limited guarantees make banks reluctant to lend money to startups (Colombo & Grilli, 2007). According to Vanacker and Manigart (2010), bank debt is a poor source of financing for new and innovative firms, since they typically do not generate sufficient cash flow to repay this type of debt and do not have sufficient tangible assets to offer in guarantee. In line with Vanacker and Manigart (2010), Goudriaan (2016) explained that obtaining bank financing depends on the ability of the borrower to offer guarantees, such as a reasonably certain cash flow or real estate.

This difficulty of obtaining resources varies depending on the context in which the startup is inserted. Emerging economies, for example, are characterized by strong restrictions on long-term third-party capital sources, in addition to high interest rates (Brito et al., 2007).

In reaction to the difficulty of qualifying for bank financing, startups obtain funding from the own resources or those of family members, angel investors, government subsidies and venture capitalists, along with crowdfunding (Goudriaan, 2016; Janaji et al., 2021).

Some of the funding sources used by startups may be unfamiliar to some readers. For example, angel investors are individuals who invest in businesses with their own money. They tend to be experienced entrepreneurs who assume management positions in the firms of their portfolios (Rosenbusch et al., 2013). Investments by angel investors as a rule occur in the initial phases of a business (Rodrigues et al., 2021). As described by Janaji, Ismail and Ibrahim (2021), angel investors typically allocate more than financial capital; they tend to make an active contribution with their knowledge, experience and monitoring, among other factors. This characteristic is fundamental to the success of a startup, as shown by the study of Croce et al. (2018). According to them, startups financed by angel investors tend to have a higher survival rate.

In turn, venture capitalists are investors that obtain money from other individuals, pension funds, banks, sovereign funds, family offices and/or governments and invest it in businesses with strong potential to generate returns (Wallmeroth et al., 2018). In return for this investment, these investors demand an equity stake in the investee. Venture capitalists tend to be active investors, who contribute to the strategic development of the business, and sometimes also take part in operational decisions (Berger & Udell, 1998). Venture capital financing usually occurs at a more mature phase of the life cycle of a startup. According to Rassenfosse and Fischer (2016), as a rule startups only receive venture capital after the initial phase of obtaining resources from the founders, their friends and relatives, and angel investors, but before receiving resources from floating shares.

Finally, crowdfunding has also been an important alternative to finance innovative projects. Janaji et al. (2021) described a characteristic of crowdfunding that distinguishes it from the other sources of capital, namely that the financiers are not necessarily people with professional investing experience. Moreover, according to the authors these financiers often have other motivations than the reasoned expectation of a financial return. Thus, in practice crowdfunding permits entrepreneurs to connect with potential investors through online platforms by which they present their business plans (Griffin, 2013). Herve and Schwienbacher (2018) pointed out that an important characteristic of this source of funding is that the right of the collective financiers to control the company or influence its management decisions is much weaker than in other modalities, such as venture capital. Finally, Janaji et al. (2021) stated that crowdfunding diminishes the information asymmetry of future investors, since it can be seen as a pretest for marketing a product or service.

Capital structure: tradeoff and pecking order

In their seminal article, Modigliani and Miller (1958) argued that the form of financing does not determine the value of a company. For this reason, there should be no difference between the net worth of a highly leveraged firm and one without debt (all other aspects being equal). In this way, what determines the value of a firm is the ability of its assets to generate cash flows. The analyses carried out by Modigliani and Miller (1958) were based on the assumption of a hypothetical market without bankruptcy costs, agency costs, information asymmetry and taxes.

When including taxation of firms in the analyses, Modigliani and Miller (1958; 1963) noted that leverage considerably reduces the tax liability because of the deduction of interest expenses from taxable income. In other words, when firms choose debt financing, they have a smaller tax obligation, which tends to increase their value.

In reaction to the assumptions underpinning the analyses of Modigliani and Miller (1958, 1963), various studies were performed and theories formulated, supported by less restrictive presuppositions. The tradeoff theory, for instance, sought to explain the choice of firms' capital structure considering the effect of market imperfections. In summary, this theory states that moderate use of debt is generally best. More specifically, according to the tradeoff theory, firms tend to seek a balance between the tax benefits of debt and the respective costs of greater reliance on debt financing (Myers, 1984). Hence, according to the tradeoff theory, companies should choose a debt level at which the marginal tax benefit is equal to the costs of financial difficulties for companies to maximize their value.

