

The Influence of the Organizational Life Cycle on the Violation of Financial Covenants

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Abstract

Purpose – To investigate how the stages of the organizational life cycle influence the probability of violation of financial covenants.

Theoretical framework – Companies in different stages of the organizational life cycle present different incentives when assuming a position regarding profitability, investment, dividend distribution, the evolution of sales, indebtedness, strategic planning, information disclosure, and earnings quality, and these factors are directly related with the inclusion and violation of financial covenants in debt contracts.

Design/methodology/approach – We used 1,328 observations of 197 non-financial Brazilian companies listed on the B3 in the period from 2010 to 2018. The accounting data were collected from the Economatica database and the financial covenant information was obtained from analyzing more than 2,400 company footnotes. To analyze the results, we used logistic regressions with year-controlled data.

Findings – The results highlight that companies in the maturity stage present a lower probability of violating some limit stipulated in the financial covenants in their debt contracts than companies in the other stages, that is, introduction, growth, turbulence, or decline.

Practical & social implications of research – In regulatory terms, the results presented further reinforce the need to revise CPC 26 (R1), making it obligatory to disclose the limits of restrictive clauses in explanatory notes for corporations.

Originality/value – These results extend the literature by presenting evidence that it is not only the turbulence and decline phases that cause operational risks that can culminate in an increased probability of violation of financial covenants, but also the initial introduction and growth phases of companies.

Keywords: Financial covenants, organizational life cycle stages, violation of covenants.

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I Introduction

Covenants are restrictive clauses inserted in loan and bank finance contracts that aim to protect the interests of the financial institutions and other creditors (Oliveira et al., 2020; Watts & Zimmerman, 1990). The insertion of such restrictive clauses is associated with the need to monitor and control indicators that provide relevant information about the companies during the negotiation process and lifetime of the financing contracts (Demerjian, 2017; Prilmeier, 2017). Within this context, specific covenants based on financial indicators come to act as a disciplinary mechanism controlling conflicts of interest between managers and creditors in that they limit the managers' discretionary actions (Oliveira & Monte-Mor, 2020) and minimize the probability of default and credit recovery risk (Prilmeier, 2017).

The violation of financial covenants occurs in many cases due to operational problems faced by companies (Beneish & Press, 1993), governance problems (Nini et al., 2009), or even due to growth strategies that place solvency and loan repayment capacity at risk (Christensen & Nikolaev, 2012; Prilmeier, 2017). The literature shows that these problems are also related to the organizational life cycles of companies (introduction, growth, maturity, turbulence, and decline) in that each stage subjects companies to different challenges and market needs, whether linked to structural investments, verticalization processes, company acquisitions, expansion of the market and areas of operation, and diversification and consolidation of company strategies, among other points inherent to each one of the phases of organizational life (Costa et al., 2015).

Therefore, besides presenting companies' economic-financial performance information, financial covenants can also limit actions linked to risk strategies and associated with each one of the phases of the organizational life cycle. In this case, the strategic actions and level of risk exposure of each phase of organizational life can provide information that explains not only banks' decisions to grant lines of credit (Anthony & Ramesh, 1992; Dickinson, 2011), but also the probability of the companies violating these covenants during the lifetime of their debt contracts. Seeking to shed light on these relationships, this article investigates how the stages of the organizational life cycle influence the probability of violation of financial covenants. More specifically, it investigates whether the

probability of violation of financial covenants is related with the stages of the organizational life cycle.

This study jointly addresses two relevant topics in the international literature that directly interfere in the fundraising and continuity of firms (De Angelo et al., 2006; Dickinson, 2011; Kim et al., 2010). For example, firms in the maturity stage tend to restructure their assets, and companies in the growth stage tend to reduce their workforce when they face financial difficulties (Koh et al., 2015). These same characteristics were found in companies that violated the limits of their financial covenants (Falato & Liang, 2016). In general, it is verified that by presenting distinct financial characteristics, needs, and strategies in each stage of the organizational life cycle companies may have affected their performance (Feltham & Ohlson, 1995), which can compromise their capacity to comply with the limits imposed by their financial covenants.

This study further extends national research such as that of Frezatti et al. (2010) and Costa et al. (2015), who highlight that Brazilian companies also present distinct financial characteristics in the different life cycle stages, as highlighted in international studies (Anthony & Ramesh, 1992; De Angelo et al., 2006; Dickinson, 2011; Fama & French, 1996; Miller & Friesen, 1984). Complementarily, this study analyzes the relationship between the life phases and the management of indicators present in debt contracts by investigating the relationship between the organizational life cycle and the probability of violation of financial covenants.

