RBGN REVISTA BRASILEIRA DE GESTÃO DE NEGÓCIOS
ISSN 1806-4892
e-ISSN 1983-0807

OPEN ACCESS

ARTICLE

Dividend Investing Using "Big Safe Dividends" to Build Equity Portfolios in Brazil

Dêner Matheus da Silva Viana[1]
Lauro Vinício de Almeida Lima[1]
Orleans Silva Martins[1]

Received on:
June/09/2023
Approved on:
June/27/2024

Responsible editor:
Prof. Dr. Maria-Celia López-Penabad

Reviewers:
Nelson Hein; Alejandro J. Useche; The other reviewer preferred not to disclose his name

Evaluation process:
Double Blind Review

This article is open data

Abstract

Purpose – This study investigates the efficiency of Big Safe Dividends (BSD) as an investment strategy for building successful portfolios in the Brazilian stock market.

Theoretical framework – Using Carlson's (2010) model, stocks with high dividend potential are identified and portfolios of 10, 15, 20, and more stocks are constructed. These portfolios are analyzed over the period from 2010 to 2023.

Design/methodology/approach – The performance of the BSD portfolios is compared to the main Brazilian stock market indices (IBOV, IDIV, IBrX, and IGC). The alpha generation of these portfolios is assessed using OLS regression models based on multi-factor asset pricing models, incorporating Fama and French's (1992, 1993) five risk factors, Carhart's (1997) momentum factor, and Amihud's (2002) liquidity factor.

Findings – The results show that BSD portfolios consistently outperform the four benchmark indices over the period analyzed. The study confirms that the use of BSD is effective in forming stock portfolios that generate positive and significant alphas.

Practical & social implications of research – The primary contribution of this study is the evidence supporting BSD as a valid indicator of a dividend factor, showing that the criteria for selecting companies that pay big and safe dividends successfully capture dividend risk, which is priced in the Brazilian market.

Originality/value – This finding is unique in the context of investment strategies related to dividend investing in Brazil, offering novel insights for investors focusing on dividend-based portfolios.

Keywords: Dividend yield, investment strategy, factor investing.

1. *Universidade Federal da Paraíba, Programa de Pós-Graduação em Ciências Contábeis, João Pessoa, PB, Brasil*

FUNDAÇÃO ÁLVARES PENTEADO
FECAP

Revista Brasileira de Gestão de Negócios

https://doi.org/10.7819/rbgn.v26i02.4262

How to cite:
Viana, D. M. S., Lima, L. V. A., & Martins, O. S. (2024). Dividend investing using "big safe dividends" to build equity portfolios in Brazil. *Revista Brasileira de Gestão de Negócios*, *26*(2), e20230230. https://doi.org/10.7819/rbgn.v26i02.4262

1. Introduction

In various capital markets, well-known professional investors have documented their investment strategies in their books, such as Benjamin Graham (Graham's Formula), Joel Greenblatt (Magic Formula), and Peter Lynch (Lynch's Formula), among others. Similarly, Charles Carlson documents his experience of more than 30 years in the American financial market in his book "The Little Book of Big Dividends," in which he presents "Big Safe Dividends," a safe formula for guaranteed returns (Carlson, 2010).

These formulas are usually evaluated as criteria for building stock portfolios in Brazil (see Palazzo et al., 2018; Silva et al., 2021; Domingues et al., 2022). However, the use of formulas exclusively associated with dividend investing has been scarcely studied in this country (Martins & Pontes, 2022). Therefore, this study aims to evaluate the efficiency of BSD as a dividend investment strategy in Brazil.

Researchers and professionals have sought to develop investment strategies in stocks that are successful in differentiating themselves in the market. Many of these strategies are grouped according to their underlying assumptions about prices and the behavior of economic agents (Palazzo et al., 2018). These groups of strategies are referred to as investment philosophies, which allow investors, investment funds, and analysts to use different approaches in the composition of their asset portfolios, especially stocks (Peralva, 2020). However, markets such as Brazil have specific characteristics, such as mandatory dividends, which can influence these investment philosophies.

The most common investment philosophies are based on the selection of stocks (stock picking) using predefined criteria such as value or growth, where investors seek to identify stocks with better performance expectations over time in order to exceed the average market return (Palazzo et al., 2018). That is, an attempt is made to establish criteria or qualities for selecting the best stocks so that they reflect such performance prospects. Some investment strategies use different sets of criteria, the best known being value investing and growth investing (Martins & Pontes, 2022).

Studies such as those developed by Nicholson (1968) and Piotroski (2005) provide alternative approaches to stock selection that follow these strategies, where stocks with P/E and P/BV lower than the market average are called value stocks. On the other hand, stocks for which these ratios are higher than the market average are called growth stocks. With the growing importance of dividends in investment decisions, the "Dogs of the Dow" (DoD) strategy emerged in the U.S., in which investors select the ten stocks in the Dow Jones Index that pay the highest dividends.

McQueen et al. (1997) and Hirschey (2000) report that this strategy has been efficient in the U.S. in the past, except when returns are adjusted for taxes, rebalancing costs, risk adjustments, and extra transaction costs. More recently, Kim (2019) highlighted that DoD has not worked well in the recent U.S. market when trading costs and taxes are included. On the other hand, in other countries, there is evidence that stocks with higher dividend yields also have higher returns and outperform the main market index, such as in the United Kingdom (Filbeck & Visscher, 1997), Latin America (Da Silva, 2001), Canada (Visscher & Filbeck, 2003), and Australia (Fin & Sheng, 2008). More recently, Ahmad et al. (2017) showed that the DoD strategy statistically and significantly outperforms average market returns in both developed and developing Asian markets.

This evidence shows that the performance of dividend-based investment strategies, especially those based on DoD, is mixed, depending on the stage of market development (emerging or developed), the proxy used to build portfolios, taxes, rebalancing costs, transaction costs, and even whether the performance metric is gross or risk-adjusted. This is especially important in Brazil, where there is evidence that stock prices react positively to dividend announcements (Mota et al., 2023) and that dividends are more persistent than company earnings (Martins et al., 2022). This suggests that there is still much to be learned about the importance of dividends as an investment strategy. This is the motivation for this study.

For Dichev (2007), the contribution of dividends to the total return of a stock investment is important to investors. Additionally, Baker et al. (2020) state that both dividends and dividend yields are crucial factors for investors when choosing stocks. In this context, Carlson (2010) and Clemens (2013) present an investment strategy based on dividends, which they call dividend investing. Martins and Pontes (2022) state that the inclusion of dividends among traditional investment strategies (value and growth investing) is a trend that has been observed in the markets in recent years, especially in Brazil, where dividends are more persistent than earnings (Martins et al., 2022) and stock prices react positively to dividend announcements (Mota et al., 2023).

Despite this evidence, little is known about the use of robust financial indicators to build portfolios of stocks of companies that stand out for their dividend payouts. Brazil offers a unique context for this investigation because companies are required to pay dividends and they are not taxed. Thus, this study is even more relevant because it is unprecedented to use a Big Safe Dividends (BSD) indicator, such as the one developed by Carlson (2010). BSD is a methodology based on an index composed of 10 indicators (or filters) that give rise to a score. The higher the score, the greater the potential to pay big and safe dividends.

To fill this gap in the investment literature, this study has the following research problem: **What is the efficiency of using "Big Safe Dividends" (BSD) as an investment strategy for building equity portfolios in the Brazilian stock market?** To answer this question, this study seeks to: (i) verify whether equity portfolios built with BSD outperform the main stock indices in Brazil, (ii) investigate the generation of alpha by these portfolios, and (iii) analyze the relevance of the dividend factor as a market risk factor.

The ranking (BSD) constructed based on the premises of Carlson (2010) is easy to interpret and may be a differentiator for investors who do not master more complex investment techniques. Basically, we selected the best positioned stocks in the ranking, which in theory belong to firms with the potential to pay bigger and safer dividends. Thus, classifying companies based on their payout and dividend growth potential is a very useful tool for investors, especially in Brazil, given the link between dividend growth and company growth, as highlighted by Vasconcelos and Martins (2019).

