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DOES DIVIDEND INDEX COMPOSITION AFFECT STOCK PRICES?

Rodrigo Leite [1]

Philip Schlanger [2]

Matheus Moura [3]

Abstract

The theme of this paper is to analyze the effect of dividend payouts on the stock prices of companies traded in Brazil's stock exchange (B3). The main objectives of this paper are to assess if dividend payouts affect positively the price of a stock, ceteris paribus and whether investors use the composition of the dividend index (IDIV) as a heuristic for portfolio allocation. We collected quarterly observations from the B3 stock exchange using Economatica, forming a non-balanced panel of 4,218 quarterly observations of 275 firms. We estimate OLS regressions with fixed-effects and differences-in-differences models. Our results show that higher dividends are correlated with higher stock prices and also that higher positive changes in the composition of IDIV, from the 3rd quarter of 2021 to the 1st quarter of 2022, were correlated to higher stock prices. This result was not driven by changes in the IBOV index composition, nor from the January (month fixed-effect). Thus, our contribution to the literature is to show that investors use the dividend index (IDIV) as a heuristic for investments.

Keywords: Dividends; Stocks; Stock Exchange.

Resumo

O tema deste artigo é analisar o efeito do pagamento de dividendos sobre os preços das ações das empresas negociadas na bolsa de valores brasileira (B3). Os principais objetivos deste artigo são avaliar se o pagamento de dividendos afeta positivamente o preço de uma ação, ceteris paribus, e se os investidores utilizam a composição do índice de dividendos (IDIV) como heurística para alocação de portfólio. Foram coletadas observações trimestrais da de empresas listadas na B3 por meio da Economatica, formando um painel não balanceado de 4.218 observações trimestrais de 275 empresas. Foram estimadas regressões OLS com modelos de efeitos fixos e de diferenças-em-diferenças. Os resultados mostram que maiores dividendos estão correlacionados com maiores preços das ações e também que maiores variações positivas na composição do IDIV, do 3º trimestre de 2021 para o 1º trimestre de 2022, foram correlacionadas com maiores preços das ações. Este resultado não foi motivado por alterações na composição do índice IBOV, nem a partir de janeiro (mês com efeito fixo). Assim, nossa contribuição para a literatura é mostrar que os investidores utilizam o índice de dividendos (IDIV) como heurística para investimentos.

Palavras-chave: Ações; Bolsa de Valores; Dividendos.

INTRODUCTION

The issue of why companies pay dividends, and, perhaps more importantly, whether they should, has been the subject of endless controversy in the finance literature. Despite many theoretical, as well as empirical advancements made, there is little consensus on the topic.

Regarding on why companies pay dividends, it can be traced back to the very history of the modern corporation. This form of legal entity and ownership sprung from 17th-century commercial voyages: highly risky, but also profitable. Investors would pool resources on behalf of a ship's captain,

[1] Professor at the Federal University of Rio de Janeiro (UFRJ). Ph. D. in Management. E-mail: rodrigo.oliveira@coppead.ufrj.br

[2] Master´s student in Management at the Federal University of Rio de Janeiro (UFRJ). E-mail: philipschlanger@gmail.com

[3] Ph. D. candidate in Management at the Getulio Vargas Foundation (FGV). E-mail: m2.matheusmoura@gmail.com

who, upon returning, ideally would pay back investors their invested capital alongside the proceeds from the expedition. As these trades became more frequent, investors would only receive the proceeds of the expeditions (a.k.a., dividends). Moreover, investors had a preference for stocks that behaved like government bonds, i.e., paying stable dividends.

In agreement to the latter – whether companies should pay dividends – it has received scrutiny from researchers over the years. From those, three major stances have emerged from the understanding: dividend payouts either create value, destroy value or are irrelevant. According to the bird-in-hand hypothesis, due to uncertainty about the future, dividends now are preferable to capital gains later. On the other hand, the tax-effect hypothesis, claims that, since dividends are more heavily taxed than capital gains (which is not always the case, including in Brazil), dividends reduce after-tax, i.e., net, returns. Extending the tax argument, the clientele hypothesis claims different investors prefer different dividend policies.

Empirically, however, there has been ample evidence investors react positively to dividend announcements, though no consensus has emerged on why that is. In order to bring more robustness to this understanding and support the literature, the main theme of this paper is to analyze the effect of dividend payouts on the stock prices of companies traded in Brazil's stock exchange (B3). This theme is developed into two objectives that form the hypotheses of our paper: dividend payouts affect positively the price of a stock, ceteris paribus? And, if dividends affect stock prices, do investors use the composition of the dividend index (IDIV) as a heuristic for portfolio allocation? These questions are of importance both theoretically and empirically. To the best of our knowledge, no paper has assessed if the IDIV composition affects stock prices until the moment this paper has been written.

Using the Brazilian Stock Market (B3) index as a heuristic for a company's dividend payout policy, the objective of this research is to provide relevant contribution to the literature by analyzing the composition of the dividend index (IDIV) and show whether it affects investors' behavior. IDIV is the Brazilian stock market index representing the weighted average total returns of the top-dividend-paying publicly traded companies. The implicit assumption is that, since investors suffer from bounded rationality, according to behavioral finance, they alternatively must rely on imperfect heuristics in their decision-making. To assess this claim, we collected quarterly observations from the B3 stock exchange using Economatica and collected data forming a non-balanced panel of 4,218 quarterly observations of 275 Brazilian firms. Moreover, we performed a series of regressions analysis to investigate whether the dividend yields are associated with higher stock returns.

The results from estimations support to both hypotheses in our paper, i.e., dividend payout positively affects stock prices, and an increase (decrease) in a stock's share in the dividend index (IDIV)

composition has a positive (negative) effect on its price, thus suggesting the index's role as a proxy to investors. It must be stressed, however, that the results are limited to this sample, even though they're consonant with the extant literature, both theoretically and empirically. Additionally, future research could surely broaden the dataset's scope and/or test for different model specifications, variables, and/or estimation methods to further confirm these results.

This research contributes to the existing literature in the dividend and payout policy literature. By empirically demonstrating that the dividend index is responsible for portfolio allocation we are able to provide further advancement on the asset allocation process and the different mechanisms that involve investors' decisions.

