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STAGES OF THE ORGANIZATIONAL LIFE CYCLE AND SYSTEMATIC RISK: EVIDENCE FROM BRAZIL

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ABSTRACT

This study examines how systematic risk varies across the stages of the organizational life cycle of Brazilian publicly traded companies whose shares are listed on B3. Brasil Bolsa Balcão. To classify firms into different stages of the firm life cycle, the Dickinson model from 2011 was employed. Market risk, or systematic risk, represented by beta from the Capital Asset Pricing Model, was assessed using a sample of 276 companies, totaling 5.416 observations, covering the period from the first quarter of 2010 to the fourth quarter of 2022. comprising 52 quarters. Using linear regression models estimated by ordinary least squares, the results indicate that firms in the growth and maturity stages tend to exhibit lower market risk, while those in the introduction, turbulence, and decline stages show higher levels of risk. These findings suggest that the relationship between systematic risk and life cycle stages follows a U shaped pattern. The evidence is relevant as it allows investors and analysts to consider life cycle stages in firm valuation, while also providing managers with insights to assess the risks associated with each stage of the organizational life cycle.

Keywords: Organizational Life Cycle. Market Risk. Beta. CAPM.

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1 INTRODUCTION

Interest in organizational life cycle models has grown since the mid twentieth century. The adaptation of this concept and the use of biological analogies in firm theory emerged from the studies of Penrose (1952), Greiner (1972), and Quinn and Cameron (1983). Since then, the literature has evolved by recognizing that firms do not follow a linear path of development, but instead move through distinct stages shaped by internal and external factors (Habib and Hasan, 2019). The stages of the firm life cycle, introduction, growth, maturity, turbulence, and decline, represent different combinations of resources, capabilities, strategies, and corporate structures (Miller and Friesen, 1984; Dickinson, 2011).

Accordingly, several studies have examined how financial and operational variables behave across life cycle stages. For example, Anthony and Ramesh (1992) and Hasan et al. (2015) show that market value and cost of capital change in each phase of the life cycle, suggesting that investors adjust their return expectations based on the firm stage. Studies such as Almand et al. (2023), Habib et al. (2022), Jaggi et al. (2022), and Lima et al. (2015) address earnings quality, confirming that earnings management practices vary according to the degree of organizational maturity. Other works, including Al Hadi et al. (2016) and Zhao and Xiao (2019), indicate that voluntary disclosure tends to be more intense in growth phases, while DeAngelo et al. (2006) show that dividend policies are shaped by life cycle stages. Finally, Erosa and González (2019) and Hasan et al. (2017) discuss how corporate taxation is influenced by financing needs and cash generation at different moments in the firm trajectory.

These contributions reveal that the life cycle significantly influences corporate decisions, capital structure, and the perception of risk by external agents. In particular, studies such as Hasan and Habib (2017) and Shahzad et al. (2020) suggest that firm risk, including systematic risk, varies across stages, although this relationship remains less explored in emerging markets. From this perspective, life cycle stages are characterized by specific features involving strategies, resources, and competition (Dickinson, 2011), which generate distinct organizational structures, systems, and agency issues capable of affecting the level of firm risk. This dynamic creates a setting in which investor risk perception varies across life cycle stages, consequently affecting stock price volatility.

Among corporate risks, market risk or systematic risk stands out. It is determined by macroeconomic factors and market conditions that affect all firms and persists even in diversified portfolios (Assaf Neto et al., 2008). In this context, market risk is expected to be higher in the introduction, growth, turbulence, and decline stages due to resource constraints, intense competition, limited operating history, and uncertainties related to the business model and firm capabilities (Kreuzberg and Vicente, 2021; Ribeiro et al., 2018). In contrast, risk is expected to be lower in the maturity stage, since the firm is already established and supported by a more solid operational and financial structure (Hasan and Cheung, 2018; Shahzad et al., 2020). This configuration suggests a U shaped relationship, in which risk is higher in the birth and decline stages (Dickinson, 2011).

Given this context, the objective of this study is to examine how systematic risk varies across the life cycle stages of Brazilian firms with shares listed on B3. Brasil Bolsa Balcão. Using the Capital Asset Pricing Model and the life cycle classification proposed by Dickinson (2011), this study seeks to contribute to the literature by identifying patterns in market beta behavior across different phases of the organizational life cycle.

In Brazil, research has focused on relating firm life cycle stages to different aspects of corporate management and performance, such as the quality of accounting information (Lima et al., 2015; Ribeiro et al., 2018), analyst forecast accuracy (Oliveira and Girão, 2018), budgetary demand (Hillen and Lavarda, 2020), covenant violations (Oliveira and Monte Mor, 2022), discretionary disclosure and cost of capital (Novaes and Almeida, 2020; Victor et al., 2018), corporate governance structure (Kreuzberg and Vicente, 2021), tax aggressiveness (Marques et al., 2022), and stock prices and expected returns in the Brazilian market (Mikosz et al., 2019). However, to date, no studies have been identified that directly investigate the effects of firm life cycle stages on the systematic risk of Brazilian companies.

The studies most closely related to this research were conducted by Hasan and Habib (2017), who examined corporate risk taking and its effects on performance across firm life cycle stages using Compustat® data from 1987 to 2013; by Mikosz et al. (2019), who analyzed the influence of life cycle stages on stock price formation and expected returns in the Brazilian market; by Saravia et al. (2021), who evaluated how systematic risk varies along the life cycle of United States firms using firm age as a proxy for life cycle classification; and by Shahzad et al. (2020), who investigated the impacts of life cycle stages on idiosyncratic risk, market risk, and total risk of Chinese firms.

International literature already provides evidence that market risk may be affected by structural factors associated with life cycle stages (Hasan and Habib, 2017; Shahzad et al., 2020), but results remain inconclusive, particularly in emerging markets. In Brazil, although there have been theoretical advances on firm life cycle stages in several areas of Accounting and Finance, the relationship with systematic risk remains unexplored. This gap reflects not only a lack of empirical evidence but also a relevant opportunity to deepen understanding of how internal and external factors combine to influence asset pricing.

Accordingly, this study contributes to the advancement of knowledge by testing whether systematic risk differs across firm life cycle stages in the Brazilian context, extending the boundaries of life cycle theory and risk management research. Specifically, the following research hypothesis is formulated: systematic risk is higher in the growth and turbulence stages, but lower than in the birth and decline stages, when compared to the maturity stage. The corresponding null hypothesis assumes that there is no statistically significant difference in systematic risk across life cycle stages.

By adopting the life cycle model proposed by Dickinson (2011), the results of this study may reveal the behavior of systematic risk among Brazilian firms across life cycle stages, allowing stakeholders to incorporate this information into resource allocation decisions based on Markowitz portfolio selection theory (1952). For investors and analysts, the findings may contribute to firm valuation and pricing processes. For managers, they may provide relevant support for risk management in each stage of the firm life cycle.

