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The impact of share-based payment plans on the performance of brazilian companies before and during the Covid-19 pandemic

El impacto de los planes de pago basados en acciones en el desempeño de las empresas brasileñas antes y durante la pandemia de Covid-19

O impacto dos planos de pagamento baseado em ações no desempenho das companhias brasileiras antes e durante a pandemia de Covid-19

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Abstract

Purpose: The study investigated the effects of Share-Based Payment Plans (SBP) on the performance of Brazilian companies before and during the period of the Covid-19 pandemic.

Methodology: The sample comprised 186 companies listed on B3 in the Novo Mercado, Level 1 and 2 segments, between 2018 and 2021. Four performance indicators (EPS, ROA, ROE, and ROS) and three PBA metrics (Adoption, Type of Settlement, and Type of Exercise Price) were used. Regressions were estimated with panel data and random effects.

Results: The results indicate that, in the pre-pandemic period, stock-based payment (SBP) contracts with exercise prices higher than the stock value at the contract date (out of the money) had a positive effect on organizational performance, as measured by return on assets (ROA) and return on sales (ROS), suggesting that only plans with more demanding exercise price conditions are associated with performance improvements. However, during the pandemic, a negative relationship was observed between plan adoption and ROA, as well as between the settlement type and earnings per share (EPS), indicating that the use of SBP may increase risk-taking and negatively impact organizational performance in times of financial stress. Furthermore, the higher risk introduced by SBP results in more significant performance declines during recessive periods, making it essential to implement stricter monitoring of managerial actions during financial crises.

Contributions of the Study: The study contributes theoretically by advancing the understanding of the contingency of financial incentives in different economic scenarios based on Agency Theory. From a practical perspective, it underscores the importance of structuring stock option plans with flexibility, such as conditional and adjustable exercise prices for periods of financial stress, and strengthening governance. In the social aspect, it underscores the need for sustainable compensation policies that balance executive incentives with the protection of investors and stakeholders.

Keywords: Share-based Payment (SBP); Employee Stock Option (ESO); Corporate Performance; Pandemic; Corporate Sustainability.

Resumen

Objetivo: El estudio investigó los efectos de los Planes de Pago Basados en Acciones (PBA) en el desempeño de las empresas brasileñas antes y durante el período de la pandemia de Covid-19.

Metodología: La muestra estuvo constituida por 186 empresas listadas en B3 en los segmentos Novo Mercado, Nivel 1 y 2, entre 2018 y 2021. Se utilizaron cuatro indicadores de rendimiento

(EPS, ROA, ROE y ROS) y tres métricas de PBA (Adopción, Tipo de Liquidación y Tipo de Precio de Ejercicio). Las regresiones se estimaron con datos de panel y efectos aleatorios.

Resultados: Los resultados indican que, en el período previo a la pandemia, los contratos de pago basado en acciones (PBA) con precios de ejercicio superiores al valor de la acción en la fecha del contrato (fuera del dinero) tuvieron un efecto positivo en el desempeño organizacional, medido por el retorno sobre los activos (ROA) y el retorno sobre las ventas (ROS), lo que sugiere que solo los planes con condiciones de ejercicio más exigentes están asociados con mejoras en el desempeño. Sin embargo, durante la pandemia, se observó una relación negativa entre la adopción del plan y el ROA, así como entre el tipo de liquidación y las ganancias por acción (EPS), lo que indica que el uso de PBA puede aumentar la asunción de riesgos y afectar negativamente el desempeño organizacional en momentos de estrés financiero. Además, el mayor riesgo introducido por los PBA resulta en caídas más significativas del desempeño en períodos recesivos, lo que hace esencial la implementación de un monitoreo más riguroso de las acciones gerenciales durante crisis financieras.

Contribuciones del estudio: El estudio contribuye teóricamente al avanzar en la comprensión de la contingencia de los incentivos financieros en distintos escenarios económicos a partir de la Teoría de la Agencia. Desde un punto de vista práctico, destaca la importancia de estructurar los planes de stock options con flexibilidad, como precios de ejercicio condicionales y ajustables para períodos de estrés financiero, además de reforzar la gobernanza. En el aspecto social, evidencia la necesidad de políticas de remuneración sostenibles que equilibren los incentivos ejecutivos con la protección de inversores y stakeholders.

Palabras clave: Pago Basado en Acciones (PBA); Planes de Opciones sobre Acciones (POA); Desempeño Corporativo; Pandemia; Sostenibilidad Corporativa.

Resumo

Objetivo: O estudo investigou os efeitos dos Planos de Pagamentos Baseado em Ações (PBA) no desempenho das companhias brasileiras antes e durante o período da pandemia de Covid-19.

Metodologia: A amostra compreendeu 186 empresas listadas na B3 nos segmentos Novo Mercado, Nível 1 e 2, no período de 2018 à 2021. Foram utilizados quatro indicadores de desempenho (EPS, ROA, ROE e ROS) e três métricas de PBA (Adoção do plano, Tipo de liquidação e Tipo de preço de exercício). Foram estimadas regressões com dados em painel e efeitos aleatórios, utilizando erros padrão robustos clusterizados por empresa.

Resultados: Os resultados indicam que, no período anterior à pandemia, contratos de pagamento baseado em ações (PBA) com preços de exercício superiores ao valor da ação na data do contrato (fora do dinheiro) tiveram um efeito positivo sobre o desempenho organizacional, medido pelo retorno sobre ativos (ROA) e pelo retorno sobre vendas (ROS), sugerindo que apenas planos mais exigentes em relação ao preço de exercício estão associados a melhorias no desempenho. No entanto, durante a pandemia, observou-se uma relação negativa entre a adoção do plano e o ROA, bem como entre o tipo de liquidação e o lucro por ação (EPS), indicando que o uso de PBA pode aumentar a assunção de riscos e impactar negativamente o desempenho organizacional em momentos de estresse financeiro. Ademais, esse maior risco introduzido pelos PBA resulta em quedas mais expressivas no desempenho em períodos recesivos, tornando essencial um monitoramento mais rigoroso das ações dos gestores durante crises financeiras.

Contribuições do Estudo: O estudo contribui teoricamente ao avançar na compreensão da contingência dos incentivos financeiros em distintos cenários econômicos a partir da Teoria da Agência. Do ponto de vista prático, destaca a importância de estruturar planos de stock options de maneira flexível, como preços de exercício condicionais e ajustáveis para períodos de estresse financeiro, além de reforçar a governança. No aspecto social, evidencia a necessidade de políticas remuneratórias sustentáveis, equilibrando incentivos executivos e a proteção de investidores e stakeholders.

Palavras-chave: Pagamento Baseado em Ações (PBA); Stock Options Plans; Desempenho Corporativo; Pandemia; Sustentabilidade Corporativa.

1. Introduction

Historically, natural disasters and significant geopolitical events have been associated with adverse effects on equity markets and business performance (Guha-Sapir et al., 2012; Fernandes, 2020). The year 2020 witnessed one of these catastrophic events: the Covid-19 pandemic, a global crisis that impacted communities and businesses worldwide, resulting in severe repercussions for financial markets and the global economy (Sampaio, 2020; World Bank, 2020).

The Organization for Economic Cooperation and Development (OECD) has identified the Covid-19 pandemic as a global challenge of health, social, and economic nature. This scenario triggered a systemic crisis in international markets, reverberating through the real economy and stock markets worldwide, underscoring that the fight against the pandemic transcends the health sphere and encompasses economic considerations (Avelar et al., 2020).

In the Brazilian stock market, the effects of the pandemic-triggered crisis were particularly significant. The IBOVESPA index recorded the worst performance among the stock market indices analyzed during 2019-2020, with a 46.8% decline. Such a scenario reflects the deleterious impact on the market performance of listed national companies (Sampaio, 2020).

These events underscore the interconnection among global phenomena, economic crises, and the behavior of financial markets, underscoring the importance of comprehensive approaches that consider not only health but also economic factors in managing major crises, such as the COVID-19 pandemic.

One way to address the effects of financial crises, such as those caused by the Covid-19 pandemic, is to reinforce the alignment of interests between executives and investors through compensation (Manzoor, 2012; Shin & Konrad, 2017). Thus, companies seek to use mechanisms to elicit greater commitment and cooperation from managers to improve organizational performance by implementing compensation packages that reduce potential conflicts between executives and the organization's owners (Jensen & Meckling, 2008).