Our paper is divided into 7 sections. In section 2 we assess the literature on the dividend effects on investment decisions. In section 3 uses this literature as a backbone to develop the two hypotheses in the paper. In section 4 we discuss the methodology in the following section. In section 5 we demonstrate and discuss the main results from our estimations. In section 6 we provide robustness test in order to confirm our results. In section 7 we conclude the paper with our final remarks.

THE BRAZILIAN STOCK MARKET

According to Costa (1994), the Brazilian stock market was small by international comparison back in 1989. In that period, it had 622 listed companies, which less than half were actively traded. Despite the maturity the Brazilian economy has faced in the last 30 years, the number of listed companies decreased nearly 28% percentage points accounting for 445 companies listed in 2024. Moreover, Tristão and Sonza (2023) suggest that one of the characteristics of the Brazilian stock market is the high concentration of shares owned by a few shareholders.

The Brazilian Stock Exchange is based in São Paulo and, since 2017, answers by the company name of B3 used henceforward as shorthand for the Brazilian stock exchange (B3, 2021). B3 is an electronic exchange, such as NASDAQ, and for this paper, there are no relevant idiosyncrasies about its functioning.

Two institutional aspects, however, require some clarification: legal minimum dividend payout, and equity interest. The legislation which regulates dividend payments (6.404/1976) establishes that shareholders are entitled to receive as a mandatory dividend, in each fiscal year, a certain portion of the company's profits. In its article 202, it states that shareholders are entitled to receive a mandatory dividend, in each year, the portion of profits defined in the company's statute. In the second item of the same article, it is established that, in case the statute explicitly defines a dividend payout policy, the

minimum mandatory dividend cannot be less than 25% of the adjusted net income. This legal provision should not be confused with the American concept of minimum dividend, which is the fixed amount - in cash or percentage relative to the par value of the share - that is owed to the shareholders of the companies. (VANCIN; PROCIANOY, 2016). A presumed objective in establishing a minimum mandatory dividend was to protect the minority shareholder, by preventing the controller from retaining all the profits (LA PORTA *et al.,* 2000). While management could, in theory, always devise expenses to prevent a net profit and, hence, dividend payments, that is not observed in practice. (For an extensive discussion of the topic see VANCIN; PROCIANOY, 2016).

In the aftermath of the rollout of a new currency – Real – as part of a successful strategy to halt an ongoing hyperinflation process, a long period of monetary correction in companies' financial statements ended (alongside hyperinflation). To offset the financial loss companies were experiencing, the provision for interest on equity (Juros sobre Capital Próprio – JCP) was created, which meant the calculation of interest on shareholders' equity and its appropriation as an expense for purposes of calculating corporate taxation. Until 1995, the net equity values were subject to monetary correction. The monetary correction system was revoked, in the following year, by article 4 of Law (9.249/95), in line with the objectives of de-indexing the economy, established with the Real Plan. To mitigate the effects on companies' equity, resulting from the extinction of monetary correction, article 10 established that, to calculate the net profit, interest paid or credited individually to partners or shareholders may be deducted as proceeds, from equity. The effective payment or credit of interest is subject to the existence of profits computed before the deduction of interest or accumulated profits, or profit reserve, in an amount equal to or greater than twice the interest to be paid or credited. Furthermore, Article 9 allows for interest on equity payments to be deducted from the legal minimum dividend payout Thus, equity interest, when transformed into a dividend, can benefit companies with a deductible dividend for purposes of calculating corporate income tax. The only caveat is, that while dividends have been tax-exempt since 1996, equity interests are taxed 15% upfront, that is, shareholders only receive 85% of what companies choose to distribute (ZANI, 2000).

The need to clarify those two concepts stems from the fact that the dividend index (IDIV) includes both dividends and interests on equity to calculate each stock's dividend yield. More formally, IDIV is calculated by B3, much like the Bovespa Index (IBOV) – the benchmark for market returns – IDIV aims to be the indicator of the average performance of shares issued by publicly traded companies that have stood out in terms of investor payout, in the form of distribution of dividends and interest on equity (B3, 2018).

The index's theoretical portfolio is valid for 4 (four) months, for the periods from January through April, May through August, and September through December, coming into force on the first Monday of the initial month of validity (or the business day immediately following the if there is no trading on that day). At the end of each four months, the portfolio is rebalanced, using the procedures and criteria that are part of this methodology.

The index is not overly susceptible to short-term market fluctuations. Considering dividends as more stable than stock prices, part of its rebalancing may reflect stock price effects, rather than a substantial change in dividend policy. Even so, the index still signals, arguably, relevant information, in particular, high dividend-paying companies as well as the median dividend yield for that subset.

Moreover, dividend indexes are widely used in research regarding dividend payout as they allow academics a suitable measure to uncover research questions related to corporate and behavioral finance. More specifically, researchers have used different dividend indexes to analyze risk premia (CEJNEK; RANDL, 2020) and the role of dividend payout policies (BASSE *et al.*, 2021; HARTZMARK; SOLOMON, 2021) to understand firm and investors behavior. While those studies rely on international indexes, we focus on the B3 index as it allows us to investigate the individual investment behavior in an emerging market.

THE ROLE OF DIVIDENDS

As Frankfurter and Wood (1997) have noted, dividend payouts are historically indissociable from the development of the corporate form itself. Corporate dividends date as far back as the early 16th century, when ship captains started selling financial claims to investors, which entitled them to share in the proceeds of the voyages. By the end of the century, these financial claims began to be publicly traded in Amsterdam and were gradually replaced by shares of ownership. At the end of each voyage, enterprise liquidation ensured a distribution of profits and helped to reduce the chances of fraud (BASKIN, 1988). As these ventures became more profitable and regular, the process of liquidation at the end of each voyage became increasingly inconvenient and costly. The ventures' success increased their credibility and shareholders became more confident in their management (captains), accomplished by, among other things, the payment of "generous dividends" (BASKIN, 1988). As a result, these companies began trading as "going concern" entities and distributing only the profits rather than the entire invested capital. This new form of organization gave rise to the issue of deciding what proportion of the firms' income (rather than assets) to return to investors and produced the first dividend payment regulations (FRANKFURTER; WOOD, 1997).