2 LITERATURE REVIEW AND HYPOTHESIS

Firms can be classified into different life cycle stages. There are models based on firm age, such as those applied by Chincarini et al. (2020) and Saravia et al. (2021), and models based on accounting data, such as the model proposed by Dickinson (2011), which categorizes firms according to cash flow patterns. In this study, Dickinson (2011) is used to classify firms into the life cycle stages of introduction, growth, maturity, turbulence, and decline (see Table 2). This classification highlights that firms exhibit distinct resources, capabilities, structures, skills, business models, objectives, and processes in each stage (Quinn and Cameron, 1983; Miller and Friesen, 1984).

In the initial stage, firms are concerned with establishing viability. They present simple and informal structures, lack an established customer base, and have limited knowledge of their own revenues and costs (Miller and Friesen, 1984; Oliveira and Girão, 2018). Firms at this stage rely primarily on investment and financing cash flows, since they generally require significant investments to expand their resource base and implement strategic objectives (Habib and Hasan, 2017; Shahzad et al., 2019). This generates cash outflows and negatively affects reported results (Jaggi et al., 2022). In general, these firms do not present positive operating results, do not undertake recurrent investments, and exhibit high leverage (Dickinson, 2011). Therefore, firms in the birth stage are expected to face higher risk compared to other life cycle stages, especially when compared to the growth and maturity stages (Saravia et al., 2021; Shahzad et al., 2020). Moreover, the search for external leverage during the birth stage finances rapid and volatile growth, which creates financial strain and greater business uncertainty. Life cycle theory thus points to higher vulnerability of firms in this phase (Saravia et al., 2021).

In the growth and maturity stages, firms show solid performance and stable cash flows, which enables investments in productive expansion and greater operational efficiency (Jaggi et al., 2022). As the firm grows, it is inferred that it has already developed skills and competencies related to its activities and begins to deliver positive results. In the growth stage, there is a greater need for external financing to invest in new projects (Anthony and Ramesh, 1992; Kreuzberg and Vicente, 2021). As these firms become more structured, they may seek funding through bank loans or strategic partnerships to scale and optimize the business. Upon reaching maturity, firms are characterized by the ability to settle their debts, implement share repurchase policies, and maintain a continuous focus on productive efficiency, cost control, and profit maximization (Dickinson, 2011; Habib and Hasan, 2019). In other words, these firms exhibit effective financial management and clear strategic planning. In addition, the consistency of cash generation and profitability in mature firms may help investors estimate future results with greater accuracy.

In the growth stage, the firm begins to report positive operating results, driven by leverage undertaken in the previous stage, strengthening of brand identity, and consolidation of market position (Dickinson, 2011; Habib and Hasan, 2017). However, it still depends on external financing to generate positive impacts on future profitability. In this context, perceived risk in this stage is lower than in the birth stage but still higher than in the maturity stage (Shahzad et al., 2019; Shahzad et al., 2020).

In the maturity stage, the firm continues to present positive operating results, although with reduced leverage. Firms maintain investments, but on a smaller scale, with the objective of preserving capital and settling debts (Kreuzberg and Vicente, 2021). Moreover, according to economic theory, this stage presents higher and more persistent levels of profitability (Dickinson, 2011; Habib and Hasan, 2017). Considering this scenario and the fact that firms at this stage hold stronger dominance in the competitive environment (Shahzad et al., 2019), risk is expected to be lower compared to other life cycle stages. Therefore, it is assumed that financial stability supports more effective risk management, sustains competitive position, and generates positive effects on market perception.

In the turbulence stage, firms face major challenges. Profitability becomes unstable, cash flows and revenues are negatively affected, and scarcity of capital for investments becomes evident. As a result, the firm finds it difficult to return to the growth and maturity stages, where the risk return structure is more balanced (Dickinson, 2011). In addition, firms face adverse periods due to significant changes in the external environment, leading to a decline in profitability (Costa et al., 2017). This makes adaptation essential, requiring revision of operational patterns and strategies to effectively deal with external transformations (Lester et al., 2003). In this context, the firm in this stage is considered riskier from a market perspective.

In the decline stage, slow growth and decreasing profitability are observed, often driven by lack of innovation and the need to reduce prices to remain competitive. This situation, combined with the inability to generate sufficient revenues to cover costs, compromises business continuity (Costa et al., 2017; Gort and Klepper, 1982; Miller and Friesen, 1984). In the decline stage, firms experience a significant reduction in profitability and weakened corporate performance, largely due to lower product prices that undermine revenues (Kreuzberg and Vicente, 2021). Furthermore, negative operating profits become frequent (Dickinson, 2011; Shahzad et al., 2020). To attempt to restore profitability, firms resort to riskier investments and asset sales to settle debts and maintain operations (Habib and Hasan, 2017; Kreuzberg and Vicente, 2021). Given uncertainty in cash flows, structural instability, and increased exposure to risk in efforts to regain profitability, a pessimistic outlook regarding future prospects and firm survival naturally emerges (Dickinson, 2011; Habib and Hasan, 2017). Consequently, risk tends to behave more aggressively in the decline stage. Therefore, firms in decline face concrete market risks, including loss of customers and reduction in market value, which lead to negative operating cash flows and falling stock prices (Wernerfelt, 1984).

Therefore, this study supports the hypothesis that firm risk is perceived differently across life cycle stages, since firms hold distinct sets of resources, capabilities, structures, skills, business models, objectives, and processes. In this sense, the following hypothesis is proposed:

Hypothesis (H1): Compared to the maturity stage of the life cycle, systematic risk is higher in the growth and turbulence stages, but lower than in the birth and decline stages.

The literature on this topic has investigated the effects of firm life cycle stages on organizational capital (Hasan and Cheung, 2018), on variations in the cost of equity capital (Hasan et al., 2015), on changes in the qualitative characteristics of annual reports under different corporate circumstances (Bakarich et al., 2019), and on how the comparability of financial statements varies across life cycle stages (Biswas et al., 2022).

In Brazil, studies have followed a similar line, examining the effect of life cycle stages on stock price determination and expected returns (Mikosz et al., 2019), analyzing how life cycle stages influence board characteristics (Kreuzberg and Vicente, 2021), and investigating the probability that life cycle stages affect financial covenant violations (Oliveira and Monte Mor, 2022). In this study, we propose to analyze how systematic risk, or market risk, measured by beta, varies across life cycle stages.

The model proposed by Dickinson (2011) offers a distinctive perspective for understanding systematic risk by directly linking firm cash flow patterns at different stages of development to their exposure to market factors. Each phase of the life cycle presents a specific profile of resource generation and use that modulates firm sensitivity to market fluctuations. Accordingly, firms in early stages, with negative operating cash flows and high dependence on external financing, are expected to become more vulnerable to changes in economic conditions, increasing their systematic risk. In the maturity stage, when cash flows stabilize and reliance on external capital declines, market sensitivity tends to decrease. In the turbulence and decline stages, deterioration of cash flows and survival strategies reintroduce a strong correlation with market movements.