From this perspective, one way to minimize potential conflicts in the relationship between principals and agents is to use incentives, such as variable compensation, offered through Share-Based Payment Plans (SBP), also known as stock option plans (Hall, 2000). Chesney et al. (2020) state that companies have widely used this compensation strategy to improve organizational performance, increase productivity, and reduce costs, as it encourages the organization's employees to share business risks and returns with investors more effectively.

Consistent with Agency Theory, Lam and Chng (2006) found that SBP has a positive impact on the performance of U.S. firms. Similarly, Marcon and Godoi (2004) found a positive relationship between SBP compensation and financial performance in Brazilian companies.

However, Perobelli et al. (2012) note that this relationship depends on the specific characteristics of the SBP contract and may even adversely affect the organization's performance.

In contrast, Konraht et al. (2018) examined variable compensation as a whole, and Nascimento et al. (2013), when investigating only the adoption of SBP, concluded that there was no significant relationship between variable compensation and the adoption of SBP and organizational performance. However, Efendi et al. (2007) found an adverse effect of SBP on company performance, given the potential opportunistic behavior of managers and the incentives arising from the characteristics of the SBP contract.

The use of SBP can imply greater risk tolerance on the part of managers, which can negatively affect the performance of companies and even lead to accounting manipulations and fraud (Rajgopal & Shevlin, 2002; Efendi et al., 2007; Shue & Townsend, 2017; De Castilho et al., 2024). In this line, the behavior of greater risk-taking among executives holding options can be accentuated during financial crises to seek compensation for any decline in share prices and to guarantee the exercise of options (Sanders & Hambrick, 2007; Lim, 2017; Chesney et al., 2020). The significant volume of *stock options* owned by the executives of the companies Enron and Worldcom between the years 2000 and 2002, in the financial crisis at the turn of the millennium, and the number of options held by executives of the companies involved in the *subprime* crisis, from 2007 to 2010, are examples that seem to confirm this concern (Choo & Tan, 2007; Chesney et al., 2020).

Despite these questions, organizations have increased the use of SBP to address the effects of the pandemic, improve performance, and ensure executive retention (Zahariev et al., 2021). Given the controversial results regarding the effect of SBP on performance and the absence of research that sought to investigate the effect of SBP plans on the performance of organizations during the pandemic period, the present research has the following research problem: **What is the effect of stock option plans on the performance of Brazilian companies before and during the Covid-19 pandemic?** Thus, the general objective is to investigate the effect of stock option plans on the performance of Brazilian companies before and during the Covid-19 pandemic.

This study expands the literature by analyzing the impact of SBPs on organizational performance and highlighting the influence of financial incentives across different economic contexts from the perspective of Agency Theory. From a practical perspective, it emphasizes the importance of designing stock option plans with conditional clauses, such as adjustable strike prices during crises, and of strengthening governance and transparency mechanisms. In the social sphere, it emphasizes the need for sustainable remuneration policies that balance executive incentives with the protection of investors' and other stakeholders' interests.

2. Literature Review

2.1 Covid-19 Pandemic and Financial Performance of Companies

The Covid-19 outbreak has had profound impacts across diverse areas, especially in health, with repercussions for the economy, education, and other sectors in different countries. As a result, the pandemic crisis severely hampered the operations of several companies, severely affecting their financial performance (Fernandes, 2020).

The pandemic caused a significant decline in the transactions of organizations worldwide, resulting in a decrease in trade sales, industrial production, reduced profitability, company share prices, and increased debt levels, thus culminating in substantial consequences in the different dimensions of organizational performance (World Bank, 2020; Ahmad et al., 2021)

Avelar et al. (2021) found that the first year of the Covid-19 Pandemic resulted in significant value losses for companies listed on the [B]³, as well as a substantial reduction in profitability and a marked increase in debt levels, compromising the economic and financial sustainability of these organizations. A similar result is reported by Oliveira et al. (2021), which showed that in 2020 there was a reduction in value (Price over Book Value of the Share and Market-to-book); in economic performance (Return on Assets and Return on Equity), and in the volatility of the shares of companies listed on the Brazilian stock exchange.

However, despite the predominance of adverse reactions by companies globally, this effect was not uniform across countries and economic sectors, highlighting that characteristics of the organizations and their markets contributed to minimizing the effects of the pandemic on the performance of part of the entities (Shen et al., 2020; Hu & Zhang, 2021).

2.2 Variable Compensation and Share-Based Payment Plans

Compensation is a central element in business administration and plays a key role in motivating managers and aligning their decisions with organizational strategic objectives. When well structured, the remuneration policy can contribute significantly to achieving higher levels of financial performance (Balkin & Gómez-Mejia, 1987). However, the separation of ownership and control creates an environment conducive to agency conflicts, as shareholders do not always fully observe managerial actions, making it challenging to ensure they are aligned with maximizing owners' wealth (Jensen & Meckling, 2008).

One factor that intensifies these conflicts is informational asymmetry, as managers possess more information about a company than shareholders do. This asymmetry can favor opportunistic actions that prioritize individual interests over organizational objectives (Jensen & Meckling, 2008; Pessoa et al., 2019). To mitigate such problems, variable compensation is widely used as a mechanism to align incentives between the principal and agent, stimulating decision-making that favors the owners (Jensen & Murphy, 1990). Stock options are one of the primary variable compensation instruments for this purpose, as they align business performance with executive compensation, thereby reducing opportunistic behavior driven by insider information (Hall, 2000; Nascimento et al., 2013).

In this context, Sanders and Hambrick (2007) argue that stock options are an effective mechanism for mitigating three challenges posed by the exclusive use of fixed compensation for executives: negligence, managerial myopia, and risk aversion. By linking compensation to a company's performance, options encourage greater dedication from managers, reduce negligence, and align their interests with those of shareholders (Eisenhardt, 1989). In addition, they reduce managerial myopia, as the vesting period requires a long-term horizon, thereby stimulating investments that strengthen the organization's sustainability (Hall & Liebman, 1998). Stock options also minimize risk aversion by encouraging bolder strategic decisions (Haugen & Senbet, 1981; Rajgopal & Shevlin, 2002), as executives can make significant gains if projects succeed while their direct losses are limited. Therefore, adopting share-based payments can be an alternative to mitigate the existing conflicts of interest between the agent and the principal.

To investigate the relationship between executive compensation and financial performance, Krauter (2013) analyzed a sample of 82 Brazilian companies in 2008 and 2009 and found a significant relationship between variable compensation and profitability over equity (ROE). Konraht et al. (2018) analyzed 75 companies that are part of the IBrX-100 index of the Brazilian stock exchange between 2010 and 2014 and concluded that there is no relationship between the percentage of variable compensation offered and organizational performance, measured by return on assets (ROA), EBITDA, total asset turnover, and operating cash flow.

The lack of correspondence between research results on the effects of variable compensation on the performance of Brazilian companies is also evident when the effect of SBP is analyzed. Nascimento et. al. (2013), investigating a sample of approximately 260 companies listed on the Brazilian stock exchange, from 2007 to 2009, analyzed the association of SBP adoption and organizational performance, considering four different metrics: ROA, ROE, Return on Sales (ROS), and Earnings per Share (EPS). The results indicate a non-significant association between the company's SBPs and its performance during the period investigated.

In contrast, Marcon and Godoi (2004) investigated whether the financial and market performance of 32 companies on Exame Magazine's list of the 100 best companies to work for was related to their adoption of SBPs. The results indicate that companies that adopted SBP had higher ROE, net sales, and abnormal returns than other companies in the same sector that did not adopt SBP. These results are consistent with those of Beuren et al. (2014), who found a positive alignment between the remuneration of stock options and the market performance of Brazilian companies from 2009 to 2013.

Unlike other studies, Perobelli et al. (2012) investigated the relationship between SBP and performance in Brazilian stock exchange companies, using not only the presence or absence of SBP but also the effect of the relationship between the exercise price and share price on the date of the grant. The results show that the SBP generates wealth for shareholders only when the plan is structured more onerously relative to the exercise price (exercise in cash and out of the money), and this relationship is more pronounced when companies exhibit better corporate governance practices.

