Publication status: This preprint has not been published elsewhere.

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https://doi.org/10.1590/1808-057x20262461.en

Submitted on: 2026-05-15
Posted on: 2026-05-15 (version 1)
(YYYY-MM-DD)

DOI: 10.1590/1808-057x20262461.en
e-location: e2461

Repurchasing wealth: Executive stock options and opportunism in the Brazilian market

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Received on 09/05/2025 – Desk acceptance on 09/18/2025 – 3rd version approved on 01/29/2026
Academic Editor-in-Chief: Andson Braga de Aguiar
Associate Editor: Pedro Guilherme Ribeiro Piccoli

Study presented at the 35º ENANGRAD, São Paulo, SP, Brazil, October 2024, and at the XVIII Congresso ANPCONT, São Paulo, SP, Brazil, December 2024.

ABSTRACT

This paper investigates the relationship between executive stock option-based compensation and share repurchases among publicly traded firms in Brazil. This study contributes to the literature by shedding light on an underexplored dimension of share repurchase activity in the Brazilian market, highlighting its relationship with governance mechanisms. While traditional finance theory predicts investor indifference between dividends and share repurchases, prior research shows that firms frequently favor repurchases due to considerations such as capital structure management, signaling effects, and managerial incentives. In particular, executives with stock option-based compensation may have strong personal incentives to initiate repurchase programs, as buybacks can support stock prices and directly increase the value of their holdings. Although stock repurchases remain relatively modest in Brazil compared to the United States of America, our evidence shows that they have meaningful implications for corporate governance, particularly executive compensation schemes. The results suggest that repurchases are not merely an alternative payout mechanism but also a channel through which managers may increase the private benefits extracted from the firm. The empirical analysis employs panel data regression models with firm and year fixed effects to assess the link between executive compensation structures and the magnitude of share repurchases. Additionally, we apply a panel logistic regression model to investigate whether firms with stock-based executive incentives are more likely to undertake repurchases above the mean level. We also conduct a series of robustness checks to ensure the consistency of results across specifications. We show that firms incorporating stock option-based compensation into executive pay packages engage in significantly larger share repurchases. This evidence suggests that managers may strategically use repurchase programs to amplify personal wealth, calling into question the extent to which stock-based incentives truly align managerial and shareholder interests. These findings are pertinent not only for investors seeking to interpret firms' payout decisions but also for regulators and policymakers concerned with the effectiveness of corporate governance mechanisms governing executive compensation and payout policies.

Keywords: executive compensation, share repurchases, agency conflict.

1. INTRODUCTION

Publicly traded companies can distribute returns to investors in two ways: through dividend payments or share repurchases. Traditional finance theory suggests that investors should remain indifferent to the method of compensation chosen by firms, as the received cash flow remains the same (Elton & Gruber, 1968). However, prior research highlights several reasons why firms may prefer share repurchases over dividends, ranging from capital structure adjustments (Bonaimé et al., 2014) to signaling effects in the market (Grullon & Ikenberry, 2000).

Beyond these motivations, managerial incentives related to stock option-based compensation also play a crucial role. Kahle (2002) finds that firms often announce share repurchases when executives hold a significant volume of unexercised stock options. Since repurchases typically lead to stock price appreciation, executives with stock options have a strong incentive to engage in buybacks, as this strategy increases their personal wealth.

This study aims to examine the relationship between executive incentives in the form of stock option compensation and share repurchases among firms listed on the B3 S.A. – Brasil, Bolsa, Balcão (B3) stock exchange. Our study investigates the association

between stock repurchases and executive compensation in two main ways. First, we employ a panel data regression model with firm and year fixed effects. Second, we examine the relationship between stock-based compensation and higher repurchase amounts, specifically focusing on stock repurchases exceeding the mean value. To this end, we adopt a panel logistic regression model with firm and year fixed effects. Additionally, we present various robustness analyses to validate the results obtained using the aforementioned methods.

The findings indicate that firms incorporating stock-based incentive programs into executive compensation conduct larger share repurchases. These results provide evidence supporting the hypothesis that managers opportunistically use repurchases to maximize their personal returns rather than (or in addition to) maximizing shareholder wealth.

This study is particularly relevant given the role of executive compensation as a corporate governance mechanism intended to align managerial and shareholder interests, especially for minority investors. However, it is essential to evaluate whether this mechanism effectively serves its intended purpose or instead creates pathways for executives to maximize their own wealth at the expense of shareholders. The findings of this study offer valuable insights for investors seeking to understand the motivations behind share repurchase announcements and for regulators aiming to develop policies that govern both repurchase activities and variable compensation mechanisms.

Moreover, this research fills a gap in the literature on share repurchases in the Brazilian market. While previous studies have examined the motivations behind repurchases, they have not explored their relationship with executive compensation (Garcia & Lucena, 2017; Nascimento et al., 2011), particularly in the recent context of the COVID-19 pandemic.

The paper is structured as follows. Section 2 discusses the literature, Section 3 describes the models and data sources, Section 4 presents the results, and Section 5 offers concluding remarks.

2. LITERATURE AND HYPOTHESES

Payout policy refers to the decisions publicly traded companies make regarding shareholder compensation, which can be structured through dividend payments or share repurchases. Defining a payout policy is a critical component of a firm's financial strategy, as it directly influences the company's capital structure, shareholder perceptions, and, consequently, stock valuation.

In Brazil, the enactment of Lei n. 9.249, of December 26, 1995, introduced several measures aimed at revitalizing the economy, including the creation of the interest on equity (*juros sobre capital próprio* [JSCP]) mechanism, which is tax-deductible for firms, and the tax exemption for investors on dividends paid by companies. This directly impacts shareholder perceptions, as capital gains from selling shares at a premium remain subject to taxation. Accordingly, Boulton et al. (2012) show that taxes are the primary determinant of payout policies for Brazilian firms. In a similar light, following a tax reform for pension funds in Brazil, Colombo and Caldeira (2018) show an increase in JSCP relative to dividends. Nevertheless, despite the tax benefit, Boulton et al. (2012) argue that firms also use dividends to cater to investor demands.

The literature on payout policy is extensive, yet it does not fully encompass the specific motivations behind each company's chosen payout strategy. Instead, it builds on theoretical frameworks that seek to explain why firms adopt particular shareholder compensation methods.

One of the most influential theories in this domain is the dividend irrelevance theory proposed by Miller and Modigliani (1961), which seeks to clarify the rationale behind dividend payments. This theory assumes a perfect market characterized by information symmetry among all participants, the absence of taxes and transaction costs, and investor rationality. Its core premise posits that dividends and capital gains are equivalent, meaning that, in the absence of dividend distributions, firms can reinvest retained earnings to drive growth, thereby increasing stock prices and generating capital gains for investors. However, market frictions, such as countries' tax structures, challenge the theory, as happens in Brazil, which has exempted dividends from taxation since 1996.