Based on the tradeoff theory, firms with significant and relatively secure tangible assets will tend to assume more debt than firms with a preponderance of intangible and risky assets (Myers, 2001). The high commercial risk of firms with more precarious intangible assets is associated with a higher cost of financial difficulties and consequently a greater chance of bankruptcy, thus reducing the attractiveness of leverage.

However, the tradeoff theory received criticism in the financial literature because of its overemphasis on tax benefits to explain financing strategies. Although it is possible to find examples of financing strategies based on taxation, there is no systematic effect among firms (Myers, 2001).

In turn, the pecking order theory, proposed by Myers and Majluf (1984), does not advocate the existence of an optimal level of debt, as does the tradeoff theory. According to the pecking order theory, the information asymmetry among agents affects the capital structure because insiders have more information about the firm than outsiders. To mitigate problems caused by information asymmetry, such as adverse selection and moral hazard, companies tend to establish an order of preference in their capital structure, prioritizing securities that are less sensitive to information.

Adverse selection and moral hazard are two concepts related to information asymmetry in economics and insurance markets. Adverse selection refers to a situation in which one party (usually the buyer) has more information about his or her own characteristics, risks and/or preferences than the other party (usually the seller or insurer) in a transaction. As a result, the party with more information can selectively participate in the transaction, leading to a higher proportion of high-risk or low-quality individuals or goods in the market. Moral hazard refers to a situation in which one party, after entering into a transaction, has incentives to take excessive risks or act in a way that may not be in the best interest of the other party due to the lack of full information or consequences of their actions (Myers & Majluf, 1984).

According to the pecking order theory, internal capital should be better than any other type of financial resource, and only if this is insufficient to satisfy the investment needs should the firm resort to debt (Myers & Majluf, 1984; Myers, 1984). The issuance of shares figures as a last resort, used only when the other possible sources mentioned are exhausted. According to Myers (1984), the issuance of shares sends negative information to the market about the share price. When the company decides to issue shares, investors often assume that the current share price is overvalued, since it would not be reasonable for the controlling stockholders to float more shares when these are undervalued. Therefore, the market's perception that the shares are overvalued should lead to a decline in the stock price at the moment of the announcement of the offering. In this way, the issuance of shares is the last financing option, given the greater sensitivity to information, implying higher costs associated with adverse selection.

Previous studies have sought to analyze the theory that best explains the capital structure of companies. In developed markets such as the United States and European countries, evidence points to the pecking order theory as the most adherent to startups or high-growth companies, but with some relevant particularities (Vanacker & Manigart, 2010; Goudriaan, 2016).

Vanacker and Manigart (2010) analyzed a set of 32,754 Belgian companies from 1997 to 2004 and the results pointed to a preference for internal sources of capital. However, contrary to

the current focus of the literature on external capital financing for high-growth companies, internal financing and financial debt are the most used financing alternatives.

Coleman and Robb (2012) used the base of the Kauffman Firm Survey from 2004 to 2008 for more than 4,000 new technology-based firms in the USA. The results pointed to different financing patterns between high-tech companies and non-technology-based companies. The study found that on average technology-based companies received $142,693 in funding in the initial year, with 44% being external equity, 25% external debt (bank loans, lines of credit, business credit cards, etc.) and 21% through the founder. The authors found that high-tech companies had a lower profit margin in the first year of activity than non-technology-based companies, but they managed to attract foreign capital due to the high performance of some companies.

Robb and Robinson (2014) used a confidential framework from the Kauffman Firm Survey based on the Dun & Bradstreet database, with an eight-year panel of 3,972 companies spanning 2004 to 2011. The objective was to study capital structure choices that entrepreneurs make in the initial year of operation of new companies. Contradicting the initial hypotheses about startup financing, Robb and Robinson (2014) found that the three main sources of financing for most startups were, in order of average prevalence, bank debt, personal equity and commercial credit. Banks provide more resources for startups to the extent that entrepreneurs bear more of the risk associated with default through the encumbrance of their personal assets. For the authors, this is much more a reflection of the balance between supply and demand for different forms of capital than a reflection of business preferences or a new "entrepreneurial pecking order".