The findings of this study are consistent with this evidence, since the portfolios based on the BSD rankings generated superior returns to the main market indices over the period analyzed. These returns are statistically superior to the main benchmarks, and the BSD portfolios generated alpha (excess return). Also, the returns per unit of risk assumed were higher, especially in the portfolio with 15 stocks. As a dividend factor, BSD was significant in explaining the returns of a market portfolio and also showed superior returns to four of the five traditional market risk factors.

2. Development of hypotheses

Investors' preference for dividends has been known for a long time (Lintner, 1962; Gordon, 1963), giving rise to the bird-in-hand theory, which states that investors prefer dividends from equity to capital gains due to the inherent uncertainty of the latter. And this preference can be reinforced when dividends are mandatory, as in Brazil. In parallel, there is evidence that dividends have a high predictive power for stock returns (Hodrick, 1992; Goetzman & Jorion, 1993; Ang & Bekaert, 2007). Therefore, we can highlight studies that point to dividend investing as a winning strategy for building investment portfolios (Siegel, 2005; You et al., 2010; Conover et al., 2016; Martins & Pontes, 2022).

The relevance of financial information in the context of analyzing and evaluating a company has long been discussed in the financial literature. For example, Nicholson (1968) highlights that financial information is crucial for determining stock prices, as it influences investors' expectations and, consequently, the results of investments in financial markets. This relevance is confirmed by later studies (Fama & French, 1993, 2015; Lev & Thiagarajan, 1993; Piotroski, 2000; Mohanran, 2005).

This evidence supports the importance of fundamental analysis, which is based on the idea that some investors can use historical financial information to devise profitable investment strategies (Piotroski, 2005). Thus, a more sophisticated analysis of financial statements can provide relevant information for decision making (Galdi, 2008). In this sense, an alternative for selecting stocks with better performance can be carried out using financial indicators or criteria that reflect such expectations. This increases the safety of investors in the process of forming their portfolios. This approach is known in the financial market as "stock picking," which, according to Palazzo et al. (2018), favors the selection of stocks with higher performance expectations than the market average.

For the selection of these criteria, the literature highlights the use of different indicators or financial criteria for the elaboration of investment strategies. For example, financial indicators can be used to identify value or growth stocks (Nicholson, 1968; Piotroski, 2005). Related to this, Ou and Penman (1989) observe that it is possible to predict future profits and returns from a set of financial indicators; while Piotroski (2000) and Mohanran (2005) show that an investment strategy based on financial indicators helps investors to obtain abnormal returns.

In Brazil, Galdi (2008) analyzed financial and corporate governance indicators using Piotroski's (2000) methodology and demonstrated the possibility that financially strong companies obtain abnormal returns. Werneck et al. (2010) also found that fundamental analysis based on accounting indices and applying the Piotroski's (2000) methodology has the same power to predict future abnormal returns as asset pricing models. This evidence reinforces the idea of using financial indicators to select good companies to build investment portfolios.

Thus, we can consider the use of financial indicators and multiples of earnings and dividends in the context of fundamental analysis as useful tools for selecting stocks and building investment portfolios (Galdi, 2008; Ahmad et al., 2017). From this perspective, Big Safe Dividends (BSD) can be a factor for selecting firms with high potential for paying dividends and returns, as the elements that make it up are based on the fundamentals of the companies and the expectations of future company performance. Although dividend-based analysis is often used as a stock investment strategy (Hodrick, 1992; Siegel, 2005; Clemens, 2013; Börjesson & Lindström, 2019), little is known about the usefulness of BSD in building investment strategies. Thus, we present the first hypothesis of this study:

> $\mathbf{H}_{1:}$ Stock portfolios built based on Big Safe Dividends outperform the main stock indices in the Brazilian market.

Previous literature shows that the stock selection strategy based on accounting and financial indicators, also called fundamental analysis, offers greater returns (Ou & Penman, 1989; Piotroski, 2000; Galdi, 2008; Werneck et al., 2010). The influence of dividends on share prices and the use of dividend indicators to build winning portfolios have been controversial since the classic study by Miller and Modigliani (1961). Even though there is no consensus, there is evidence of a positive relationship between dividend indicators and expected returns (You et al., 2010; Clemens, 2013; Mota et al., 2023).

The financial indicators that make up BSD are consistent with those used in mainstream fundamental analysis. Therefore, it is natural to expect that dividend-related indicators serve as proxies for firms that offer positive abnormal returns (Hodrick, 1992; Goetzman & Jorion, 1993; Ang & Bekaert, 2007; Clemens, 2013). Furthermore, the aforementioned literature provides evidence of the efficiency of dividend-based investment strategies in generating abnormal returns (McQueen et al., 1997; Hirschey, 2000; Da Silva, 2001; Visscher & Filbeck, 2003; Fin & Sheng, 2008). Thus, we can expect that a stock portfolio composed of companies that are well ranked on BSD will offer a positive and significant alpha, according to Hypothesis 2:

> $\mathbf{H}_{2:}$ The use of Big Safe Dividends to build stock portfolios generates positive alpha in the Brazilian stock market.

Various studies have raised questions, doubts, and discussions about the criteria or factors that could explain the returns of investment portfolios. We verified that in the markets different factors explain the returns of a portfolio, whether we use the traditional asset pricing model (CAPM) with one risk factor, or later models that have been improved, such as the three-factor model by Fama and French (1993), the four-factor model by Carhart (1997), or the five-factor model by Fama and French (2015), among others.

Even considering the contributions of the CAPM models and the three factors of Fama and French (1993), subsequent evidence has demonstrated the existence of other significant factors in explaining expected stock returns. From this perspective, other models have emerged that explore several other factors in an attempt to identify the elements that are important in each market to explain portfolio returns. From this perspective, considering the efficiency of a dividend strategy to generate an additional return on a portfolio (McQueen et al., 1997; Hirschey, 2000; Da Silva, 2001; Visscher & Filbeck, 2003; Fin & Sheng, 2008), we hypothesize that BSD is a relevant factor in explaining stock returns in Brazil.

> $\mathbf{H}_{3:}$ The Big Safe Dividends (or dividend) factor is a relevant market risk factor in explaining stock returns in Brazil.

To test this hypothesis, we start from the five-factor model that includes the three factors of Fama and French (1993), in addition to the momentum factor (WML – Winners Minus Losers) of Carhart (1997) and the liquidity factor (IML – Illiquid Minus Liquid) of Amihud (2002). In Brazil, some studies have shown that the significance of one or more risk factors is not observed (Rogers & Securato, 2009), leaving room for other factors to explain stock returns, such as the dividend factor.

3. Method

The sample analyzed is made up of non-financial companies that had all the information necessary to calculate the BSD, which represented 142 companies. Financial firms were excluded because some indicators, such as the interest coverage ratio, could not be calculated for them. When building the portfolios, only one stock per company (the most liquid) was considered for those firms that had more than one stock traded on the stock exchange. This assumption considers the objective of portfolio diversification. A significant restriction on the companies occurred due to the "long-term expected earnings growth" indicator, which requires firms to have analyst coverage. Therefore, we chose to adapt the BSD model to have a larger sample (See Supplementary Data 5 - Words to Measure Value).

The financial data analyzed cover the period from 2006 to 2023 and were collected from Economatica (Supplementary Data 2 - Dados Diarios, and Supplementary Data 4 - Dados Mensais). The market risk factors used for the alpha generation analysis were collected from NEFIN/USP (Supplementary Data 3 - Market Factors NEFIN). The portfolio construction considers the data available in April of each year, due to the maximum period of disclosure of the annual financial statements. Considering the time window needed to calculate the BSD indicators, portfolios of stocks were created with returns ranging from May/2010 to Apr/2023, with an annual rebalancing of the portfolios every May.

3.1. Application of BSD for stock selection

Big Safe Dividends (BSD) is a method of ranking stocks based on 10 financial indicators that are weighted by percentages of relevance. In this study, some adjustments are made to the model proposed by Carlson (2010), considering the characteristics of the Brazilian market. The first relates to the "variation in tangibles" indicator, which is expanded to "variation in tangibles and intangibles." The author did not consider the importance given to intangible assets since 2010, which have gained relevance in the value creation process, given the recent technological advances in the business environment.