Another framework that explains corporate payout decisions is the dividend policy theory proposed by Lambrecht and Myers (2012). The authors argue that a comprehensive analysis of payout policies must consider investment and financing decisions, as these factors influence firms' strategic choices and financial outcomes. One key aspect of this theory is dividend smoothing, where managers absorb market shocks to maintain predictable dividend payments, aiming to foster stable relationships with shareholders. Rather than adjusting dividends in response to short-term market fluctuations, directors choose to buffer variations, ensuring a steady payout stream.

Lambrecht and Myers (2012) further explore the interdependence between investment, financing, and payout policies. Their findings suggest that firms shape investment and financing decisions based on their dividend commitments, making it more likely for firms to either raise external capital or forgo certain investment opportunities to sustain their current dividend policies. This underscores the critical role of dividend policy in corporate financial management, demonstrating how maintaining consistent dividends can influence broader financing and investment strategies. However, this is not necessarily true also for share repurchases. The next section explores the differences between these two payout mechanisms.

2.1 Relationship between Dividends and Share Repurchases

Iyer and Rao (2017) analyze data from the U.S. market during the subprime crisis of 2008-2009, treating the financial turmoil as an exogenous shock that created severe liquidity constraints, prompting firms to adjust their payout policies. Their objective is to assess market reactions to changes in dividend payments and share repurchase activities, thereby testing the flexibility hypothesis. The flexibility hypothesis posits that the market perceives reductions in share repurchases more favorably than decreases in dividend payments. This preference arises because share repurchases serve as a more flexible mechanism for shareholder compensation compared to dividends (Iyer & Rao, 2017).

To support this argument, Iyer and Rao (2017) report that 74.43% of firms that had engaged in share repurchases before the crisis reduced their repurchase activity during the crisis. In contrast, only 53.91% of dividend-paying firms reduced either the frequency or value of their dividend distributions. This approximately 20% higher reduction rate among repurchasing firms underscores the greater flexibility associated with share repurchases compared to dividend policy adjustments.

Brav et al. (2005) provide additional evidence through a survey of 407 financial executives. Their findings indicate that approximately 50% of respondents would adjust their company's dividend policy in response to investment opportunities. However, when asked about share repurchase policies, 80% stated they would modify buyback activity based on investment opportunities, further reinforcing the flexibility hypothesis.

Beyond flexibility, the signaling hypothesis, initially introduced by Spence (1973), explores the implications of information asymmetry. This hypothesis suggests that, in

markets where information is not evenly distributed, better-informed participants use signals to convey information to less-informed investors. Vermaelen (1981) applies the signaling hypothesis to share repurchases, demonstrating that stock prices often experience a significant increase following repurchase announcements. These findings indicate that investors interpret repurchase programs as a signal that the company's stock is undervalued. McNally (1999) strengthens the link between the signaling hypothesis and share repurchases, arguing that repurchases serve not only as an indication of stock undervaluation but also as a signal of managerial efficiency. His study finds that firms engaging in share repurchases tend to have higher profits, though they also face greater risks.

However, flexibility and signaling are not the only motives behind firms' payout policies. A string of literature focuses on the role of incentives, especially when managers face the possibility of increasing their own rents via stock compensation schemes. Therefore, the choice between share repurchases and dividend distributions also lies at the core of shareholder compensation discussions. Several scholars have proposed theories to explain the motivations behind corporate payout decisions. The next section explores this literature.

2.2 Share Repurchases and Managerial Incentives

While scholars continue to debate the various motivations behind shareholder compensation strategies, Jensen and Meckling (1976) introduced the agency theory, which addresses the relationship between principals (owners or shareholders) and agents (managers or administrators). They highlight potential conflicts of interest, as managers, despite being hired to act in the shareholders' best interests, may also pursue personal incentives that diverge from those of the firm's owners.

In the context of agency conflicts, Jensen and Meckling (1976) emphasize the importance of corporate governance mechanisms in mitigating these misalignments. They argue that incentive structures and oversight mechanisms are essential to ensuring that managerial decisions align with shareholder interests. Executive compensation plays a central role in this governance structure, as it directly influences managerial performance and the methods used to compensate shareholders. Executive compensation usually includes fixed and variable components. The fixed component includes base salaries and annual payments, while the variable component consists of long-term incentives such as bonuses or stock-based compensation. Several studies explore how executive compensation structures influence firm performance and corporate payout policies.

Babenko (2009) investigates the relationship between share repurchases and pay-performance sensitivity (PPS), a metric that correlates executive compensation with company performance. Her findings suggest a positive relationship between PPS and share repurchases, indicating that firms with higher PPS are more likely to engage in buybacks. In Brazil, Perobelli et al. (2012) bring evidence that stock-based compensation is positively associated with market value, but only when it is well made.

Bhargava (2013) examines executive compensation, share repurchases, and investment expenditures in a dataset of 700 U.S. firms. He finds a positive correlation between share repurchase activity and variable executive compensation, particularly for stock- and option-based compensation. These results suggest that managers may strategically use share buybacks to increase stock value, thereby maximizing their personal financial gains.

Young and Yang (2011), in turn, analyze how the relationship between executive compensation and share repurchases affects corporate financial performance. They focus

on earnings per share (EPS)-linked compensation, showing that executives whose bonuses depend on EPS growth are more likely to initiate share repurchases. Their findings suggest that managers use buybacks to artificially inflate EPS by reducing the number of outstanding shares. According to Young and Yang (2011), this practice can significantly impact long-term corporate investments. In line with this, Almeida et al. (2016) bring evidence that firms use share repurchases to increase EPS to beat analysts' forecasts, even sacrificing employment and investment to do so. In summary, since share repurchases offer immediate financial benefits to executives, firms may prioritize short-term stock price increases over long-term strategic investments aimed at sustainable growth.

Jolls (1998) further demonstrates that share repurchases serve as an effective tool for short-term stock price appreciation, directly benefiting executives who hold substantial amounts of stock or stock options. This phenomenon highlights a potential trade-off between short-term executive compensation and long-term corporate investment strategies. Jolls (1998) concludes that firms with compensation structures heavily reliant on stock or option incentives exhibit a greater propensity for share repurchases.

Analyzing the Brazilian market from 2011 to 2018, Amorim et al. (2019) examine the relationship between share repurchases, dividend distributions, and JSCP. Their findings indicate that Brazilian firms often use share repurchases as an extension of profit distribution policies, providing additional returns to shareholders.

