

DIVIDEND POLICY IN THE BRAZILIAN MEAT INDUSTRY: INFLUENCE OF FREE FLOW CASH

POLÍTICA DE DIVIDENDOS NA INDÚSTRIA DE CARNES BRASILEIRA: INFLUÊNCIA DO FLUXO DE CAIXA LIVRE

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Resumo

O objetivo deste estudo é demonstrar que empresas do setor de proteína animal possuem fluxo de caixa semelhante aos demais setores e se o fluxo de caixa deste setor está relacionado ao yield. Metodologia: foram coletados dados de empresas de capital abertos listadas na Bolsa de Valores de São Paulo (B3) entre os anos de 2017 e 2020, sendo usadas ferramentas estatísticas de teste Chi-quadrado e de mínimos quadrados ordinários. Setor de proteína animal (grupo CARNE) foi comparado com as demais empresas listadas na B3 (grupo OUTROS). Resultados: a despeito de haver associação positiva entre yield e variação anual de fluxo de caixa (DFCL) em empresas de capital aberto listadas na B3, ao se avaliar o setor de proteína animal não se encontrou tal achado. Ao se avaliar de forma estratificada o DFCL, ficou demonstrado que no grupo OUTROS houve maiores variações positivas de DFCL que no grupo CARNE. Estes achados podem sugerir um comportamento diferente do setor de proteína animal em relação aos demais.

Palavras-chave: dividendos; indústria da carne; fluxo de caixa livre

Abstract

The objective of this study is to demonstrate that companies in the animal protein sector have cash flow similar to other sectors and whether the cash flow from meat industry is related to yield. Methodology: Data were collected from publicly traded companies listed on São Paulo Stocks Exchange (B3) between 2017 and 2020, using Chi-square and ordinary least squares statistical tools. Animal protein sector (MEAT group) was compared with the other companies listed on B3 (OTHERS group). Results: despite the positive association between yield and annual variation in cash flow (DFCL) in publicly traded companies listed on B3, when evaluating the animal protein sector, no such finding was found. When evaluating the DFCL in a stratified way, it was demonstrated that in the OTHERS group there were greater positive variations of DFCL than in the MEAT group. These findings may suggest a different behavior of the animal protein sector in relation to the others.

Keywords: *dividends; Meat industry; free flow cash*

1 INTRODUÇÃO

The agribusiness sector, more specifically meat and meat products, has grown significantly in recent years. According to data from the Brazilian Institute of Geography and Statistics (IBGE, 2015), the growth in the accumulated production of meat and meat products (poultry, beef and pork) grew by about 15% between 2010 and 2014, reaching approximately 24 million tons produced in 2014. Updated data from the Ministry of Agriculture, Livestock and Supply (MINISTÉRIO DA AGRICULTURA, PECUÁRIA E ABASTECIMENTO (MAPA), 2022) show that the second largest agribusiness exporting sector was meat. With US\$ 1.61 billion in January 2022 (39.8%), it reached a record value for these months in the entire historical series. There was an increase in the volume exported (21.1%) and in average export prices (15.5%). According to MAPA, the main

meat exported by Brazil was beef, with US\$ 801.06 million in foreign sales (46.2%), a record for the months of January.

Brazil has gone through a major transformation process in the meat and meat sector. As Oliveira (2014) highlights, it is clear that the advances presented both in animal production and in the development of the national industry have taken Brazil to a prominent level in the world economy as one of the largest world exporters of meat. Even with the economic crisis that hit several countries in 2008 and barriers imposed by the government (such as the high tax burden and health issues that force many slaughterhouses to act illegally), Brazil was strengthened by its internal solidity, heated aggregate demand and solid financial system, managing to remain with some security in the international market (OLIVEIRA, 2014). With regard to exports of meat and meat products, especially those of bovine origin, Brazil continues to be one of the main exporters (ABDI, 2011).

In recent years, changes can be observed in the industry, with a greater degree of professionalization of market agents, leading companies to go public, internationalization, diversification of activities and products, mainly with the aggregation of value and creation of brands, as a consequence of a concentration of large players that are price makers (BRAGAGNOLO, 2020). Assim, o sucesso do agronegócio da carne bovina brasileira e o alcance da primeira colocação na exportação do produto no mundo foram conseguidos pelo comprometimento, responsabilidade e amadurecimento de grande parte dos componentes da cadeia produtiva, que ao mesmo tempo, fortaleceram os elos de produção, agroindustrialização e distribuição, facilitando ao máximo a constituição de uma sólida estrutura mercadológica (SILVA et al, 2005; OLIVEIRA-NETTO, 2004).