Another indicator that proved to be quite restrictive in the Brazilian market is "long-term expected earnings growth," as many companies in Brazil are not covered by analysts, or have very sparse coverage. In the period analyzed in this study, only 109 companies presented at least one earnings forecast for the year. Carlson (2010) uses a five-year earnings forecast window, which is unusual in Brazil. Thus, the weight attributed to this indicator (10%) was redistributed to the "earnings growth" indicator, considering the historical growth of firms' profits. This is consistent with the findings of Vasconcelos and Martins (2019), who show that in Brazil, the profitability of growth companies is greater than that of value companies, leading to a higher growth of dividends of these companies (Supplementary Data 1 - Calculo BSD).

Table 1 presents a summary of Carlson's (2010) indicators adapted to Brazil.

The BSD ranking is formed from the scores that each company receives in its indicators, with the best placed being the company whose score is 100 and the other companies being ranked proportionally to it. The final BSD is the result of weighting the scores of each indicator by its weight according to Equation 1.

$$BSD_{it} = \sum \frac{I \, x \, W}{N} \tag{1}$$

Where BSD_{it} represents the BSD indicator of firm *i* in year *t*, resulting from the sum of the scores of its indicators (I), weighted by the weights assigned to them (W), divided by the number of indicators considered (N).

3.2. Portfolio construction

Regarding the amount of assets needed to build a sufficiently diversified portfolio, there is evidence that supports a larger N of stocks, but there is also evidence that a smaller N is sufficient. Statman (1987) talked about the need for 30 to 40 stocks, but almost two decades later Statman (2004) himself recognized that diversification is a puzzle, as modern portfolio theory attests that the optimal level of diversification would be achieved with more than 300 stocks, but in practice the average investor holds three or four shares.

Alexeev and Mardi (2015) show that for an average investor, equally weighted portfolios with seven (10) stocks are enough to diversify 85% (90%) of the risk, regardless of the period considered. This is consistent with Fisher and Lorie (1970), who years earlier found that eight stocks were enough to eliminate most of the non-systemic risk. These authors found no justification for building a portfolio with more than 10 assets from a diversification point of view.

Table 1
Carlson's (2010) indicators adapted for the Brazilian market

Indicator (Weight)	Formula	Description
Payout Ratio (30%)	$\frac{Dividend\ Paid_{it}}{Net\ Profit_{it}}$	The ratio of dividend paid to net income of firm i in year t.
Interest Coverage (10%)	$\frac{EBIT_{it}}{Financial\ Expenses_{it}}$	The ratio of EBIT to financial expenses of firm i in year t.
Cash Flow to Net Income (5%)	$\frac{Operating\ Cash\ Flow_{it}}{Net\ Profit_{it}}$	The ratio of operating cash flow to net income of firm i in year t.
Dividend Yield (5%)	$\frac{Dividend\ Paid\ per\ Share_{i,\ t}}{Stock\ Price_{i,t-1}}$	The ratio of the dividend paid by stock i in year t to the stock price at the end of year t-1.
Relative Performance (10%)	$\frac{ì\ (R_{it})}{ì\ (Rm_t)}$	The ratio of the average stock returns of firm i over the last 12 months to the average Ibovespa returns over the last 6 months.
Variation in Tangibles and Intangibles (10%)	$\frac{(TA_t - TA_{t-1}) + (IA_t - IA_{t-1})}{Total\ Asset_{t-1}}$	The ratio of the change in tangible (TA) and intangible (IA) assets between years t-1 and t to the total assets in year t-1 for firm i.
Cash Flow Growth (5%)	$\frac{Operating\ Cash\ Flow_{it}}{Operating\ Cash\ Flow_{i,t-2}} - 1$	The ratio of the operating cash flow in year t to the operating cash flow in year t-2 for firm i.
Dividend Growth (10%)	$\frac{Dividend\ Paid_{it}}{Dividend\ Paid_{i,t-2}} - 1$	The ratio of the dividend paid in year t to the dividend paid in year t-2 for firm i.
Earnings Growth (15%)	$\frac{Net\ Profit_{it}}{Net\ Profit_{t-2}} - 1$	The ratio of the net income in year t to the net income in year t-2 for firm i.

Source: Adapted from Carlson (2010).
Note: As already mentioned, for the calculation of the BSD in this study, the long-term expected earnings growth indicator was given a weight of 0% and the earnings growth indicator had its weight increased from 5% to 15%.

Zaimovic et al. (2021) reinforce the argument that there is no optimal N that can be generalized to various markets, but they find that this N is smaller for emerging markets, especially when stocks are strongly correlated with the market. In Brazil, the evidence converges on a lower N, such as that of Brito (1981), who highlights the advantages of diversification in small portfolios with around eight stocks, and Oliveira and Paula (2008), who emphasize that 12 stocks result in the optimal degree of diversification for investors using home brokers. Santiago and Leal (2015) analyzed stock portfolios formed by small, unsophisticated investors with six to 16 shares and showed that diversification was sufficient (lower risk) and performance was equivalent to the main equity investment funds.

Thus, our analysis includes portfolios with 10, 15, and 20 assets, as these are easily manageable for small and medium investors. Additionally, we constructed a fourth portfolio containing the tertile (1/3) of stocks with the highest BSD scores, averaging 29 stocks per year. The four portfolios analyzed used the BSD ranking as a selection criterion. All portfolios are long only (have only long positions in stocks) and have equal weights for stocks.

3.3. Analysis of research hypotheses

To support the comparative analysis of portfolio performance, we follow the "buy-and-hold" approach with annual turnover of portfolio positions, considering the annual financial information disclosed by companies in their financial statements. Even in the dividend investing strategy, the focus is on identifying firms that pay not only higher dividends. but also generate higher capital gains. In this sense, the calculation of total shareholder return (TSR) for the long-term investor is given by Equation 2.

$$TSR_{it} = \frac{P_{i,t} + DIV_{i,t}}{P_{i,t-1}} - 1 \qquad (2)$$

Where TSR_{it} is the total shareholder return of firm i in period t; $P_{i,t}$ is the stock price of firm i in period t and

$P_{i,t-1}$ is the stock price of firm i in period $t-1$; and $DIV_{i,t}$ is the dividend paid by firm i in period t.

Dividend portfolio returns (R_p) were calculated based on the TSR_{it} of each stock selected by BSD_{it} for that period, considering the reinvestment of dividends, with the stocks having equal weights in the formation of each portfolio. To evaluate the first hypothesis of the study, that these portfolios provide superior returns to the main stock indices in the Brazilian market, tests of the difference of means of the obtained returns were conducted. As benchmarks, we consider the most common stock indices in the Brazilian market: Ibovespa Index (IBOV), Dividend Index (IDIV), Brazil 100 Index (IBrX), and Corporate Governance Index (IGC).

In the following analyses, we assume that the idiosyncratic risk of the portfolios is eliminated through diversification, where the risk is evaluated in terms of beta. Based on this reference, we used Jensen's alpha to evaluate the portfolio's performance in terms of beta, as a risk-adjusted return, analyzing the difference between the return obtained by the portfolio and that expected by the CAPM. The alpha (α) was estimated by regressing the excess returns of the portfolios (R_p) on the risk-free asset (R_f) against the excess return of the Ibovespa (R_m) on the risk-free asset (R_f), according to Equation 3. β_p represents the volatility coefficient between the portfolio and the market.

$$\alpha = (R_p - R_f) - \beta_p \left(R_m - R_f\right) \tag{3}$$

We analyzed the alpha of a regression model composed of portfolio returns and market risk factors. When it is positive, it means that the portfolio generated a higher return than expected (in addition to risk premiums). To estimate the regressions, the ordinary least squares (OLS) method was used, following Stevenson (1981). Due to the intrinsic variability and the possible presence of heteroscedasticity, the use of robust standard errors (Newey-West method) was crucial to ensure reliable and valid estimates of the regression coefficients.