Castro and Yoshinaga (2019) find results consistent with the signaling hypothesis, though their study suggests that the market does not fully incorporate this signal into stock prices. They show that firms announcing repurchase programs experience abnormal future returns, meaning that companies conducting buybacks tend to perform better in subsequent periods, yet the market does not price this signal efficiently, which creates an opportunity for abnormal returns.

Kahle (2002) provides evidence that firms exploit this market reaction to inflate stock prices and increase managerial gains, particularly for executives compensated through stock options. Stock options grant managers the right to purchase a set number of shares at a predetermined price. Since higher stock prices translate into larger profits when exercising these options, managers have a strong incentive to conduct buybacks. While this mechanism theoretically aligns managerial incentives with shareholder interests, it also creates perverse incentives, such as using repurchases strategically to boost personal compensation.

Additionally, in the United States of America, preferred dividends dilute EPS, whereas share repurchases do not. This distinction creates yet another incentive for managers to favor buybacks when their compensation is tied to stock performance (Bens et al., 2003; Jolls, 1998).

Therefore, we expect Brazilian firms to behave similarly, as documented in the international literature, so we test the following hypothesis: Firms with executive compensation programs based on stock incentives conduct larger share repurchases.

This research seeks to deepen the understanding of the relationship between executive compensation, particularly variable pay, and share repurchase programs in the Brazilian market between 2018 and 2022. Unlike extensively studied markets such as the United States of America, the Brazilian market exhibits distinct characteristics that may influence share repurchase behavior in ways not yet fully captured by existing literature.

3. DATA AND EMPIRICAL STRATEGY

We study the period from 2018 to 2022, covering companies listed on B3 with available data in the selected databases. Executive compensation data are from the open data portal of the Brazilian Securities and Exchange Commission (Comissão de Valores Mobiliários [CVM], 2024), specifically compiling total compensation data for the board of directors, executive officers, and fiscal council (Item 13.2 of Annex 24 of ICVM 480). We selected our sample period based on Black et al. (2023), who show that firms gradually improved the reporting of executive compensation information over time. The year 2018 marks the first year in which reporting quality peaked across firms from different corporate governance segments.

The share repurchase data are sourced from the Center for Capital Markets and Investor Relations Studies (Centro de Estudos em Mercado de Capitais e Relações com Investidores [CEMCRI], 2024), which compiles actual repurchase transactions disclosed in the Securities Traded and Held (Valores Mobiliários Negociados e Detidos) filings from the CVM Consulta Aberta system. The last available year for the repurchase data is 2022. Additional financial and market data come from Economatica. We excluded financial institutions and firms with negative equity from the analysis due to their distinct capital structures and financial conditions. Following data cleaning, the final sample consists of 343 firms, with data organized in an unbalanced panel spanning from 2018 to 2022. The number of observations for each analysis varies depending on the availability of data for specific variables.

To empirically test whether executive compensation programs based on stock incentives lead to larger share repurchases, we adopt two alternative regression model approaches.

First, we use the total repurchase amount for each company during the sample period as our dependent variable. The key variable of interest, stock compensation, is a dummy variable indicating whether a firm, in a given year, allocated any percentage of executive compensation to stock-based incentives. The model includes several control variables to better isolate the relationship between share repurchases and executive compensation, holding constant the following factors: (i) free float percentage (the proportion of shares freely traded on the market); (ii) return on assets (ROA); (iii) firm size (measured as the natural logarithm of total assets); (iv) leverage (ratio of total liabilities to total assets); (v) book-to-market ratio (ratio of shareholders' equity to the market value of shares); (vi) cash (natural logarithm of the sum of cash and cash equivalents in the balance sheet); (vii) governance level (a dummy variable that takes the value of 1 if the firm is listed in the Novo Mercado or Level 2 governance tiers, and 0 otherwise), and firm (c_i) and year fixed effects (γ_t).

Using a two-way fixed effects panel regression model, we specify the following equation:

$$Repurchase_{it} = \beta_0 + \beta_1 StockCompensation_{it} + \beta_2 FreeFloat_{it} + \beta_3 ROA_{it} + \beta_4 FirmSize_{it} + \beta_5 Leverage_{it} + \beta_6 BTM_{it} + \beta_7 Cash_{it} + \beta_8 GovernanceLevel_{it} + c_i + \gamma_t + \epsilon_{it}. \quad (1)$$

Our additional approach considers firms with share repurchases above the median. In addition to empirically investigating the association between buyback programs and stock compensation, we examine whether stock compensation programs are related to higher repurchase amounts. We introduce a dummy variable that equals 1 if a firm's share repurchases exceed the median in our sample and 0 otherwise. Using a two-way fixed effects logistic panel regression model**,** we specify Eq. 2:

$$Prob(y = 1|x)_{it} = G(\beta_0 + \beta_1 StockCompensation_{it} + \beta_2 FreeFloat_{it} + \beta_3 ROA_{it} + \beta_4 FirmSize_{it} + \beta_5 Leverage_{it} + \beta_6 BTM_{it} + \beta_7 Cash_{it} + \beta_8 GovernanceLevel_{it} + c_i + \gamma_t). \quad (2)$$

In Eq. 2, y is the dependent variable (indicating whether a firm's share repurchases exceed the median), x represents the explanatory variables, and $G(.)$ is the cumulative distribution function used in the logistic regression model.

4. RESULTS

4.1 Descriptive Analysis

The descriptive analysis provides information on share repurchases, executive compensation, and the economic and financial variables of the companies included in the study. Figure 1 presents the average buyback across the analyzed sectors during the study period, highlighting their varied distribution. We also compare with dividends, highlighting that they are much more common as payouts to investors in Brazil than share repurchases. While the average dividend per share in the sample is R$ 1.67, the average Repurchase per share is only R$ 0.16. This suggests that share repurchases are still underused in the Brazilian market. Considering different industries, the Oil, Natural Gas, and Biofuels sector exhibits the highest average stock repurchase levels, while the largest dividends come from Public Utilities. The Healthcare and Communications sectors had the lowest average share repurchase values, as well as the lowest dividends.