Although some previous studies have not identified a significant relationship between variable compensation linked to SBP and organizational performance, a substantial portion of the literature, grounded in Agency Theory (Jensen & Meckling, 2008), maintains that stock options constitute an effective mechanism for aligning interests and improving corporate performance. Based on this theoretical and empirical framework, the following hypotheses are formulated:

H1: Stock-based compensation (SBP) positively influences the financial performance of Brazilian companies before the Covid-19 Pandemic.

H2: The liquidation of the SBP in stocks positively influenced the financial performance of Brazilian companies before the Covid-19 Pandemic.

H3: Contracts with an out-of-the-money strike price positively influenced the financial performance of Brazilian companies in the period prior to the Covid-19 Pandemic.

Despite the optimistic view of the effects of SBPs, Rajgopal and Shevlin (2002) warned that the most demanding characteristics of executive SBP contracts entail greater risk for companies. The authors investigated U.S. oil and gas companies. They observed that higher-risk SBP incentives for CEOs are positively associated with the exploration of riskier future projects and negatively associated with companies' oil price hedging mechanisms, demonstrating a clear relationship between more demanding SBPs and a significant increase in organizational risk. A similar result was found for Brazilian companies by De Castilho et al. (2024), who indicated that the use of compensation by SBP is associated with greater fiscal aggressiveness and the potential risk of this behavior for future organizational performance.

Although the use of SBPs for executives has been pointed out as an effective strategy to mitigate the challenges imposed by periods of financial instability, such as the one seen during the Covid-19 Pandemic (Zahariev et al., 2021), the use of this type of compensation has also been the target of criticism, especially in times of crisis, because of its potential to encourage excessive risk-taking by executives (Sanders & Hambrick, 2007). In this sense, Choo and Tan (2007) highlight the correlation between the increase in operational risk and the

volume of options exercised by the executives of Enron and WorldCom between 2000 and 2002, a period marked by the financial crisis at the turn of the millennium.

A similar result was found by Efendi et al. (2007), who investigated the relationship between accounting fraud that led to the republication of the financial statements of American companies and the use of SBP during the early 2000s financial crisis. The results indicate that the probability of a fraudulent financial statement increases when the CEO has sizable holdings of stock options with more demanding exercise terms.

The same criticisms were again mentioned during the *subprime* financial crisis, which occurred between 2007 and 2010, in which most of the companies that went bankrupt were characterized by the use of significant compensation through SBPs for their executives, thus promoting an increase in the tolerance for risk exposure by the managers of these institutions (Chesney et al. 2020).

Lim (2017) highlights that SBP benchmarks influence executives' risk-taking propensity directly. In scenarios where the potential gains from exercising options are lower than in previous periods, especially in the context of financial distress, executives tend to take on more risk to improve the company's performance and increase the potential gain. However, when the potential gain exceeds prior periods, as in situations of financial slack, executives' risk propensity tends to decrease.

Corroborating this perspective, Sanders and Hambrick (2007) show that high levels of stock options in executive compensation not only increase the magnitude of investments but also intensify the volatility of results. The authors identify that CEOs whose incentives are mostly option-based prioritize high-variance designs, seeking to maximize rewards even in the face of significant risk of loss. This behavior becomes even more pronounced during periods of recession, when the pressure to recover share value intensifies the adoption of risky strategies, often resulting in asymmetric performance characterized by significant losses that exceed gains.

Given this scenario, it is observed that although SBPs can be an effective instrument for encouraging executive performance, their impact can be ambiguous, especially during periods of crisis. The literature indicates that an emphasis on stock-based compensation can intensify managers' risk-taking, resulting in greater volatility and uncertainty for companies. During the Covid-19 Pandemic, which was characterized by an unstable and unpredictable economic environment, these effects may have been even more pronounced. Thus, based on this evidence, the following research hypotheses are proposed:

H4: Stock-based compensation (SBP) negatively influences the financial performance of Brazilian companies during the Covid-19 Pandemic.

H5: The liquidation of the SBP in stocks negatively influenced the financial performance of Brazilian companies during the Covid-19 Pandemic.

H6: A contract with an out-of-the-money strike price negatively influences the financial performance of Brazilian companies during Covid-19.

3. Methodological Procedures

3.1. Sample Selection

To investigate the impact of PBA on the financial performance of Brazilian companies, publicly traded companies listed on [B]³ that belong to the differentiated Corporate Governance segments—Novo Mercado, Level 1, and Level 2—were selected. The choice of these segments is justified by their stricter governance and transparency rules, which enhance information comparability and reduce potential distortions arising from less uniform accounting practices

(KPMG, 2023). Thus, greater data reliability is ensured for analyzing the relationship between PBAs and performance.

Initially, information was obtained from 250 companies; however, companies in the financial sector were excluded because they follow different accounting regulations. Companies with negative equity were also excluded, as they could influence the ROE analysis, and companies that did not have complete information on all variables for every year. Therefore, the final sample comprised 186 companies and 683 observations across various sectors.

The years from 2018 to 2021 were analyzed, since 2018 and 2019 were before the pandemic, while 2020 and 2021 were the years that showed the most significant effects of the Covid-19 crisis. The research data were collected from the [B]³ and Economatica databases. Information on PBAs was gathered from the explanatory notes on Share-Based Payment and Stock Option Plans found in the companies' financial statements.

3.2. Research Variables

As performance *proxies* for the definition of the model-dependent variables, the following measures were selected: EPS (Earnings per Share), ROA (Return on Assets), ROE (Return on Equity), and ROS (Return on Sales). Earnings per share (EPS) is an indicator that shows how much each share can generate in profit for the investor. ROE demonstrates a company's ability to remunerate the capital invested by investors. ROA is a measure of a company's ability to generate profit in relation to the total investment made. ROS measures a company's performance by analyzing the percentage of total revenue converted into profits.

As independent variables of interest, three dichotomous variables related to SBP plans were used: the first (ASBP) assumed a value of 1 when SBP was adopted and 0 otherwise. The second variable (LIQSHARE) indicates the type of settlement for the SBP, assuming a value of 1 for settlement in shares and 0 for cash or mixed settlement. The third variable (OUTOF) indicates the type of SBP contract, assuming a value of 1 when the strike price is greater than the share value on the contract date (out of the money) and 0 if the strike price is equal to the share price on the contract date (in the money) or if the strike price is less than the share price on the contract date (inside-the-money).

The following control variables were used: investment opportunities (INV), whose inclusion is justified because it is related to the hypothesis that the more future investment opportunities the company has, the more resources it will need to raise, and therefore, the better its mechanisms for aligning interests and performance should be (Perobelli et al., 2012); natural logarithm of assets (LNAT), representing the size of the company, which can influence performance; leverage (LEV) is justified by controlling the potential impacts of the debt levels in relation to the creation of value for the shareholder; and segment (SEG) representing the differentiated Corporate Governance segment of the companies listed on [B]³ because it considers that the companies listed in the Novo Mercado segment voluntarily adopt the best corporate governance practices in relation to the others and this may influence performance.

Table 1 summarizes the research variables, highlighting the type, variable name, and its description, as well as the main literature sources.

Table 1
Description of Variables

Types of Variables	Variables	Description	Source
Dependents	Earnings per Share (EPS)	Ratio of Net Income (NI) to Outstanding Shares (OS) – (NI/OS)	Beuren et al. (2014) Nascimento et al. (2013)
	Return on Asset (ROA)	Ratio of Net Income to Total Assets (TA) - $(NI/TA) \times 100$	Beuren et al. (2014); Nascimento et al. (2013)
	Return on Equity (ROE)	Ratio of Net Income to Book Value (BV) - $(NI/BV) \times 100$	Nascimento et al. (2013) Marcon and Godoi (2004)
	Return on Sales (ROS)	Ratio of Net Income to Net Revenue (NR) - $(NI/NR) \times 100$	Pessoa et al. (2019); Nascimento et al. (2013)
Independents of Interest	Share-Based Payment Plan (ASBP)	Binary variable indicative of the existence of SBP (1 - Plan Adoption; 0 - Non-Adoption)	Pessoa et al. (2019); ErmeI and Medeiros (2019) Marcon and Godoi (2004)
	Share-Based Payment Type (LIQSHARE)	Binary variable indicative of the type of SBP (1 - Settlement in Shares; 0 - Settlement in Cash or Mixed)	ErmeI e Medeiros (2019)
	Type of Contract (OUTOF)	Binary variable indicative of the type of SBP settlement contract (1 - out-of-the-money; 0 - in-the-money or inside-the-money)	Perobelli et al. (2012)
Controls	Investment Opportunities (INV)	Ratio of the market value of stocks (MV) plus total debt (TD), relative to total assets – $(MV + TD) / TA$	ErmeI e Medeiros (2019); Perobelli et al. (2012)
	Natural logarithm of assets (LNAT)	Natural logarithm of total asset	Pessoa et al. (2019); ErmeI and Medeiros (2019)
	Leverage (LEV)	Percentage ratio of Liabilities to Equity – $(TD / BV) \times 100$	Pessoa et al. (2019)
	Segment (SEG)	Differentiated Corporate Governance segment of Companies listed on [B] ³ , 1 for companies in the Novo Mercado and 0 for companies in the other segments	Pessoa et al. (2019)

Source: research data.