To analyze the potential for generating additional returns on the portfolio formed with BSD, we used the five market factors model, considering Fama and French's (1993, 2015) three and five factors, which are market ($R_{Mt} - R_{Ft}$), size (SMB), and value (HML), Carhart's (1997) momentum factor (WML), and Amihud's (2002) liquidity factor (IML). R_{Mt} is the market return and R_{Ft} is the risk-free asset return. We verified whether the alpha (α) of Equation 4 is positive and significant. Additionally, we estimated Equation 5 to control for the effect of the crisis caused by COVID-19, including a dummy variable (D_t) that takes the value of 1 in the years 2020 and 2021.

$$R_{BSDt} = \alpha + \beta_1\left(MKT_t - R_{Ft}\right) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 WML_t + \beta_5 IML_t + \varepsilon_t \tag{4}$$

$$\begin{aligned} R_{BSDt} = {} & \alpha + \beta_1\left(MKT_t - R_{Ft}\right) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 WML_t + \\ & \beta_5 IML_t + \beta_6 D_t + \beta_7\left(D_t \times \left(MKT_t - R_{Ft}\right)\right) + \beta_8\left(D_t \times SMB_t\right) + \\ & \beta_9\left(D_t \times HML_t\right) + \beta_{10}\left(D_t \times WML_t\right) + \beta_{11}\left(D_t \times IML_t\right) + \varepsilon_t \end{aligned} \tag{5}$$

As BSD is a criterion for identifying firms that prioritize profit distribution over reinvestment (Börjesson & Lindström, 2019; Baker, De Ridder & Råsbrant, 2020), we also analyzed the dividend risk premium as a risk factor (dividend factor) to explain the market risk premium (using the Ibovespa portfolio), based on Conover et al. (2016) and Cejnek and Randl (2020). For this, we used a multifactor asset pricing model, adding the dividend risk premium ($R_{BSDt} - R_{Ft}$) according to Equation 6. Again, we control for the effect of COVID-19 in Equation 7.

$$R_{IBOVt} = \alpha + \beta_1\left(R_{BSDt} - R_{Ft}\right) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 WML_t + \beta_5 IML_t + BSD_t + \varepsilon_t \tag{6}$$

$$\begin{aligned} R_{IBOVt} = {} & \alpha + \beta_1\left(R_{BSDt} - R_{Ft}\right) + \beta_2 SMB_t + \beta_3 HML_t + \\ & \beta_4 WML_t + \beta_5 IML_t + \beta_6 D_t + \beta_7\left(D_t \times \left(R_{BSDt} - R_{Ft}\right)\right) + \\ & \beta_8\left(D_t \times SMB_t\right) + \beta_9\left(D_t \times HML_t\right) + \beta_{10}\left(D_t \times WML_t\right) + \\ & \beta_{11}\left(D_t \times IML_t\right) + \varepsilon_t \end{aligned} \tag{7}$$

Where $\boldsymbol{R_{IBOVt}}$ is the return of a market portfolio (IBOV). A positive and significant $\hat{a}_1$ would confirm Hypothesis 3 of this study.

4. Findings

For the analysis of the descriptive statistics of the portfolios' performance, we considered the annualized returns of each portfolio, both those formed from the BSD rankings and from the stock indices used as benchmarks (Supplementary Data 6 - Python Code). The first annualized return is formed between May/2010 and Apr/2011 (one year), the second between Jun/2010 and May/2011, and so on. The use of moving windows recognizes that it is more common for investors to make investments and financial contributions to their portfolios on a monthly basis, rather than at a single point in time during the year.

The moving window allows the performance of portfolios started in any month of the year to be tracked.

Table 2 shows that the highest average annualized return came from the portfolio of the 15 stocks with the highest BSD scores (Rank_15), whose average was 14.78%. This portfolio also had the highest average annualized Sharpe ratio (0.48), indicating the best excess return per unit of risk among all portfolios.

The other two BSD portfolios also had annualized returns above the benchmark stock indices. The average annualized return of the Rank_20 portfolio was 13.29% and that of the Rank_10 portfolio was 11.68%. However, the BSD portfolios (10, 15, and 20) had an average annualized standard deviation (SD) greater than all the benchmarks. Despite this, the first three BSD portfolios also had positive average annualized Sharpe ratios (0.14, 0.48, and 0.11, respectively), indicating that the excess returns offset the higher levels of risk.

Panel B of Table 2 shows that in eight of the 12 comparisons, the BSD portfolios outperform the average benchmark returns (positive and significant differences of means). The exceptions are the pairs with IDIV, whose mean differences are not significant. The greatest differences in means are in favor of Rank_15, which outperforms three out of the four benchmarks analyzed. These findings confirm H_1 and are consistent with the evidence observed in other markets by Filbeck and Visscher (1997), Fin and Sheng (2008), Visscher and Filbeck (2003), and Da Silva (2001).

Considering that investors can start investing in BSD portfolios in different months (according to moving windows), we analyzed the percentage of times each BSD portfolio beat each of the benchmarks over the 145 windows of annualized returns. Panel C of Table 2 shows that only Rank_10 failed to beat all benchmarks in most time windows (it beat IDIV by only 46.21%). The BSD portfolios outperformed especially with respect to IBOV, the main market index in Brazil. Once again, these findings confirm the first hypothesis and are consistent with Hodrick (1992) and Börjesson and Lindström (2019), strengthening the arguments of Carlson (2010) and Clemens (2013) that dividend investing is a winning investment strategy.

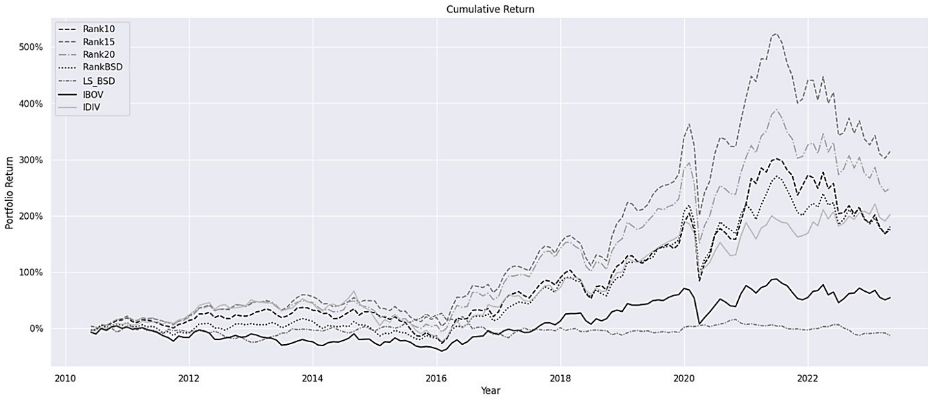
Graph 1 shows the accumulated returns between May/2010 and Apr/2023 for the BSD portfolios and the IBOV and IDIV indices. The highest final return was obtained by Rank_15 (316.67%), followed by Rank_20 (246.66%), IDIV (202.13%), Rank_BSD (176.60%), Rank_10 (180.02%), IBOV (55.66%), and finally the Long-Short_BSD portfolio (-11.53%).

Despite these percentages, it is important to emphasize that they assume an investment started on the

Table 2
Annualized returns and Sharpe ratio of portfolios between May/2010 and Apr/2023

Panel A: Statistics	**Mean**	**Median**	**SD**	**Min**	**Max**	**Sharpe**
Rank10	11.68%	8.30%	26.20%	-39.75%	108.52%	0.14
Rank15	14.78%	13.10%	24.57%	-29.02%	92.57%	0.48
Rank20	13.29%	7.85%	24.42%	-30.68%	93.15%	0.11
RankBSD	11.11%	6.27%	22.34%	-27.57%	68.46%	-0.01
IBOV	5.56%	1.16%	18.53%	-24.64%	60.03%	-0.24
IDIV	11.38%	10.99%	22.48%	-41.88%	92.64%	0.11
IBrX	7.87%	3.66%	17.26%	-23.02%	62.17%	-0.17
IGC	8.66%	5.90%	16.49%	-26.03%	64.74%	-0.04
Panel B: Differences in Mean Returns			IBOV	IDIV	IBrX	IGC
Rank10			6.12%***	0.30%	3.80%	3.02%
Rank15			9.22%***	3.40%	6.90%***	6.12%**
Rank20			7.73%***	1.91%	5.41%**	4.62%**
RankBSD			5.56%**	-0.27%	3.24%	2.45%
Panel C: Portfolios that Beat Benchmarks			IBOV	IDIV	IBrX	IGC
Rank10			66.21%	46.21%	60.69%	61.38%
Rank15			68.97%	63.45%	66.21%	66.21%
Rank20			66.90%	56.55%	62.76%	64.14%
RankBSD			68.28%	52.41%	61.38%	57.93%

Note: Statistical significance of T-Test at *** 1% and ** 5%.