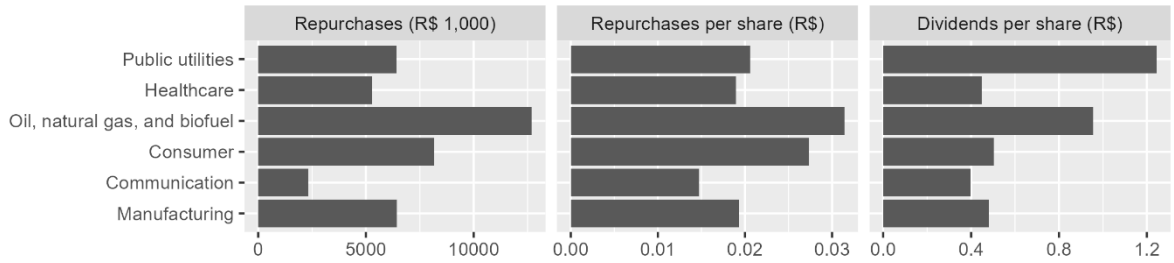

Figure 1 *Mean share repurchases and dividends by sector.*
Source: *Elaborated by the authors.*

Figure 2 shows the average repurchases and dividends (both per share and total) over time. While Iyer and Rao (2017) report lower repurchases than dividends in the Financial Crisis, we see an increase in repurchases per share in 2020, when the COVID-19 pandemic hit, while dividends decreased. This can be explained by the much lower repurchase levels in Brazil than in the United States of America. In the United States of America, firms spend more cash repurchasing common shares than paying dividends, as reported in Grullon and Michaely (2002) and Bhargava (2010), while in our sample, dividend payments averaged R$ 1,302,241 (R$ 378,920 after 5% winsorization) thousand, and share repurchases averaged only R$ 20,204 (R$ 8,316 after 5% winsorization) thousand. Notwithstanding, it is important to highlight the steep increase in share repurchases over the sample period, amounting to 77.7% (while dividends grew 48.74%).

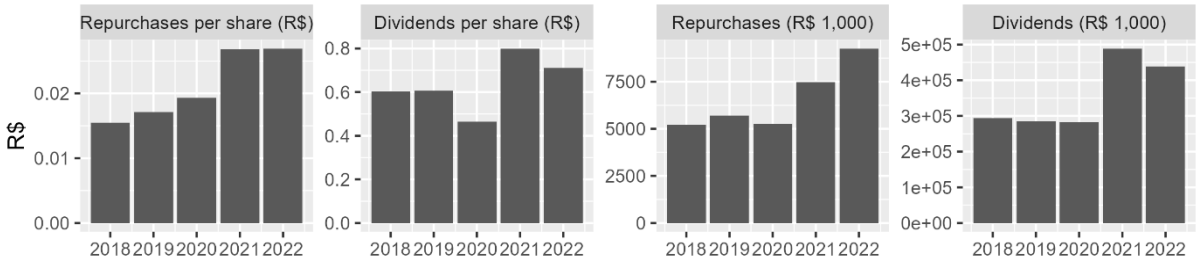

Figure 2 *Mean share repurchases and dividends by year.*
Source: *Elaborated by the authors.*

Figure 3 shows the average executive compensation divided into salary, benefits, and stock compensation by sector. The public utilities industry has the lowest stock compensation, at less than one million reais, followed by Manufacturing and Communication. Healthcare, Consumer Goods, and the Oil industries have large values of stock compensation, averaging R$ 6.6 million, R$ 5.9 million, and R$ 4.8 million, respectively. **Erro! Fonte de referência não encontrada.** provides more details on the compensation structure in our dataset. In addition to descriptive information on salary, benefits, and stock compensation, it includes the frequency of stock compensation used throughout the entire period. Stock-based compensation is present in 49.4% of the observations. Half of the sample firms do not use this type of compensation scheme.

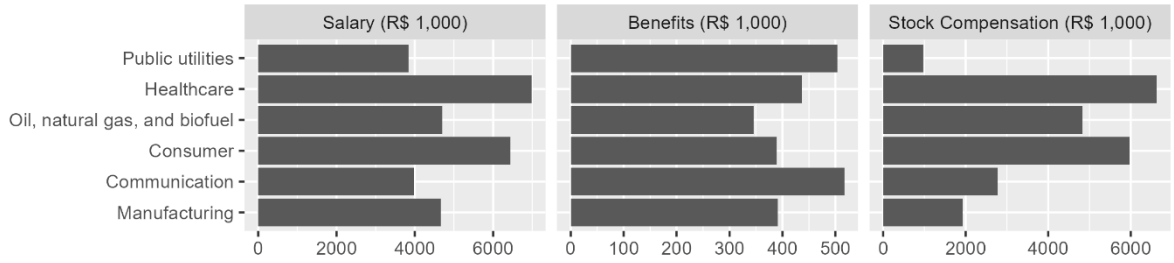

Figure 3 *Mean executive compensation by sector.*
Source: *Elaborated by the authors.*

Table 1
Descriptive statistics of executive compensation

		Compensation in values			
Type of compensation	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**
Salary (R$ 1,000)	917	5,925	5,429	0	45,132
Benefits (R$ 1,000)	917	549,000	859.000	0	8,675
Stock compensation (R$1,000)	917	5,137	13,140	0	196,243

Stock compensation (dummy)		
	Frequency	**Percentage**
Yes	453	49.4
No	464	50.6
Total	917	100.0

Source: *Elaborated by the authors.*

Table 2 provides the descriptive statistics for the remaining variables (not winsorized) collected in this study. As mentioned before, the average share repurchases amount to R$ 20.2 million a year, which represents an average of only 0.212% of total assets. The average free float of the sample is a little over 50%, while the average ROA is only 4.441%, and total liabilities finance an average of 58% of total assets. The corporate governance tier is defined as a dummy variable, identifying firms listed in the Novo Mercado and Level 2 tiers. Due to space constraints, we do not report a correlation matrix for the variables presented in Tables 1 and 2. We did not find correlations that could indicate multicollinearity issues in the regressions. This is further supported by a variance inflation factor test, which yielded values below three for all variables and an average value of 1.69 for our specifications.

Table 2
Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Share repurchase (R$1,000)	917	20,204	110,739	0	2,444
Share repurchase (natural logarithm)	917	4.314	4.276	0	14.709
Stock compensation (dummy)	917	0.494	0.500	0	1
Free float (%)	917	51.131	28.482	0	106.541
ROA (%)	917	4.441	9.374	-45.977	106.956
Total assets (R$ 1,000,000)	917	22,910	74,403	29	987,419
Firm size	917	15.537	1.703	10.270	20.711
Leverage	917	57.783	19.908	0.381	99.743
Book-to-market	917	0.805	0.834	0.008	10.549
Corporate governance (dummy)	917	0.706	0.456	0	1
Cash (R$ 1,000,000)	917	1,789	5,491	1	70,086
Cash (natural logarithm)	917	12.606	2.187	0	18.065

Notes: *Return on assets (ROA) is the ratio between net income and total assets in percentage, firm size is the natural logarithm of total assets, leverage is the ratio between total liabilities and total assets as a percentage, book-to-market is the ratio between equity and market capitalization, and cash is the value of cash and equivalents*.
Source: *Elaborated by the authors.*

4.2 Regression Results

Table ***3*** reports the results from the specifications outlined in the previous section. Model (1) estimates a panel regression with firm and repurchase-year fixed effects, revealing a positive association between the natural logarithm of the total amount of stock repurchases and stock-based compensation. Model (2) employs a logistic regression with the same fixed effects structure, using a binary dependent variable that equals 1 for repurchase amounts exceeding the median of the sample. The results indicate that firms are more likely to engage in above-median stock repurchases when executive compensation includes stock payments. Without firm fixed effects (to avoid the decrease in observations), the conclusion remains the same. In these regressions, the corporate governance level is omitted because of no within-group variance. Models (3) to (5) in Table 3 show the estimation results for some specifications considering share repurchases scaled by total assets. Due to more than half of the sample not repurchasing at all, Model (3) uses the zero-inflated model estimation, also gauging a positive and statistically significant effect for stock compensation. The same happens in the Tobit estimation in Model (4) and the panel logit estimation in Model (5). The results in

Table ***3*** use non-winsorized data (Section 4.3 shows results with winsorized data).