Companies modeled themselves after bonds, which made regular and stable interest payments, and corporate managers found that investors preferred shares that performed like bonds. The Bank of North America 1781 paid dividends after only six months of operation, “Paying consistent dividends remained of paramount importance to managers during the first half of the 19th century” (FRANKFURTER; WOOD, 1997, p.24). As suggested by Koleosho *et al.* (2022) It is expected that any business aims to increase shareholders’ value. Thus, announcement of corporate actions by firms over the last decade has always been met with several reactions by both current and potential shareholders.

Due to uncertainty, in the absence of regular and accurate corporate reporting, dividends were often preferred to reinvested earnings, and often even regarded as a better indication of corporate performance than published earnings accounts. Consequently, an increase in dividend payments tended to be reflected in rising stock prices. As corporations became aware of this phenomenon, it raised the possibility that managers of companies could use dividends to signal strong earnings prospects. Corporate managers soon realized the importance of dividend payments in satisfying shareholders' expectations. They often smoothed dividends over time believing that dividend reductions might have unfavorable effects on share price and therefore, used dividends as a device to signal information to the market. Since the 1950s, the effect of dividend policy on firm value and other issues of corporate dividend policy has been subjected to a great debate among finance scholars (AL-MALKAWI, 2010).

Another key determinant to the dividend payout policy may be related to managerial incentives, more specifically to CEOs’ compensation. As suggested by Bhattacharyya *et al.* (2008), CEO compensation is correlated to executive compensation is positively (negatively) associated with earnings retention (dividend payout). Moreover, Dutra; Ceretta (2023) demonstrate, there is a positive relationship between firms’ prestige and executive compensation. That is, firms that experience an increase in their prestige will have a higher likelihood of compensating better their executives. Thus, CEOs may choose to increase dividend policy as a signal to the market about their firm’s prestige and profitability to maintain investors satisfied while, in turn, they can get higher compensation.

Three main contradictory theories of dividends can be identified. High dividends increase share value theory (or the so-called “bird-in-the-hand” argument), low dividends increase share value theory (the tax-preference argument), and the dividend irrelevance hypothesis. More recently, other explanations have been put forward to try to solve what Black (1976) famously dubbed a puzzle. These arguments include the information content of dividends (signaling), the clientele effects, and the agency cost hypotheses.

Modigliani and Miller (1961) argued that regardless of how the firm distributes its income, its value is determined by its earning capacity and its investment decisions. In other words, investors

calculate the value of companies based on the discounted (compounded) value of their future earnings, and this is not affected by whether firms pay dividends or not and how dividend policies are set. The conclusion that in perfect capital markets dividend policy should be irrelevant is a logical extension of the neoclassical assumption of perfect competition into financial economics.

Black, Scholes (1974, p.18), to test the tax-effect hypothesis, examined the relationship between dividend yield and stock returns. Their results showed that the dividend yield coefficient was not significantly different from zero either for the entire period (1936-1966) or for any of the shorter subperiods. That is, the expected return either on high or low-yield stocks is the same. Black and Scholes, therefore, concluded that "we are unable to show that differences in yield lead to differences in stock prices".

Other studies by leading financial economic researchers such as Miller (1978); Miller; Scholes (1982); Miller (1986); Hess (1992), and more recently, Bernstein (1996) provided evidence in support of the dividend irrelevance hypothesis. Ball *et al.* (1979) examined the effect of dividends on firm value using Australian data over the period from 1960 to 1969. However, they failed to find conclusive evidence to support M&M's irrelevance proposition. Baker *et al.* (1985) surveyed the chief financial officers (CFOs) of 562 firms listed on the New York Stock Exchange (NYSE) from three industry groups (150 utilities, 309 manufacturing, and 103 wholesale/retail). Based on 318 responses, they found that respondents strongly agreed that dividend policy affects common stock prices. Baker and Powell (1999) surveyed 603 CFOs of US firms listed on the NYSE, and observed that 90% believed that dividend policy affects a firm's value as well as its cost of capital. Other studies including Siddiqi (1995) and Casey; Dickens (2000) have provided evidence inconsistent with DIH.

In a recent study, Dixon *et al.* (2021) tackle this issue by suggesting that while securities lending agreements transfer the legal right to receive dividends – and any tax liability thereof – from the lender to the borrower, the borrower should reimburse the lender the dividend payments that happen during the life of the loan and return the shares upon recall. Thus, in a world where dividends and income from other sources are taxed differently, the separation of ownership and exposure matters as it gives investors an opportunity to earn dividend-like income from either dividend paid by the company or substitute dividends paid by a third party. Additionally, Yin; Nie (2021) argue that as a well-accepted measure of cash flow, dividends can be understood as a key determinant of stock price movements in economic analysis. The model-implied dividend-price ratio alongside with dividend levels matches the valuation of the stock market (KRAGT *et al.* 2020; CEJNEK; RANDL 2020).

Relaxing the perfect information hypothesis, it can be argued that, given the ensuing uncertainty, dividends are valued differently from retained earnings (or capital gains). Investors prefer the "bird in

the hand" of cash dividends rather than the "two in the bush" of future capital gains. As a higher current dividend reduces uncertainty about future cash flows, a high payout ratio will reduce the cost of capital, and hence increase share value.

The tax-effect hypothesis states that low dividend payout ratios lower the cost of capital and increase the stock price. That is, low dividend payout ratios contribute to maximizing the firm's value. This argument is based on the assumption that dividends are taxed at higher rates than capital gains. In addition, dividends are taxed immediately, while taxes on capital gains are deferred until the stock is sold. These tax advantages of capital gains over dividends tend to predispose investors, who have favorable tax treatment on capital gains, to prefer companies that retain most of their earnings rather than paying them out as dividends and are willing to pay a premium for low-payout companies. Therefore, a low dividend payout ratio lowers the cost of equity and increases the stock price. Brennan (1970) developed an after-tax version of the capital asset pricing model (CAPM) to test the relationship between tax risk-adjusted returns and dividend yield. Higher pre-tax risk-adjusted returns are associated with higher dividend yield stocks to compensate investors for the tax disadvantages of these returns. This suggests that *ceteris paribus*, a stock with a higher dividend yield will sell at lower prices because of the disadvantage of higher taxes associated with dividend income. Higher pre-tax risk-adjusted returns are necessary to compensate investors for holding high-dividend-paying stocks because of the disadvantage associated with dividend income. However, in Brazil, dividends are tax-exempt for the investor, and hence we expect this theory not to be replicated in Brazil.