Graph 1. Cumulative returns of stock portfolios and benchmarks

Table 3
Average annualized performance metrics of portfolios and benchmarks

Metrics	Rank_10	Rank_15	Rank_20	RankBSD	IBOV	IDIV	IBrX	IGC
Return	11.68%	14.78%	13.29%	11.11%	5.56%	11.38%	7.87%	8.66%
Alpha (Jensen)	6.66%	9.40%	8.00%	5.64%	-	5.62%	2.02%	2.54%
Volatility	22.57%	20.74%	20.52%	21.25%	21.44%	21.04%	20.23%	19.04%
Standard Deviation	15.55%	14.33%	14.53%	12.91%	12.01%	13.58%	11.64%	13.58%
Tracking Error	1.62%	2.14%	1.71%	1.33%	-	0.72%	0.34%	0.47%
Sharpe Ratio	-0.3089	-0.0596	-0.2127	-0.3038	-0.4239	-0.1083	-0.1750	-0.1903

first day of the series and was held until the end, which is unlikely to be practical for the average investor. Therefore, Table 3 shows the averages of some performance metrics commonly used by the investment industry to analyze the performance of an investment fund or any stock portfolio.

The portfolio that had the lowest average annualized volatility was the IGC index with 19.04%. The highest volatility was for Rank_10 (22.57%). Rank_15 (20.74%) and Rank_20 (20.52%) had lower volatilities than IBOV (21.44%) and IDIV (21.04%). IBrX had the lowest standard deviation (11.64%). In terms of tracking error, which is a risk measure that indicates the standard deviation between portfolio returns and the main market index (IBOV), it can be seen that the BSD portfolios have positive tracking errors, which confirms that they had higher standard deviations than the IBOV, and therefore were riskier.

Rank_15 was the portfolio with the highest average annualized return (14.78%). It is possible to verify the Jensen's alpha of each portfolio, in addition to the benchmarks of dividends (IDIV), liquidity (IBrX), and corporate governance (IGC). The largest alphas came from the BSD portfolios, Rank_15 (9.40%), Rank_20 (8.00%), Rank_10 (6.66%), and Rank_BSD (5.64%), in that order. However, the average annualized Sharpe ratios were negative for all portfolios, whether BSD or benchmark.

To evaluate the alpha generation potential of the BSD portfolios, the portfolio returns of the five market risk factors are used, namely market (MKT), size (SMB), value (HML), momentum (WML), and liquidity (IML). Graph 2 shows the cumulative returns of the BSD portfolios and market risk factors between May/2010 and Apr/2023. As we can see, the order of performance of the BSD portfolios was as follows: Rank_15 (316.67%), Rank_20 (246.66%), Rank_BSD (176.60%), and Rank_10 (180.02%). The performance of the risk factor portfolios was led by the momentum factor WML, with a return of 232.37%, followed by MKT (127,37%), IML (89.47%), HML (21.05%), and SMB (-15.79%).

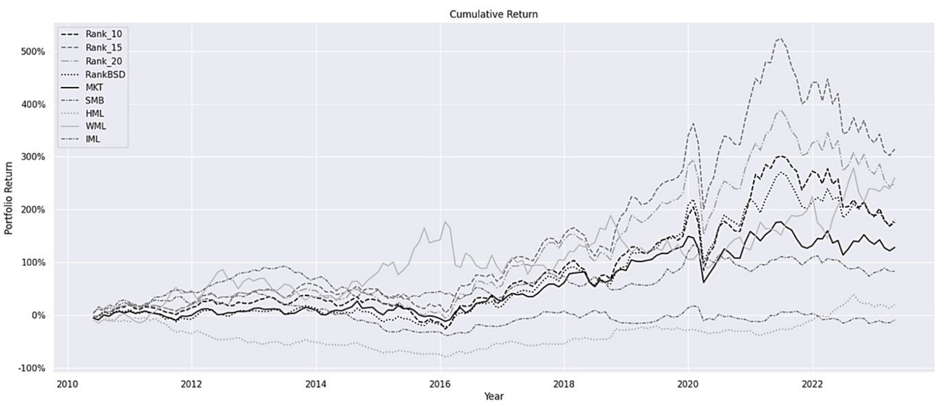
Looking at the performance of the BSD portfolios, we can see that there are elements in these portfolios that are constructed using criteria of dividend-paying firms, which leads us to believe that the dividend factor has the potential to generate additional returns.

4.1. Regression analysis with market risk factors

To analyze the generation of alpha by the BSD portfolios, according to the second research hypothesis (H_2), regression models were estimated with the daily returns of the Rank_10, Rank_15, Rank_20, and Rank_BSD portfolios as explanatory variables, in addition to the five market risk factors. Figure 1 shows the correlation between the returns of the BSD portfolios and the returns of the five market risk factors.

The market risk premium (MKT-RF) was the risk factor with the highest correlation with the returns of the BSD portfolios, reaching 0.89 with Rank_BSD. Despite this, the inclusion of MKT-RF in the models is essential, as it captures the systematic risk that is crucial for explaining stock portfolio returns. Although the correlation with the dependent variable is high for this variable, the correlations between the explanatory variables are lower, in addition to the maximum VIF being 8.29, which indicates the absence of severe multicollinearity, validating its maintenance in the model.

Table 4 presents the results of the estimations of Equations 4 and 5, including the control for the period of the Covid-19 crisis. Alpha was positive and significant for all BSD portfolios, which indicates that the portfolio formation strategy using the rankings of firms with the best BSD scores is a winning investment strategy. This is consistent with the findings of McQueen et al. (1997), Hirschey (2000), Da Silva (2001), Visscher and Filbeck (2003), and Fin and Sheng (2008) for other stock markets.



Graph 2. Cumulative returns of BSD portfolios and market risk factors

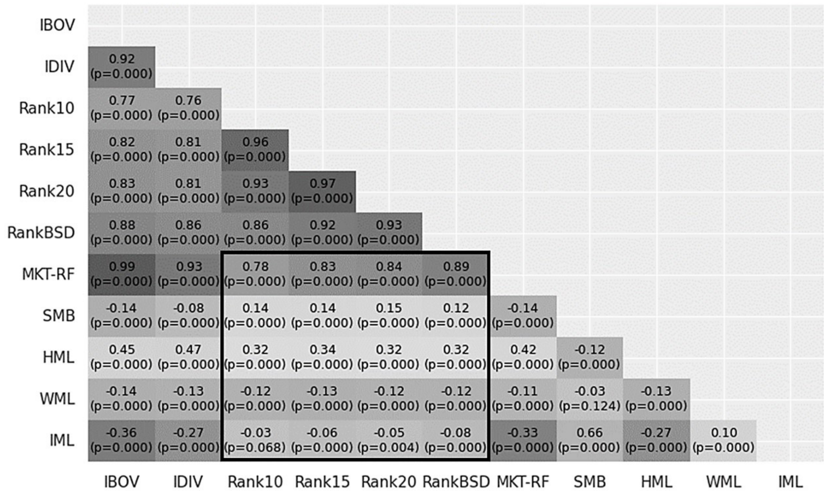


Figure 1. Correlation between portfolio premiums and market risk factors.
Note: *p* is the *p*-value of significance

By annualizing the additional daily return of the Rank_15 portfolio in Model 1 (alpha = 0.0004), we can observe that the use of BSD to build a winning portfolio with 10 dividend stocks delivered an additional return of about 10.6% per year ($[1+0.0004]^{252}-1$). For Rank_15 and Rank_20, the additional return was around 13.4% per year. This is consistent with H_2 and shows that the dividend factor has the potential to generate additional returns.