Table 3

Baseline regression

	Dependent variable				
	Share repurchases (in of R$ 1,000)	**Above-median share repurchases (in of R$ 1,000) (dummy)**	**Share repurchases/ total assets**	**Share repurchases/ total assets**	**Above median share repurchases/total assets (dummy)**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Stock compensation (dummy)	1.370**	1.739**	0.321**	3.512***	1.739**
	(0.572)	(0.688)	(0.143)	(-1.107)	(0.688)
Free float	-0.227	1.745	0.044	0.533	1.745
	(-1.119)	(-1.646)	(0.218)	(-1.951)	(-1.646)
ROA	0.0836	2.923	-0.854	-2.143	2.923
	(-1.490)	(-2.999)	(-1.099)	(-5.727)	(-2.999)
Firm_Size	-0.177	-0.0474	-0.174***	-0.259	-0.047
	(0.688)	(0.769)	(0.063)	(0.497)	(0.769)
Leverage	-2.229	-0.205	0.351	-7.373**	-0.205
	(-1.923)	(-2.195)	(0.392)	(-2.877)	(-2.195)
Book-to-market	0.592**	0.397	-0.163	-1.389*	0.397
	(0.231)	(0.280)	(0.108)	(0.765)	(0.280)
Cash	-0.227	-0.158	-0.025	0.173	-0.158
	(0.164)	(0.169)	(0.045)	(0.375)	(0.169)
Constant	10.97		1.528**	4.739	
	(10.76)		(0.700)	(-5.430)	
Observations	917	561	728	917	561
Individuals	279	138		279	138
Model	OLS fixed effects	Logit fixed effects	Zero-inflated beta	Panel Tobit	Logit fixed effects
Firm fixed effects	Yes	Yes	No	No	Yes
Year fixed effects	Yes	Yes	No	Yes	Yes
R^2 within	0.1787				
R^2 between	0.0126				
R^2 overall	0.0476				
Rho				0.2371**	
Zero inflated			0.1541**		
Ln_Phi			0.639***		

Note: *Standard errors, clustered at the firm level, are reported in brackets for Model (1). The conditional maximum likelihood estimator of the fixed effects panel logit model conditions the probability on each individual. This process removes the individual fixed effects, eliminating any variation between individuals at the aggregate level. As a result, clustering by individual is not meaningful in this model, as identification relies solely on units that exhibit variation in the dependent variable.*
OLS = ordinary least squares; ROA = return on assets.
****, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*
Source: *Elaborated by the authors.*

These results indicate that, despite share repurchases still being so low in the Brazilian market, managers rely on them when they can extract rent via stock-based compensation. Castro and Yoshinaga (2019) show that firms that repurchase their stock generate abnormal returns. When stocks increase in value, managers earn higher profits when exercising their stock options. These buybacks can thus serve as a strategy to increase stock prices, thereby maximizing executive compensation.

In addition to the previous models, we recalculated our above-median repurchase dummy using a normalized version (stock repurchases/total assets) relative to the industry median to avoid sector-specific distortions in the variable's construction. The results presented in Table A1 of the Appendix remain robust and qualitatively unchanged.

4.3 Robustness Checks

Although establishing causal associations between the variables is beyond the scope of this study, we believe it is useful to demonstrate the robustness of our analyses. Accordingly, we conduct a series of additional tests to assess the robustness of the results presented in

Table ***3***, whose results are shown in Table 4. First, we estimate Eq. 1 winsorizing the model variables at the 1% level in each tail of the distribution to mitigate the influence of potential outliers (Model [1]) and, second, we employ a quantile regression approach to emphasize the association between executive compensation and stock repurchases at the median (Model [2]), given that the mean may be more sensitive to the dispersion of stock repurchase data. Next, in Model (3), we use the repurchase amount per share as an alternative dependent variable. Finally, we also consider including industry fixed effects rather than firm fixed effects (Model [4]).

Table 4
Robustness check for Eq. 1

	Dependent variable			
	Share repurchases (ln of R$ 1,000)	**Share repurchases (ln of R$ 1,000)**	**Share repurchases (R$ per share)**	**Share repurchases (ln of R$ 1,000)**
	Winsorized at 1%	**Quantile regression**		
	(1)	**(2)**	**(3)**	**(4)**
Stock compensation (dummy)	1.370**	2.190***	0.0272	1.292**
	(0.571)	(0.404)	(0.0299)	(0.558)
Free float	-0.213	0.0783	0.0180	0.0942
	(1.117)	(0.681)	(0.151)	(1.154)
ROA	0.316	-0.383	-0.00511	-0.662
	(1.728)	(2.165)	(0.116)	(1.491)
Firm size	-0.181	0.0787	-0.259**	0.0907
	(0.686)	(0.177)	(0.108)	(0.737)
Leverage	-2.150	-0.0114	-0.104	-1.727
	(1.937)	(0.977)	(0.236)	(2.020)
Book-to-market	0.592**	-0.0751	-0.0119	0.610**
	(0.231)	(0.234)	(0.0211)	(0.265)
Cash	-0.227	-0.0333	0.00428	-0.313*
	(0.164)	(0.138)	(0.00736)	(0.165)
Corporate governance level	-	0.115	-	-
		(0.436)		
Constant	10.97	4.095**	4.126**	5.805
	(10.74)	(1.821)	(1.701)	(11.50)
Observations	917	917	917	917
Groups(i)	279		279	279
Firm fixed effects	Yes	No	Yes	No
Year fixed effects	Yes	Yes	Yes	No

Industry_year fixed effects	No	No	No	Yes
R^2				0.209
R^2 within	0.1792		0.0849	
R^2 between	0.0128		0.0014	
R^2 overall	0.048		0.0001	
Pseudo R^2		0.2094		

Note: *Standard errors, clustered at the firm level, are reported in brackets.*
ROA = return on assets
****, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*
Source: *Elaborated by the authors.*

The winsorized model for outliers and the quantile regression focused on the median of repurchases produce qualitatively similar results to Model (1) in Table 3. In the quantile regression, the association between stock-based compensation and the total repurchase amount is statistically significant at the 1% level. However, when using the ratio of total repurchases to the number of shares, the coefficient remains positive, but the relationship does not achieve statistical significance at the 1%, 5%, or 10% levels. This is likely because of the larger variation in repurchase value per share. Finally, Model (4) yields very similar results to Model (1), suggesting firm fixed effects are mostly captured by industry characteristics.