In Brazil, the pecking order theory has been found to best explain the capital structure of large companies. These works include Bastos, et al. (2009), Correa et al. (2013), Iglesias et al. (2021) and Rocha and Camargos (2023). However, when it comes to startups, this is still an open question in the literature.

MATERIAL AND METHODS

We aimed to analyze startups' capital structure in their first years of life in light of the tradeoff and pecking order theories. For this purpose, we performed a survey to understand the behavior of a determined group of firms concerning these theories (Marconi & Lakatos, 2003).

The survey was carried out through the application of a questionnaire. We divided it into four parts: the first contained five questions on the profile of the founders of the startups (gender, race, age, schooling level and hours worked per week); the second examined the profile and characteristics of the firms (segment of activity, number of employees and year of founding); the third contained questions on the business performance, such as yearly profit or loss and the respective amount; and the last part involved the sources of capital used (capital of the founders, angel investor, internal cash flow, official subsidies, resources from friends and relatives) and the respective amounts raised per year.

The original population studied consisted of 170 startups between 2008 and 2019 located in a high-tech park in the city of Ribeirão Preto, São Paulo State, called "SUPERA Parque". This park originated from a working arrangement among the University of São Paulo, the Ribeirão Preto municipal government and the São Paulo State Secretariat of Economic Development, Science, Technology and Innovation. The park aims to attract and retain high-tech firms, especially in the sectors of health, biotechnology, information technology, and bioenergy.

The first step was to contact the representative of SUPERA regarding conducting interviews with the founders of the startups in the park. We obtained a database containing the name and contact information of the key people of the 170 startups, among those installed in the park and some of their commercial partners. The park management also supplied the information necessary for us to contact all the companies by telephone. This first contact served as a pretest.

We performed this pretest with ten respondents before finalizing the questionnaire. The participants in the pretest took an average of five minutes to answer the full questionnaire. We sought to keep the questionnaire short enough to keep it from being tiresome to the respondents. This phase also served to evaluate whether the questions were easy to understand.

The results of the pretest revealed the existence of resistance among the founders to answer questions over the telephone, so we chose to post a totally digital online questionnaire, defined by Marconi and Lakatos (2003, p. 201) as "an instrument for collection of data, composed of an ordered series of questions, to be answered in writing without the presence of the interviewer."

Of the 170 startups established in the SUPERA Park between 2008 and 2019, the founders or representatives of 40 responded to the final questionnaire, structured using the Google Forms tool. The questionnaire was posted on August 26, 2019, and remained available until September 27th of the same year. Participation in the survey was voluntary and anonymous. All the potential respondents received a standard informed consent form, identifying the study's objective, the limits of participation, and a guarantee of nondisclosure of personal data that could enable identifying the participant and company.

To analyze the reliability of the questionnaire, we computed Cronbach's alpha (α). It measures the correlation among the responses, providing an average correlation for all the questions. A value greater than 0.7 indicates high correlation of a group of variables. It is usually used as a criterion to ascertain the reliability and internal consistency, i.e., to what extent the scale items are correlated with each other (Fávero & Belfiore, 2019). The coefficient was 0.9 for the complete questionnaire, while the lowest value for the individual questions was 0.8326. We calculated the coefficient using the "alpha" command of the Stata software (version 16).

RESULTS AND ANALYSES

Profile of the founders

Table 1 presents an overview of the profile of the startups' founders. The sample of 40 startups corresponds to 78 founders, including companies with 1 to 7 founders. Most of these people were female (73.1% of the sample of founders), in stark contrast to the companies in the database of ABStartups, in which only 12.3% of the firms were headed by women (Brito, 2018). The result was also different than that indicated by Distrito Dataminer, an innovation platform for startups that analyzed the origin and trajectory of 100 founders of 42 startups operating in Brazil from 1996 to 2018.

Distrito Dataminer used information in public databases, social networks and private databases, such as TransUnion, to select the 100 founders with most relevant impact on the main Brazilian startups, according to revenue, number of users, evolution of the number of employees, potential market, investment rounds, liquidity events, influence on social networks and media exposure, among other factors. In the report published in August 2019[2], of the 100 founders, only 2% were women: Cristina Junqueira of Nubank and Karin Thies of Geru.