In order carry out the study, we considered 1,328 observations of 197 publicly-traded non-financial Brazilian companies listed on the B3, covering the period from 2010 to 2018. Accounting data and financial indicators were obtained from the Economatica database. Financial covenant information was obtained by analyzing the companies' explanatory notes, according to guidance featured Comitê de Pronunciamentos Contábeis (2011) - CPC 26 (R1), in which companies should disclose additional information about their financial and patrimonial position so that users understand the impact of transactions and debt contracts (Oliveira et al., 2020).

So that it was possible to identify whether the probability of violation of financial covenants is related with the stages of the organizational life cycle, logistic regression analysis was carried out in an unbalanced panel with year fixed effects. In general, the results highlight that the companies fitting the maturity stage presented a greater probability of violation of financial covenants

compared with those fitting the introduction, growth, turbulence, and decline stages.

These results extend the literature by presenting evidence that it is not only the turbulence and decline phases that bring operational risks that can culminate in an increased probability of violation of financial covenants, but also the initial introduction and growth phases of companies. As the violation of covenants can compromise companies' operational continuity through triggering the accelerated receipt of debt (Borges, 1999; Prilmeier, 2017), the possibility of demands for new guarantees (Press & Weintrop, 1991), or even an increase in loan rates and remodeling of debt contracts (Kim et al., 2010), this prompts the monitoring of these contracts primarily in companies in the initial introduction and growth phases, given that in these phases strategy errors can be crucial and compromise the companies' operational continuity. In regulatory terms, the results presented further reinforce the need to revise Comitê de Pronunciamentos Contábeis (2011) - CPC 26 (R1), making it obligatory to disclose the limits of restrictive clauses in the explanatory notes for corporations.

2 Literature review

2.1 Financial covenants

A financial covenant is a restrictive financial clause included in a bank loan contract aiming to control the conflicts of interest between lenders and borrowers, with its insertion being associated with the need for relevant information about the borrower during the fundraising process (Christensen & Nikolaev, 2012; Demerjian, 2017; Prilmeier, 2017).

Financial covenants are generally classified as capital covenants, when they are used to minimize agency problems by limiting dividend payments, new fundraising, and the carrying out of investments; or they are classified as performance covenants, when they are established based on efficiency indicators and are related to cash generating potential, to bank debt, to net equity, to coverage, and to payment capacity (Beneish & Press, 1993; Christensen & Nikolaev, 2012; Nini et al., 2009; Prilmeier, 2017; Smith & Warner, 1979).

Studies have highlighted that companies that recognize more losses and show high levels of leverage are subject to having more financial covenants in their debt contracts (Bradley & Roberts, 2015; Nikolaev, 2010). On the other hand, companies that present relevant

weaknesses in their internal controls are subject to a lower quantity of covenants based on financial indicators and have greater monitoring through credit protection mechanisms (Costello & Wittenberg-Moerman, 2011). Within the accounting perspective, companies with a high level of accounting conservatism tend to have less restrictive contractual clauses and lower loan interest rates compared to companies with a lower level of conservatism, which minimizes the probability of violation of financial covenants (Callen et al., 2016; Zhang, 2008).

When companies are close to violating the limits of covenants, these companies present indications of earnings management to mitigate the probability of violation. These discretionary actions occur to impede the early maturity of the debt and a surcharge on the interest rate in a possible debt renegotiation (Beneish & Press, 1993; Fan et al., 2019; Franz et al., 2014; Iatridis & Kadorinis, 2009; Pinto et al., 2015; Press & Weintrop, 1991; Prilmeier, 2017; Reisel, 2014; Rezende Duarte et al., 2020; Silva, 2008).

Altogether, these points indicate that the presence of financial covenants is directly associated with the firm's future performance expectations, thus being linked to the phases of companies' organizational cycle. Ghosh and Moon (2010), for example, highlighted a positive association between levels of indebtedness and earnings quality, identifying that companies with high levels of bank debt tend to present a greater probability of violating the limits of their debt financial covenants. And it is precisely the companies that fit the growth, turbulence, or decline stages that have higher leverage levels on average (Costa et al., 2015).

Besides managerial and operational incentives, studies such as those of Lin, Song, and Tian (2016) highlight that the good reputation of a CEO influences fundraising with low interest rates and the inclusion of less restrictive financial covenants. This is because the risk exposure comes to be mitigated by the quality of the corporate governance. This point is also directly associated with the literature on organizational life stages, which highlights that companies in the maturity stage adopt better corporate governance practices (Habib et al., 2018; Hasan & Habib, 2017; O'Connor & Byrne, 2015).

Based on the synergy between these results, it is expected that companies in the maturity stage tend to minimize the probability of violation of their financial covenants, whether through the quality of corporate governance or the greater predictability of future performance. The next section discusses more specific points about this relationship.