Given that stock repurchase decisions and executive compensation through stock grants may be jointly determined by variables unobservable to the researcher, we conduct an additional robustness test. If the residuals of the equations explaining these decisions are correlated, the equations are not independent, which may introduce bias in the ordinary least squares estimator.

To address this potential problem, we adopt the approach of Hoyt and Liebenberg (2011), who faced a similar empirical challenge when analyzing the adoption of enterprise risk management and value creation. Accordingly, we employ the treatment effects model (TEM), which accounts for the possible correlation between the residuals of the equations explaining stock repurchase decisions and stock-based compensation.

This model estimates the relationship between a dummy variable indicating stock-based compensation and the total repurchase value, conditional on other determinants of the repurchase decision. The primary equation of interest is (now, k_j indicates sector fixed effects):

$$Repurchase_{it} = \beta_0 + \beta_1 StockCompensation_{it} + \beta_2 FreeFloat_{it} + \beta_3 ROA_{it} + \beta_4 FirmSize_{it} + \beta_5 Leverage_{it} + \beta_6 BTM_{it} + \beta_7 Cash_{it} + \beta_8 GovernanceLevel_{it} + k_j + \gamma_t + \vartheta_{it} \quad (3)$$

The decision to compensate executives with stock in year *t* is modeled as an unobserved latent variable, $\overline{Stock\_Compensation_{it}}$, defined as a linear function of relevant determinants:

$$\overline{StockCompensation_{it}} = \beta_0 + +\beta_1 OwnershipConcentration_{it} + \beta_2 FirmSize_{it} + \beta_3 ROA_{it} + \beta_4 \Delta Revenue_{it} + k_j + \gamma_t + u_{it} \quad (4)$$

In Eq. 3, $OwnershipConcentration$ is the percentage of the firm owned by the three largest stockholders, and $\Delta Revenue$ is operational revenue growth. The observed variable $StockCompensation_{it}$, is determined as follows:

$$StockCompensation_{it} = \begin{Bmatrix} 1, if\ \overline{Stock_{Compensation_{it}}} > 0 \\ 0, otherwise \end{Bmatrix} \quad (5)$$

In the TEM, we estimate Eqs. 3 and 4 simultaneously using maximum likelihood estimation, allowing us to account for the interdependence between stock repurchase and stock-based compensation decisions.

Table 5 presents the results of the simultaneous estimation. Considering the possible correlation in the residuals, the Wald test for independent equations supports the joint estimation of Eqs. 3 and 4. The results for the firm's stock repurchase estimation using a fixed effects panel model are consistent with those obtained from the maximum-

likelihood treatment effects model. The stock compensation coefficient is positive and statistically significant at the 1% level.

Table 5
Estimation results for the treatment effects model

	Dependent variable	
	Share repurchases (ln of R$ 1,000)	**Stock compensation (dummy)**
	(1)	**(2)**
Free float	-1.633**	
	(0.709)	
ROA	5.625**	
	(2.279)	
Firm size	0.0416	
	(0.184)	
Leverage	0.102	
	(0.884)	
Book-to-market	-0.301*	
	(0.172)	
Cash	-0.120	
	(0.110)	
Governance level	0.461	
	(0.480)	
Stock compensation (dummy)	7.351***	
	(1.356)	
Ownership concentration		-1.672***
		(0.326)
Firm size		0.195***
		(0.0494)
ROA		-2.115***
		(0.633)
Variation in revenue		0.137
		(0.0962)
Constant	2.799	-2.032***
	(2.181)	(0.746)
Year fixed effects	Yes	Yes
Sector fixed effects	Yes	Yes
Wald test of independent equations	8.11***	
athrho	-1.012***	
	(0.238)	
lnsigma	1.541***	
	(0.0767)	
Groups(i)	272	272
Observations	893	893

Note: *Standard errors, clustered at the firm level, are reported in brackets.*
ROA = return on assets.
****, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Source: *Elaborated by the authors.*

We now emphasize the robustness analysis for Eq. 2, which focuses on the execution of larger stock repurchases, specifically those above the median. Since Eq. 2 is specified as a panel logistic regression with firm and year fixed effects, we consider alternatives using the pooled logit model and random effects, which allow for the inclusion of industry fixed effects and robust standard errors clustered at the firm level. Table 6 presents the results. Model (1) shows the results for the above-median repurchases dummy, yielding similar results as Model (2) in Table (3). Additionally, the marginal effects (Model [2]) estimated in the pooled logit model indicate that, on average, the probability of repurchases exceeding the mean value increases by approximately 22% when stock-based compensation is granted. Next, Model (3) shows that the same model, but with random effects, yields a similar conclusion. Models (4) and (5) consider share repurchases scaled by net income above the sample median as the dependent variable, but using pooled data and random effects, respectively. The conclusions also remain the same. Additionally, Table A2 in the Appendix shows the results considering above industry median of share repurchases scaled by total assets for pooled and random effects logit. The conclusion remains the same.