3.3. Econometric model

The econometric model used to investigate the impact of SBP plans was based on Perobelli et al. (2012) and adapted to the research objective, as shown in Equation 1:

$$\text{Performance [EPS, ROE, ROA, ROS]}_{it} = \beta_0 + \beta_1 \text{SBP [ASBP, LIQSHARE, OUTOF]}_{it} + \beta_n [\text{control variables}]_{it} + \varepsilon \quad (1)$$

Thus, the econometric model presented in Equation 1 was estimated using panel-data multiple regression. Regressions were estimated for each of the four performance variables in relation to each of the three variables of interest to SBP, totaling 12 models per period analyzed, estimated separately for the period before the Covid-19 Pandemic (2018 and 2019) and for the

pandemic period (2020 and 2021). Due to outliers, the numerical data were winsorized at the 1% level.

Adequacy tests for these models (Chow, Breusch-Pagan, and Hausman) indicated that the random-effects model was the most appropriate. The variables did not follow a normal distribution, and the data were heteroscedastic; therefore, a robust regression with clustered standard errors by company was used.

4. Results

To show the number of companies with compensation under Share-Based Payment (SBP) during the research period, Figure 1 was prepared, including companies in the differentiated corporate governance segments of B3: Novo Mercado, Level 1, and Level 2. Figure 1 shows the companies that, in the fiscal years 2018, 2019, 2020, and 2021, had SBP, compared with those that did not, separated by economic sector classification into B3.

Figure 1 shows that the Industrials and Consumer Discretionary sectors account for 46% of the total number of companies. Notably, 49% of the companies with SBP are allocated to these sectors (51 companies out of 103). In the Communications Services, Consumer Staples, Materials, Energy, Health Care, Information Technology, and Utilities sectors, only 28% offered this type of compensation.

Of the 186 companies analyzed, 103 (55%) had stock option plans, indicating that many companies use this type of compensation. It is noteworthy that in the differentiated segment of corporate governance, the rules are stricter. There is concern about minimizing investors' risk, which justifies the greater use of this type of compensation in companies in this segment, as managers' shareholding can align interests with shareholders and reduce agency conflicts, as noted by Perobelli et al. (2012).

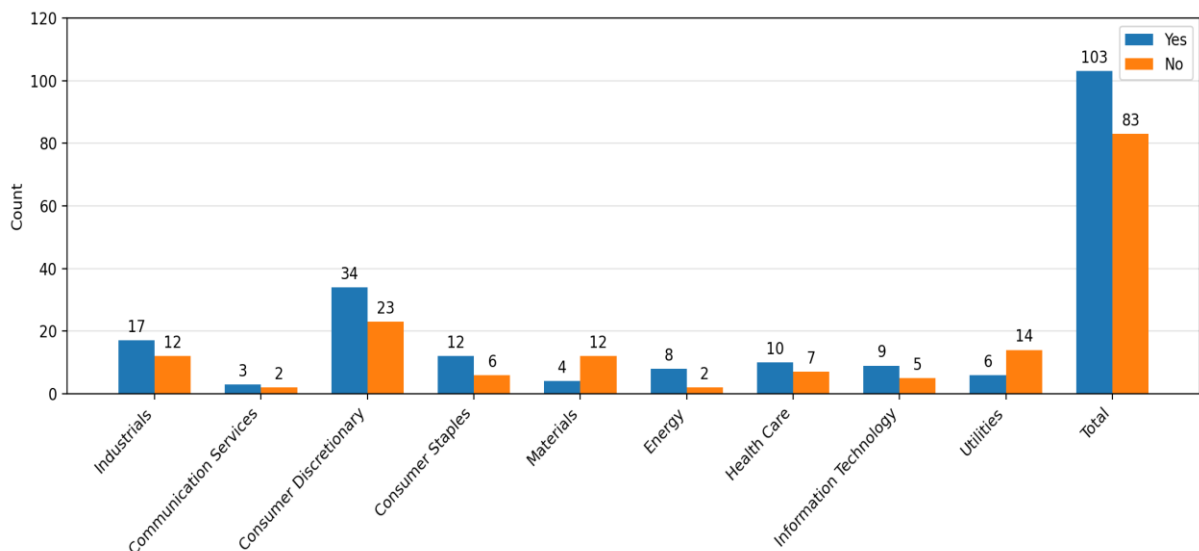


Figure 1 : Companies in the sample that had stock option plans by sector.

Source: survey data.

Table 2 presents the stock options that can be granted when the plan is issued by the company, grouped into three categories: out-of-the-money, in-the-money, and inside-the-money. In the in-the-money option, the exercise price is equal to the share price on the date of the grant; in the inside-the-money option, the exercise price is lower than the share price on the grant date; and in the out-of-the-money option, the exercise price is higher than the share price at the grant date.

Table 2*Type of stock options*

Grant option	Enterprises
Out of the money	52
In the money	16
Inside the money	35
Grand Total	103

Source: *survey data.*

Table 2 shows that 50% of the companies analyzed adopt the out-of-the-money option, which indicates the companies' intention to encourage employees to seek to increase the company's value, but it may also imply a greater risk tolerance on the part of the executives of these organizations (Perobelli et al., 2012). It is also observed that 15% of the companies chose the at-the-money option, which requires less effort from employees to exercise the options. In this sense, 52 of the companies with SBPs in the sample had more demanding contracts for their employees, mostly executives, since the exercise prices of the stock option contracts for these employees were higher than the price at which the share was traded on the market on the contract date. Therefore, these are contracts with greater risk for the employee and are more demanding (Efendi et al., 2007).

Table 3 verifies the settlement form for these transactions: shares, cash, or mixed. It is noted that, of the 103 companies in the sample, 65% foresee settlement through the delivery of equity instruments (i.e., shares). The other companies in the sample, however, used cash or mixed settlements.

Table 3*Settlement Method*

Options Liquidation	Enterprises
Share	67
Money	35
Mixed	27
Grand Total	103

Source: *survey data.*

Table 4 presents the descriptive statistics (number of observations, mean, standard deviation, minimum, and maximum values) of the sample variables before the Covid-19 Pandemic period.

Table 4*Descriptive statistics of variables before the Pandemic (2018 and 2019)*

Variable	Obs.	Average	Standard deviation	Min	Max
EPS	329	0.1550858	3.653814	-26.8831	7.352026
ROA	329	3.644377	7.812524	-30.8	22.2
ROE	329	5.634606	41.03791	-249.6	89.1
ROS	329	0.0476139	0.2007604	-0.986605	0.558151
INV	329	1.462393	1.996345	-3.47966	11.52981
LNAT	329	15.27045	1.587741	11.75801	19.64949
LEV	329	3.215923	5.167475	0.129157	34.46704

Source: *research data.*

Analyzing the results in Table 4, it is noted that return on equity was the performance indicator with the highest average, 5.63, followed by return on assets, which presented an

average of 3.64. Conversely, ROS had the lowest mean (0.04) and EPS (0.15). These results corroborate the findings of Pessoa et al. (2019).

Table 5 presents the results of the descriptive statistics during the Covid-19 Pandemic period.