In this sense, by proposing that the systematic risk of Brazilian firms follows a non linear trajectory across life cycle stages, this study reinforces the understanding that operational and financial constraints in early stages and in final stages amplify exposure to market risk (Habib and Hasan, 2017), affecting investor perception and giving rise to agency conflicts and earnings management practices (Shahzad et al., 2020; Jaggi et al., 2022). This perspective strengthens the relationship when viewed alongside the findings of Saravia et al. (2021) and Chincarini et al. (2020) in linear trajectory models.

Considering that a substantial portion of studies has not comprehensively addressed the relationship between firm evolution and life cycle stages, it can be inferred that there is a significant information gap on this topic (Shahzad et al., 2019). According to Penrose (1952) and Wernerfelt (1984), firm evolution is intrinsically linked to capabilities and resources, which play a central role in life cycle stages. In this context, DeAngelo et al. (2006) highlight the impact of life cycle stages on financial decisions and organizational performance.

3 METHODOLOGICAL PROCEDURES

The study population consists of Brazilian publicly traded firms whose shares are listed on B3. Brasil Bolsa Balcão. The period of analysis spans from the first quarter of 2010 to the fourth quarter of 2022. totaling 52 quarters. This interval was chosen due to greater availability and quality of accounting and market data from 2010 onward, especially after the mandatory adoption of International Financial Reporting Standards in Brazil, which ensures greater comparability of cash flow information used to classify firm life cycle stages. The selected time frame is also sufficiently long to capture variations in the economic environment, allowing observation of systematic risk under different market conditions, which strengthens the suitability of the period for the study objective.

To compose the sample, stocks with higher liquidity in the equity market were selected, considering only tickers with the highest average daily trading volume, according to data obtained from the Economatica® database. The selection criteria and sample composition are detailed in Table 1. The filtering procedures presented in Table 1 follow well established practices in the Finance and Accounting literature. The exclusion of firms with missing data ensures completeness of the variables used in the models. The removal of financial institutions is based on their distinct asset structure and operational characteristics, as adopted by Habib and Hasan (2017), Saravia et al. (2021), and Shahzad et al. (2020). The minimum liquidity criterion, defined as a daily trading percentage above 80 percent within the quarter, follows the methodology employed by Mikosz et al. (2019) to ensure representativeness of prices in the secondary market. Finally, the exclusion of statistically insignificant betas with p values above 0.05 aims to ensure robustness of systematic risk estimates, in line with common practice in beta estimation and CAPM based studies in the Brazilian context.

Table 1
Sample selection and composition process

Panel A – Sampling process		
Description of procedures	**Firms**	**Observations**
Initial population between Q1 2010 and Q4 2022	401	28.852
(–) firms with missing or unavailable data	(46)	(16.312)
(–) firms belonging to the financial and insurance sector	(57)	(2.964)
(–) firms with trading percentage below 80 percent in the quarter	(16)	(1.975)
(–) firms with non significant betas ($p > 0.05$)	(6)	(2.185)
= Final sample	276	5.416
Panel B – Sample composition by		
***FLCS* according to Dickinson (2011)**	**Obs.**	**%**
Birth	590	10.89
Growth	1.162	21.46
Maturity	2.398	44.28
Turbulence	898	16.58
Decline	368	6.79
Panel C – Sample composition by sector		
Sectors	**Obs.**	**%**
Food and beverages	398	7.35
Commerce	271	5.00
Construction and real estate development	962	17.76
Education and leisure	253	4.67
Electricity, sanitation, and gas	758	14.00
Machinery and equipment	509	9.40
Oil and chemicals	449	8.29
Healthcare and pharmaceuticals	313	5.78

Steel and metallurgy	378	6.98
Telecommunications, software, and data	299	5.52
Transportation	402	7.42
Apparel and accessories	424	7.83

Source: Prepared by the authors (2024).

A substantial portion of the observations was excluded due to missing data, corresponding to 56.54 percent of the initial population. The main reason for excluding these observations was the lack of sufficient daily price quotations to estimate beta, particularly among firms with low liquidity. This limitation arises from structural characteristics of the Brazilian stock market, where a significant share of firms exhibits infrequent trading. Therefore, the adopted filtering procedures aimed to ensure statistical robustness in beta estimation and follow methodological guidelines aligned with the empirical literature on systematic risk.

In addition, financial firms were removed since their activities have a specific nature and their financial statements present a distinct structure. The final sample of the study comprises 276 firms and 5.416 observations.

Next, outlier treatment was performed for continuous variables by applying winsorization to observations located at the extremes of the distribution, with limits of 1 percent in each tail. It is noted that this statistical technique was not applied to logarithmized variables. The procedure was conducted using Stata® software and did not result in changes in the number of firms or observations.

The dependent variable is represented by systematic risk, estimated through the asset pricing model known as the Capital Asset Pricing Model, developed by Sharpe (1964), Lintner (1965), and Mossin (1966). Although this model predates more recent multifactor approaches (Regis et al., 2023; Regis et al., 2024), it remains widely used in the Brazilian literature to estimate systematic risk, especially in studies that analyze beta behavior in relation to specific firm characteristics (Souza e Silva et al., 2024; Santos et al., 2023). The model is presented in Equation 1.

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it} \qquad \text{Equation 1}$$

Where $R_{it}$is the stock return of firm i on day t; $R_{ft}$is the daily return of the risk free rate j on day t, represented by the Selic rate; $R_{mt}$is the daily return of market index m on day t, represented by the Ibovespa; $\alpha_i$is the intercept; $\beta_i$is the slope coefficient that captures systematic risk; and $\varepsilon_{it}$is the error term, where $\varepsilon_{it} \sim N(0.\sigma^2)$. Betas were estimated on a quarterly basis using a series of daily returns. The models were estimated using the Newey West covariance matrix, which corrects for autocorrelation and heteroskedasticity in the error terms (Newey & West, 1987).

Daily stock prices of Brazilian firms and the Ibovespa index were obtained from Yahoo Finance® using the quantmod package available and executed in R. Data on the Selic rate were also obtained in R using the Quandl statistical package, which allows direct access to data from the Central Bank of Brazil. Discrete returns were calculated for individual stocks and for the Ibovespa index. Subsequently, risk premiums for the assets $(R_{it} - R_{ft})$and for the market $(R_{mt} - R_{ft})$were computed. Finally, the model expressed in Equation 1 was estimated in R, generating quarterly beta coefficients.

To measure firm life cycle stages, the model proposed by Dickinson (2011) was used. This approach considers the signs of operating, investing, and financing cash flows reported in the statement of cash flows to classify firms into the stages of birth, growth, maturity, turbulence, and decline, as described in Table 2.

Table 2
Classification of firms across FLCS

Cash flow	NASC	CRES	MATU	TURB			DECL	
Operating	–	+	+	+	–	+	–	–
Investing	–	–	–	+	–	+	+	+
Financing	+	+	–	+	–	–	+	–

Note: NASC = birth; CRES = growth; MATU = maturity; TURB = turbulence; DECL = decline.
Source: Prepared by the authors (2024) based on Dickinson (2011).