2.2 Stages of the organizational life cycle and the violation of financial covenants

International studies including those of Miller and Friesen (1984), Anthony and Ramesh (1992), Fama and French (1996), De Angelo et al. (2006), and Dickinson (2011) have highlighted the relationship between the stages of the organizational life cycle and a series of operational and strategic factors such as dividend distribution policy, profitability, the evolution of sales, capital structure, etc. Among those studies, the research of Dickinson (2011) stands out, which used a proxy based on the accounting variables taken from the cash flow statement (CFS) to measure the stages of the organizational life cycle. Possible combinations were identified through the signs of the operational flows, investment, and financing to classify the companies into stages: introduction and growth (companies' initial stages); the maturity stage; and the turbulence and decline stages (considered the final stages of the life cycle).

In these different stages, companies' strategies are distinct. In the maturity stage, companies present strategic planning focused on increased profitability through sales growth and cost reductions (Alves & Marques, 2007; Black, 1998; Jenkins et al., 2004). Companies in the introductory stages of birth and growth, in turn, focus on increasing sales without necessarily prioritizing profitability, which directly influences financial planning and debt contract management (Alves & Marques, 2007; Black, 1998; Canton et al., 2019; Frezatti et al., 2010; Jenkins et al., 2004).

Corroborating with this evidence, other studies show that in the maturity phase companies seek to maximize profitability through cost optimization (Anthony & Ramesh, 1992; Miller & Friesen, 1984), they are more conservative by reporting higher profits in order to pay lower dividends, and they are less risk-exposed (Grullon & Michaely, 2002; Owen & Yawson, 2010). These factors can minimize the probability of violation of financial covenants (Bradley & Roberts, 2015; Nikolaev, 2010). Companies in the turbulence and decline stages, in turn, present a higher level of indebtedness, low profitability, and fewer growth opportunities compared with companies in the maturity stage (Costa et al., 2015), which can mean greater probabilities of violation of financial covenants (Costello & Wittenberg-Moerman, 2011).

Other results also show that firms in the maturity stage tend to restructure their assets, while companies in the growth, turbulence, and decline stages tend to reduce their workforces when they face financial difficulties

(Koh et al., 2015). These characteristics were also found in companies that violated the limits of their financial covenants (Falato & Liang, 2016).

It is also verified that, besides profitability strategies, companies in the different stages of the organizational life cycle present distinct managerial planning and control (Auzair, 2010; Silvola, 2008). Companies in the maturity stage disclose more optimistic, less complex, and clearer information; on the other hand, these characteristics are reverted when the firms evolve to the decline stage, and there can also be more complexity for companies that are in initial stages (Bakarich et al., 2019).

Finally, Hasan et al. (2015) highlighted that companies in the different stages of the life cycle present fluctuations in their cost of capital. Specifically, companies in the introduction and decline stages present a higher cost of capital over net equity, with companies in the growth and maturity stages, on the other hand, having a lower cost of capital. As the cost of debt is directly related with the inclusion of financial covenants in debt contracts (Konraht & Soares, 2020), it is also verified through the cost of capital that there is a relationship between the phase of the organizational life cycle and the inclusion of financial covenants in debt contracts.

It is therefore perceived that companies in different stages of the organizational life cycle present different incentives when assuming a position regarding profitability, investment, dividend distribution, the evolution of sales, indebtedness, strategic planning, information disclosure, and earnings quality (Alves & Marques, 2007; Anthony & Ramesh, 1992; Bakarich et al., 2019; Black, 1998; Canton et al., 2019; Costa et al., 2015; De Angelo et al., 2006; Dickinson, 2011; Fama & French, 1996; Frezatti et al., 2010; Grullon & Michaely, 2002; Jenkins et al., 2004; Miller & Friesen, 1984; Owen & Yawson, 2010; Silvola, 2008), and that these factors are directly related with the inclusion of financial covenants in debt contracts (Beneish & Press, 1993; Callen et al., 2016; Christensen & Nikolaev, 2012; Costello & Wittenberg-Moerman, 2011; Demiroglu & James, 2010; Fan et al., 2019; Nini et al., 2009; Prilmeier, 2017; Smith & Warner, 1979).

Altogether, this evidence indicates that companies in the maturity stage tend to minimize the probability of violation of financial covenants, whether through the quality of corporate governance, greater predictability of future performance, or the reduction of operational risks, and that companies in the initial (introduction or growth) or decline phases present contexts that can increase the probability of violation of these clauses compared with companies in

the maturity phase. Based on the synergy between these results, it is expected that companies in the maturity stage tend to minimize the probability of violation of financial covenants, whether compared with companies in the initial phases (introduction or growth) or with companies in the final phases (turbulence or decline). This evidence provides a complementary basis for the following hypotheses:

H_{1a} : Companies in the initial stages (introduction or growth) present a greater probability of violating the financial covenants in their debt contracts compared to companies in the maturity stage.

H_{1b} : Companies in the maturity stage present a greater probability of violating the financial covenants in their debt contracts compared to companies in the final stages (turbulence or decline).