Table 6

Robustness check for Eq. 2

	Dependent variable				
	Above-median share repurchases (ln of R$1,000) (dummy)	**Marginal effects**	**Above-median share repurchases (ln of R$1,000) (dummy)**	**Above-median share repurchases/net income (dummy)**	**Above-median share repurchases/net income (dummy)**
	(1)	**(2)**	**(4)**	**(3)**	**(5)**
Stock compensation (dummy)	0.918***	0.221***	1.23***	0.585***	0.727***
	(0.218)	(0.051)	(0.295)	(0.213)	(0.265)
Free float	0.241	0.059	0.220	-0.0939	-0.496
	(0.400)	(0.098)	(0.547)	(0.391)	(0.550)
ROA	0.438	0.107	1.167	8.694***	9.240***
	(1.090)	(0.027)	(1.275)	(2.209)	(3.123)
Firm size	0.186*	0.046*	0.284**	0.309***	0.415***
	(0.100)	(0.025)	(0.142)	(0.0917)	(0.123)
Leverage	-0.587	-0.144	-0.851	-0.589	-0.961
	(0.555)	(0.136)	(0.778)	(0.615)	(0.792)
Book-to-market	-0.245*	-0.060*	-0.083	-0.211	-0.195
	(0.126)	(0.019)	(0.161)	(0.137)	(0.170)
Cash	-0.0497	-0.012	-0.500	-0.0766	-0.065
	(0.0767)	(0.019)	(0.110)	(0.0721)	(0.097)
Governance level	0.390	0.096	0.825**	0.408	0.723**
	(0.275)	(0.068)	(0.401)	(0.276)	(0.376)
Constant	-1.800		-3.731**	-4.105***	-6.121***
	(1.123)		(1.592)	(1.026)	(1.368)
Pseudo R^2	0.2030			0.1921	
Model	Pooled logit		Random effects logit	Pooled logit	Random effects logit
Year fixed effects	Yes		Yes	Yes	Yes
Sector fixed effects	Yes		Yes	Yes	Yes
Clustered standard errors	Yes		Yes	Yes	Yes
Correctly classified	72.96%			72.30%	
Sensitivity	85.14%			73.66%	
Specificity	56.63%			71.11%	
Groups(i)			279		279
Observations	917		917	917	917

Note: *Standard errors, clustered at the firm level, are reported in brackets.*
ROA = return on assets
****, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*
Source: *Elaborated by the authors.*

Next, as a falsification test, we conduct an additional analysis by examining the association between stock compensation and dividends to reinforce the idea that stock-based incentives are specifically relevant for repurchases. Using the same empirical specifications employed in our main tests, but changing the dependent variable, we find no statistically significant relationship between stock compensation and dividends. These findings reinforce the interpretation that managers may use repurchases opportunistically. The results are presented in Table A3 of the Appendix.

The Appendix shows a series of other specifications. Table A4 shows estimations of Eqs. 1 and 2, adding industry × year fixed effects. Tables A5 and A6 show estimation results adding the explanatory variables sequentially. Table A7 shows the results for Eq. 2 using the linear probability model. All specifications show a positive and statistically significant relationship between the stock compensation dummy and share repurchases.

As a final analysis, we also examine differences between the pre- and during COVID-19 periods in our regression models, for which the results are shown in Table A8 of the Appendix. We show that, on average, firms increased stock repurchases during the pandemic. There is also some evidence that this effect was higher for firms with larger stock compensation programs, suggesting these firms took advantage of the hot market period during the pandemic.

5. CONCLUSION

This paper examined the relationship between executive incentives**,** specifically stock option-based compensation, and share repurchase practices among firms listed on B3. The findings indicate that firms implementing stock-based compensation programs tend to engage in higher-value share repurchases, suggesting that executives strategically use these transactions to maximize their own returns**.** This relationship highlights a potential alignment between executive interests and corporate financial decisions that, while benefiting shareholders, also enhances the variable compensation of senior management**.**

Our study makes a significant contribution by exploring the connection between executive compensation structures and share repurchase strategies. By conducting this analysis, the research broadens the understanding of how financial incentives influence strategic corporate decisions, offering new insights into corporate governance practices in Brazil**.** Furthermore, by linking executive compensation to share repurchases, this study adds to the ongoing debate on the effectiveness and potential distortions caused by such incentive structures.

Notwithstanding, the research has important limitations. Despite our best efforts in designing the models, it is still possible that omitted factors are driving the results or that firms expecting higher repurchases may design stock-based compensation schemes. Therefore, causal inference is still not possible.

Future research could build upon these findings, particularly by examining different economic contexts**.** A valuable extension would involve separately analyzing pre- and post-pandemic periods, considering the substantial impact of COVID-19 on corporate management and financial decision-making**.** This temporal analysis could reveal whether the relationship between executive compensation and share repurchases remained stable or shifted in response to economic changes**.**

Additionally, further research could explore whether the association identified in this study persists across different phases of the economic cycle**,** including both expansionary and recessionary periods. A comparative analysis of these periods could provide deeper insights into the resilience and adaptability of share repurchase strategies

in response to executive incentives, considering varying economic conditions. Expanding this investigation would contribute to a more comprehensive and robust understanding of the role of executive incentives in shaping corporate financial strategies**.**

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AUTHOR CONTRIBUTIONS

Verônica Santana

Conceptualization: equal;
Data curation: equal;
Formal analysis: equal;
Funding acquisition: equal;
Investigation: equal;
Methodology: equal;
Project administration: equal;
Writing – original draft: equal;
Writing – review and editing: equal.

Augusto de Castro Silva Barbetta

Conceptualization: equal;
Data curation: equal;
Formal analysis: equal;
Funding acquisition: equal;
Investigation: equal;
Writing – original draft: equal;
Writing – review and editing: equal.

Vinicius Augusto Brunassi Silva

Conceptualization: equal;
Formal analysis: equal;
Investigation: equal;
Methodology: equal;
Writing – original draft: equal;
Writing – review and editing: equal.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The entire dataset supporting the results of this study can be made available upon request to the authors.

GENERATIVE AI DISCLOSURE

The authors declare that generative artificial intelligence was used in the following stages of the production of this manuscript:
- Text refinement: ChatGPT.
- Translation: ChatGPT.

The author(s) declare(s) that, regardless of the use of the tools mentioned above, all generated content was supervised, verified, and critically validated by humans. The author(s) assume(s) full and exclusive responsibility for the accuracy of the data, integrity of mathematical/statistical formulas, originality of the text, and the conclusions presented in the published article.

Annex I

Market announcements

TENDA
Construindo Felicidade

TEND3
NOVO
MERCADO
BM&FBOVESPA

CONSTRUTORA TENDA S.A.
CNPJ/MF n° 71.476.527/0001-35
NIRE 35.300.348.206

Comunicado ao Mercado
Encerramento do Programa de Recompra de Ações

CONSTRUTORA TENDA S.A. (B3: TEND3) ("Companhia", "Tenda"), em cumprimento ao disposto na Instrução CVM nº 358, de 3 de janeiro de 2002, conforme alterada, e na Instrução CVM nº 567, de 17 de setembro de 2015, comunica aos seus respectivos acionistas e ao mercado em geral o encerramento do Programa de Recompra de Ações aprovado pelo Conselho de Administração da Companhia em 8 de novembro de 2018 ("Programa"), conforme Fato Relevante divulgado naquela data.

Desde a criação do Programa até a presente data, foram adquiridas 2,461,800 ações ordinárias de emissão da Companhia, equivalentes a 4,7% do capital social da Companhia, adquiridas em Bolsa de Valores a preço de mercado.