The dividend is a portion of net income that is distributed to investors as a form of remuneration for their capital. The amount to be paid and the form of distribution are complex decisions that have generated numerous

researches (VANCIN, 2014). The optimal dividend policy is one in which the balance between current dividends and future growth is reached, maximizing the stock price (LEMES-JÚNIOR et al, 2002). For a long time, dividends were not relevant to investors in Brazil, mainly due to the high inflation rates prevailing in the Brazilian economy and the absence of monetary correction on dividends (PROCIANOY, 2006). With the stability of prices in the economy after 1996, dividends became more valued, gaining prominence in companies' portfolios (ASSAF-NETO et al, 2007).

Brazil's dividend policy differs from that established in developed countries such as the United States and England. Mandatory configurations in the payment of dividends, aspects of accounting for operations and taxation on this type of income are examples of comparative differences (BRUGNI et al. 2011). Brazilian regulators, in order to improve legal protection for minority shareholders, established a mandatory minimum dividend through Law 6,404/76.

Despite this, according to Mota (2007), the conclusions of international studies cannot be applied directly to the Brazilian market, since there are a number of particularities, among which the following stand out: (a) existence of a mandatory minimum dividend; (b) possibility of paying interest on equity; (c) large concentration of ownership; and (d) dividends, from a fiscal point of view, are more advantageous than share buybacks. Also, according to the author, the existence of cash flow, the stability of these flows, the non-commitment to indebtedness, the concern with corporate governance and the existence of few investment opportunities are factors that lead companies to distribute a greater part of the its profits in the form of dividends and/or interest on equity.

For Nunes (2015), good administration begins with full knowledge of the institution, making decisions, especially with regard to new investments and acquisitions, requires knowing what the company's availabilities are. In this analysis, cash flow is of fundamental importance

in providing management information. According to Silva (2012), cash flow is a financial planning and control instrument that expresses financial results as a function of time and company actions. It is a tool used to support short, medium and long-term decision-making. For Ludícibus and Marion (1999), the cash flow reveals the origin and destination of all the financial resources that passed through the company's cash. From a more managerial point of view, Sá (2004) highlights the importance of cash flow as a liquidity management tool.

Cash control is essential for the management and planning of companies, regardless of size and field of activity. The cash flow presents information for monitoring and decision-making in a simple, comprehensive, objective and clear way (OLIVEIRA et al, 2014). Hoog (2008, p.145) defines cash flow as: "The main accounting piece for the management of organizations [...] because it is the demonstration that allows you to visualize in advance the result of cash inflows (receipts), cash outflows (payments) and the balance (financial result in cash at the end of the period projected by the cash system)." Still according to Hoog (2008), cash flow does not represent economic profit because it discriminates only financial movements and does not follow the accrual basis. Activities such as depreciation, amortization, incurred expenses and revenues do not generate changes in cash for the period, therefore they are not itemized in the cash flow.

The aim of this work is to seek a correlation between free cash flow and the dividend distribution policy by companies in the Brazilian meat industry through their respective yields. This work is divided as follows: this introduction, followed by the theoretical framework (part 2), where the literature on the subject is reviewed and working hypotheses are formulated. In section 3, the methodology used is explained, both for the formation of the sample and for the analysis of the data. The results are shown and discussed in section 4, where the hypotheses will be tested. The work ends in section 5, where the conclusions are resumed.

2 THEORETICAL FRAMEWORK

According to data from CEPEA (2020), in the Agribusiness Export Indexes report for the third quarter of 2019, the volume exported grew by 6%, when compared to 2018, due to the expansion of exports of meat, corn, cotton, ethanol and coffee. Foreign sales recorded a significant increase of 354% in the first nine months of 2019 compared to the volume shipped in 2000. The study points out, however, that this increase in the volume shipped was not enough to keep the sector's foreign sales at the same levels observed in 2018. There was a drop of 4% and the sector's revenue totaled US\$ 72 billion in this period. Invoicing in national currency registered an even more intense decline, of 15%, which is due to the effects of both the retraction of prices in dollars and the appreciation of the real. The dollar is fundamental for the profitability of exports; however, its appreciation can lead to significant increases in production costs and harm the profitability of the sector (BRAGAGNOLO, 2020).