The variable of interest representing FLCS is binary. It takes the value of 1 when firm i is classified in a given LCS in quarter t, and 0 otherwise. Therefore, there is one measure for each life cycle stage, individually represented by birth ($NASC_{it}$), growth ($CRES_{it}$), maturity ($MATU_{it}$), turbulence ($TURB_{it}$), and decline ($DECL_{it}$). The Dickinson (2011) model has been widely used as a proxy to capture firm life cycle stages, including in studies by Habib and Hasan (2017), Mikosz et al. (2019), and Shahzad et al. (2020). Data on operating cash flow, investing cash flow, and financing cash flow were obtained from the Economatica® database.

To test the hypothesis that, compared to the maturity stage, systematic risk is higher in the growth and turbulence stages, but lower than in the birth and decline stages, a linear regression model estimated by ordinary least squares is applied, with fixed effects for year (δ_t)and sector (ϑ_s). As emphasized by Shahzad et al. (2020), results obtained through ordinary least squares may be potentially biased because this method does not fully eliminate endogeneity concerns. However, the Hausman test supports the use of the fixed effects specification, which significantly reduces unobservable heterogeneity, a form of endogeneity. The generated standard errors are robust to heteroskedasticity. Therefore, the model used for this proposition is based on Equation 2. in which firm life cycle stages help explain the level of systematic risk of firms.

$$RISC_{it} = \gamma_0 + \gamma_1 ECVF_{it} + \gamma_{2-6} CONT_{it} + \delta_t + \vartheta_s + \varepsilon_{it} \qquad \text{Equation 2}$$

Where $RISC_{it}$is systematic risk, represented by the beta estimated through the CAPM as shown in Equation 1; $FLCS_{it}$is individually represented by the firm life cycle stages of birth, growth, maturity, turbulence, and decline ($NASC_{it}$, $CRES_{it}$, $MATU_{it}$, $TURB_{it}$, $DECL_{it}$); $CONT_{it}$represents the control variables of the study; $\delta_t$denotes time fixed effects; $\vartheta_s$denotes sector fixed effects; $\varepsilon_{it}$is the regression error term; $i$is the firm subscript; $t$is the time subscript; and $s$is the sector subscript.

Following prior literature, the model includes firm size (TAM_{it}), profitability (ROE_{it}), leverage (END_{it}), market to book ratio (MTB_{it}), dividend yield (DY_{it}), and stock return (RET_{it})as control variables, identified as determinants of systematic risk (Habib and Hasan, 2017; Saravia et al., 2021; Shahzad et al., 2020). $TAM_{it}$is calculated as the natural logarithm of total assets. $ROE_{it}$is measured as the ratio between net income in period t and shareholders equity in period t minus one. $END_{it}$is calculated as the ratio between total liabilities in period t and total assets in period t. $MTB_{it}$is calculated as the ratio between market value in period t and the book value of shareholders equity in period t. $DY_{it}$is calculated as the ratio between dividends per share cumulatively paid in quarter t and the initial stock price in quarter t. $RET_{it}$is calculated as the discrete price variation in quarter t. Data for the control variables were obtained from the Economatica® database.

Before testing the study hypothesis, descriptive analysis of the variables used in the econometric model was conducted, distributed according to FLCS. Parametric Pearson correlation analysis and non parametric Spearman correlation analysis were performed, along with the Variance Inflation Factor to identify the presence of multicollinearity problems.

4 ANALYSIS AND DISCUSSION OF RESULTS

4.1 Results Analysis

This study examines how systematic risk varies across the life cycle stages of Brazilian publicly traded firms listed on B3. Table 3 presents descriptive statistics for the independent and control variables for the full sample in Panel A and segmented by different firm life cycle stages in Panel B.

The descriptive analysis shows that, in the full sample, firms exhibit systematic risk values below one, with a mean of 0.92 and a median of 0.85. indicating that the assets display a relatively low level of market risk. Across FLCS, systematic risk is lowest in the growth stage, with a mean of 0.871 and a median of 0.819. and highest in the decline stage, with a mean of 1.056 and a median of 0.987. It is also observed that systematic risk follows a U shaped pattern across FLCS, with higher values at the extreme stages.

The descriptive results further indicate that the control variables, except for firm size due to its logarithmic transformation, exhibit substantial data dispersion, which justifies the use of the winsorization technique. The stock return variable shows the highest variability, with a coefficient of variation of 2243.05 percent. High dispersion is also observed for profitability, dividend yield, and market to book ratio.

Overall, the descriptive evidence suggests that firm characteristics differ across LCS. This variation reflects the specific dynamics of each stage, as proposed by Dickinson (2011). These differences may directly affect investor perception of market risk, highlighting the relevance of organizational life cycle theory (Miller and Friesen, 1984) as a framework to understand structural and strategic changes that influence firm performance and risk over time.

Table 3

Descriptive Statistics of Variables by FLCS

Panel A – Descriptive Statistics of Continuous Variables

Variables	Observations	Minimum	25th Percentile	Mean	Median	75th Percentile	Maximum	Standard Deviation
RISC	5.416	–0.636	0.597	0.915	0.851	1.169	2.053	0.415
TAM	5.416	9.423	14.709	15.737	15.599	16.794	20.738	1.563
ROE	5.416	–1.093	0.002	0.023	0.240	0.050	0.947	0.142
END	5.416	0.043	0.448	0.614	0.577	0.702	7.754	0.353
MTB	5.416	–5.133	0.800	2.013	1.402	2.473	16.667	2.273
DY	5.416	0.000	0.000	0.694	0.000	0.727	9.146	1.490
RET	5.416	–0.545	–0.128	0.011	0.000	0.132	0.957	0.237

Panel B – Descriptive Statistics across FLCS

ECVF	*NASC (N = 590)*			*CRES (N = 1.162)*			*MATU (N = 2.398)*			*TURB (N = 898)*			*DECL (N = 368)*		
Variables	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**
RISC	0.976	0.935	0.421	0.871	0.819	0.385	0.883	0.814	0.411	0.958	0.878	0.429	1.056	0.987	0.438
TAM	15.435	15.385	1.385	15.982	15.920	1.493	15.828	15.685	1.626	15.622	15.450	1.534	15.126	15.231	1.446
ROE	0.187	0.200	0.178	0.272	0.243	0.121	0.030	0.284	0.145	0.015	0.021	0.126	-0.009	0.008	0.155
END	0.692	0.659	0.282	0.612	0.591	0.260	0.596	0.552	0.381	0.609	0.569	0.394	0.627	0.584	0.399
MTB	1.816	1.217	2.340	2.103	1.570	2.180	2.158	1.481	2.405	1.924	1.298	2.144	1.318	0.898	1.637
DY	0.409	0.000	1.070	0.545	0.000	1.197	0.826	0.000	1.602	0.818	0.000	1.748	0.464	0.000	1.332
RET	0.236	–3.063	27.948	–0.396	–0.665	21.398	2.107	1.470	22.627	2.555	0.443	25.016	–3.547	–4.714	25.734

Note**:** RISC = systematic risk; TAM = firm size; ROE = profitability; END = leverage; MTB = market to book; DY = dividend yield; RET = stock return; N = number of observations in each FLCS; DP = standard deviation; NASC = birth; CRES = growth; MATU = maturity; TURB = turbulence; DECL = decline.