Table 5

Descriptive statistics of variables during the Pandemic (2020 and 2021)

Variable	Obs.	Average	Standard deviation	Min	Max
EPS	353	0.9117619	3.012722	-11.68194	14.60092
ROA	353	3.905949	7.814246	-24.1	24.3
ROE	353	5.20398	71.3778	-146	206.4
ROS	353	0.0236628	0.3352478	-1.915097	0.637581
INV	353	0.5448748	0.188623	0.166507	0.976807
LNAT	353	15.65101	1.467301	12.78506	19.98539
LEV	353	4.411161	16.06506	0.112391	141.03

Source: research data.

To assess the performance of the indicators during the pandemic period (2020 and 2021) compared to the previous period (2018 and 2019), a T-test was applied for paired mean differences. The results indicated statistical significance of less than 5% for all differences between the indicators analyzed, except for ROA and ROE, whose differences were not statistically significant (p-values of 0.55 and 0.91, respectively). Among the indicators with significant differences, earnings per share (EPS) increased, possibly due to the sharp drop in share prices during the period, which reduced the denominator of the index. However, there was a 50% reduction in average return on sales (ROS), from 4.7% to 2.3%, and a 63% reduction in the investment opportunity indicator (INV), while leverage (LEV) increased, suggesting that some companies became highly leveraged. These results reflect the impacts of the financial crisis triggered by the pandemic, including demand contraction, supply chain disruptions, greater risk aversion to investments, and the consequent increase in leverage among Brazilian companies (World Bank, 2020; Sampaio, 2020).

Table 6

Panel A- Correlation between variables before the Pandemic (2018 and 2019)

Variables	EPS	ROA	ROE	ROS	INV	LNAT	LEV
EPS	1.00						
ROA	0.61***	1.00					
ROE	0.66***	0.78***	1.00				
ROS	0.62***	0.77***	0.57***	1.00			
INV	0.03	0.02	0.04	-0.02	1.00		
LNAT	0.21***	0.07*	0.08*	0.19***	0.14***	1.00	
LEV	-0.19***	-0.27***	-0.33***	-0.21***	0.11**	0.03	1.00

Panel B- Correlation between variables during the Pandemic (2020 and 2021)

Variables	EPS	ROA	ROE	ROS	INV	LNAT	LEV
EPS	1.00						
ROA	0.68***	1.00					
ROE	0.28***	0.35***	1.00				
ROS	0.58***	0.77***	0.27***	1.00			
INV	-0.04	0.04	0.05	-0.13**	1.00		
LNAT	0.31***	0.13***	-0.02	0.17***	-0.18***	1.00	
LEV	-0.19***	-0.19***	-0.14***	0.01	0.02	-0.04	1.00

Significance is given by *** (1%), ** (5%), and * (10%).

Source: research data.

The analysis of the correlation matrices in Table 6, considering the pre-pandemic (Panel A: 2018-2019) and pandemic (Panel B: 2020-2021) periods, reveals substantial changes in the patterns of association between the indicators. In the pre-pandemic period, ROA and ROE exhibited a strong correlation (0.78), as did ROA and ROS (0.77), suggesting that operating efficiency (net income) affected both return on assets and return on shareholders' equity. During the pandemic, the correlation between ROA and ROE dropped to 0.35, whereas the ratio between ROA and ROS remained high (0.77). This indicates that, despite the crisis, operational efficiency continued to affect the net operating margin, but its relationship with shareholder returns became less pronounced, suggesting possible changes in the cost structure and the financial policies adopted to mitigate the crisis's impact.

The correlation between EPS and profitability indicators also varied. The ratio between EPS and ROA increased from 0.61 to 0.68, indicating that shareholder value creation is even more closely associated with operational efficiency during the pandemic than before. Conversely, the correlation between EPS and ROE fell significantly (from 0.66 to 0.28), reinforcing the idea that the crisis affected return on equity differently, possibly due to fluctuations in financial leverage or profit retention policies adopted by companies. The behavior of leverage (LEV) in relation to performance indicators remained relatively stable, with negative correlations in both periods, though without significant changes.

The control variables (INV, LNAT, and LEV) did not exhibit strong correlations with each other across any of the periods, ruling out multicollinearity. However, the relationship between LNAT (company size) and INV (investment opportunities) has evolved. In the pre-pandemic period, the positive correlation (0.14) indicates that larger companies have more investment opportunities. During the pandemic, this ratio reversed (-0.18), suggesting that larger companies faced a greater reduction in investment opportunities, possibly due to strategies to preserve their liquidity.

Table 7 presents the results of the regressions of the models in Equation 1 for the period before the pandemic (2018–2019). The results indicate that before the Covid-19 Pandemic, the adoption of SBP (ASBP) and settlement in shares (LIQSHARE) were not statistically significant in any of the estimated models, rejecting hypotheses H1 and H2, and confirming the findings of Konraht et al. (2018) and Nascimento et. al. (2013). The literature highlights that the effectiveness of SBPs can vary depending on the economic context and the specific design of the contracts (Haugen & Senbet, 1981; Efendi et al., 2007)

The OUTOF variable (out-of-the-money contracts) presented a positive and significant coefficient for the models with ROA ($p < 10\%$) and ROS ($p < 5\%$), leading to the non-rejection of Hypothesis H3. This result suggests that more demanding contracts, in which the exercise price exceeds the share's value on the date of the grant, are associated with better corporate performance during periods of financial stability. These findings corroborate studies indicating that out-of-the-money options encourage managers to seek greater appreciation in the company's stock to obtain financial gains (Perobelli et al., 2012). According to Lim (2017),

such incentives are particularly effective in stable economic environments, where managers can focus on long-term strategies.

Thus, the results suggest that the effectiveness of SBPs lies not only in their adoption but also in the careful definition of their contractual conditions. This dynamic aligns with the literature on risk incentives linked to variable compensation, which argues that compensation structures that impose greater risk on executives can lead to more strategic decisions aligned with shareholders' interests (Devers et al., 2007). Thus, in times of greater financial stability, stricter rules governing SBP grants act as disciplinary mechanisms, ensuring greater alignment of executive incentives with the creation of value for the company (Sanders & Hambrick, 2007).

The results are supported by the arguments of studies such as those of Haugen and Senbet (1981) and Rajgopal and Shevlin (2002), which indicate that more demanding contracts can stimulate bolder strategic decisions, mitigate agency problems, and encourage sustainable valuation of the organization. In this sense, during periods of stability, out-of-the-money options can serve as an efficient mechanism for aligning executives' and shareholders' interests, ensuring that the company's growth is linked to solid, long-term performance.

The control variable, natural logarithm of assets (LNAT) in the EPS and ROS models had a positive, significant coefficient, indicating that company size influences performance when measured by return on sales and earnings per share. In contrast, the variable leverage (LEV) was statistically significant in almost all models and had a negative coefficient. The segment variable (FES) was significant only for the ROS model, indicating that the type of corporate governance segment can influence the return on sales index.