In global terms, the most produced and consumed source of animal protein (except milk) is pork, with 29.86% of the total. It is followed by chicken meat, with 22.97%, chicken eggs (18.5%) and beef (17.56%). These four sources correspond to 88.44% of the animal protein consumed worldwide (SANTOS FILHO et al, 2011). Brazil presents a different dynamic for the consumption of animal protein (except milk). Unlike the rest of the world, animal protein production is dominated by chicken and beef with, respectively, 41.31% and 36.49% of the national total, while pork and chicken eggs correspond to 12.19% and 7.38%, respectively. These four sources correspond to 97.37% of the total animal protein produced in the country (SANTOS FILHO et al, 2011). From the point of view of the organization of production, over the years, first the poultry industry and later the swine industry has undergone significant changes. The verticalization of chains is a reality and the predominant integration model (KRABBE et al, 2013).

In recent years, changes can be observed in the meat industry, with a greater degree of professionalization of market agents, leading companies to go public, internationalization, diversification of activities and products, mainly with the aggregation of value and creation of brands, as a consequence of a concentration of large players that are price makers (BRAGAGNOLO, 2020). Economic variables, also according to Bragagnolo (2020), are also crucial for the formation of market prices for beef, since beef has a high-income elasticity of demand, therefore its demand is sensitive to price increases and income reductions, it also has as competitors, proteins which are perfect substitutes, and historically cheaper, such as poultry and pork meat.

The importance of the meat and derivatives sector can also be verified by observing its importance to the Brazilian capital market. Companies in the meat and meat products segment have had a special participation in the consumption index (ICON) and in the composition of the Ibovespa (IBOV) of the São Paulo Stock, Commodities and Futures Exchange (BM&FBOVESPA, 2015; BM&FBOVESPA, 2022). According to Folletto (2015), the significant participation in these indexes (28.15% of the composition of the ICON and 6.04% of the IBOV), which are composed of companies in the cyclical and non-cyclical consumption sectors (ICON) and companies with the highest number of trading on the stock exchange (IBOV), allows us to observe the important participation of the meat and derivatives sector in the negotiations of companies in the consumer sectors and in the average quotation of the assets with the highest volume traded and representativeness of the stock market. More recent data (BM&FBOVESPA, 2022) show a decline in the weight of these companies in the index, with 13% of the ICON composition and 3.3% of the IBOV, but still with relevant weight.

Sousa (2015) evaluated whether the performance of food companies' shares can be explained by the behavior of macroeconomic variables such as GDP, Selic interest rate, exchange rate, trade

balance, unemployment rate, price index and consumer confidence index. Using Johansen's tests for the period from 2004 to 2014, the results allow us to infer that the variable GDP and trade balance, represented by the coverage rate, have significant cointegrations in the behavior of stock prices and that some stocks such as the company Minerva have strong cointegrations with all the variables studied, it is then concluded that the macroeconomic variables have significant importance in the performance of stocks.

The valuation of companies, according to Ikuno et al (2011), is necessary in the face of several negotiation processes and can be carried out through different methods such as the Discounted Cash Flow, the Multiples Method, the Equity Value, among others. Farias et al (2015) applied the asset pricing model known in the financial economics literature as the Capital Asset Pricing Model, using the balance sheets of selected companies JBS and BRF - Brasil Foods as tools. The period related was from the year 2009 to 2010. The results showed that both companies in the period under study had a beta lower than 1, that is, risk lower than the market risk. This can also be observed from the expected returns. In 2009, the year in which the market showed high growth, the analyzed firms saw expected returns below the market returns. As in 2010, the year in which the market had a drop in the rate of return, firms showed a decline in return in a smaller proportion than the market, obtaining expected returns higher than the market.

Gaspar and Garcia (2018) when applying fundamental analysis via discounted cash flow on Minerva Foods shares, brought the projected value of the company's cash flow to present value, based on a discount rate. It found that the fair value of shares issued by Minerva Foods, and as previously presented, after an analysis of both the Company and its sector of activity, the fair value of R\$ 12.42 per share was found. The author concluded that the Company's shares had a high potential for appreciation, which makes them an extremely interesting asset to buy.

Gouvêa (2013) also used the discounted cash flow method approach for the company JBS, the most

used method to determine the value of industrial companies, where the valuation pointed to a price of R\$ 5.64 per share of the company which is not consistent with the market price of R\$ 6.90 on 05/24/13. The share is, in this scenario of analysis, overvalued for the assumptions used, and it should be noted that the values obtained are significantly affected by the assumption of long-term growth. Bragagnolo (2020) also evaluated through discounted cash flow companies in the meat industry in 2019, showing that the shares of Minerva and Marfrig were underpriced, while the shares of JBS were overpriced.