The Dividend Clientele Effect Hypothesis (DCH) posits that the two sets of factors are likely to cancel each other out after all: investors in high tax brackets likely prefer either no or low dividends. Low-tax bracket investors generally fall into three categories: low-income individuals, pension funds, which pay no taxes on either dividends or capital gains, and corporations, which can exclude at least 70% of their dividend income but cannot exclude any of their capital gains. Thus, corporations are likely to prefer high-dividend stocks, even without a preference for current income. (GRAHAM; KUMAR, 2006). It is worth mentioning, nonetheless, that the tax treatment above described is US-specific, though the intuition can be easily extrapolated to other institutional settings.

Allen *et al.* (2000) suggest that clienteles such as institutional investors tend to be attracted to invest in dividend-paying stocks because they have relative tax advantages over individual investors. These institutions are also often subject to restrictions in institutional charters (such as the "prudent man rule"), which, to some extent, prevent them from investing in non-paying or low-dividend stocks. Analogously, good quality firms prefer to attract institutional clientele (by paying dividends) because institutions are better informed than retail investors and have more ability to assess the company's

fundamentals, in other words, avoiding price volatility. It is worth noting that institutional investors face liquidity constraints to sell off their holdings. As such, these decisions are taken, at least, in a medium-term perspective. This prediction is consistent with the signaling hypothesis. Allen *et al*. (2000) link signaling and agency arguments with the clientele effects of the dividend hypothesis. They conclude by positing that, "…these clientele effects are the very reason for the presence of dividends…" (2000, p. 2531). Supporting this view, Golubov *et al.* (2020) find that country-level differences in dividend taxes, governance quality, and population age shape the adjustment in ways consistent with dividend preferences. In there analysis, the academics gathered a sample of global M&A deals announced between 1990 and 2015 from Thomson Reuters SDC Mergers and Acquisitions Database. Through a regression analysis using a constructed variable to measure he change in the acquirer's dividends per share (DPS), their results suggest that there is a change in acquirer DPS during the first, second, and third year following the completion of the M&A deal. This suggest a clientele effect as there is an adjustment of the acquiring firm's dividend policy toward that of the target when the acquirer inherits target shareholders through a stock-swap deal. That is, firms actively manage their dividend policy toward the preferences of their investors.

The previous arguments pointed out that the corporate leverage decision involves a trade-off. The firm's capital structure is optimized where the marginal subsidy to debt equals the marginal cost. while all firms will increase debt levels somewhat to fool investors, the costs of extra debt prevent the less valuable firms from issuing more debt than the more valuable firms issue. Thus, investors can still treat debt level as a signal of firm value. In other words, investors can still view an announcement of debt as a positive sign for the firm.

Drawing from M&M's assumptions, signaling theory follows from relaxing the perfect information premise. And, consequently, moving to a more realistic model, namely, one accounting for the existence of asymmetric information between insiders (managers) and outsiders (shareholders). The former, who look after the firm, usually possess information about its current and prospects that is not available to the latter. This informational gap between insiders and outsiders may cause the true intrinsic value of the firm to be unavailable to the market. If so, the share price may not reflect the best estimate of the firm's value (AL-MALKAWI, 2010). Historically, due to a lack of complete and reliable information to shareholders, the cash flow provided by a security to an investor often formed the basis for its market valuation (BASKIN *et al.*, 1999). Hence dividends came to provide a useful tool for managers with which to convey their private information to the market because investors used visible (or actual) cash flows to equity as a way of valuing a firm. Even Modigliani; Miller (1961) suggest that, when markets are imperfect, share prices may respond to changes in dividends. In other words, dividend

announcements may be seen to convey implicit information about the firm's future earnings potential. This proposition has since become known as the "information content of dividends" or signaling hypothesis. For it to hold, (1) managers should have private information about a firm's prospects and incentives to convey that information to the market. And (2) a signal should be true, i.e., a firm with poor prospects should not be able to mimic it and send false signals to the market by increasing dividend payments.

Empirical work on dividend signaling has examined two main issues: (1) whether share prices move in the same direction with dividend change announcements, and (2) whether dividend changes enable the market to predict future earnings. Unsurprisingly, results have been mixed. Pettit (1972) observed that dividend announcements do communicate valuable information and showed that the market reacts positively to the announcement of dividend increases, and vice-versa: "…dividend announcement, when forthcoming, may convey significantly more information than the information implicit in an earnings announcement" (p.1002). AHARONY; SWARY (1980) argued that dividend and earning announcements are not perfect substitutes and a proper test for the signaling hypothesis needs to that taken into account. Still, they found support for the results obtained by Pettit even after controlling for contemporaneous earnings announcements. Woolridge (1983) also found a significant increase (decrease) in common stock returns following the unexpected dividend increase (decrease) announcements. Asquith; Mullins (1983), in an often-cited paper, examined the market's reaction to dividend announcements for a sample of 168 firms that initiated dividends either for the first time in their corporate history or resumed paying dividends after at least a ten-year hiatus. They tested the average daily excess stock returns ten days before and ten days after the announcement of dividend initiation. For the two-day announcement period, their result shows that there is an excess return of about +3.7 percent. Michaely *et al.* (1995) have gone further by examining the impact of initiations and omissions of dividends on share prices. They observed 561 dividend initiation events and 887 dividend omission events over the period of 1964 to 1988. During the three days surrounding announcements, the average excess return was about –7.0% for omissions and +3.4 % for dividend initiations. More recently, Bali (2003) presented evidence consistent with the preceding results. He reported an average 1.17% abnormal return for dividend increases and -5.87% for decreases. He also tested the long-run drifts of stock prices in reaction to dividend policy changes and reinforced Michaely *et al.* (1995) findings. The signaling power of dividends, however, may not be the same in markets other than the US. In a comparison study of dividend policies between Japanese and US firms, Dewenter; Warther (1998) revealed that the influence of dividends as a signaling mechanism in Japan is significantly lower when compared to the US. Japanese firms are subject to less information asymmetry, especially among

keiretsu (industrial groups) member firms. These differences in findings are attributable to the differences in corporate governance structures between Japan and the US, and the nature of corporate ownership in Japan. Conroy *et al.* (2000) provide evidence consistent with Dewenter; Warther (1998) study for Japanese firms.