In the same Distrito Dataminer report, all the founders had an undergraduate college degree, converging with our results, with around 5% of the sample of founders not having a bachelor's degree or equivalent. Table 1 indicates that the majority of the founders in our sample were young, between 25 and 34 years old (60.3%). Only three (3.8%) founders were younger than 25 and five (6.4%) were 55 years or older, with the oldest one being 65 years old.

Table 1

Profile of the founders

Characteristics	Frequency[1]	Percentage (%)
Gender		
Female	57	73.1
Male	21	26.9
Race		
White	63	80.8
Brown	11	14.1
Black	3	3.8
Yellow	1	1.3
Age		
24 or younger	3	3.8
25-34	47	60.3
35-44	15	19.2
45-54	8	10.3
55 or older	5	6.4
Schooling		
Secondary school diploma	4	5.1
Undergraduate degree	57	73.1
Postgraduate degree	17	21.8
Hours worked per week		
< 20	4	5.1
20 – 35	12	15.4
36 – 45	19	24.4
46 – 55	18	23.1
56 or more	25	32.0

Notes: [1] *n* = number of founders = 78.
Elaborated by the authors.

With regard to the color/race of the participants, 80.8% identified themselves as white. Similar results were reported by Robb and Robinson (2014) and Coleman and Robb (2012) based on through the Kauffman Firm Survey, in which 79.0% and 75.8% of the founders were white, respectively.

Regarding the workload, 55% of the founders on average worked more than 46 hours a week, confirming their strong dedication, as also noted by Robb and Robinson (2014), who found that 48% of their sample worked a similar number of weekly hours.

Profile of the companies

Table 2 contains the results of the responses regarding the firms' profile (the 40 startups). In general, 25% of the sample was composed of information technology companies, and 20% of firms were in the biotechnology segment. Seven firms were classified as "others" for having highly specific business activities that did not fit in any of the segments.

The startups were small measured by number of workers: 85% of the sample (34 companies) reported having at most 10 employees, and 50% of the sample had between one and five employees (including freelance service providers). Besides this, the majority of firms were new (85% founded as of 2014, and 57.5% between 2017 and 2019).

Analysis of performance

The results in Table 3 consider firms in each of the first four years of activity. There were 39 companies in the first year of operation, 25 in the second, 17 in the third and 14 in the fourth. The low number of firms in the fourth year is because most startups in the sample were founded in 2017 to 2019, so they had not yet reached four years when the survey was conducted. We stress that companies that had not yet completed one year of activity did not answer the performance questions (accounting profit/loss).

Table 2

Profile of the Companies

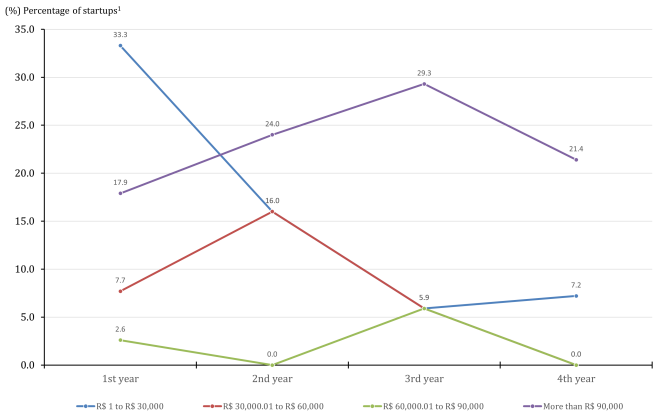
Characteristics	Frequency[1]	Percentage (%)
Segment of activity		
Information technology	10	25.0
Biotechnology	8	20.0
Others	7	17.5
Healthtechs	6	15.0
Digital marketing	4	10.0
Edtechs	3	7.5
Fintechs	1	2.5
Social network	1	2.5
Number of employees		
0	5	12.5
1 to 5	20	50.0
6 to 10	9	22.5
11 to 15	4	10.0
16 to 20		
21 to 25	1	2.5
26 or more	1	2.5
Year of founding		
2008 to 2010	3	7.5
2011 to 2013	3	7.5
2014 to 2016	11	27.5
2017 to 2019	23	57.5

Notes: [1] *n* = number of startups = 40. Frequencies equal zero (0) were omitted.
Elaborated by the authors.

Considering the companies active in each of the first four years, there was evolution of the accounting result. Figure 1 shows a decreasing trend in the number of startups that suffered losses over the years for each value range, especially for losses up to R$ 60,000, while Figure 2 shows a growing trend of startups that generated profits over the years, except those that earned up to R$ 30,000.