Source: Prepared by the authors (2024).

The data presented in Table 4 provide information on parametric and non parametric correlation analysis between the dependent variable $RISC$, the independent variables ($NASC$, $CRES$, $MATU$, $TURB$, $DECL$), and the control variables of the study (TAM, ROE, END, MTB, DY, RET). The results indicate that $RISC$ shows a low positive correlation with the NASC, TURB, and DECL stages, and a low negative correlation with the CRES and MATU stages. These findings offer initial evidence regarding the relationship between the dependent variable and the main variables of interest in this study, namely the FLCS. It is also observed that there is negative correlation among all FLCS, with the strongest occurring between MATU and DECL ($r = -0.397; p < 0.01$).

Additionally, among the control variables, the strongest correlation is found between END and RISC ($r = 0.171; p < 0.01$), indicating that as the proportion of firm leverage increases, its systematic risk also rises. Next, the results show a low, positive, and significant correlation between MTB and RET ($r = 0.134; p < 0.01$). Finally, Table 4 suggests that some variables do not present statistically significant correlations with one another.

Table 4

Correlation matrix among the study variables

	RS	*NASC*	*CRES*	*MATU*	*TURB*	*DECL*	*TAM*	*ROE*	*END*	*MTB*	*DY*	*RET*
RS	1.00	0.06***	–0.05***	–0.08***	0.04***	0.09***	0.09***	–0.19***	0.19***	–0.18***	–0.16***	–0.11***
NASC	0.05***	1.00	–0.18***	–0.31***	–0.16***	–0.09***	–0.06***	–0.04***	0.15***	–0.04***	–0.07***	–0.037***
CRES	–0.05***	–0.18***	1.00	–0.47***	–0.23***	–0.14***	0.09***	0.01	0.04***	0.05***	–0.03**	–0.03*
MATU	–0.07***	–0.31***	–0.05***	1.00	–0.40***	–0.24***	0.04***	0.11***	–0.10***	0.06***	0.11***	0.05***
TURB	0.05***	–0.16***	–0.23***	–0.30***	1.00	–0.12***	–0.03**	–0.05***	–0.03*	–0.03**	0.00	0.02*
DECL	0.09***	–0.09***	–0.14***	–0.24***	–0.12***	1.00	–0.10***	–0.11***	–0.01*	–0.12***	–0.07***	–0.05***
TAM	0.09***	–0.07***	0.08***	0.05***	–0.03**	–0.11***	1.00	0.03*	0.19***	0.02**	0.14***	0.07***
ROE	–0.06***	–0.01	0.02**	0.04***	–0.02*	–0.06***	0.02	1.00	–0.06***	0.35***	0.27***	0.15***
END	0.17***	0.08***	–0.00	–0.05***	–0.01	0.01	–0.03**	–0.01	1.00	–0.03*	–0.17***	–0.05***
MTB	–0.11***	–0.03**	0.02**	0.06***	–0.02	–0.08***	–0.01	0.08***	–0.08***	1.00	0.17***	0.19***
DY	–0.11***	–0.07***	–0.05***	0.08***	0.04***	–0.04***	0.11***	0.08***	–0.09***	–0.01	1.00	0.07***
RET	–0.07***	–0.01	–0.03**	0.04***	0.03**	–0.05***	0.05***	0.05***	–0.04***	0.13***	0.07***	1.00

Note. RS = systematic risk; TAM = firm size; ROE = profitability; END = leverage; MTB = market to book; DY = dividend yield; RET = stock return; NASC = birth; CRES = growth; MATU = maturity; TURB = turbulence; DECL = decline. Note: *, **, and *** denote significance levels of 10 percent, 5 percent, and 1 percent, respectively. The lower diagonal presents Pearson parametric correlations. The upper diagonal presents Spearman non parametric correlations. Source: Prepared by the authors(2024).

Table 5 presents the results of the ordinary least squares regressions between $RISC$ and each FLCS, allowing the test of the study hypothesis that, compared to the MATU stage, $RISC$ is higher in the CRES and TURB stages, but lower in the NASC and DECL stages.

It is worth noting that Table 4 initially indicated a potential risk, showing moderate and significant correlations, especially between the life cycle stage variables CRES and MATU ($r = -0.47; p < 0.01$), which could introduce endogeneity bias into the model. However, Table 5 specifies five separate models, each including only one life cycle stage dummy at a time along with the control variables. This strategy isolates the source of multicollinearity. The low maximum VIF of 1.65 confirms that within each specific model there is no problematic correlation between the tested stage dummy and the other explanatory variables, ensuring robustness and inferential reliability of the estimated coefficients for each phase of the life cycle.

Accordingly, the estimated models are statistically significant, and the independent variables, control variables, and fixed effects explain on average 33.52 percent of the variation in $RISC$. As the main result, the empirical evidence indicates that all FLCS exert some influence on the level of systematic risk. Firms classified in the NASC, TURB, and DECL stages are associated with higher levels of $RISC$. In contrast, firms in the CRES and MATU stages present effects that contribute to reducing the level of $RISC$.

Table 5

Regression Analysis between RISC and FLCS

$$RISC_{it} = \gamma_0 + \gamma_1 NASC_{it} + \gamma_{2-6} CONT_{it} + \delta_t + \vartheta_i + \varepsilon_{it} \quad (1)$$
$$RISC_{it} = \gamma_0 + \gamma_1 CRES_{it} + \gamma_{2-6} CONT_{it} + \delta_t + \vartheta_i + \varepsilon_{it} \quad (2)$$
$$RISC_{it} = \gamma_0 + \gamma_1 MATU_{it} + \gamma_{2-6} CONT_{it} + \delta_t + \vartheta_i + \varepsilon_{it} \quad (3)$$
$$RISC_{it} = \gamma_0 + \gamma_1 TURB_{it} + \gamma_{2-6} CONT_{it} + \delta_t + \vartheta_i + \varepsilon_{it} \quad (4)$$
$$RISC_{it} = \gamma_0 + \gamma_1 DECL_{it} + \gamma_{2-6} CONT_{it} + \delta_t + \vartheta_i + \varepsilon_{it} \quad (5)$$