3 Methodological procedures

3.1 Model of the stages of the organizational life cycle

To measure the stages of the organizational life cycle, we used the model developed by Dickinson (2011), which considers the sign of the operational flows, investment, and financing from the cash flow statement (CFS) to identify the stages, according to Table 1. Based on the

discussion presented, it is verified that these movements are important for the inclusion and management of the financial covenants in debt contracts.

It is important to mention that this model has been used in various studies for measuring the stages of the organizational life cycle, with the stages derived from this classification being related with a series of financial and economic indicators of publicly-traded Brazilian companies (Canton et al., 2019; Costa et al., 2015; Novaes & Almeida, 2020; Ribeiro et al., 2018).

3.2 Data collection

The study involves empirical research, in which we used 1,328 observations of 197 publicly-traded non-financial Brazilian companies listed on the B3, covering the period from 2010 to 2018, in an unbalanced panel. The accounting data were collected from the Economatica database. Financial covenant information was obtained by analyzing the companies' explanatory notes, according to guidelines featuring in CPC 26 (R1), in which companies should disclose additional information about their financial and patrimonial position so that users understand the impact of transactions and debt contracts (Oliveira et al., 2020). The process used for obtaining the sample is described in Table 2 below.

Table 1
Possible associations for classification of the stages of the organizational life cycle

Cash flow	Initial stages		Maturity	Final stages				
	Birth	Growth		Turbulence		Decline		
Operational	-	+	+	+	-	+	-	-
Investment	-	-	-	+	-	+	+	+
Financing	+	+	-	+	-	-	+	-

Source: (Dickinson, 2011).

Table 2
Sample selection process covering the period from 2010 to 2018

Actions carried out	N. obs. removed	N. obs.
Total observations collected from Economatica.	----	2,989
Observations removed in which the audited FSs were not located.	533	2,456
Companies/observations removed which did not voluntarily disclose whether they had financial covenants or not.	711	1,745
Observations removed that did not have bank debts.	19	1,726
Observations removed that lacked data to classify the stages of the organizational life cycle.	94	1,632
Observations removed that were incomplete for measuring the control variables.	43	1,589
Observations removed that did not have financial covenants.	261	1,328
Total observations considered in the study		1,328

Source: Elaborated by the authors.



It is important to highlight that it was necessary to develop our own database referring to the covenants based on an analysis of the explanatory notes collected from the B3 website and the companies' websites (on the investor relations page). For this, we used the keywords "covenants," "clauses," "restrictive," and "indices" to identify the explanatory notes related to loans and financing. In total, more than 2,400 explanatory notes were individually analyzed to identify whether the companies communicated whether they had covenants, if they had financial or non-financial covenants, and if they had violated some limit in the respective year/observation.

We removed from the sample the companies that did not disclose in the respective year whether they had financial covenants or not, taking into consideration that Brazilian corporations are not obliged to provide this information in their explanatory notes, but are obliged to disclose the event when they violate some financial covenant, as described in paragraph 74 of Technical Pronouncement CPC 26 (R1) – Presentation of Financial Statements.

Taking into consideration the non-existence of a violation for the companies that do not have covenants, we discarded from the sample the companies that did not have financial covenants in the respective year/observation, which culminated in the discarding of 261 observations.

The same procedure was adopted for the firms that did not have bank debt or debentures, since there is no probability of a company having financial covenants without there being the presence of bank debt. The final sample retained a total of 1,328 observations, which were used to test hypotheses H_{1a} and H_{1b} .

Table 3 presents the quantity of observations per year and stage of the sample used in the research, with Figure 1 presenting the organizational chart of the quantity of observations used in each hypothesis.

3.3 Empirical designs

So that it was possible to verify whether companies that are in the maturity stage present a lower probability of violating financial covenants in debt contracts compared to those in the initial and final stages, according to hypotheses H_{1a} and H_{1b} , we used logistic regressions with year fixed effects.

We chose the logit model due to the nature of the dependent variable (*Violation of covenants_{it}*), which takes the value of 1 if company *i* violated some financial covenant in fiscal year *t*, and 0 if there was no violation. Since the dependent variable is dichotomous in nature (1 or 0), the logit model is indicated as it enables us to capture the effects of the maturity phase on the probability of violation of financial covenants based on an analysis of the marginal effects.

Table 3
Quantity of observations classified in each stage and by year

Stages	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Introduction	18	17	18	12	13	14	12	11	21	136
Growth	34	48	53	53	50	41	37	46	42	404
Maturity	55	45	63	63	75	76	84	87	81	629
Turbulence	1	7	5	14	12	19	18	19	17	112
Decline	6	3	1	5	5	6	8	4	9	47
Total	114	120	140	147	155	156	159	167	170	1,328

Source: Elaborated by the authors.