Figure 1

Evolution of startups' losses by value range and year of existence



Notes: [1] Percentage of startups over the total number of startus within each year (see Table 3).
Elaborated by the authors.

As indicated in Table 3, 61.5% of the startups generated losses in the first full year of existence, while in the second year this declined to 56.0%. This panorama reversed in the third and fourth years, with the majority of firms earning profits (in the third year 53.0% and in the fourth year 71.4%).

Even though the majority of companies were profitable in the third and fourth years, the amount was relatively small. In the third year, of the nine profitable companies, four earned up to R$ 30,000 and two earned from R$ 30,000 to R$ 60,000. In turn, in the fourth year, out of the ten profitable companies,

Table 3

Losses and profits

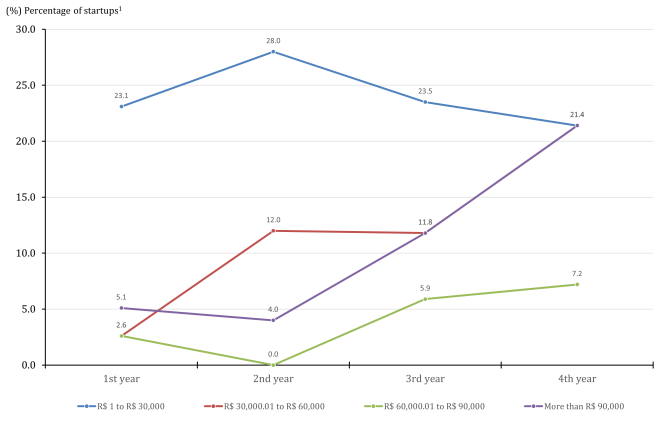
Losses				Profits			
Years		**Frequency[1]**	**%**	**Years**		**Frequency[1]**	**%**
First	*n = 39*			*First*	*n = 39*		
Did not have loss				Did not have profit		2	5.1
R$ 1 to R$ 30,000		13	33.3	R$ 1 to R$ 30,000		9	23.1
R$ 30,000.01 to R$ 60,000		3	7.7	R$ 30,000.01 to R$ 60,000		1	2.6
R$ 60,000.01 to R$ 90,000		1	2.6	R$ 60,000.01 to R$ 90,000		1	2.6
More than R$ 90,000		7	17.9	More than R$ 90,000		2	5.1
Total		24	61.5	Total		15	38.5
Second	*n = 25*			*Second*	*n = 25*		
R$ 1 to R$ 30,000		4	16.0	R$ 1 to R$ 30,000		7	28.0
R$ 30,000.01 to R$ 60,000		4	16.0	R$ 30,000.01 to R$ 60,000		3	12.0
R$ 60,000.01 to R$ 90,000				R$ 60,000.01 to R$ 90,000			
More than R$ 90,000		6	24.0	More than R$ 90,000		1	4.0
Total		14	56.0	Total		11	44.0
Third	*n = 17*			*Third*	*n = 17*		
R$ 1 to R$ 30,000		1	5.9	R$ 1 to R$ 30,000		4	23.5
R$ 30,000.01 to R$ 60,000		1	5.9	R$ 30,000.01 to R$ 60,000		2	11.8
R$ 60,000.01 to R$ 90,000		1	5.9	R$ 60,000.01 to R$ 90,000		1	5.9
More than R$ 90,000		5	29.3	More than R$ 90,000		2	11.8
Total		8	47.0	Total		9	53.0
Fourth	*n = 14*			*Fourth*	*n = 14*		
R$ 1 to R$ 30,000		1	7.2	R$ 1 to R$ 30,000		3	21.4
R$ 30,000.01 to R$ 60,000				R$ 30,000.01 to R$ 60,000		3	21.4
R$ 60,000.01 to R$ 90,000				R$ 60,000.01 to R$ 90,000		1	7.2
More than R$ 90,000		3	21.4	More than R$ 90,000		3	21.4
Total		4	28.6	Total		10	71.4

Notes: [1] *n* = number of startups. Frequencies equal zero (0) were omitted. Elaborated by the authors.

six earned up to R$ 30,000 and the same number gained from that level to R$ 60,000. Regarding the top earners, in the third year only two companies earned more than R$ 90,000 (the same number as in the first year), and three achieved this profitability in the fourth year, indicating that these firms did not achieve rising growth of profits in the first four years of activity.