In recent years there has been a significant growth in corporate Mergers and Acquisitions (M&A) strategies in Brazil (KPMG, 2012). During this period, the JBS Friboi case stands out, which acquired Frigorífico Bertin, becoming the world leader in the animal protein processing sector. The purpose of this study is to identify the variables that determine the post M&A performance of the aforementioned case (FORTI, 2015). The post-combination results revealed that the variables that represent operational efficiency and financial situation were the ones that best explained the post-merger performance, therefore, capable of changing the profitability behavior of acquiring companies that opt for strategies of this type.

Sehnem et al (2012) analyzed the economic and financial performance of meatpacking companies that trade on the BM&FBOVESPA in a historical series from 2006 to 2010: BR Foods S.A., Excelsior Alimentos S.A., JBS S.A., Marfrig S.A., Minerva S.A. and Minupar S.A., totaling 6 publicly traded companies. The leading companies in the sector, namely JBS Friboi, BRF Foods and Marfrig, mostly occupy the leadership in the analyzed economic performance indicators. These are companies that have grown and internationalized in recent years, increasing their equity, production structure and income. They have greater ability to compete, as they have scale structures and industrial units distributed across different continents, which earns them gains to the detriment of smaller companies. However, these

are the companies that have the highest level of indebtedness, in general, associated with the “wave” of acquisitions they have gone through in recent years. Smaller companies, on the other hand, are more volatile in terms of instabilities and present lower performance behaviors, such as high debt and growth in short-term obligations. The authors conclude that internationalization has a strong impact on the performance of the organizations analyzed in this study.

Folletto (2015) analyzed the economic-financial performance of companies in the meat and derivatives segment listed on BM&FBOVESPA in a historical series covering the period from 2010 to 2014. The results of the study demonstrated, in general and on average, satisfactory liquidity, high utilization of third-party capital, low or negative profitability and profitability. They also revealed a high degree of immobilization of shareholders' equity, net sales greater than assets, a significant share of exports in revenues; in addition to generating cash and positive added economic value (EVA®).

Silva et al (2015) verified how costs behave in companies listed on BM&F Bovespa, in the meat and derivatives segment, between 2004 and 2013. The research is classified as descriptive, with a quantitative approach and the procedures were through research document, using information from the financial statements of companies in the meat and meat products segment listed on BM&F Bovespa, from 2004 to 2013. The results achieved indicated that, in the analysis of the meat and meat products segment, 76% of Net Revenue from Sales (RLV) are intended to cover the Cost of Goods Sold (COGS) in the 10-year period analyzed. This percentage is consistent with the results found by other studies that evaluated companies from different sectors of the economy. In the correlation analysis, it was confirmed that there is a strong correlation between the COGS and RLV (0.998), which demonstrates that, in the segment, the RLV alteration has a significant association with the increase in the COGS, which may influence the performance of companies. This result is in line

with the trend of companies in the segment, which is investment focused on productivity and scale production, increasing profit by increasing sales turnover.

Silva (2022), in turn, found different results from those of Silva (2015) in the sector during the COVID-19 crisis in 2020 and 2021. Animal protein companies listed on B³, throughout the pandemic period, showed a strong increase in its costing items, without, however, being able to transfer these values to the final price of its products, since there was no significant increase in COGS in relation to its revenues. In addition, it was concluded that the impacts on the companies analyzed were positive in terms of operating, investment and financing flows, as well as the market consequences arising from the COVID-19 pandemic, which encourage companies to adopt new strategies aimed at increasing profit through expansion in market-share and other types of protein-related businesses in different countries.

Rodrigues et al (2015) showed that the variables that represent operational efficiency and financial situation were the determinants of JBS Friboi's post M&A performance. The results show a significant and positive relationship between the variables Net Margin, Current Liquidity and EBITDA/Net Sales Revenue, ROA and ROE, so that these variables are capable of changing the behavior of JBS Friboi's profitability. However, when analyzing the period before and after the merger, the average indicators show that there was no improvement in the performance of JBS Friboi. This can be attributed to the short period of time analyzed, as a strategy of this type requires time for synergy gains and an increase in the company's operational efficiency. The average results of the indicators signaled that there was a decrease in the profitability of JBS Friboi after the M&A, which is in line with theoretical precepts that argue that in the short term the acquiring companies present substantially lower gains than the acquired companies. As for the financial situation indicators, the post-combination results were constant for current liquidity and a decrease for the capital structure and debt profile, different

evidence compared to the findings of Adu-Darko and Bruce-Twum (2014) and Singla et al (2012).