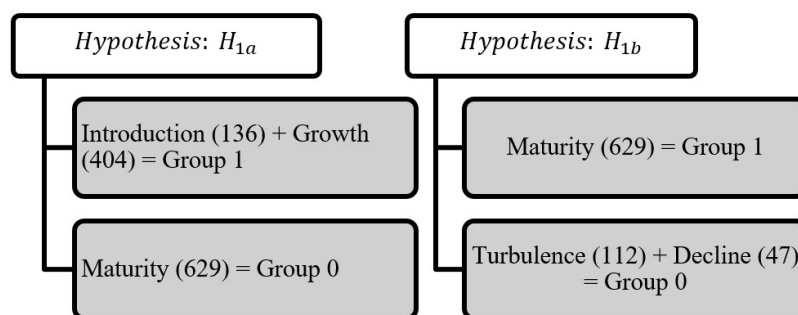


Figure 1. Organizational chart of the hypotheses

Source: Elaborated by the authors

Besides guaranteeing that the estimated probabilities remain within the logical limits from 0 to 1, the interpretation of the marginal effects of the logit is more parsimonious when compared to the probability ratios provides by other probability models (Gujarati & Porter, 2011, p. 542). In addition, the inclusion of year fixed effects enables them to be controlled for exogenous macroeconomic shocks that may have impacted the companies' operational performance and, therefore, the probability of violation of restrictive financial clauses, beyond the organization's managerial decisions.

So that it was possible to verify whether companies that are in the initial stages (introduction or growth) present a greater probability of violating the financial covenants in their debt contracts compared to those in the maturity stage (hypothesis H_{1a}), we used the model according to Equation 1. The coefficient β_1 relates the dummy *Introduction or Growth vs Maturity* with the probability of violation of financial covenants. It is expected, according to hypothesis H_{1a} , that the coefficient β_1 presents a positive sign.

$$Probability(Violation\ of\ covenants_{it} = 1 / X) = \frac{1}{1 + e^{-z}} \quad (1)$$

with

$$Z = \beta_0 + \beta_1\ Introduction\ or\ Growth\ vs\ Maturity + \beta_2\ Size + \beta_3\ Leverage + \beta_4\ Earnings\ Management + \beta_5\ Variation\ in\ Revenues + \beta_6\ Current\ Liquidity + \beta_7\ Year\ Fixed\ Effect + \epsilon_{it}$$

where:

Violation of covenants_{it} is a dummy variable taking the value of 1 if company i violated a financial covenant in year t, and the value of 0 if company i did not violate any financial covenant in year t.

Introduction or Growth vs Maturity_{it} is a dummy variable taking the value of 1 for companies i fitting the initial stages of introduction or growth in year t, and 0 for companies i fitting the maturity stage in year t.

To test the hypothesis that companies that are in the maturity stage present a lower probability of violating the financial covenants in their debt contracts compared to those in the final stages (turbulence or decline), according to hypothesis H_{1b} , Equation 2 was used. The coefficient β_1 relates the dummy *Maturity vs Turbulence or Decline_{it}* with the probability of violation of financial covenants. It is expected, according to hypothesis H_{1b} , that the coefficient β_1 presents a negative sign.

$$Probability(Violation\ of\ covenants_{it} = 1 / X) = \frac{1}{1 + e^{-z}} \quad (2)$$

with

$$Z = \beta_0 + \beta_1\ Maturity\ vs\ Turbulence\ or\ Decline + \beta_2\ Size + \beta_3\ Leverage + \beta_4\ Earnings\ Management + \beta_5\ Variation\ in\ Revenues + \beta_6\ Current\ Liquidity + \beta_7\ Year\ Fixed\ Effect + \epsilon_{it}$$

The dependent variable *Violation of the covenants_{it}* follows according to the previous definition, with the dummy *Maturity vs Turbulence or Decline_{it}* being defined as below:

Maturity vs Turbulence or Decline_{it} is a dummy variable taking the value of 1 for companies i fitting the maturity stage in year t, and the value of 0 for companies i fitting the final stages of turbulence or decline in year t.

So that it was possible to analyze the quality of the econometric models used in the study, the Hosmer-Lemeshow test was conducted to verify the fit of the logistic models. We observed the quantity of correctly classified observations using the classification table and analyzed the area under the ROC curve. These tests are recommended in order to be able to analyze the quality of the logit model fit (Gujarati & Porter, 2011).

So that it was possible to control for heterogeneities existing between the companies participating in the sample, the econometric designs also considered size, leverage, level of earnings management, variation in revenue, and current liquidity as control variables, according to the descriptive variables in the subsection below.

3.4 Control variables used in the models

The size variable is measured using the natural logarithm of the companies' total assets in BRL, in which it is expected that the biggest companies have a greater probability of having less restrictive debenture clauses, thus reducing the probability of violation of their financial covenants (Bakar et al., 2012; Dahrawy et al., 2015; Freudenberg et al., 2011; Palhares et al., 2019).