Table 7*Regression in the Prior to the Covid-19 Pandemic (2018 and 2019)*

Variable	EPS			ROA			ROE			ROS		
	ASBP	LIQSHARE	OUTOF	ASBP	LIQSHARE	OUTOF	ASBP	LIQSHARE	OUTOF	ASBP	LIQSHARE	OUTOF
CONS	-8.104044** (4.027243)	-13.49585* (8.120194)	-13.98495* (8.419704)	-0.2904893 (8.383066)	-14.79558 (13.72696)	-15.06679 (13.76406)	-43.00461 (43.4912)	-97.13812 (78.22385)	-99.71312 (79.88069)	-0.2363224 (0.151872)	-0.3891703* (0.2176344)	-0.3772684* (0.210749)
ASBP	0.0356308 (0.5982251)			0.0498789 (1.252447)			5.369118 (6.101925)			0.0352662 (0.031207)		
LIQSHARE		-1.069175 (0.738096)			-1.040071 (1.56234)			-6.399113 (6.133727)			-0.0059994 (0.0360478)	
OUTOF			0.9918259 (0.710000)			2.82367* (1.544575)			8.923499 (5.78896)			0.0825384** (0.032246)
INV	0.0156759 (0.0917628)	-0.0543115 (0.0947954)	-0.0373682 (0.097113)	0.0511392 (0.1549948)	-0.1219208 (0.2233333)	-0.0881134 (0.225154)	0.9770529 (1.085089)	-0.63214 (1.130863)	-0.5007544 (1.15247)	-0.0022625 (0.003344)	-0.0058692 (0.0053821)	-0.0047492 (0.005256)
LNAT	0.5500733*** (0.2111565)	0.7476954** (0.378978)	0.7159858* (0.367866)	0.3192573 (0.4880579)	0.9714485 (0.741408)	0.8877846 (0.702906)	3.418926 (2.379705)	5.039912 (3.57281)	4.762899 (3.484147)	0.022026** (0.009277)	0.0261524** (0.0133268)	0.0234895** (0.011813)
LEV	-0.144632** (0.059293)	-0.1144636 (0.0773432)	-0.1076721 (0.083336)	-0.41103*** (0.125655)	-0.3065333* (0.1854304)	-0.288059 (0.208538)	-3.8091** (1.70657)	-0.4029959 (1.436451)	-0.329942 (1.522543)	-0.0064*** (0.002211)	-0.005429** (0.0021394)	-0.0049664* (0.002762)
SEG	0.0978355 (1.266149)	3.18535 (3.058181)	3.053881 (3.044221)	-0.0062507 (1.776604)	5.111045 (3.731298)	4.330543 (3.633459)	2.8199 (12.07763)	34.33851 (29.68999)	32.47224 (29.43783)	0.060625* (0.035385)	0.075832** (.0303491)	0.046021* (.0270245)
Obs.	329	162	162	329	162	162	329	162	162	329	162	162
Enterprises	169	86	86	169	86	86	169	86	86	169	86	86
Panel Estimation	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects

Note: Standard errors are shown in parentheses. Significance is given by *** (1%), ** (5%), and * (10%). CONS: constant of regressions; ASBP: adoption of SBP; LIQSHARE: settlement in shares; OUTOF: out-of-the-money contract, in which the exercise price is higher than the share price on the date of the contract grant; INV: investment opportunity; LNAT: natural logarithm of the asset; LEV: leverage; SEG: differentiated Corporate Governance segment of companies listed on [B]³ represented by listing on the Novo Mercado.

Source: research data.

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Table 8 presents the results of the regressions of the models of Equation 1 estimated for the period of the Covid-19 Pandemic (2020 and 2021). During the economic crisis caused by the pandemic, the impacts of SBPs were substantially different. The variable ASBP showed a negative and significant association ($p < 5\%$) with ROA, indicating that the adoption of SBP was associated with a reduction in return on assets, which implies that hypothesis H4 was not rejected. Similarly, the LIQSHARE variable showed negative significance ($p < 10\%$) in the EPS model, suggesting that the use of SBP settled in shares reduced shareholders' profits, indicating the non-rejection of hypothesis H5.

These findings corroborate studies that indicate that, in times of financial instability, stock-based incentives can induce managers to take excessive risks to try to reduce their own risk of exercising options, which can lead to riskier choices of operational strategies and the reduction of financial protection procedures (Rajgopal & Shevlin, 2002; Efendi et al., 2007; Chesney et al., 2020).

In contrast, unlike the period before the pandemic, the OUTOF variable was not statistically significant in any of the models in Table 8, rejecting hypothesis H6. This result suggests that, in times of crisis, external factors and economic uncertainty can mitigate the impact of contract type on a company's performance. Studies indicate that in unstable contexts, managers may prioritize protecting their own interests, thereby reducing the effectiveness of certain types of option-based incentives (Devers et al., 2008). This perspective is reinforced by Greiner and Julian (2021), who argue that specific stock option contracts may become less attractive during crises. This can lead managers, under very demanding contracts that indicate a greater certainty of current loss for the executive's exercise, as can occur with out-of-the-money contracts, to adopt more conservative strategies to prevent future losses, which can reduce the effectiveness of this type of contract.

The results in Table 8, taken together, are in line with Sanders and Hambrick (2007) and Lim (2017) in indicating that in scenarios where the exercise of options generates lower returns, managers tend to take greater risks to compensate for the loss of perceived value, which can enhance not only riskier operational strategies, but also the volatility of the results. During the pandemic, this effect may have been amplified by the severity of its impact on the business environment, generating intense pressure on executives to recover shareholder value and encouraging the adoption of higher-risk strategies. However, the most demanding contracts for managers may, once an executive perceives a loss, reduce the effectiveness of this type of contract. Thus, in times of crisis, poorly designed incentives can exacerbate opportunistic behavior and increase organizational vulnerability, underscoring the importance of well-structured compensation policies aligned with the economic context.

The control variables maintained trends similar to those of the previous period: leverage (LEV) remained negatively correlated with performance, while company size (LNAT) continued to be a positive factor in several models, which shows that the greater the set of financial and economic resources that the company manages, the greater its return tends to be (Ermel & Medeiros, 2019).

Table 8*Regression in the Covid-19 Pandemic Period (2020 to 2021)*

Variable	EPS			ROA			ROE			ROS		
	ASBP	LIQSHARE	OUTOF	ASBP	LIQSHARE	OUTOF	ASBP	LIQSHARE	OUTOF	ASBP	LIQSHARE	OUTOF
CONS	-6.308878** (2.515834)	-7.807136*** (2.850304)	-7.945962** (3.068708)	-2.142258 (5.856813)	-15.65874* (8.385707)	-15.90948* (8.607307)	49.25613 (42.41322)	-26.0818 (55.20287)	19.54465 (57.08751)	-0.341413 (0.2583847)	-0.7472202 (0.5315533)	-0.7684858 (0.544257)
ASBP	-0.3742185 (0.3441823)			-2.244569** (0.9809572)			-8.296127 (5.726745)			-0.0659282 (0.0448391)		
LIQSHARE		-0.6108585* (0.3689594)			-2.094497 (1.385355)			-12.67698 (8.309217)			-0.0726594 (0.0598785)	
OUTOF			-0.7823574 (0.5618386)			-0.7616795 (1.558114)			-3.048592 (9.499191)			0.0321213 (0.076336)
INV	0.0934363 (0.6594462)	0.1502937 (0.9010417)	0.3525856 (0.9959565)	1.182256 (2.361484)	-1.312027 (3.943688)	-0.7952082 (3.945355)	19.43325 (19.28257)	28.39796 (28.39796)	34.5815 (28.49072)	-0.1209735 (0.1162455)	-0.3128245 (.196433)	-0.297028 (0.200029)
LNAT	0.5792008** * (0.1426543)	0.5634735*** (0.1541095)	0.5655249** * (0.1585129)	0.6589773* (0.3408603)	1.193331*** (0.4489121)	1.156686** (0.4665451)	-0.2103643 (2.133424)	2.452401 (2.685556)	2.260108 (2.747315)	0.0326314** (0.015866)	0.0509211* (0.0280843)	0.0493078* (0.028147)
LEV	-0.0248631** (0.0108182)	-0.0189474 (0.0141888)	-0.0198272 (0.0132984)	-0.0706353** (0.0285817)	-0.0662319 (0.0407851)	-0.06601* (0.0399285)	-0.60935* (0.354021)	-0.7161883 (0.4581285)	-0.7102293 (0.460135)	-0.0040128* (0.0022518)	-0.0044666 (0.003436)	-0.0044234 (0.003443)
SEG	-1.853077** (0.7585124)	-0.2209705 (0.7475195)	0.0276513 (0.7844261)	-4.065639*** (1.468852)	1.170341 (3.054228)	1.374624 (3.16258)	6.537921 (10.72254)	33.44692* (19.2256)	33.91786* (19.54465)	-0.0354838 (0.0560125)	0.5315533 (0.1864015)	0.1459086 (0.182337)
Obs.	353	181	181	353	181	181	353	181	181	353	181	181
Enterprises	181	96	96	181	96	96	181	96	96	181	96	96
Panel Estimation	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects

Note: Standard errors are shown in parentheses. Significance is given by *** (1%), ** (5%), and * (10%). CONS: constant of regressions; ASBP: adoption of SBP; LIQSHARE: settlement in shares; OUTOF: out-of-the-money contract, in which the exercise price is higher than the share price on the date of the contract grant; INV: investment opportunity; LNAT: natural logarithm of the asset; LEV: leverage; SEG: differentiated Corporate Governance segment of companies listed on [B]³ represented by listing on the Novo Mercado.