Figure 2

Evolution of startups' profits by value range and year of existence



Notes: [1] Percentage of startups over the total number of startus within each year (see Table 3). Elaborated by the authors.

Table 4 reports the sources of funding of the startups in their first four years. The leading source was the founders. In the founding year, 34 companies obtained seed money from their founders, but the amounts were not large (of the 34 companies in the sample, 27 received up to R$50,000 from the founders). In the second year, 19 companies relied on financing by the founders, and like in the first year, the majority of founders invested up to R$50,000. The number of firms relying on capital from the founders declined annually, because in the third year, nine companies were financed in this way and in the fourth year only five were.

As of the second year, some companies had generated sufficient cash to finance themselves with internal capital. In the third year, three companies financed themselves internally, and in the fourth year this number was four. However, the revenues generated did not allow large investments: in the third year, of the three companies that reinvested capital, two did so in the lowest category (up to R$50,000), while in the fourth year, the number of companies in this category was three.

The results in Table 4 also show that in our sample, angel investors generally invested more than R$ 150,000 in any one year. Of the nine companies that received such investments in the first four years, eight received more than R$150,000.

Government development agencies, in this study mainly the São Paulo State Research Support Foundation (Fapesp), invested in companies from their inception, generally large amounts, and did more frequently with greater company age. In the first year, only two companies (5.1%) received subsidized financing, and in only one case was the amount greater than R$150,000. In the second year, three companies (12%) received more than this amount, and in the fourth year, four (28.6%) received more than R$150,000.

The only firms receiving subsidized investments were the biotechs and healthtechs (8 and 6 firms, respectively). Table 5 presents more details on these two business types. In the first year, two biotechs (i.e., 25% of biotechs) received investments from Fapesp (government subsidies), while in the second year this number was three (37.5%) and in the third and fourth years, two firms (25%) each received this type of investment. Finally, regarding healthtechs, only in the fourth year two firms received subsidies (33.3% of healthtechs).

Table 4

Sources of investments

Type of Source	Founding		Year 2		Year 3		Year 4	
	Frequency[1]	%	Frequency[1]	%	Frequency[1]	%	Frequency[1]	%
n	39		25		17		14	
Capital of the Founders								
up to R$ 50,000	27	69.2	16	64.0	6	35.3	4	28.6
R$ 50,000.01 to R$ 100,000	2	5.1						
R$ 100,000.01 to R$ 150,000	2	5.1	1	4.0				
more than R$ 150,000	3	7.7	2	8.0	3	17.6	1	7.1
Total	34	87.2	19	76.0	9	52.9	5	35.7
Angel Investor								
up to R$ 50,000								
R$ 50,000.01 to R$ 100,000					1	5.9		
R$ 100,000.01 to R$ 150,000								
more than R$ 150,000	2	5.1	3	12.0	2	11.8	1	7.1
Total	2	5.1	3	12.0	3	17.6	1	7.1
Internal Investment								
up to R$ 50,000	1	2.6	1	4.0	2	11.8	3	21.4
R$ 50,000.01 to R$ 100,000	1	2.6						
R$ 100,000.01 to R$ 150,000					1	5.9	1	7.1
more than R$ 150,000								
Total	2	5.1	1	4.0	3	17.6	4	28.6
Government Subsidies								
up to R$ 50,000	1	2.6						
R$ 50,000.01 to R$ 100,000								
R$ 100,000.01 to R$ 150,000					1	5.9		
more than R$ 150,000	1	2.6	3	12.0	1	5.9	4	28.6
Total	2	5.1	3	12.0	2	11.8	4	28.6
Accelerator								
up to R$ 50,000	1	2.6						
R$ 50,000.01 to R$ 100,000								
R$ 100,000.01 to R$ 150,000								
more than R$ 150,000					1	5.9		
Total	1	2.6			1	5.9		
Family/Friends								
up to R$ 50,000	1	2.6	1	4.0				
R$ 50,000.01 to R$ 100,000								
R$ 100,000.01 to R$ 150,000								
more than R$ 150,000								
Total	1	2.6	1	4.0				

Notes: [1] number of startups that received investments, with a maximum of *n* = 40 within each source category. Frequencies equal zero (0) were omitted. Elaborated by the authors.