The leverage variable is calculated by dividing total liabilities by total assets. It is expected that the companies with higher levels of leverage have more restrictive financial covenants, intensifying the probability of violation of their financial covenants (Bakar et al., 2012; Dahrawy et al., 2015; Freudenberg et al., 2011; Palhares et al., 2019).

The level of earnings management is measured by the model developed by Dechow et al. (1995), aiming to measure the level of discretionary accruals. Studies have highlighted that when they are close to violating the limits established in their financial covenants, companies present a greater level of earnings management to avoid the

violation event (Franz et al., 2014; Iatridis & Kadorinis, 2009; Rezende Duarte et al., 2020; Silva, 2008).

The variation in revenues is represented by the variation in revenues net of sales, in which it is expected that the companies in the growth phase present more restrictive financial covenants (Bakar et al., 2012; Freudenberg et al., 2011), raising the probability of violation of the limits of their financial covenants (Reisel, 2014).

Finally, the current liquidity variable is measured by dividing current assets by current liabilities, in which it is expected that the companies with the greatest short-term payment capacity present a lower probability of

default and consequently a lower probability of violating the limits of their financial covenants (Inamura, 2009). All variables are summarized in Table 4.

4 Presentation and analysis of the results

4.1 Descriptive statistics

The research aims to investigate whether the probability of violation of financial covenants is related with the stages of the organizational life cycle. Table 5 presents

Table 4
Variables used in the models

Variable	Sign	Description of the Variables	Source	Literature
Dependent				
Violation of covenants		Violation dummy, with 1 if it violated some financial covenant limit and 0 if it did not.	Explanatory notes	
Explanation				
Introduction or growth <i>vs</i> maturity	(+)	Classification dummy, with 1 for companies fitting the introduction or growth stages and 0 for companies in the maturity stage.	Economática	Dickinson (2011)
Maturity <i>vs</i> turbulence or decline	(-)	Classification dummy, with 1 for companies fitting the maturity stage and 0 for companies in the turbulence or decline stages.	Economática	Dickinson (2011)
Control				
Size	(-)	Natural logarithm of total assets	Economática	Freudenberg et al. (2011); Bakar et al. (2012); Dahrawy et al. (2015); Palhares et al. (2019)
Leverage	(+)	Division of total liabilities by total assets	Economática	Freudenberg et al. (2011); Bakar et al. (2012); Dahrawy et al. (2015); Palhares et al. (2019)
Earnings management	(-)	Level of discretionary accruals	Economática	Dechow et al. (1995)
Variation in revenues	(+)	Variation in revenue net of sales	Economática	Freudenberg et al. (2011); Bakar et al. (2012); Reisel (2014).
Current liquidity	(-)	Division of current assets by current liabilities	Economática	Inamura (2009)

Source: Elaborated by the authors.

Table 5
Descriptive statistics of the dependent and control variables

Variables	N	Mean	St. Dev.	Q1	Median	Q3
<i>Violation of covenants_{it}</i>	1,328	0.1642	-	-	-	-
Size	1,328	15.3471	1.3590	14.3450	15.2782	16.3111
Leverage	1,328	0.6651	0.1941	0.5443	0.6638	0.7607
Earnings management	1,328	-0.0038	0.1374	-0.0696	-0.0036	0.0493
Variation in revenues	1,328	-0.0656	0.1387	-0.1142	-0.0437	0.0053
Current liquidity	1,328	1.4271	0.8742	0.8680	1.2527	1.8790

Source: Elaborated by the authors.

the descriptive statistics of the dependent and control variables used in the research. The descriptions of the variables used are in line with the other studies that have used publicly-traded Brazilian companies as a sample in the same study period.

From the descriptive statistics it is possible to verify that although the Brazilian companies in the sample present short-term payment capacity (R\$ 1.41, on average, in goods and rights for every R\$1.00 in obligations), approximately 16% of the firms/year considered violated some financial covenant. In this case, it may be that the violation of the restrictive clauses is linked to the companies being situated in specific stages of the organizational life cycle.

It is also verified that although the Brazilian companies in the sample present short-term payment capacity, on average they have 67% total assets with short- and long-term obligations, which shows a considerable degree of leverage. This result, aligned with the mean reduction in revenues of 7% a year and the considerable percentage of companies that violated financial covenants, raise a warning regarding the degree of leverage of the Brazilian companies and the probability of violation of covenants. This initial evidence is further analyzed based on the results of the next section, which models the relationship between the companies' life phases and the probability of violation of financial covenants.