Source: research data.

The findings of this study highlight that the impact of SBP depends on the economic context. Before the pandemic, out-of-the-money contracts were associated with better performance, suggesting that stricter incentives steered managers toward long-term strategies and sustainable growth. These results are consistent with the literature, which argues that SBPs can be effective when they are structured and aligned with shareholder interests (Zaharieva et al., 2021).

However, during the pandemic, SBPs negatively impacted companies' performance, reinforcing the thesis that, in times of crisis, such incentives can generate adverse effects. Previous studies (Haugen & Senbet, 1981; Rajgopal & Shevlin, 2002; Greiner & Julian, 2021) have pointed out that under high uncertainty, managers may become more risk-averse (in the case of greater certainty of loss, as in the case of out-of-the-money contracts) or, conversely, adopt risky short-term strategies to offset losses, as evidenced by the negative results associated with SBPs in Table 8.

In these situations, Greiner and Julian (2021) suggest that SBP effectiveness can be enhanced by structuring contracts flexibly, taking into account factors such as the economic context and managers' risk tolerance. These findings suggest that companies should adopt precise oversight mechanisms and targets to mitigate risks during crises, ensuring that incentives are aligned with the organization's sustainable performance.

Thus, the results reinforce the need for more adaptable policies in the formulation of SBP. Companies should recognize that SBP effectiveness is not uniform and depends on the economic environment, contract structure, and managers' ability to respond to external shocks. Adjustments to incentive mechanisms can minimize negative impacts and promote more efficient alignment between managers and shareholders, thereby contributing to corporate sustainability across different market conditions.

5. Final Considerations

This study investigates the effects of Share-Based Payment Plans (SBP) on the performance of Brazilian companies before and during the Covid-19 Pandemic. Thus, six hypotheses were raised considering the difference in the effect of the plans in periods without financial crises (before the pandemic) and in periods of financial crisis (during the pandemic) in four different performance indicators (EPS, ROA, ROE and ROS) and in three SBP metrics (Adoption of the plan, Type of settlement and Type of contract exercise price).

The first three hypotheses argued about the positive effects of stock-based compensation (SBP) on performance in the period before the pandemic, and had the following results: hypothesis H1 that the simple adoption of SBP increases performance and H2 that the adoption of shares settlement instead of cash or mixed improves performance, were both rejected. However, Hypothesis H3 that the more demanding SBP contracts in terms of defining the amount to be paid by the employee to acquire the shares (out-of-the-money exercise price) positively influence the financial performance of the companies, was not rejected, indicating that the simple adoption of variable compensation through SBPs does not necessarily lead to an improvement in performance and that in order for this to happen, it is necessary to set more stringent rules in the contracts regarding the relationship between the share price on the grant date and the exercise price for the executive.

Three other hypotheses were also defined for the period of the financial crisis caused by the pandemic, arguing adverse effects of share-based remuneration on performance and which had the following results: hypotheses H4 and H5 that, respectively, the adoption of SBP and its settlement in cash have an adverse effect on the performance of companies in the period of the

Covid-19 Pandemic, were not rejected. However, Hypothesis H6, that out-of-the-money SBP contracts would reduce companies' performance, was rejected. These results suggest that the potential increase in risk tolerance of executives of companies that adopt SBP plans can lead to a reduction in organizational performance or even losses during periods of financial stress due to the increase in risk assumed. However, it is observed that the need for a higher exercise price in times of crisis can offset the impact of the SBP on business performance.

The results of this study show that SBPs' effectiveness depends on factors such as contractual flexibility, the economic context, and managers' risk tolerance. In periods of stability, SBPs can boost performance when the exercise price of options incentivizes the search for better returns. In times of crisis, such incentives can lead to hazardous behaviors, requiring greater oversight and clear goals to align executives with organizational objectives. This implies that structuring *stock option* plans for executives requires a strategic balance between creating incentives aligned with organizational performance and mitigating operational risks arising from excessive pressure during periods of financial difficulty.

Thus, the results reveal that the calibration of the exercise price is critical: values that are excessively low in relation to the share price on the date of signing the contract can dilute the motivational potential, while levels that are too high can encourage risky behaviors or even inertia when the loss seems more certain to the executive, especially in contexts of financial instability. Therefore, companies should adopt industry benchmarks and other long-term performance metrics, aligned with extended vesting periods, to define realistic parameters, ensuring that options serve as mechanisms of value creation rather than triggers for decisions focused exclusively on immediate results. Additionally, it is recommended to combine share-based compensation with non-financial incentives (e.g., ESG goals and innovation indicators) to foster a more holistic alignment between executives' and shareholders' interests. In times of financial adversity, the adoption of hybrid compensation structures, in which SBPs complement but do not dominate executive packages, is an alternative to preserving organizational resilience.

Second, the findings highlight the need for robust management monitoring mechanisms during crises or periods of financial instability to reduce the likelihood of exposure to operational risks misaligned with corporate sustainability. In this sense, increased transparency in the disclosure of SBPs' contractual terms reinforces the organization's governance. By detailing the disclosure of the conditions for the exercise of options, adding to this, for example, the presentation of scenarios with the sensitivity of these conditions to the expected performance of the company – whether market, operational, or sales–strengthens investor confidence and allows other stakeholders to monitor any ethical pressures that may lead to behavioral distortions.

Finally, for regulators, the results of this study highlight the importance of guidelines that promote transparency and disclosure of information about SBPs, covering goals, concession criteria, and associated risks, with the strengthening of inspection in scenarios of high volatility, ensuring the transparency of contract designs and their potential impact on the company's performance, in relation to the exercise or not of the options of its executives.

The present study contributes to the financial e accounting theory by advancing understanding of the contingency of financial incentives across different economic scenarios from an Agency Theory perspective. From a practical perspective, this study highlights the importance of structuring flexible stock option plans, such as conditional and adjustable strike prices for periods of financial stress, in addition to strengthening governance. From a social perspective, it highlights the need for sustainable remuneration policies that balance executive incentives with the protection of investors and stakeholders.

The research has limitations, including the short time period studied and the representativeness of the sample, which was restricted to Brazilian publicly traded companies with higher corporate governance requirements and may not reflect the particularities of companies at other levels of governance or in other markets. Industry differences have not been explored in depth, and the absence of qualitative metrics limits the understanding of the impacts of SBPs on factors such as organizational culture and managers' engagement. For future studies, it is suggested to extend the analysis period to include other financial crises and to incorporate qualitative measures to enrich the evaluation of the impact of SBPs.

References

- Ahmad, W., Kutan, A. M., Chahal, R. J. K., & Kattumuri, R. (2021). COVID-19 Pandemic and firm-level dynamics in the USA, UK, Europe, and Japan. *International review of financial analysis*, 78, 101888. <https://doi.org/10.1016/j.irfa.2021.101888>
- Bálkin, D. B. & Gómez-Mejia, L. R. (1987). Toward a contingency theory of compensation strategy. *Strategic Management Journal*, 8(2), 169-182. <https://doi.org/10.1002/smj.4250080207>
- Banco Mundial (2020). O COVID-19 lança a economia mundial na pior recessão desde a Segunda Guerra Mundial. *Banco Mundial*, 8 jun. 2020. <https://bit.ly/39rblnn>.
- Beuren, I. M., Silva, M. Z., & Mazzioni, S. (2014). Remuneração dos executivos versus desempenho das empresas. *Revista de Administração FACES Journal*, 13(2), 8-25. <https://doi.org/10.21714/1984-6975FACES2014V13N2ART1556>
- Choo, F., & Tan, K. (2007). An “American Dream” theory of corporate executive Fraud. In *Accounting forum*, 31 (2), 203-215. <https://doi.org/10.1016/j.accfor.2006.12.004>
- Chesney, M., Stromberg, J., Wagner, A. F., & Wolff, V. (2020). Managerial incentives to take asset risk. *Journal of Corporate Finance*, 65, 101758. <https://doi.org/10.1016/j.jcorpfin.2020.101758>
- De Castilho, Z. H. R., De Souza Machado, L., Do Carmo, C. H. S., & Diaz, M. E. P. (2024). Pagamentos baseados em ações e agressividade tributária das empresas do setor de bens industriais. *REUNIR Revista de Administração Contabilidade e Sustentabilidade*, 14(2), 91-104. <https://doi.org/10.18696/reunir.v14i2.1777>
- Devers, C. E., McNamara, G., Wiseman, R. M., & Arrfelt, M. (2008). Moving closer to the action: Examining compensation design effects on firm risk. *Organization Science*, 19(4), 548-566. <https://doi.org/10.1287/orsc.1070.0317>
- Efendi, J., Srivastava, A., & Swanson, E. (2007). Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics*, 85(3), 667-708. <https://doi.org/10.1016/j.jfineco.2006.05.009>

- Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of management review*, 14(1), 57-74. <https://doi.org/10.5465/amr.1989.4279003>
- Ermel, M. D. A., & Medeiros, V. (2019). Plano de remuneração baseado em ações: uma análise dos determinantes da sua utilização. *Revista Contabilidade & Finanças*, 31(82), 84-98. <https://doi.org/10.1590/1808-057x201907620>
- Fernandes, N. (2020). Economic effects of coronavirus outbreak (COVID-19) on the world economy. *IESE Business School Working Paper* No. WP-1240-E, 1-33. <https://dx.doi.org/10.2139/ssrn.3557504>
- Guha-Sapir, D., Vos, F., Below, R., & Ponsérre, S. (2012). *Annual disaster statistical review 2011: the numbers and trends*.
- Greiner, M., & Julian, S. (2021). Should you reward your CEO with stock options? *Harvard Business Review*. <https://hbr.org/2021/01/should-you-reward-your-ceo-with-stock-options>
- Hall, B. J. (2000). What you need to know about stock options. *Harvard Business Review*, 78(2), 121-129.
- Hall, B. J., & Liebman, J. B. (1998). Are CEOs really paid like bureaucrats?. *The Quarterly Journal of Economics*, 113(3), 653-691. <https://doi.org/10.1162/003355398555702>
- Haugen, R. A., & Senbet, L. W. (1981). Resolving the agency problems of external capital through options. *The Journal of Finance*, 36(3), 629-647. <https://doi.org/10.1111/j.1540-6261.1981.tb00649.x>
- Hu, S., & Zhang, Y. (2021). COVID-19 pandemic and firm performance: Cross-country evidence. *International review of economics & finance*, 74, 365-372. <https://doi.org/10.1016/j.iref.2021.03.016>
- Jensen, M. C., & Meckling, W. H. (2008). Teoria da firma: comportamento dos administradores, custos de agência e estrutura de propriedade. *Revista de Administração de Empresas*, 48(2), 87-125. <https://www.scielo.br/j/rae/a/vr3bbm6tBJStSmQZk4Y8y4m#>
- Jensen, M. C.; Murphy, K. J. (1990). Performance pay and top-management incentives. *Journal of Political Economy*, 98(2), 225-264. <https://www.journals.uchicago.edu/doi/abs/10.1086/261677>
- Konraht, J. M., Lunkes, R. J., Gasparetto, V., & Schnorrenberger, D. (2018). Remuneração variável, um estudo da relação com indicadores financeiros das companhias abertas brasileiras. *Investigación y Reflexión*, 26(1), 209-224. <https://doi.org/10.18359/rfce.1781>
- KPMG. (2023). A governança corporativa e o mercado de capitais: 18ª edição. *KPMG Brasil*. Recuperado em 18 de fevereiro de 2025, de <https://kpmg.com/br/pt/home/insights/2023/11/estudo-aborda-governanca-corporativa-mercado-capitais.html>
- Krauter, E. (2013). Remuneração de Executivos e Desempenho Financeiro: um Estudo com Empresas Brasileiras. *Revista de Educação e Pesquisa em Contabilidade*, 7(3): 259-273. <https://doi.org/10.17524/repec.v7i3.988>
- Lam, S. S., & Chng, B. F. (2006). Do executive stock option grants have value implications for firm performance? *Review of Quantitative Finance and Accounting*, 26(3), 249-274. [10.1007/s11156-006-7433-3](https://doi.org/10.1007/s11156-006-7433-3)

- Lim, E. (2017). CEO option wealth and firm risk-taking: An analysis of multiple reference points. *Long Range Planning*, 50(6), 809-825. <https://doi.org/10.1016/j.lrp.2016.12.013>
- Manzoor, Q. A. (2012). Impact of employees motivation on organizational effectiveness. *Business management and strategy*, 3(1), 1-12. [10.5296/bms.v3i1.904](https://doi.org/10.5296/bms.v3i1.904)
- Marcon, R., & Godoi, C. K. (2004). Desempenho financeiro das empresas e remuneração por stock options: um estudo multissetorial. *Revista de Administração FACES Journal*, 3(1), 59-76. <https://doi.org/10.21714/1984-6975FACES2004V3N1ART32>
- Mazzioni, S., Rigo, V. P., Klann, R. C., & da Silva Junior, J. C. A. (2014). A relação entre a intangibilidade e o desempenho econômico: estudo com empresas de capital aberto do Brasil, Rússia, Índia, China e África do Sul (BRICS). *Advances in Scientific and Applied Accounting*, 7(1) 122-148. <http://dx.doi.org/10.14392/asaa.2014070105>
- Nascimento, E. M., Barbosa Neto, J. E., da Cunha, J. V. A., & Dias, W. D. O. (2013). Teoria da Agência e Remuneração de Executivos: influência do uso de stock options no desempenho das empresas brasileiras. *Revista Iberoamericana de Contabilidad de Gestión*, 11(21), 1-16.
- Oliveira, T., Jesuka, D., Peixoto, F. M., & Tizziotti, C. P. P. (2021). A sustentabilidade e a covid-19 afetam o desempenho, o valor e o risco de firmas no Brasil?. *Advances in Scientific and Applied Accounting*, 14(2), 227-239. [10.14392/asaa.2021140209](https://doi.org/10.14392/asaa.2021140209)
- Perobelli, F. F. C., Lopes, B., & Silveira, A. M. (2012). Planos de Opções de Compra de Ações e o Valor das Companhias Brasileiras. *Revista Brasileira de Finanças*, 10(1), 105-147. <https://doi.org/10.12660/rbfin.v10n1.2012.2654>
- Pessoa, E. A., Oliveira, I. L. D. M. C., & do Carmo, C. H. S. (2019). O Impacto dos Planos de Opções de Compra de Ações no Desempenho das Companhias Brasileiras. In *8º Congresso UFSC de Controladoria e Finanças*, Florianópolis, Santa Catarina-SC, Brasil.
- Rajgopal, S., & Shevlin, T. (2002). Empirical evidence on the relation between stock option compensation and risk taking. *Journal of Accounting and Economics*, 33(2), 145-171. [https://doi.org/10.1016/S0165-4101\(02\)00042-3](https://doi.org/10.1016/S0165-4101(02)00042-3)
- Sampaio, J. (2020). *COVID-19 e mercado financeiro: impacto do covid-19 nos mercados financeiros globais*. https://fgvprojetos.fgv.br/artigos/covid-19-e-mercado-financeiro-maio-2020?utm_source=portal-fgv&utm_medium=fgvnoticias&utm_campaign=fgvnoticias-2020-06-04
- Sanders, W. G., & Hambrick, D. C. (2007). Swinging for the fences: The effects of CEO stock options on company risk taking and performance. *Academy of Management Journal*, 50(5), 1055-1078. <https://doi.org/10.5465/amj.2007.27156438>
- Shen, H., Fu, M., Pan, H., Yu, Z., & Chen, Y. (2020). The impact of the COVID-19 pandemic on firm performance. *Emerging Markets Finance and Trade*, 56(10), 2213-2230. <https://doi.org/10.1080/1540496X.2020.1785863>
- Shin, D., & Konrad, A. M. (2017). Causality between high-performance work systems and organizational performance. *Journal of management*, 43(4), 973-997. <https://doi.org/10.1177/0149206314544746>
- Shue, K., & Townsend, R. R. (2017). How do quasi-random option grants affect CEO risk-taking?. *The Journal of Finance*, 72(6), 2551-2588. <https://doi.org/10.1111/jofi.12545>

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Zahariev, A., Simeonov, S., & Zaharieva, G. (2021). Management motivation and capital creation through employee stock options–International evidences under covid-19 circumstances. *SSRN 3959990*.