One of the assumptions of Modigliani; Miller (1961) perfect capital market is that there are no conflicts of interest between managers and shareholders. In practice, however, this assumption is questionable, i.e., managers are imperfect agents of shareholders (principals). This gives rise to agency costs: generally defined as the costs from the conflicts of interest among stockholders, bondholders, and managers (ROSS, 2015). Jansen; Meckling (1976) addressed the potential conflict between shareholders and bondholders. Shareholders are considered as the agents of bondholders' funds: excess dividend payments to shareholders may be taken as shareholders expropriating wealth from bondholders. Shareholders have limited liability, and they can access the company's cash flow before bondholders; consequently, bondholders prefer to put constraints on dividend payments to secure their claims. Conversely, for the same reasons, shareholders prefer to have large dividend payments (ANG, 1987). Easterbrook (1984) argued that dividends could be used to reduce the free cash flow in the hands of managers. In addition, he hypothesized that dividend payments would oblige managers to approach the capital market to raise funds. In this case, investment professionals such as bankers and financial analysts will also be able to monitor managers' behavior. Therefore, shareholders can monitor managers at a lower cost. This suggests that dividend payments increase management scrutiny by outsiders and reduce the chances for managers to act in their self-interest.

Rozeff (1982), for instance, was one of the first to formally model agency costs using a large sample of US firms. The key idea of Rozeff (1982) model is that the optimal dividend payout is at the level where the sum of transaction costs and agency costs are minimized, therefore it is called the "cost minimization model". Rozeff (1982) model implied that there should be a negative relationship between the percentage of stock held by insiders (insider ownership) and the payout ratio, and a positive relationship between the number of shareholders (dispersion of ownership) and the dividend payout ratio. He suggested that the benefits of dividends in reducing agency costs are smaller for companies with lower dispersion of ownership and/or higher insider ownership. He found the agency cost variables significant and consistent with their hypothesized relations. Alli *et al.* (1993) found the ownership dispersion factor insignificant in dividend decisions, inconsistent with Rozeff (1982). However, the insider ownership variable was found to be significant and negatively related to dividend payouts. Jensen *et al.* (1992) applied three-stage least squares to examine the determinants of cross-sectional differences in insider ownership, debt, and dividend policy. They used a sample of 565 firms for the

year 1982 and 632 firms for the year 1987. The insider ownership variable was found statistically significant with a negative sign, implying that there is a negative relationship between insider holdings and dividend payments, which is consistent with Rozeff (1982) and therefore with the agency costs hypothesis. More recently, Holder *et al.* (1998), from a sample of 477 US firms over the period from 1980 to 1990, reported that insider ownership and dividend payouts are significantly and negatively related and that the number of shareholders positively influences payouts. They also found support for Jensen's free cash flow hypothesis. Other studies, such as Denis *et al.* (1994) and Yoon; Starks (1995), however, provide support to the cash flow signaling hypothesis rather than the free cash flow hypothesis as an explanation for the stock price reactions to dividend change announcements (AL-MALKAWI, 2010).

EMPIRICAL EVIDENCE FOR DIVIDEND PAYOUTS IN BRAZIL

NOVIS (2002) reported the impact reflected in the share price after the disclosure of dividends - the study was composed of a total of 163 announcements of dividend payments (events), carried out between 1998 and 2000 and included, in its sample, the most traded shares on the São Paulo Stock Exchange (BM&FBovespa – [B]3) in that period. Another study was carried out by Freire *et al.* (2005) and investigated the relationship between dividend yield and abnormal profit, concluding that this relationship does not exist for the period analyzed, comprised between the years 1996 and 2001.

Procianoy and Verdi (2009) analyzed the clientele effect and the market signaling hypothesis in research carried out between 1996 and 2000 in the Brazilian stock market. They used event studies as one of the methodologies and reported that there was a positive abnormal return equal to 1.5% on the first ex-dividend day, with a statistical significance level of 1%.

Martins and Famá (2012) highlighted that dividend policy is one of the most controversial issues in the field of corporate finance. According to Kothari and Warner (2006), event studies examine the behavior of company stock prices around corporate events. Kramer (2001), however, states that the statistical inference method of event studies based on Bootstrap performs better than traditional methods. The Bootstrap method was initially presented by Efron (1979) as a robust process to estimate the distribution of independent and identically distributed data. This procedure, according to Kramer (2001), performs better than traditional methods. Bootstrap also concentrates on simulation methods to evaluate the sampling properties of statistical estimates.

Silva *et al.* (2016) tested whether dividends are seen as indicators of information to the market, based on the Dividend Signaling Theory. They found evidence of the usefulness of the proposed

additional dividend (DAP) as a mechanism for transmitting opportunities and for the future growth of company values (ANTÔNIO *et al.*, 2019).

Leite *et al.* (2020) contributes to the current literature of payout policy in the Brazilian landscape by analyzing the determinants of dividend payout in periods of economic prosperity and crisis. By taking this approach, the researchers are able to understand in depth how Brazilian firms determine dividend payout in different economic situations, which could be explored for emerging markets as well. Through an archival methodology that took account 68 Brazilian firms in the period from 2010 and 2016 and amassed 448 observations, they observe that despite economic crises negatively affect firms' performance, they do not decrease the dividend value. Hence, they argue that this is related to the idea that firms want to keep investors glad even in the expenses of losing future investment opportunities. Additionally, they also find that profitability and size positively affect dividend payout policy in both economic crisis and periods of economic prosperity.

HEURISTICS FOR INVESTMENTS

Standard finance theories have been developed on the assumption that investors are rational, have complete information, participate in frictionless markets, and always make rational decisions. (SHAH, 2018). Notable examples include the Efficient Market Hypothesis (EMH; FAMA, 1970) and the Modern Portfolio Theory (MARKOWITZ, 1952), which hold that individual investors are rational as well as risk-averse and prefer a low-risk to a high-risk at a given level of return. While these theories have yielded relevant results, it has been long established they do not truly represent how individuals make decisions, nor can they explain "inefficient" market outcomes. Behavioral finance provides a satisfactory demonstration and understanding of why individual investors trade, how they choose their portfolios, and how they perform (SHAH, 2018).