Models 2 for each BSD portfolio consider the control for the effects of the COVID-19 pandemic. We note that this phenomenon was not relevant in explaining the variations in portfolio returns (the dummy variable was not significant), which can be explained by the rapid recovery of prices on the Brazilian stock exchange in 2020 itself, when the IBOV fell -29.90% in March, but ended 2020 with gains of 2.92%. In 2021, the IBOV fell -11.93%, mainly due to the sharp increase in Brazil's basic interest rate (Selic), which had seven consecutive increases, rising from 2.00% p.a. to 9.25% p.a. These elements changed the market dynamics, affecting the significance of market risk factors during this period.

Table 4 also shows the risk factors that explain the returns of the BSD portfolios. Some of these factors were not significant in explaining portfolio returns, as observed by Rogers and Securato (2009) in a previous study in Brazil. The market premium factor (MKT-RF) had a positive and significant coefficient in all estimated models (1 and 2), with coefficients between 0.8017 and 0.9621, indicating that a 1.0% variation in the market premium risk is associated with a variation between 0.8017% and 0.9621% in the returns of the BSD portfolios.

Table 4
BSD portfolio returns and market risk factors

Portfolio	**Rank10**		**Rank15**		**Rank20**		**RankBSD**	
Model	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
Alpha	0.0004***	0.0004**	0.0005***	0.0004***	0.0005***	0.0004***	0.0004***	0.0004***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	0.0001	(0.0001)
(MKT-Rf)	0.8989***	0.8017***	0.8663***	0.8275***	0.8506***	0.8146***	0.9621***	0.9386***
	(0.0160)	(0.0170)	(0.0120)	(0.0140)	(0.0110)	(0.0130)	0.0090	(0.0100)
HML	0.0190	0.0457***	0.0079	0.0192	-0.0132	-0.0079	-0.0398***	-0.0341***
	(0.0150)	(0.0160)	(0.0110)	(0.0120)	(0.0100)	(0.0110)	0.0090	(0.0090)
SMB	0.2276***	0.1959***	0.2291***	0.2217***	0.2265***	0.2207***	0.2133***	0.1969***
	(0.0210)	(0.0220)	(0.0170)	(0.0190)	(0.0160)	(0.0170)	0.0150	(0.0160)
WML	-0.0372***	-0.0494***	-0.0344***	-0.0362***	-0.0269***	-0.0263***	-0.0266***	-0.0265***
	(0.0110)	(0.0120)	(0.0090)	(0.0100)	(0.0080)	(0.0090)	0.0070	(0.0080)
IML	0.2259***	0.1658***	0.1665***	0.1346***	0.1716***	0.1389***	0.1779***	0.1529***
	(0.0260)	(0.0260)	(0.0200)	(0.0200)	(0.0180)	(0.0180)	0.0170	(0.0170)
D(Covid-19)		0.0006		0.0004		0.0002		0.0001
		(0.0000)		(0.0000)		(0.0000)		(0.0000)
D*(MKT-Rf)		0.2067***		0.0821***		0.0764***		0.0412**
		(0.0290)		(0.0300)		(0.0260)		(0.0190)
D*HML		-0.0624		-0.0306		0.0007		-0.0178
		(0.0400)		(0.0300)		(0.0290)		(0.0290)
D*SMB		0.0863		-0.0094		-0.0137		0.0360
		(0.0630)		(0.0460)		(0.0440)		(0.0410)
D*WML		0.0395*		0.0026		-0.0075		-0.0031
		(0.0230)		(0.0180)		(0.0170)		(0.0160)
D*IML		0.1458*		0.1239*		0.1237**		0.1011*
		(0.0004)		(0.0630)		(0.0590)		(0.0560)
R2	0.683	0.693	0.767	0.769	0.793	0.795	0.866	0.867
Adjusted R2	0.683	0.692	0.767	0.768	0.792	0.794	0.865	0.867
F-Test	768***	474***	1,267***	602***	1,321***	668***	2,538***	1,349***
Observations	3,199	3,199	3,199	3,199	3,199	3,199	3,199	3,199

Notes: Standard errors are robust to heteroscedasticity and autocorrelation. They are shown in parentheses. The maximum VIF was 8.2933. Significant coefficients at *** 1%, ** 5% and * 10%.

The size factor (SMB) also had positive and significant coefficients (between 0.1959 and 0.2291) in all BSD portfolios. The momentum factor (WML) had negative and significant coefficients (between -0.0494 and -0.0263), indicating that the dividend factor, being inversely related to BSD, has less momentum and generates greater returns, especially when the market moves against the company. This may indicate that dividend stocks are more sought after in Brazil during bear market periods. The illiquidity factor (IML) presented positive and significant coefficients in all models (between 0.1326 and 0.2259), suggesting that the returns of the BSD portfolios are explained by stocks with less liquidity, which indicates that these portfolios are composed of stocks with greater liquidity risk.

The investment literature points out that dividends are also a market risk factor and can explain the returns of any portfolio (Conover et al., 2016; Cejnek & Randl, 2020). Table 5 presents the results of testing H_3, which analyzes how the dividend risk premium ($R_{BSD} – R_f$) can explain the returns of a market portfolio. We can see that the dividend risk premium has a positive and significant association (between 0.8028 and 0.9230) with the return on the market portfolio (IBOV), explaining part of the variation in its returns. Thus, our findings show that the dividend risk premium (or dividend factor) is a relevant risk factor in explaining stock returns, regardless of whether the portfolio consists of 10, 15, 20, or more stocks.

It is also important to note that, in general, the HML coefficients are positive and significant (between 0.0495 and 0.1933), which suggests that the IBOV is mostly composed of value companies. SMB had negative and significant coefficients (between -0.1784 and -0.0947), suggesting that

Table 5
Ibovespa premium regressions with market risk factors

Portfolio	$(IBOV - R_F)$		$(IDIV - R_F)$		$(IBRx100 - R_F)$		$(IGC - R_F)$	
Model	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
Alpha	-0.0001	-0.0001	-0.0001	<0.0001	<0.0001	0.0001	<0.0000	<0.0001
	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
(BSD-Rf)	0.9230***	0.8919***	0.8996***	0.8559***	0.8111***	0.8028***	0.8962***	0.8504***
	(0.0150)	(0.0120)	(0.0160)	(0.0120)	(0.0130)	(0.0180)	(0.0180)	(0.0110)
HML	0.1389***	0.1558***	0.1139***	0.1244***	0.1767***	0.1933***	0.0495***	0.0536***
	(0.0110)	(0.0100)	(0.0110)	(0.0100)	(0.0160)	(0.0170)	(0.0110)	(0.0100)
SMB	-0.1444***	-0.1241***	-0.1784***	-0.1633***	-0.1089***	-0.1083***	-0.1173***	-0.0947***
	(0.0160)	(0.0160)	(0.0160)	(0.0150)	(0.0170)	(0.0190)	(0.0160)	(0.0140)
WML	-0.0053	-0.0184**	0.0205***	0.0088	0.0019	0.0070	0.0483***	0.0408) ***
	(0.0080)	(0.0090)	(0.0070)	(0.0080)	(0.0110)	(0.0140)	(0.0070)	(0.0080)
IML	-0.2992***	-0.2987***	-0.2574***	-0.2655***	-0.1545***	-0.1618***	-0.1966***	-0.2036***
	(0.0170)	(0.0180)	(0.0160)	(0.0160)	(0.0210)	(0.0230)	(0.0160)	(0.0160)
D(Covid-19)		-0.0004		-0.0005		-0.0005		-0.0004
		(0.0000)		(0.0000)		(0.0000)		(0.0000)
D*(BSD-Rf)		0.0873***		0.1138***		0.0144		0.1260***
		(0.0280)		(0.0280)		(0.0270)		(0.0300)
D*HML		-0.0611*		-0.0174		-0.0853**		0.0256
		(0.0340)		(0.0330)		(0.0430)		(0.0310)
D*SMB		-0.0839*		-0.0569		-0.0254		-0.0777*
		(0.0450)		(0.0460)		(0.0440)		(0.0470)
D*WML		0.0518***		0.0431**		-0.0195		0.0246
		(0.0170)		(0.0180)		(0.0210)		(0.0190)
D*IML		-0.0215		-0.0160		0.0674		-0.0439
		(0.0620)		(0.0610)		(0.0600)		(0.0610)
R2	0.871	0.873	0.877	0.880	0.800	0.801	0.861	0.866
Adjusted R2	0.871	0.873	0.877	0.880	0.800	0.801	0.861	0.865
F-Test	1,711***	1,275***	1,470***	1,241***	1,124***	549***	989***	986***
Observations	3,199	3,199	3,199	3,199	3,199	3,199	3,199	3,199

Notes: Standard errors are robust to heteroscedasticity and autocorrelation. They are shown in parentheses. The maximum VIF was 7.7565. Significant coefficients at *** 1%, ** 5% and * 10%.

the IBOV return is more influenced by companies with higher funding, which is reasonable since Petrobras and Vale represent around 1/4 of the index. IML also had negative and significant coefficients (between -0.2992 and -0.1545), showing that more liquid assets influence the IBOV return. The momentum factor (WML) was not significant in most of the models, converging with the findings of Rogers and Securato (2009). Again, the dummy to control for the effect of COVID-19 was not significant in this analysis.