Variables	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (4)	Eq. (5)
NASC	0.028*				
	(0.015)				
CRES		–0.357***			
		(0.011)			
MATU			–0.022**		
			(0.010)		
TURB				0.030**	
				(0.130)	
DECL					0.073***
					(0.020)
TAM	0.053***	0.531***	0.525***	0.053***	0.053***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
ROE	–0.127***	–0.126**	–0.125**	–0.126**	–0.121**
	(0.041)	(0.041)	(0.041)	(0.041)	(0.409)
END	0.127***	0.128***	0.128***	0.129***	0.129***
	(0.185)	(0.186)	(0.185)	(0.019)	(0.019)
MTB	–0.150***	–0.150***	–0.149***	–0.150***	–0.147***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
DY	–0.250***	–0.260***	–0.247***	–0.026***	–0.250***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
RET	–0.001*	–0.001**	–0.001*	–0.001*	–0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constante	–0.242***	–0.236***	–0.227***	–0.241	–0.251***
	(0.072)	(0.725)	(0.073)	(0.073)	(0.729)
EF Setor	*Sim*	*Sim*	*Sim*	*Sim*	*Sim*
EF Ano	*Sim*	*Sim*	*Sim*	*Sim*	*Sim*
R^2 (%)	33.47	33.55	33.49	33.50	33.62
Estatística	38.65***	38.44***	38.99***	38.67***	38.78***
VIF Maximum	1.65	1.65	1.65	1.65	1.65
Empresas	276	276	276	276	276
Observations	5.416	5.416	5.416	5.416	5.416

Note. RISC = systematic risk; TAM = firm size; ROE = profitability; END = leverage; MTB = market to book; DY = dividend yield; RET = stock return; NASC = birth; CRES = growth; MATU = maturity; TURB = turbulence; DECL = decline. Note: *, **, and *** denote significance levels of 10 percent, 5 percent, and 1 percent, respectively. The models were estimated by ordinary least squares with fixed effects for year and sector, with standard errors robust to heteroskedasticity.

Source: Prepared by the authors (2024).

Among the negative relationships between FLCS coefficients and $RISC$, the CRES stage contributes most strongly to reducing systematic risk ($\beta_1 = -0.357; p < 0.01$). Conversely, the DECL stage contributes most to increasing $RISC(\beta_1 = 0.073; p < 0.01)$. Overall, the relationship between FLCS and systematic risk confirms that market risk follows a U shaped pattern, with higher levels in the NASC and DECL stages, as suggested by Dickinson (2011).

In agreement with Habib and Hasan (2017), Miller and Friesen (1984), Oliveira and Girão (2018), and Shahzad et al. (2019), firms in the NASC and DECL stages exhibit higher levels of $RISC$, indicating that uncertainties associated with operations make these phases riskier from a market perspective. These results reinforce the hypothesis that, in these stages, the combination of factors such as the need for leverage, lack of a consolidated operating history, and financial vulnerability increases investor risk perception.

The results further show that the CRES stage contributes most to reducing $RISC$, followed by the MATU stage, confirming the findings of Anthony and Ramesh (1992) and Kreuzberg and Vicente (2021). This can be explained by the fact that, during the CRES stage, firms begin to report positive results and consolidate their market position (Habib and Hasan, 2017; Dickinson, 2011), reducing uncertainty and increasing investor confidence. In the MATU stage, operational stability, effective management capacity, and a robust financial structure further minimize risk (Shahzad et al., 2019), reflecting a balance between market demands and available resources.

In contrast, the TURB stage, which also exhibits higher levels of $RISC$, highlights the difficulties firms face when dealing with adverse changes in the external environment, as discussed by Costa et al. (2017) and Lester et al. (2003). This result reinforces the notion that firms in this stage must rapidly adapt to market conditions by revising strategies and organizational structures in order to reverse recurrent negative outcomes (Dickinson, 2011; Habib and Hasan, 2017; Shahzad et al., 2020). Thus, the empirical results indicate that while risk is inherently high in the NASC and DECL stages, firms in the TURB stage also face significant challenges that negatively affect their risk perception in the market.

Regarding the relationship between the dependent variable and the control variables, the results show that larger firms (TAM) and more leveraged firms (END) present higher levels of $RISC$, with stronger effects among firms with a greater proportion of debt from loans and financing. In contrast, profitability (ROE), market valuation (MTB), stock returns (RET), and dividend yield (DY) contribute to reducing the systematic risk of Brazilian firms.

4.2 Discussion of results

The results reinforce the theoretical premise that FLCS are associated with different levels of risk perceived by investors. Studies such as Dickinson (2011) and Hasan and Habib (2017) have already indicated that operational structure and the ability to generate cash flows vary substantially across stages, directly affecting systematic risk. In this study, firms in the NASC, TURB, and DECL stages present significantly higher levels of risk, confirming that the instability typical of these phases is priced by the market.

International literature also suggests that the maturity stage tends to be the most stable, with firms exhibiting lower earnings variability and greater operational predictability (DeAngelo et al., 2006; Hasan et al., 2015). This evidence also supports the argument of Al Hadi et al. (2016), according to which mature firms tend to display higher transparency and more consolidated governance mechanisms, factors that reduce information asymmetry and market volatility. The empirical findings of this research confirm this expectation by showing that the maturity stage is associated with the lowest average betas among the FLCS.

The elevated risk in the turbulence and decline stages is also consistent with Hasan and Habib (2017), who identified that firms experiencing performance deterioration face higher risk due to weakening operational indicators and increased stakeholder pressure. These results point to a U shaped behavior in which risk is higher at the extremes of the life cycle and lower in the intermediate stage.

From an empirical perspective, this research aligns partially with international literature (Shahzad et al., 2020; Saravia et al., 2021), while providing an important contribution by applying the Dickinson (2011) model in an emerging market environment. In Brazil, investigations that directly associate FLCS with systematic risk remain scarce. Most studies focus on accounting information quality (Lima et al., 2015), disclosure practices (Novaes and Almeida, 2020), and stock pricing (Mikosz et al., 2019), without directly addressing beta variation across LCS.

From a practical standpoint, the results suggest that managers should pay close attention to the firm stage when designing risk mitigation strategies. In stages of greater exposure, such as birth and decline, it may be important to strengthen governance, enhance earnings predictability, and communicate strategies effectively to the market. For investors and analysts, incorporating LCS into risk assessment models may improve portfolio selection and support investment decisions aligned with desired risk return profiles.

5 CONCLUSON

This study was motivated by the observation that, although FLCS are associated with different accounting and financial behaviors, the literature had not yet explored their direct relationship with systematic risk in Brazil. The research achieved its objective by examining how systematic risk varies across the life cycle stages of Brazilian firms listed on B3 between the first quarter of 2010 and the fourth quarter of 2022, forming a sample of 276 firms and 5,416 observations. The results confirm the proposed hypothesis that, compared to the maturity stage, systematic risk is higher in the growth and turbulence stages, but lower in the birth and decline stages.

The findings support the proposition that FLCS affect levels of systematic risk, indicating that the birth, turbulence, and decline stages contribute to higher risk, while the growth and maturity stages tend to reduce it. It is concluded that Brazilian firms exhibit distinct resources, capabilities, strategies, structures, and activities in each FLCS, which directly impacts the level of systematic risk. The results are aligned with evidence reported by Habib and Hasan (2017), Shahzad et al. (2019), and Shahzad et al. (2020), supporting the validity of these findings in Brazil using the Dickinson (2011) model.