The "father" of bounded rationality, SIMON (1989), asked this very question: "How do human beings reason when the conditions for rationality postulated by the model of neoclassical economics are not met?" (p. 377) As Simon (1979, p. 500) stressed in his Nobel Memorial Lecture, the classical model of rationality requires knowledge of all the relevant alternatives, their consequences and probabilities, and a predictable world without surprises. These conditions, however, are rarely met for the problems that individuals and organizations face.

Investors often simplify their decision-making processes by using behavioral heuristics that might cause systematic errors in judgment and lead to satisfactory investment choices, but not maximize utility (KAHNEMAN; TVERSKY, 1979). As Kahneman (2003, p. 1449) explained in his Nobel

Memorial Lecture: “Our research attempted to obtain a map of bounded rationality, by exploring the systematic biases that separate the beliefs that people have and the choices they make from the optimal beliefs and choices assumed in rational-agent models”.

Gigerenzer (2011), who has put forward a somewhat different research program than Kahneman and Tversky Arguably the most influential authors on the subject, defines heuristics as efficient cognitive processes, conscious or unconscious, that ignore part of the information. Because using heuristics saves effort, the classical view – he argues – has been that heuristics are more error-prone than “rational” decisions. For many decisions, however, the assumptions of rational models are not met, and it is an empirical rather than an a priori issue of how well cognitive heuristics function in an uncertain world.

Both Kahneman and Gigerenzer agree on the centrality of heuristics in decision-making. However, for Kahneman heuristics often appear as a fallback when the standard Von Neumann–Morgenstern axioms of rational decision-making do not describe investors' choices. In contrast, for Gigerenzer heuristics are simply a more effective way of evaluating choices in the rich and changing decision-making environment investors must face (FORBES, 2015).

Gigerenzer; Brighton (2009) point to ambiguities in the application of perhaps the most famous heuristic of all, the representativeness heuristic. This heuristic is sometimes stated to imply that we construct a distribution of expected outcomes according to our distribution of impressions. So, for example, the representative heuristic has been used to explain: the “hot hand” effect that sometimes a person is “on a roll” and scores from every free-kick, or plants home every shot at the basket, forming a streak of good luck and; simultaneously, the “gambler's fallacy” or the spoof “law of small numbers”, this is the belief that small samples must approximate the population they are drawn from and hence, after a poor run “my luck must change”.

Nevertheless, Kahneman (2011) defines a heuristic as “a very simple procedure that helps find adequate, though often imperfect, answers to difficult questions” (p. 98), by reducing the complexity of measuring probabilities and forecasting values to simpler judgments. Heuristics allow human beings to speed up decision-making, compared to rationally processing the available information.

Naturally, heuristics also influence financial markets’ behavior (BONDT; THALER, 1985). Representative, availability, overconfidence, and anchoring and adjustment are heuristic biases that are used by investors to reduce the risk of loss in uncertain situations. When individual investors use heuristics, they reduce the mental effort in the decision-making process, but that leads to errors in judgment and, as a result, investors make incorrect investment decisions, which could lead to the market becoming inefficient (SHAH, 2018).

Representativeness: (i) the level to which an event's characteristics are similar to its parent population, also (ii) contemplates prominent features of the procedure by which it is yielded (KAHNEMAN, 2011). There are two types of representativeness bias: base-rate neglect and sample-size neglect. Base-rate neglect means not adequately incorporating the base likelihood of the stereotype occurring. Sample-size neglect occurs when decision-makers try to generalize based on too few examples or incorrectly take small samples as representative of populations (POMPIAN, 2006). According to Kahneman; Tversky (1974), individuals use the representativeness heuristic because they do not fully understand the basic concept of forecasts, the preponderance of an event within its population of events or characteristics. Another reason is insensitivity to the sample size because it is incorrectly believed that small samples of events, people, etc. are representative of the entire populations from which the sample is drawn. People tend to overestimate the likelihood that the characteristics of a small sample of a population adequately represent those of the entire population. "We also tend to use the representativeness heuristic when we are very aware of anecdotal evidence based on a very small sample of the population" (KAHNEMAN; TVERSKY, 1974). The consequences of the representativeness heuristic are that decision-makers adopt forecasts based on a small sample and update beliefs using simple classifications rather than complex data.

Availability is a cognitive heuristic bias, also known as a mental shortcut, that occurs when people rely too much on easily available information in their decisions or predictions. Tversky; Kahneman (1973) suggest that individuals determine the chances of an event by using the availability heuristic, the ease with which relevant data come to mind. They explain that depending on the availability heuristic leads individuals to "systematic biases" and, due to these biases, they overestimate the probability of it repeating.

Anchoring and adjustment is a cognitive heuristic bias related to humans' excessive reliance on the first piece of information provided (the "anchor") when making decisions. Kahneman; Tversky (1974) argue that different starting points yield different estimates, which are biased toward the initial value. So, the anchoring and adjustment bias can be explained by the tendency of individual investors to "anchor" their ideas or thoughts to a logically irrelevant reference point when making a decision (POMPIAN, 2006).

HYPOTHESIS DEVELOPMENT

In the Literature Review, we discussed several different theories formulated for the effect of dividend yield on stock price. We discussed how high dividends increase share value theory (or the so-

called “bird-in-the-hand” argument), and how low dividends increase share value theory (the tax-preference argument). However, in Brazil, there is no difference in taxes between reinvested earnings and dividends paid, which weakens the tax-preference argument for low dividends. Empirical evidence for the Brazilian stock market, as previously discussed, follows suit. Moreover, high dividends are also expected to increase the stock price due to signaling, the clientele effects, and the agency cost. Hence, we hypothesize that: *H1: Higher dividend yields are associated with higher stock prices, ceteris paribus.*

In the second part of the literature review, we discussed how heuristics can affect investments. Based on the anchoring and adjustment biases, we expect that smaller investors may use public indexes as a way to structure their portfolios. In the case of dividends, if H1 is true, then investors will tend to invest more in stocks that pay higher dividends, and may use the IDIV index as a proxy, hence we hypothesize: *H2: Investors use the dividends index as a heuristic to manage their portfolios.*

METHODOLOGY

We collected quarterly observations from the B3 stock exchange using Economatica. We collected data forming a non-balanced panel of 4,218 quarterly observations of 275 firms. Thus, all data collected are secondary and represent the main companies in Brazil which are publicly traded. Thus, the sample is representative of the population of this study.