5. Conclusion

We approached dividend investing using the Big Safe Dividends (BSD) selection criteria, recognizing that some aspects of its formulation were originally designed for the developed U.S. market. To make these criteria more applicable and insightful for the Brazilian stock market, we adapted the BSD model to reflect the unique characteristics of this market. This adaptation represents a significant contribution because, while ratio-based stock selection criteria are common in Brazil, there has been limited focus on dividend-based criteria. To the best of our knowledge, this study is pioneering in its application of a BSD framework adapted to the Brazilian context.

Our findings indicate that selecting stocks based on their potential to pay big and safe dividends is an effective strategy in Brazil. Since dividends are derived from earnings, using filters to exclude companies that do not generate cash flows or exhibit persistent and growing earnings is a valuable approach for investors aiming to build successful portfolios. Despite the higher volatility associated with this strategy, the return on risk remains superior to other market benchmarks, as evidenced by the generation of additional returns (alpha).

Dividends can be considered as a market risk factor, as profit distribution instead of reinvestment may pose a risk to a company’s continuity and investment performance. Nonetheless, our findings show that the market prices the dividend risk premium, partially explaining the returns of a market portfolio (IBOV). These findings are particularly novel for the Brazilian market, as indicators typically used in a developed market are adapted to help local investors in identifying companies with high dividend potential and constructing winning portfolios.

It is crucial to acknowledge that our findings and conclusions are limited to the sample and assumptions of this study. This limitation does not undermine the study’s relevance, but should be considered when interpreting the results. The conflicting nature of the literature on dividend investing suggests that various factors, such as stock selection criteria, taxes, and transaction costs, can significantly influence the results.

References

Ahmad, N., Ghouse, S., & Salamuddin, N. (2017). Empirical analysis of the dogs of the dow (DoD) trading strategy in developed and developing Asian markets. *Pertanika Journal of Social Science & Humanities*, *25*, 75-84.

Alexeev, V., & Mardi, D. (2015). Equity portfolio diversification with high-frequency data. *Quantitative Finance*, *15*(7), 1205-1215. http://doi.org/10.1080/14697688.2014.973898.

Amihud, Y. (2002). Illiquidity and stock returns: Cross-section and time-series effects. *Journal of Financial Markets*, *5*(1), 31-56. http://doi.org/10.1016/S1386-4181(01)00024-6.

Ang, A., & Bekaert, G. (2007). Stock return predictability: Is it there? *Review of Financial Studies*, *20*(3), 651-707. http://doi.org/10.1093/rfs/hhl021.

Baker, H. K., De Ridder, A., & Råsbrant, J. (2020). Investors and dividend yields. *The Quarterly Review of Economics and Finance*, *76*, 386-395. http://doi.org/10.1016/j.qref.2019.09.004.

Börjesson, E., & Lindström, H. (2019). *The Value of Dividends: The effect of dividend exposure on stock returns*. [Doctoral dissertation]. Uppsala University. Retrieved from: https://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-389411.

Brito, N. R. O. (1981). O efeito de diversificação de risco no mercado acionário brasileiro. *RAUSP Management Journal*, *16*(2), 108-121.

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

Carlson, C. B. (2010). *The little book of big dividends: A safe formula for guaranteed returns.* John Wiley and Sons.

Cejnek, G., & Randl, O. (2020). Dividend risk premia. *Journal of Financial and Quantitative Analysis*, *55*(4), 1199-1242. http://doi.org/10.1017/S0022109019000309.

Clemens, M. (2013). Dividend investing performance and explanations: A practitioner perspective. *International Journal of Managerial Finance*, *9*(3), 185-197. http://doi.org/10.1108/IJMF-06-2012-0065.

Conover, C. M., Jensen, G. R., & Simpson, M. W. (2016). What difference do dividends make? *Financial Analysts Journal*, *72*(6), 28-40. http://doi.org/10.2469/faj.v72.n6.1.

Da Silva, A. L. (2001). Empirical tests of the Dogs of the Dow strategy in Latin American stock markets. *International Review of Financial Analysis*, *10*(2), 187-199. http://doi.org/10.1016/S1057-5219(01)00047-3.

Dichev, I. D. (2007). What are stock investors' actual historical returns? Evidence from dollar-weighted returns. *The American Economic Review*, *97*(1), 386-401. http://doi.org/10.1257/aer.97.1.386.

Domingues, C. H. S., Aronne, A., Pereira, F., & Magalhães, F. (2022). Piotroski, Graham e Greenblatt: Uma Abordagem Empírica do Value Investing no Mercado Acionário Brasileiro. *Brazilian Business Review*, *19*(5), 475-491. http://doi.org/10.15728/bbr.2022.19.5.1.pt.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*(1), 3-56. http://doi.org/10.1016/0304-405X(93)90023-5.

Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, *116*(1), 1-22. http://doi.org/10.1016/j.jfineco.2014.10.010.

Filbeck, G., & Visscher, S. (1997). Dividend yield strategies in the British stock market. *European Journal of Finance*, *3*(4), 277-289. http://doi.org/10.1080/135184797337372.

Fin, L. A. F., & Sheng, Y. T. (2008). 'Dogs of the Dow' Down Under. *AJAF*, *3*, 30.

Fisher, L., & Lorie, J. H. (1970). Some studies of the variability of returns on investments in common stocks. *The Journal of Business*, *43*(2), 99-134. http://doi.org/10.1086/295259.

Galdi, F. C. (2008). *Estratégias de investimento em ações baseadas na análise de demonstrações contábeis: é possível prever o sucesso?* [Doctoral dissertation]. Universidade de São Paulo.

Gordon, M. J. (1963). Optimal investment and financing policy. *The Journal of Finance*, *18*(2), 264-272.

Goetzmann, W. N., & Jorion, P. (1993). Testing the predictive power of dividend yields. *The Journal of Finance*, *48*(2), 663-679.

Hirschey, M. (2000). The "dogs of the Dow" myth. *Financial Review*, *35*(2), 1-16. http://doi.org/10.1111/j.1540-6288.2000.tb01411.x. PMid:12500317.

Hodrick, R. J. (1992). Dividend yields and expected stock returns: Alternative procedures for inference and measurement. *Review of Financial Studies*, *5*(3), 357-386. http://doi.org/10.1093/rfs/5.3.351.

Kim, D. (2019). The dogs of the dow theory C is it valid? *International Journal of Economics and Finance*, *11*(5), 43-49. http://doi.org/10.5539/ijef.v11n5p43.

Lev, B., & Thiagarajan, S. R. (1993). Fundamental information analysis. *Journal of Accounting Research*, *31*(2), 190-215. http://doi.org/10.2307/2491270.

Lintner, J. (1962). Dividends, earnings, leverage, stock prices, and the supply of capital to corporations. *The Review of Economics and Statistics*, *44*(3), 243-269. http://doi.org/10.2307/1926397.

Martins, O. S., Souza, R. A. M., & Girão, L. F. A. P. (2022). Persistência dos dividendos e gerenciamento de resultados em mercados emergentes. *Revista Contabilidade & Finanças*, *33*(88), 130-149. http://doi.org/10.1590/1808-057x202113040.