Analysis of the results based on the tradeoff and pecking order theories

None of the startups in our sample obtained bank financing in their first four years of existence, contrary to the evidence in Vanacker and Manigart (2010), Coleman and Robb (2012), and Robb and Robinson (2014), who found bank debt to be an important source of financial resources for startups. This result is probably a reflection of insufficient cash flows to make debt payments. This situation corroborates the findings of Vanacker and Manigart (2010) and Goudriaan (2016), that startups face difficulty in obtaining bank loans due to the low cash flow and lack of tangible assets to guarantee such loans.

Another aspect that can also explain the lack of bank financing is the relative unimportance of tax benefits from debt financing of small companies. As noted by Fourati and Affes (2013), young companies tend to have smaller tax benefits from use of debt than older (and larger) ones. In Brazil this is because small firms in terms of net revenue are eligible for simplified tax regimes where interest is not deducted from earnings for tax purposes (but tax rates are lower than for large firms). It is likely that none of the startups in our sample were able to obtain tax benefits from use of debt.

Table 5

Biotechs and Healthtechs

	Biotechs, n = 8		Healthtechs, n = 6	
	Number	%	Number	%
Founding				
Capital of the Founders	5	62.5	6	100.0
Government Subsidies	2	25.0		
Internal Investment	1	12.5		
Angel Investor			1	16.7
Year 2				
Capital of the Founders	4	50.0	3	50.0
Government Subsidies	3	37.5		
Angel Investor			1	16.7
Year 3				
Capital of the Founders	2	25.0	2	33.3
Government Subsidies	2	25.0		
Angel Investor	1	12.5	1	16.7
Year 4				
Capital of the Founders			1	16.7
Government Subsidies	2	25.0	2	33.3
Angel Investor	1	12.5		

Notes: Frequencies equal zero (0) were omitted. Elaborated by the authors.

In a context of low profits, high risk and no tax benefits of debt, leverage is not justified (Modigliani & Miller, 1963). This result agrees with the tradeoff theory. In other words, the absence of bank debts indicates adherence to the tradeoff theory because the business risk restricts external financing.

In general, startups have more limited access to external financing than large companies, especially in emerging countries where financial constraints are greater (Brito et al., 2007; Weber & Zulehner, 2009). Startups have high risk related to their activities and also face different problems of information asymmetry. Problems arising from this asymmetry, such as adverse selection and moral hazard, severely restrict access to external financing (Huyghebaert, 2003; Colombo & Grilli, 2007).

For this reason, startups tend to seek alternative funding sources, such as money from the founders' relatives and friends, government subsidies and angel investors. In the case of angel investors, they are a source of funding that diminishes the risks of low professionalism of the firm and problems arising from the conflict of economic and personal interests between the company and the owner-manager. The reason is that angel investors typically contribute their professional experience and act as monitors, along with their cash infusions (Rosenbusch et al., 2013; Janaji et al., 2021).

In the pecking order context, the results show that with the passage of time, the startups began financing themselves with resources generated internally, since this source is less sensitive to information disclosure. Although none of the startups obtained bank financing, which is in second place in the order of preference according to the pecking order theory, this result is partially a reflection of the information asymmetry between the agents (company and creditor). Problems of information asymmetry generate additional costs (sorting costs, monitoring costs, among others), which along with the lack of guarantees (cash flow, tangible assets) faced by startups, limit their perceived creditworthiness by banks.

In light of the absence of bank loans, the results show that the companies analyzed sought financing from angel investors and government subsidies. The availability of these resources is a way to minimize market flaws, such as information asymmetry and financial constraints. Angel investors also diminish these two failings, by bringing greater managerial professionalization and supplying resources, respectively. According to Croce et al. (2018), startups financed by angel investors are more likely to succeed.

The capital structure of startups is influenced by the particular environment in which they are inserted (information asymmetry, risks, growth potential, etc.), and our results show that the order of preference for financial capital is different from that commonly investigated in traditional companies (Bastos et al., 2009; Iglesias et al., 2021; Rocha & Camargos, 2023). Our results also were different from the order indicated by Coleman and Robb (2012) and Robb and Robinson (2014), showing market differences between Brazil and the USA.