We performed a series of OLS (ordinary least squares) regressions to assess whether the dividend yields are associated with higher stock returns (H1). Our specification is as follows:

$$Price\ Adjusted_{iq} = \beta \frac{Total\ Dividends_{iq}}{Total\ Equity_{iq}} + \gamma Total\ Assets_{iq} + \delta EPS_{iq} + \theta_q + \rho_i + \varepsilon_{iq}$$

Thus, our dependent variable (DV) is the price adjusted (after dividend payout). Our independent variable (IV) of interest is the dividends paid by the firm over its total equity (as to scale the variable). We use the total assets of the firm and its earnings per share as control variables. Additionally, we employ quarterly fixed effects (θ_q) and firm-specific fixed effects (ρ_i). Lastly, we perform regressions using the natural logarithm of the main DV and IV, as well as winsorizing it at 5%, to avoid problems with outliers. Table 1 shows the summary statistics of all variables.

To test H2, we restrict our dataset, this time using just the companies that are present in IDIV and on IBOV. This allows us to capture the variation on the dividend index controlling for the variation

of the total index, which not only eliminates the alternative explanation that the IBOV index composition was driving our results but also accounts for the rebalancing effects of large ETFs (the biggest ETFs on the B3 stock exchange track IBOV).

We collected 7 trading days before and after the rebalancing (15 days: -7 to +7) for the 23 firms that are on both indexes, totaling 345 individual observations.

Our main specification to test H2 is as follows:

$$Price_{id} = \beta difIDIV_{id} + \gamma difIBOV_{id} + \theta_d + \rho_i + \varepsilon_{id}$$

Hence, our main DV in this estimation is again the stock price. Our main IV of interest is $difIDIV$, which captures the difference in the IDIV index composition, assuming a value of 0 for days -7 to -1, and then takes the value of $IDIV_{1q2022} - IDIV_{4q2021}$ for days 0 to +7. Thus, our specification is similar to a DiD estimator, but instead of two levels of treatment (0 vs 1) in the interaction term ($treat \cdot post$), the treatment varies in levels. We calculate $difIBOV$ in a similar manner and use it as a control variable. The variable θ_d represents daily fixed effects, which captures the January effect on our sample, and ρ_i is the firm-specific fixed effects. Table 1 shows the summary statistics of all variables.

Table 1 - Summary Statistics

Dataset for H1:	N obs	N firms	Mean	SD	Min Value	Max Value
Price	4,218	275	19.246	29.259	0.140	560.00
ln(Price)	4,218	275	2.445	1.027	-1.970	6.328
Price winsorized	4,218	275	17.236	15.422	1.880	66.700
Div/TE	4,218	275	0.051	0.851	0	47.412
ln(Div/TE)	4,218	275	-9.312	6.176	-16.118	3.858
Div/TE winsorized	4,218	275	0.024	0.037	0	0.132
Total Assets (in millions)	4,218	275	44.543	202.420	0.001	2,154.879
EPS	4,218	275	-2.002	28.659	-783.947	451.390
Dataset for H2:	**N obs**	**N firms**	**Mean**	**SD**	**Min Value**	**Max Value**
Price	345	23	22.005	10.723	4.58	48.50
ln(Price)	345	23	2.951	0.566	1.522	3.881
Price winsorized	345	23	21.656	9.834	6.13	38.60
difIDIV	345	23	0.095	0.543	-1.529	1.383
difIBOV	345	23	-0.019	0.194	-1.167	0.256

Source: Self elaboration.

MAIN RESULTS

Table 2 shows the results of the main specification for H1. As expected, we find consistent positive associations between dividend payout and quarterly stock price. Thus, we show timely evidence that dividends positively affect stock prices in Brazil.

We now proceed to analyze H2, and the estimation results are presented in Table 3. We find that, after the change in index composition, larger positive changes in IDIV compositions were correlated with larger positive stock prices. This result was robust to change the DV to ln(Price) and also to winsorize the DV at the 5th and the 95th percentile. We perform further robustness in the next section.

Table 2 - Main Results for H1

	Model 1	Model 2	Model 3
Dividends distributed scaled by Total Equity	0.156*	0.013***	0.233**
	(0.091)	(0.003)	(0.101)
N	4,218	4,218	4,218
R^2	0.74	0.88	0.80
Controls	Yes	Yes	Yes
Daily FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Robust SE	Yes	Yes	Yes
log of Price and Dividends	No	Yes	No
Winsorization at 5% of Price and Dividends	No	No	Yes

Standard errors in parentheses. P-values: * p<0.1, ** p<0.05, *** p<0.01.
Source: Self elaboration.

Table 3 - Main Results for H2

	Model 1	Model 2	Model 3
difIDIV	0.305***	0.013***	0.383***
	(0.071)	(0.003)	(0.070)
N	345	345	345
R^2	0.99	0.99	0.99
difIBOV control	Yes	Yes	Yes
Daily FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Robust SE	Yes	Yes	Yes
ln(Price)	No	Yes	No
Price winsorized at 5%	No	No	Yes

Standard errors in parentheses. P-values: * p<0.1, ** p<0.05, *** p<0.01.
Source: Self elaboration.

ROBUSTNESS CHECKS

Different estimation windows

Our first robustness check is whether our choice of estimation window affected the results. In addition to presenting the results for the 7 days after the change in index composition, we also present results for 3 and 5 days. Table 4 shows the results. In all the results we find a positive effect for the change in IDIV with stock prices, thus lending more credibility to our results.

Table 4 - Results for robustness estimations (different estimation windows)

	Model 1	Model 2	Model 3

difIDIV	0.305***	0.256***	0.168***
	(0.071)	(0.069)	(0.064)
N	345	299	253
R^2	0.99	0.99	0.99
difIBOV control	Yes	Yes	Yes
Daily FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Robust SE	Yes	Yes	Yes
t after	7 days	5 days	3 days

Standard errors in parentheses. P-values: * p<0.1, ** p<0.05, *** p<0.01.
Source: Self elaboration.