This research contributes to the literature by analyzing the relationship between FLCS, based on the Dickinson (2011) model that uses the signs of operating, investing, and financing cash flows, and systematic risk measured by beta estimated through the CAPM proposed by Sharpe (1964), Lintner (1965), and Mossin (1966). The study provides relevant insights for stakeholders in decision making processes by showing that investors and analysts can incorporate FLCS into the valuation of Brazilian firms, and that managers can use this information to improve risk management in each LCS.

As a limitation, this study does not consider alternative measures of FLCS, such as those based on firm age used by Saravia et al. (2021), and their potential endogeneity issues. In addition, the analysis is restricted to the use of CAPM to estimate systematic risk, without incorporating more recent and robust multifactor models, which, even with procedures applied to mitigate these concerns, may still raise questions regarding uncertainty in risk estimation. Furthermore, the sample includes only firms with high liquidity in the secondary market, which limits generalization of the results to firms with lower trading frequency. Finally, reliance on data from Yahoo Finance may not perfectly reflect the Brazilian market environment.

For future research, the adoption of alternative models is recommended, such as the three factor model of Fama and French (1992) and the four factor model of Carhart (1997), which allow capturing additional effects such as size, value, and momentum. It is also suggested to investigate dynamic risk metrics capable of considering the evolution of FLCS over time, as well as expanding the analysis to different economic contexts and specific sectors, in order to enrich understanding of the impact of firm life cycle stages on systematic risk.

REFERENCES

Al-Hadi, A., Hasan, M. M., & Habib, A. (2016). Risk committee, firm life cycle, and market risk disclosures. *Corporate Governance: An International Review, 24*(2), 145–170. https://doi.org/10.1111/corg.12115

Almand, A., Cantrell, B., & Dickinson, V. (2023). Accruals and firm life cycle: improving regulatory earnings management detection. *Advances in Accounting, 60*, 100642. https://doi.org/10.1016/j.adiac.2023.100642

Anthony, J. H., & Ramesh, K. (1992). Association between accounting performance measures and stock prices. *Journal of Accounting and Economics, 15*(2-3), 203–227. https://doi.org/10.1016/0165-4101(92)90018-W

Assaf Neto, A., Lima, F. G., & Araujo, A. M. P. (2008). Uma proposta metodológica para o cálculo do custo de capital no Brasil. *Revista de Administração - RAUSP, 43*(1), 72-83.

Bakarich, K. M., Hossain, M., Hossain, M., & Weintrop, J. (2019). Different time, different tone: company life cycle. *Journal of Contemporary Accounting & Economics, 15*(1), 69–86. https://doi.org/10.1016/j.jcae.2018.12.002

Biswas, P. K., Habib, A., & Ranasinghe, D. (2022). Firm life cycle and financial statement comparability. *Advances in Accounting, 58*, 100608. https://doi.org/10.1016/j.adiac.2022.100608

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of Finance, 52*(1), 57–82. https://doi.org/10.1111/j.1540-6261.1997.tb03808.x

Chincarini, L. B., Kim, D., & Moneta, F. (2020). Beta and firm age. *Journal of Empirical Finance, 58*, p. 50–74. https://doi.org/10.1016/j.jempfin.2020.05.003

Costa, W. B., Macedo, M. A. S., Yokoyama, K. Y., & Almeida, J. E. F. (2017). Análise dos estágios de ciclo de vida de companhias abertas no Brasil: um estudo com base em variáveis contábeis e financeiras. *Brazilian Business Review, 14*(3), 304–320. https://doi.org/10.15728/bbr.2017.14.3.3

Deangelo, H., Deangelo, L., & Stulz, R. M. (2006). Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory. *Journal of Financial Economics, 81*(2), 227–254. https://doi.org/10.1016/j.jfineco.2005.07.005

Dickinson, V. (2011). Cash flow patterns as a proxy for firm life cycle. *The Accounting Review, 86*(6), 1969–1994. https://doi.org/10.2308/accr-10130

Erosa, A., & González, B. (2019). Taxation and the life cycle of firms. *Journal of Monetary Economics, 105*, 114–130. https://doi.org/10.1016/j.jmoneco.2019.04.006

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *The Journal of Finance*, 47(2), 427–465. https://doi.org/10.1111/j.1540-6261.1992.tb04398.x

Greiner, L. E. (1972). Evolution and revolution as organizations grow. *Harvard Business Review*, 37–46.

Gort, M., & Klepper, S. (1982). Time paths in the diffusion of product innovations. *The Economic Journal, 92*(367), 630. https://doi.org/10.2307/2232554

Habib, A., & Hasan, M. M. (2017). Firm life cycle, corporate risk-taking and investor sentiment. *Accounting & Finance, 57*(2), 465–497. https://doi.org/10.1111/acfi.12141

Habib, A., & Hasan, M. M. (2019). Corporate life cycle research in accounting, finance and corporate governance: a survey, and directions for future research. *International Review of Financial Analysis, 61*, 188–201. https://doi.org/10.1016/j.irfa.2018.12.004

Habib, A., Ranasinghe, D., Wu, J. Y., Biswas, P. K., & Ahmad, F. (2022). Real earnings management: a review of the international literature. *Accounting & Finance, 62*(4), 4279–4344. https://doi.org/10.1111/acfi.12968

Hasan, M. M., Al-Hadi, A., Taylor, G., & Richardson, G. (2017). Does a firm's life cycle explain its propensity to engage in corporate tax avoidance? *European Accounting Review, 26*(3), 469–501. https://doi.org/10.1080/09638180.2016.1194220

Hasan, M. M., & Cheung, A. (W-K). (2018). Organization capital and firm life cycle. *Journal of Corporate Finance, 48*, 556–578. https://doi.org/10.1016/j.jcorpfin.2017.12.003

Hasan, M. M., & Habib, A. (2017). Firm life cycle and idiosyncratic volatility. *International Review of Financial Analysis, 50*, 164–175. https://doi.org/10.1016/j.irfa.2017.01.003

Hasan, M. M., Hossain, M., Cheung, A. (W-K), & Habib, A. (2015). Corporate life cycle and cost of equity capital. *Journal of Contemporary Accounting & Economics, 11*(1), 46–60. https://doi.org/10.1016/j.jcae.2014.12.002

Hillen, C., & Lavarda, C. E. F. (2019). Orçamento e ciclo de vida em empresas familiares em processo de sucessão. *Revista Contabilidade & Finanças, 31*, 212–227. https://doi.org/10.1590/1808-057x201909600

Jaggi, B., Allini, A., Casciello, R., & Meucci, F. (2022). Firm life cycle stages and earnings management. *Review of Quantitative Finance and Accounting, 59*(3), 1019–1049. https://doi.org/10.1007/s11156-022-01069-5

Kreuzberg, F., & Vicente, E. F. R. (2021). As características do conselho de administração mudam conforme os estágios do ciclo de vida da empresa? *Revista Universo Contábil, 17*(1), 109–129. https://doi.org/10.4270/ruc.2021106