Martins, O., & Pontes, F. (2022). *O investidor em ações de dividendos*. TC.. http://doi.org/10.29327/554606.

McQueen, G., Shields, K., & Thorley, S. R. (1997). Does the "Dow-10 Investment Strategy" beat the Dow statistically and economically? *Financial Analysts Journal*, *53*(4), 66-72. http://doi.org/10.2469/faj.v53.n4.2101.

Miller, M. H., & Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares. *the Journal of Business*, *34*(4), 411-433.

Mohanram, P. S. (2005). Separating winners from losers among lowbook-to-market stocks using financial statement analysis. *Review of accounting studies*, *10*, 133-170.

Mota, S. L., Moura, F. F., & Martins, O. S. (2023). Reação do mercado ao anúncio do pagamento de dividendos: O que explicam as teorias da sinalização e do fluxo de caixa livre? *Revista Enfoque: Reflexão Contábil*, *42*(2), 1-18. http://doi.org/10.4025/enfoque.v42i2.57458.

Nicholson, S. F. (1968). Price ratios in relation to investment results. *Financial Analysts Journal*, *24*(1), 105-109. http://doi.org/10.2469/faj.v24.n1.105.

Oliveira, F. N., & Paula, E. L. (2008). Determinando o grau ótimo de diversificação para investidores usuários de home brokers. *Brazilian Review of Finance*, *6*(3), 439-463. http://doi.org/10.12660/rbfin.v6n3.2008.1347.

Ou, J. A., & Penman, S. H. (1989). Financial statement analysis and the prediction of stock returns. *Journal of Accounting and Economics*, *11*(4), 295-329. http://doi.org/10.1016/0165-4101(89)90017-7.

Palazzo, V., Savoia, J. R., Securato, J. R., & Bergmann, D. R. (2018). Análise de portfólios de valor no mercado brasileiro. *Revista Contabilidade & Finanças*, *29*, 452-468. http://doi.org/10.1590/1808-057x201804810.

Peralva, V. M. (2020). Múltiplos de ações e indicadores financeiros para seleção de portfólios: Uma análise para o mercado acionário brasileiro. *Brazilian Journal of Business*, *2*(3), 2006-2027. http://doi.org/10.34140/bjbv2n3-012.

Piotroski, J. D. (2000). Value investing: The use of historical financial statement information to separate winners from losers. *Journal of Accounting Research*, *38*, 1-41. http://doi.org/10.2307/2672906.

Piotroski, J. D. (2005). Discussion of "separating winners from losers among low book-to-market stocks using financial statement analysis". *Review of Accounting Studies*, *10*(2), 171-184. http://doi.org/10.1007/s11142-005-1527-3.

Santiago, D. C., & Leal, R. P. C. (2015). Carteiras igualmente ponderadas com poucas ações e o pequeno investidor. *RAC. Revista de Administração Contemporânea*, *19*(5), 544-564. http://doi.org/10.1590/1982-7849rac20151794.

Rogers, P., & Securato, J. R. (2009). Estudo comparativo no mercado brasileiro do capital asset princing model (CAPM), modelo 3-fatores de Fama e French e reward beta approach. *Revista de Administração Contemporânea*, *3*(1), 159-159.

Siegel, J. J. (2005). *The future for investors: Why the tried and the true triumphs over the bold and the new.* Currency.

Silva, A. C. M. D., Faria, R. M., & Vieira, P. R. D. C. (2021). Formação de carteira de investimentos baseada em value investing: Um estudo entre as metodologias de Piotroski e Greenblatt. *Revista de Contabilidade do Mestrado em Ciências Contábeis da UERJ*, *25*(3), 44-60.

Statman, M. (1987). How many stocks make a diversified portfolio? *Journal of Financial and Quantitative Analysis*, *22*(3), 353-363. http://doi.org/10.2307/2330969.

Statman, M. (2004). The diversification puzzles. *Financial Analysts Journal*, *60*(4), 44-53. http://doi.org/10.2469/faj.v60.n4.2636.

Stevenson, W. J. (1981). *Estatística aplicada à administração*. São Paulo: Harbra.

Vasconcelos, L. N. C., & Martins, O. S. (2019). Value and growth stocks and shareholder value creation in Brazil. *Revista de Gestão*, *26*(3), 293-312. http://doi.org/10.1108/REGE-12-2018-0127.

Visscher, S., & Filbeck, G. (2003). Dividend-yield strategies in the Canadian stock market. *Financial Analysts Journal*, *59*(1), 99-106. http://doi.org/10.2469/faj.v59.n1.2506.

Werneck, M. A., Nossa, V., Lopes, A. B., & Teixeira, A. J. (2010). Estratégia de investimentos baseada em informações contábeis: Modelo residual Income Valuation-Ohlson Versus Rscore•Piotroski. *Advances in Scientific and Applied Accounting*, *3*(2), 141-164.

You, C. F., Lin, S. H., & Hsiao, H. F. (2010). Dividend yield investment strategies in the Taiwan stock market. *Investment Management and Financial Innovations*, *7*(2), 189-199.

Zaimovic, A., Omanovic, A., & Arnaut-Berilo, A. (2021). How many stocks are sufficient for equity portfolio diversification? A review of the literature. *Journal of Risk and Financial Management*, *14*(11), 1-30. http://doi.org/10.3390/jrfm14110551.

SUPPLEMENTARY MATERIAL

Supplementary Data 1 - Calculo BSD

Supplementary Data 2 - Dados Diarios

Supplementary Data 3 - Market Factors NEFIN

Supplementary Data 4 - Dados Mensais

Supplementary Data 5 - Words to Measure Value

Supplementary Data 6 - Python Code

Supplementary material to this article can be found online at https://doi.org/10.7910/DVN/RGBIUM

Financial support:
This work was carried out with the support of the Coordination for the Improvement of Higher Education Personnel – Brazil (CAPES).

Open Science:
Viana, Dêner Matheus da Silva; Lima, Lauro Vinício de Almeida; Martins, Orleans Silva, 2024, "Supplementary Data - Dividend Investing Using "Big Safe Dividends" to Build Equity Portfolios in Brazil", https://doi.org/10.7910/DVN/RGBIUM, Harvard Dataverse, V1, UNF:6:jtIIyFWo0jEryqNXV5iXQA== [fileUNF]

Conflicts of interest:
The authors have no conflicts of interest to declare.

Plagiarism analysis:
RBGN performs plagiarism analysis on all its articles at the time of submission and after approval of the manuscript using the iThenticate tool.

Authors:
1. Dêner Matheus da Silva Viana, Mestre em Ciências Contábeis, Universidade Federal da Paraíba, João Pessoa, PB, Brasil. Master in Accounting, Federal University of Paraiba, João Pessoa, PB, Brasil.
E-mail: denerppgcc@gamil.com
2. Lauro Vinício de Almeida Lima, Doutor em Ciências Contábeis, Universidade Federal da Paraíba, João Pessoa, PB, Brasil.PhD in Accounting, Federal University of Paraiba, João Pessoa, PB, Brasil.
E-mail: lvinicio2@gmail.com
3. Orleans Silva Martins, Pós-Doutor em Ciências Contábeis, Universidade Federal da Paraíba, João Pessoa, PB, Brasil Post-Doctorate in Accounting, Federal University of Paraiba, João Pessoa, PB, Brasil.
E-mail: orleansmartins@yahoo.com.br

Authors' contributions:
1st author: definition of research problem; development of hypotheses or research questions (empirical studies); development of theoretical propositions (theoretical work); definition of methodological procedures; data collection; literature review; statistical analysis; analysis and interpretation of data; critical revision of the manuscript; manuscript writing.
2nd author: definition of research problem; development of hypotheses or research questions (empirical studies); development of theoretical propositions (theoretical work); definition of methodological procedures; data collection; literature review; statistical analysis; analysis and interpretation of data; critical revision of the manuscript; manuscript writing.
3rd author: definition of research problem; development of hypotheses or research questions (empirical studies); development of theoretical propositions (theoretical work); definition of methodological procedures; data collection; literature review; statistical analysis; analysis and interpretation of data; critical revision of the manuscript; manuscript writing.