Difference-in-differences

In this subsection, we employ a difference-in-differences (DiD) estimator, coding the firms that had a *negative* change in IDIV as receiving $treat = 0$ and those that had a *positive* change as $treat = 1$. We also code the time between -7 and -1 as $post = 0$ and between 0 and 7 as $post = 1$. Thus, the coefficient of an interaction term $treat \cdot post$ captures the difference of the groups in the differences before and after. Thus, we estimate the following model:

$$Price_{id} = \beta treat_i + \gamma post_d + \delta treat_i \cdot post_d + \theta_d + \rho_i + \varepsilon_{id}$$

However, for the DiD to have a causality claim, the pre-trends have to be parallel, and hence any difference is due to the change in the IDIV composition. We then estimate the following regression in $post_d = 0$ (i.e., at the time between -7 and -1), in which *d* captures the pre-trend:

$$Price_{id} = \beta treat_i + \gamma d + \delta treat_i \cdot d + \varepsilon_{id}$$

Thus, if the δ coefficient is statistically different from 0, then there are different trends between groups. We find that the trends are parallel ($\delta = 0.037, p = .966, 95\%\ CI = [-1.683, 1.756]$), and our DID estimator is valid. Table 5 presents the results.

Table 5 - Results for robustness estimations (DiD)

	Model 1	Model 2	Model 3
$treat\ x\ post$	0.417***	0.567***	0.677***

	(0.140)	(0.130)	(0.129)
N	345	345	345
R^2	0.99	0.99	0.99
Daily FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Robust SE	Yes	Yes	Yes
difIBOV control	No	Yes	Yes
Price winsorized at 5%	No	No	Yes

Standard errors in parentheses. P-values: * p<0.1, ** p<0.05, *** p<0.01.
Source: Self elaboration.

We again replicate our main results: firms with positive IDIV changes had higher stock prices than the negative ones. Moreover, this effect was not driven by the IBOV change on the same date, since the inclusion of it as a control variable did not affect the result. Additionally, the presence of outliers did not affect the result, as Model 3 presents the results winsorized.

CONCLUSION

In conclusion, the purpose of this paper was to test, or more precisely, and in line with the extant literature on the subject, to confirm whether dividend payouts positively affect the price of a stock (H1), and subsequently, to test whether the Brazilian market's dividend index (IDIV) is used by investors as a dividend payout proxy, in other words, whether changes to the index affect the prices of the stocks involved (H2). In both instances, results have lent support to the hypotheses. Ordinary Least Squares (OLS) regressions were the estimation method employed.

At first, the literature review summarized the main theoretical arguments on dividend payouts, then the empirical evidence on the subject, both internationally and in Brazil, and lastly the main behavioral finance principles (biases, in this case) were outlined as a possible explanation for the investor behavior this paper sought out to test. As suggested by KOLEOSHO *et al.* (2022) It is expected that any business aims to increase shareholders' value.

Theoretically, three major stances on dividends can be identified: high dividends increase share value theory (or the so-called "bird-in-the-hand" argument), low dividends increase share value theory (the tax-preference argument), and the dividends irrelevance hypothesis. Empirical evidence, however, has mostly found a positive relationship between dividend payouts and stock prices (this paper included). Additional explanations for it include signaling, clientele effects, and agency costs, and, specifically in Brazil, dividends are tax-exempt for the most part, thus weakening the tax-preference argument for low dividends. Supporting this view, GOLUBOV *et al.* (2020) find that country-level

differences in dividend taxes, governance quality, and population age shape the adjustment in ways consistent with dividend preferences.

The second part of the literature review sought to provide possible rationales for the hypothesized behavior in H2. Simply put, due to bounded rationality, investors (low-income individuals, in particular) must instead rely on heuristics in their decision-making, as previously shown by Dutra; Ceretta (2023). By using a public index composition as a proxy of stock behavior, they're presumably suffering from the anchoring and adjustment biases, that is, to "anchor" one's decision in a first piece of salient information (not necessarily relevant) and to make marginal adjustments from the original reference point.

To test H1, the dependent variable (DV) was set as the adjusted price (after dividend payout), while the independent variable (IV) was dividends paid by the firm over its total equity (as to scale the variable). As control variables total assets of the firm, its earnings per share, quarterly fixed effects (θ_q), and firm-specific fixed effects (ρ_i) were used. Alternative specifications using the natural logarithm of the main DV and IV, as well as winsorization at 5% were also tested, as to avoid problems with outliers.

To test H2, the data set was comprised of just the companies that are present in IDIV and on IBOV, thus allowing to capture the variation on the dividend index controlling for the variation of the total index, not only eliminating the alternative explanation that IBOV composition was driving the results but also accounting for rebalancing effects of large ETFs (which tracks IBOV). 7 trading days before and after the rebalancing (15 days: -7 to +7) for the 23 firms that are on both indexes, totaling 345 individual observations were collected, and, to ensure more robustness to the results, three-time windows were tested (-3 and +3, -5 and +5, and the full -7 and +7 days) all leading to the same conclusion.

Hence, the main DV to test H2 was again the stock price and daily fixed effects, and firm-specific fixed effects were also control variables. The IV of interest was $difIDIV$, which captures the difference in the IDIV index composition, being equal to 0 for the days before the rebalancing, and then taking the value of $IDIV_{1q2022} - IDIV_{4q2021}$ for the next 7 days immediately following it. Thus, the specification is similar to a DiD estimator, but instead of two levels of treatment (0 vs 1) in the interaction term ($treat \cdot post$), the treatment varies in levels. $difIBOV$ was calculated similarly and used as a control variable. As another robustness test, a difference-in-differences (DiD) estimator was also employed: firms that had a *negative* change in IDIV were assigned $treat = 0$, and those that had a *positive* change as $treat = 1$. The days before and after the index rebalancing were also coded: -7 to -1 as $post = 0$ and between 0 and 7 as $post = 1$. Thus, the coefficient of an interaction term $treat \cdot post$

captured the difference of the groups in the differences before and after. This estimation also led to qualitatively similar results.

Essentially, as a contribution to the body of work on the topic, the estimation results have lent support to both H1 and H2, i.e., dividend payout positively affects stock prices, and an increase (decrease) in a stock's share in the dividend index (IDIV) composition has a positive (negative) effect on its price, thus suggesting the index's role as a proxy to investors. It must be stressed, however, that the results are limited to this sample, even though they're consonant with the extant literature, both theoretically and empirically. Additionally, future research could surely broaden the dataset's scope and/or test for different model specifications, variables, and/or estimation methods to further confirm these results.

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