According to Fourati and Affes (2013), the order of preference in the capital structure tends to be reversed in situations where investors have greater knowledge than the entrepreneur regarding the process of marketing a product and/or service. Moreover, this result can be explained by possible excess confidence of managers. Overconfidence of managers tends to make them prefer equity over debt to finance the firm's investment needs, especially of small businesses (Vivian & Xu, 2017). In the case of the startups in this study, although the resort to angel investors (equity) came before debt, this choice can be explained because the former is less sensitive to information asymmetry and is less costly than the latter.

Therefore, according to the results found, the traditional tradeoff and pecking order theories help to explain the choice of financing by the startups. In relation to the absence of bank financing, the tradeoff theory seems to have better explanatory capacity, while the pecking order theory helps to understand the emergence and expansion of different sources of capital (angel investors, crowdfunding, venture capital), which are more common to this type of business. Nevertheless, the results do not rule out the need for future studies to propose theories that better fit the reality of startups, especially in developing countries.

FINAL CONSIDERATIONS

We analyzed Brazilian startups' capital structure in light of the tradeoff and pecking order theories. For this purpose, we surveyed the founders of a sample of startups in the city of Ribeirão Preto, São Paulo. The questionnaire enabled the collection of information on the profile of the founders and firms, amounts of profits/losses, and sources of funding received in the first four years of existence.

The results showed that in all four periods of the sample, the most common source was the founders' capital. In the first year of existence, the financing option used by the startups that did not obtain significant capital from the founders was highly diversified. In the second year, after the founders' capital, the startups received financing from angel investors and government subsidies, in that order. Half of the startups still obtained funding mainly from the founders in the third year, but a more significant number of firms also relied on reinvestment of resources generated internally. Finally, in the fourth year, startups diversified the sources of financing among founders' capital, internally generated resources and subsidies.

The tradeoff theory helped to explain the results obtained. In general, the theory posits that companies with a high level of intangible assets, high market risk, and low profitability, as was the case of startups in this study, tend not to rely on bank debt to finance investments. Indeed, none of the startups in our sample obtained this type of financing.

The pecking order theory also helped to understand the results. According to this framework, resources generated internally tend to be the first source of companies' resources. In our sample, as of the third year of existence, the firms started using internal resources, i.e., at the moment, the majority of the companies began generating profits. Although none of the companies analyzed had bank debts, the obtainment of money from angel investors and government subsidies can be interpreted as less sensitive to information disclosure, in line with the typical choices of startups.

In light of the relative lack of studies investigating aspects related to the financing of startups, this study can be of value to scholars, investors, creditors, governments, and entrepreneurs. Besides this, the results presented here can help the managers of startups to make choices on financing strategies.

This study had some restrictions. In particular, we only analyzed startups located in the city of Ribeirão Preto due to the convenience of access to information. Therefore, the results only present a perspective of the situation in a single city in the state of São Paulo and may not hold in other regions. Hence, the results cannot be generalized, so future research must analyze more companies and different areas, to verify whether the results presented here pertain to other contexts.

Conflit of interest statement

The authors declare that there is no conflict of interest.

An earlier version was presented at 21º USP International Conference in Accounting, 2021, São Paulo, SP: https://congressousp.fipecafi.org/anais/21UspInternational/ArtigosDownload/3124.pdf

Endnotes:

1 Available at: https://g1.globo.com/globonews/noticia/2020/01/15/numero-de-startups-no-brasil-aumentou-20-vezes-nos-ultimos-oito-anos-11-ja-sao-unicornios.ghtml. Accessed in February 2022

2 Available at: http://conteudo.distrito.me/dataminer-super-founders. Accessed in February 2021.

Authors' statement of individual contributions

Roles	Contributions			
	Colombo G. de C.	Gomes M da C	Eça J. P. A.	Valle M. R. do
Conceptualization	■	■		■
Methodology	■	■		
Software		N. A.		
Validation			■	■
Formal analysis		■	■	
Investigation	■			
Resources		N. A.		
Data Curation		■		
Writing - Original Draf	■			
Writing - Review & Editing		■	■	
Visualization		N. A.		
Supervision				■
Project administration		N. A.		
Funding acquisition		N. A.		

Note: Acc. CRediT (Contributor Roles Taxonomy): https://credit.niso.org/

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