Lester, D. L., Parnell, J. A., & Carraher, S. (2003). Organizacional life cycle: a five-stage empirical scale. *The International Journal of Organizational Analysis, 11*(4), 339–354. https://doi.org/10.1108/eb028979

Lintner, J. (1965). Security prices, risk, and maximal gains from diversification. *The Journal of Finance, 20*(4), 587–615. https://doi.org/10.2307/2977249

Lima, A. S., Carvalho, E. V. A., Paulo, E., & Girão, L. F. A. P. (2015). Estágios do ciclo de vida e qualidade das informações contábeis no Brasil. *Revista de Administração Contemporânea, 19*(3), 398–418. https://doi.org/10.1590/1982-7849rac20151711

Markowitz, H. (1952). Portfolio selection. *The Journal of Finance, 7*(1), 77–91. http://dx.doi.org/10.1002/9780470404324.hof002001

Marques, V. A., Campos, B. D. S., Alencastre, B. Z., Louzada, L. C., & Martinez, A. L. (2022). Agressividade tributária, estágios do ciclo de vida e nível de investimentos: uma análise do efeito moderador em empresas listadas na B3. *Contabilidade Vista & Revista, 33*(2), 57–83. https://doi.org/10.22561/cvr.v33i2

Mikosz, K. S. C., Roma, C. M. S., Louzada, L. C., & Macedo, M. R. G. O. (2019). Previsão de retornos e preços das ações a partir de dados contábeis condicionado ao ciclo de vida das firmas. *Revista de Contabilidade e Organizações, 13*, e160869. https://doi.org/10.11606/issn.1982-6486.rco.2019.160869

Miller, D., & Friesen, P. H. (1984). A longitudinal study of the corporate life cycle. *Management Science, 30*(10), 1161–1183. https://doi.org/10.1287/mnsc.30.10.1161

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica, 34*(4), 768. https://doi.org/10.2307/1910098

Newey, & West, K. D. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica, 55*(3), 703.

Novaes, P. V., & Almeida, J. E. (2020). O papel dos estágios do ciclo de vida da firma sobre o *disclosure* voluntário e o custo de capital próprio nas companhias abertas brasileiras. *Brazilian Business Review, 17*(6), 601–620. https://doi.org/10.15728/bbr.2020.17.6.1

Oliveira, A. S., & Girão, L. F. A. P. (2018). Acurácia na previsão de lucros e os estágios do ciclo de vida organizacional: evidências no mercado brasileiro de capitais. *Revista de Educação e Pesquisa em Contabilidade (REPeC), 12*(1), 115–138. https://doi.org/10.17524/repec.v12i1.1530

Oliveira, W. C., & Monte-Mor, D. S. (2022). A influência do ciclo de vida organizacional na violação de *convenants* financeiros. *Revista Brasileira de Gestão de Negócios, 24*(4), 708–722. https://doi.org/10.7819/rbgn.v24i4.4204

Penrose, E. T. (1952). Biological analogies in the theory of the firm. *The American Economic Review, 42*(5), 804–819. http://www.jstor.org/stable/1812528

Quinn, R. E., & Cameron, K. (1983). Organizational life cycles and shifting criteria of effectiveness: some preliminary evidence. *Management Science, 29*(1), 33–51. http://dx.doi.org/10.1287/mnsc.29.1.33

Regis, R. O., Ospina, R., Bernardino, W., & Cribari-Neto, F. (2023). Asset pricing in the Brazilian financial market: five-factor GAMLSS modeling. *Empirical Economics, 64*(5), 2373–2409. https://doi.org/10.1007/s00181-022-02316-3

Regis, R. O., Ospina, R., & Bernardino, W. (2024). Asset pricing: an alternative estimation for the five-factor model. *Revista Brasileira de Gestão de Negócios, 26*(3), e20230205. https://doi.org/10.7819/rbgn.v26i03.4272

Ribeiro, F., Carneiro, L. M., & Scherer, L. M. (2018). Ciclo de vida e suavização de resultados: evidências no mercado de capitais brasileiro. *Revista Contabilidade, Gestão e Governança, 21*(1), 63–79. https://doi.org/10.21714/1984-3925_2018v21n1a4

Santos, W. C. dos, Souza, G. H. D., Coaguila, R. A. I., & Takamatsu, R. T. (2023). Influência da Incerteza da Política Econômica nos níveis de Accruals e Retornos Anormais. *Advances in Scientific and Applied Accounting, 16*(1), 031–045/046. https://doi.org/10.14392/asaa.2022160102

Saravia, J. A., García, C. S., & Almonacid, P. M. (2021). The determinants of systematic risk: a firm lifecycle perspective. *International Journal of Finance & Economics, 26*(1), 1037–1049. https://doi.org/10.1002/ijfe.1834

Shahzad, F., Fareed, Z., Wang, Z., & Shah, S. G. M. (2020). Do idiosyncratic risk, market risk, and total risk matter during different firm life cycle stages? *Physica A: Statistical Mechanics and its Applications, 537*, 122550. https://doi.org/10.1016/j.physa.2019.122550

Shahzad, F., Lu, J., & Fareed, Z. (2019). Does firm life cycle impact corporate risk taking and performance? *Journal of Multinational Financial Management, 51*, 23–44. https://doi.org/10.1016/j.mulfin.2019.05.001

Sharpe, W. F. (1964). Capital asset prices: a theory of market equilibrium under conditions of risk. *The Journal of Finance, 19*(3), 425–442. https://doi.org/10.1111/j.1540-6261.1964.tb02865.x

Souza e Silva, S. C., Wickboldt, L. A., & Miranda, K. F. (2024). The top-5 Brazilian stocks' resilience over 13 years of political-economic events. *Revista de Administração Mackenzie, 25*(5), 1–27. https://doi.org/10.1590/1678-6971/eRAMG240075

Victor, F. G., Carpio, G. B., & Vendruscolo, M. I. (2018). Ciclo de vida das companhias abertas brasileiras como determinante de sua estrutura de capital. *Revista Universo Contábil, 14*(1), 50–71. https://doi.org/10.4270/ruc.2018103

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal, 5*(2), 171–180. https://doi.org/10.1002/smj.4250050207

Zhao, T., & Xiao, X. (2019). The impact of corporate social responsibility on financial constraints: does the life cycle stage of a firm matter? *International Review of Economics & Finance, 63*, 76–93. https://doi.org/10.1016/j.iref.2018.08.010

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding this submitted work.

DATA AVAILABILITY

The dataset that supports the findings of this study is not available.

AUTHOR CONTRIBUTIONS

Roles	1st Author	2nd Author	3rd Author
Conceptualization			♦
Data Curation	♦	♦	♦
Formal Analysis			♦
Funding Acquisition			
Investigation	♦	♦	♦
Methodology	♦	♦	♦
Project Administration			♦
Resources			
Software	♦	♦	♦
Supervision			♦
Validation			♦
Visualization	♦	♦	
Writing – Original Draft	♦	♦	♦
Writing – Review and Editing	♦	♦	♦