As ações recompradas no âmbito do Programa serão mantidas em tesouraria para posterior cancelamento, alienação e/ou utilização em atendimento ao exercício de opções de compra de ações outorgadas pela Companhia no âmbito do Plano de Opção de Compra de Ações da Companhia ou eventuais novos planos de outorga de ações restritas ou opção de compra de ações que vierem a ser aprovados, conforme definição do Conselho de Administração da Companhia.

São Paulo, 21 de fevereiro de 2019

Construtora Tenda S.A.
Renan Barbosa Sanches
Diretor Financeiro e de Relações com Investidores

moura dubeux

MDNE
B3 LISTED NM

MOURA DUBEUX ENGENHARIA S.A.

Companhia Aberta
CNPJ/ME nº 12.049.631/0001-84
NIRE 26.3.0001525-1
CVM nº 21067

FATO RELEVANTE

Encerramento do Programa de Recompra de Ações

A **MOURA DUBEUX ENGENHARIA S.A.** ("**MD**" ou "**Companhia**") (**B3: MDNE3**; **Bloomberg MDNE3: BZ**) em cumprimento ao disposto no artigo 157, §4º, da Lei nº 6.404, de 15 de dezembro de 1976, conforme alterada ("**Lei das Sociedades por Ações**"), e na Resolução da Comissão de Valores Mobiliários ("**CVM**") nº 44, de 23 de agosto de 2021 e da Instrução da CVM nº 567, de 17 de setembro de 2015, conforme alterada ("**Instrução CVM 567**"), comunica aos seus acionistas e ao mercado em geral que o Conselho de Administração da Companhia aprovou, nesta data, o encerramento do programa de recompra de ações da Companhia aprovado pelo Conselho de Administração da Companhia em 19 de abril de 2021 ("**Programa de Recompra**"), conforme fato relevante divulgado naquela data.

Por meio do Programa de Recompra, foram adquiridas 1.690.000 ações ordinárias de emissão da Companhia que são equivalentes a 2,0% do seu capital social.

Conforme informado quando da aprovação do Programa de Recompra, as ações adquiridas nos termos do Programa de Recompra serão mantidas em tesouraria, podendo ser posteriormente canceladas ou alienadas e/ou fazer frente às obrigações da Companhia para eventual plano de opções de ações e/ou plano de remuneração baseado em ações, sem redução do capital social da Companhia.

Recife, 22 de dezembro de 2021

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MDNE
B3 LISTED NM

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NIRE 26.3.0001525-1
CVM nº 21067

FATO RELEVANTE

A **MOURA DUBEUX ENGENHARIA S.A.** ("**Companhia**") em cumprimento ao disposto no artigo 157, §4º, da Lei nº 6.404, de 15 de dezembro de 1976, conforme alterada ("**Lei das Sociedades por Ações**"), e nos termos da Resolução da Comissão de Valores Mobiliários ("**CVM**") nº 44, de 23 de agosto de 2021,conforme alterada ("**Resolução CVM nº 44**"), vem informar aos seus acionistas e ao mercado que a Assembleia Geral Extraordinária da Companhia aprovou, nesta data, o Plano de Outorga de Incentivo de Longo Prazo, cujas principais características estão descritas abaixo ("**Plano**").

O Plano visa criar mecanismos de retenção de pessoas-chave da Companhia e suas Investidas por meio da outorga, sem contrapartida financeira, de Ações de Matching a funcionários ("**Pessoas Elegíveis**") que venham a ser eleitos pelo Conselho de Administração para utilizar parte ou totalidade de sua remuneração variável para adquirir ações.

As Pessoas Elegíveis terão o direito, obedecidas as condições gerais do Plano, de subscrever ações da Companhia que sejam equivalentes a até o limite 5% (cinco por cento) do capital social da Companhia.

O inteiro teor do Plano está disponível no *website* de Relações com Investidores da Companhia (ri.mouradubeux.com.br) bem como no *website* da CVM (www.cvm.org.br).

Recife, 16 de novembro de 2021

Marcello Winik Dubeux
Diretor Financeiro e de Relações com Investidores

ENERGISA S.A.
Companhia Aberta
CNPJ n.º 00.864.214/0001-06
NIRE 31.3.000.2503-9 | Código CVM n.º 15.253

COMUNICADO AO MERCADO
Encerramento do Programa de Recompra

ENERGISA S.A., sociedade por ações de capital aberto, com sede na Cidade de Cataguases, Estado de Minas Gerais, na Praça Rui Barbosa, n.º 80 (parte), Centro, CEP 36770-901, com seus atos constitutivos registrados na Junta Comercial do Estado de Minas Gerais sob o NIRE 31.3.000.2503-9, inscrita no CNPJ sob o n.º 00.864.214/0001-06 ("Companhia"), em atenção ao disposto no artigo 157, §4 da Lei 6.404, de 15 de dezembro de 1976, conforme alteração e às disposições da Instrução da Comissão de Valores Mobiliários ("CVM") nº 358, de 3 de janeiro de 2020, comunica aos seus acionistas e ao mercado em geral o encerramento do Programa de Recompra de Ações aprovado pelo Conselho de Administração da Companhia em 15 de abril de 2021 ("Programa de Recompra"), conforme Fato Relevante divulgado naquela data, mediante a aquisição da totalidade de Units objeto do Programa de Recompra.

Desde a criação do Programa até a presente data, foram adquiridas, em ambiente de bolsa, a preço de mercado, 1.100.000 (um milhão e cem mil) Units de emissão da Companhia, representativas de 1.100.000 (um milhão e cem mil) ações ordinárias e 4.400.000 (quatro milhões e quatrocentas mil) ações preferencias de emissão da Companhia, equivalente, nesta data, a 0,30% e 0,44% das ações totais emitidas e em circulação da Companhia, respectivamente.

As ações recompradas no âmbito do Programa de Recompra serão mantidas em tesouraria para posteriormente fazer frente às obrigações decorrentes dos programas de concessão de ações aprovados, de tempos em tempos, pelo Conselho de Administração da Companhia com base no Plano de Incentivo de Longo Prazo Baseado em Ações da Companhia aprovado na Assembleia Geral Extraordinária realizada em 25 de abri de 2018 ("Programas de Concessão de Ações - ILP"). As ações adquiridas que não forem transferidas para os beneficiários do 1º Programa de Concessão de Ações - ILP deverão ser destinadas para manutenção em tesouraria para, preferencialmente, serem concedidas aos beneficiários dos demais Programas de Concessão de Ações.

Cataguases, 23 de abril de 2021

Mauricio Perez Botelho
Diretor de Relações com Investidores

This preprint was submitted under the following conditions:

- The authors declare that the necessary Terms of Free and Informed Consent of participants or patients in the research were obtained and are described in the manuscript, when applicable.
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