4.2 Analysis of the logistic regressions

Table 6 presents the results of the logistic regressions for hypotheses H_{1a} and H_{1b} , measured by Equations 1 and 2, in which the models presented good quality for the estimation of the probability of violation of financial covenants, as there is no rejection of the null hypothesis of quality of fit from the Hosmer-Lemeshow test, with $\text{prob} > \chi^2 = 0.6338$ for Equation 1 and $\text{prob} > \chi^2 = 0.2144$ for Equation 2. The area under the ROC curve was 0.70 for hypothesis H_{1a} and 0.75 for hypothesis H_{1b} , and approximately 85% and 86% of the observations were correctly classified for hypotheses H_{1a} and H_{1b} , respectively.

The results demonstrate, through the positive sign of the coefficient β_1 of the explanatory variable introduction or growth *vs* maturity, that the companies fitting the introduction or growth stages presented a higher probability of violating some financial covenant of debt contracts compared with those in the maturity stage, rejecting hypothesis H_{1a} with a 5% significance level.

Similarly, the results demonstrate, through the 10% significance of the coefficient β_1 and negative sign of the explanatory variable maturity *vs* turbulence and decline, that the companies fitting the maturity stage also presented a lower probability of violating some financial covenant in debt contracts compared with those fitting the turbulence or decline stages, thus not rejecting hypothesis H_{2a} .

Table 6
Results of the logistic regressions for hypotheses H_{1a} and H_{1b}

Variables	Dependent = Violation of covenants _{it}			
	Hypothesis: H_{1a}		Hypothesis: H_{1b}	
	Coef.	P-value	Coef.	P-value
Introduction or growth <i>vs</i> maturity	0.3483	0.046		
Maturity <i>vs</i> turbulence or decline	-	-	-0.4870	0.065
Size	-0.0753	0.248	0.0401	0.629
Leverage	2.1445	0.000	3.6376	0.000
Earnings management	-0.1422	0.830	-1.0995	0.293
Variation in revenues	2.8802	0.000	1.8926	0.055
Current liquidity	-0.3267	0.011	-0.2499	0.165
Constant	-1.6158	0.150	-4.1197	0.004
Year fixed effect		Yes		Yes
Observations		1,161		788
Pseudo R ²		0.085		0.150
ROC curve		0.70		0.75
Classification table		84.7%		85.8%
White (Hosmer-Lemeshow) test		Prob > $\chi^2 = 0.6338$		Prob > $\chi^2 = 0.2144$

Source: Elaborated by the authors.



These results show that the firms in the initial and final stages of the organizational life cycle presented a higher probability of violation of their financial covenants and are more exposed to penalties generated by the violation event, including the early maturity of their debt and the incurrance of extra financial expenses (a waiver), which impact the financial planning of firms.

The evidence found is in line with the findings of Miller and Friesen (1984), Anthony and Ramesh (1992), Black (1998), Jenkins et al. (2004), and Owen and Yawson (2010), by highlighting that the companies in the maturity stage seek to maximize profitability, cost optimization, and present high levels of accounting conservatism, and that the companies with high levels of accounting conservatism present a lower probability of violating the limits stipulated in their financial covenants (Zhang, 2008).

On the other hand, the firms in the growth stage are less conservative and focus on the evolution of sales without maximizing their profits (Alves & Marques, 2007). Similarly, when the companies are in the decline stage they tend to present negative profitability. These factors raise the probability of violation of financial covenants (Canton et al., 2019). The financial covenants are inserted into debt contracts with the aim of minimizing agency problems through the monitoring of dividend payments, cash generation, and payment capacity, among other limitations (Beneish & Press, 1993; Christensen & Nikolaev, 2012; Nini et al., 2009; Prilmeier, 2017; Smith & Warner, 1979).

From analyzing the results of the control variables, we highlight that the high degree of leverage and the increased revenues net of sales leave the companies vulnerable to violating some limit established in their financial covenants. In turn, a good capacity to pay short term obligations reduces the probability of violating their financial covenants. These findings are consistent with the expected results, which were based on the evidence presented in the studies of Inamura (2009), Freudenberg et al. (2011), Bakar et al. (2012), Reisel (2014), Dahrawy et al. (2015), and Palhares et al. (2019).

From verifying the chances of the event occurring by analyzing the odds ratios presented in Table 7, the chances of the companies that are in the introduction or growth stages violating some financial covenant in debt contracts are 42% higher than for those in the maturity stage. In turn, the chances of the companies that are in the maturity stage violating some financial covenant in debt contracts are 39% lower compared with those fitting the turbulence or decline stages.

These results extend the literature by presenting evidence that it is not only the turbulence and decline phases that involve operational risks that can culminate in an increased probability of violation of financial covenants, but also the initial phases of introduction and growth. As the violation of covenants can compromise the operational continuity of companies through triggering the accelerated receipt of debt (Borges, 1999; Prilmeier, 2017), the probability of demands for new guarantees (Press & Weintrop, 1991), or even increased loan rates and debt contract remodeling (Kim et al., 2010), a warning is raised for monitoring these clauses primarily in companies in the initial introduction and growth phases, given that in these phases strategy errors can be crucial and compromise the companies' operational continuity. In regulatory terms, the results presented further reinforce the need to revise CPC 26, making it obligatory to disclose the limits of restrictive clauses in the explanatory notes for corporations.

The findings are in line with the studies of Alves and Marques (2007) and Costa et al. (2015), identifying low profitability in Brazilian companies that are in the introduction and growth stages, and when companies are in the turbulence or decline stages they present a greater level of indebtedness, low profitability, and few growth opportunities compared to the maturity stage.

These factors directly affect the probability of violation of the financial covenants that are included by creditors in debt contracts, with the aim of requiring relevant information about the borrowers in order to reduce the level of information asymmetry caused by the uncertainty involved in credit recovery (Demerjian, 2017; Demiroglu & James, 2010; Prilmeier, 2017).

Table 7
Odds ratio results for the occurrence of the event

Variables	Violation of covenants	
	<i>H_{1a}</i>	<i>H_{1b}</i>
Introduction or growth <i>vs</i> maturity	1.4167**	-
Maturity <i>vs</i> turbulence or decline	-	0.6144*
Size	0.9275	1.0409
Leverage	8.5381***	37.9995***
Earnings management	0.8675	0.3331
Variation in revenues	17.8188***	6.6366*
Current liquidity	0.7213**	0.7789

Significance levels: *p<0.10; **p<0.05; and ***p<0.01.

Source: Elaborated by the authors.

5 Concluding remarks

Companies in different stages of the organizational life cycle present different incentives when assuming a position regarding profitability, investments, dividend distribution, the evolution of sales, indebtedness, strategic planning, information disclosure, and earnings quality. These factors are directly related with the inclusion of financial covenants in their debt contracts. Based on the synergy between these results, it was verified in this study whether companies in the maturity stage have a lower probability of violating their financial covenants.

In general, the results highlight that the companies in the maturity stage present a lower probability of violating some limit stipulated in the financial covenants in debt contracts than the companies in the other stages, that is, introduction, growth, turbulence, or decline.

These results imply an ex-post analysis in relation to the formalization of the contracts. Complementarily to the evidence from the literature that, because they are more risk-exposed, companies with high leverage are more subject to more restricted financial covenants and have a greater probability of violating their covenants, it is verified that the strategies and different incentives linked to the phases of the organizational life cycle of companies also explain the probability of violation of these clauses as companies in the initial or final stages also present a greater probability of violation compared to those in the maturity phase. This result suggests that in those stages there may be hidden risks that are being assumed by the creditors during the process of negotiating the debt contracts.

In regulatory terms, the results presented further reinforce the need to revise Comitê de Pronunciamentos Contábeis (2011) - CPC 26 (R1), making it obligatory to disclose the limits of the restrictive clauses in the explanatory notes for corporations, primarily for companies in initial phases that need to be leveraged due to their growth strategies and need to make investments. This revision could help in reducing the level of information asymmetry caused by the uncertainty involved in credit recovery, primarily in contexts of high interest rates and with credit restrictions, as is the case of Brazil and other emerging countries.

This study jointly addresses two relevant topics in the international and national literature that directly interfere in fundraising and in the operational continuity of firms. In general, by presenting distinct financial

characteristics, needs, and strategies in each stage of the organizational life cycle, companies may have affected their performance, which can compromise their capacity to comply with limits imposed by financial covenants, in both the initial and final stages of the organizational life cycle.

As a limiting factor of the research imposed by Comitê de Pronunciamentos Contábeis (2011) - CPC 26 (R1) itself, we did not consider companies that, although they had bank debt or debentures, did not voluntarily disclose whether they had financial covenants or not in their respective debt contracts. The results of this research open up space not only for a technical discussion of revising Comitê de Pronunciamentos Contábeis - CPC 26 (R1) (2011), but also signal a need for a more in-depth academic investigation of the relationship between the financing incentives of companies in initial phases of the organizational life cycle (and their respective control and monitoring mechanisms) and the conditions and limitations of financing contracts. Therefore, we suggest, for example, that new studies could analyze whether creditors include more or less restrictive financial clauses in their debt contracts depending on the stage of the organizational life cycle in which the companies find themselves, given the evidence that the level of restriction is an important factor that impacts the probability of violation of financial covenants and directly influences the firm's managerial decisions.

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1st author: definition of research problem; development of hypotheses or research questions (empirical studies); theoretical framework/literature review; definition of methodological procedures; data collection; statistical analysis; analysis and interpretation of data; critical revision of the manuscript; manuscript writing.

2nd author: analysis and interpretation of data; critical revision of the manuscript; manuscript writing.