Free cash flow is an approach that is within the Discounted Cash Flow models, and is similar to dividend discounting, as both start from the same assumptions: estimate the cash flows to the shareholder and bring to present value, discounted at a rate that reflects the cost of capital (ALLEBRANTE, 2018). This method “values the company using free cash flow, that is, the cash flow available to the company or shareholders net of capital expenditures.” (BODIE et al, 2015, p. 544). Still according to the authors, this method is very useful for valuing stocks that do not pay dividends. According to Damodaran (2002), each company adopts the dividend policy that best suits this particular reality. Developing companies with rapid growth generally do not pay high dividends, while stable companies with high cash flows and fewer projects tend to pay higher amounts.

Assaf (2014) states that according to the dividend relevance theory, investors who need constant cash flow prefer companies that have regular dividend policies, as this reduces the risk associated with the instability of company results. Still according to Assaf (2014), the Signaling Theory argues that dividends have informational content and, therefore, the highest dividends can signal to the market and shareholders the expectation of positive future cash flows. In this context, according to Assaf (2014), the payment of dividends is a way to minimize the cash flow available for decision-making by managers, who often do not make decisions that maximize the capital gain of shareholders. Therefore, the greater the variation in operating cash flow, there will be a tendency for managers to try to reduce the basis for calculating dividends in order to keep more resources available for their choice of projects to be executed.

Assaf-Neto (2011), in this sense, asserts that the Statement of Cash Flows reveals where cash resources were obtained and where they were invested in a given year. From the Statement of Cash Flows, it is also possible to analyze trends, making it possible, with a certain risk, to predict

future cash generation capacity (FOLLETO, 2015).

Mota (2007) analyzed the companies listed on the B3, in the period from 2000 to 2005, where he found that the existence of cash flow is due to the non-involvement with debt, having a relationship with corporate governance and the existence of few investment opportunities, as they are factors that generate a high distribution of their profits in the form of dividends. The author states that companies with positive cash flow have fewer agency problems, since what is being done by managers is generating a positive result. Therefore, the opportunity cost of distributing higher dividends to satisfy shareholders is greater than that of reinvesting capital to achieve future gains. In this sense, John and Knyazeva (2006) state that the higher the ROA (indicator of a greater cash flow), the greater the availability for carrying out a dividend distribution.

Mota (2007) also observed that, by also using the variation in revenues, a negative relationship with the distribution of dividends. According to the author, the opportunity for growth and investment have a negative effect on dividends, since companies that have projects capable of generating positive future cash flow minimize their agency conflicts and, therefore, the opportunity cost of distributing dividends becomes larger, causing entities to choose to invest in growth opportunities.

On the other hand, in studies by Santana (2006), Jiraporn et al (2011), Adjaoud and Ben-Amar (2010) and Fonteles et al (2012) found positive results between the cash flow variable (represented by $ROA = \text{Net Income} / \text{Total Assets}$) and the dividend policy. In this context, Fonteles et al (2012) propose that cash flow is relevant in the policy of high dividends.

Forti et al (2015) and Forti and Freitas (2014) present a hypothesis referring to the company already having a high Market-to-Book and using dividends as a way to signal the occurrence of positive future cash flows. The authors add that the higher the leverage in the previous year, the lower the amount distributed through dividends

in the following year and that, with debt, the entity believes that it will increase its cash flow for the next period, allowing for better shareholder remuneration.

Adjaoud and Ben-Amar (2010) investigated the correlation between the quality of corporate governance and dividend policy in Canadian companies. Adopting as a sample the set of companies listed on the Toronto Stock Exchange in the period from 2002 to 2005, they found that companies with stronger corporate governance paid higher dividends. The results also point to a positive association between the size of the company, the level of free cash flows and the payment of dividends.

Santos (2020), when studying the variation in operating cash flow, showed that companies that paid above the mandatory dividends had less variation in operating cash flow (OCF) and that they also paid higher dividends in the previous year. The author concluded that decisions on dividend policy were determined by the policy of the previous year and by the OCF variation. On the other hand, companies with a greater variation in OCF tended to manage the calculation basis for dividends, that is, the greater the variation in operating cash flow, the lower the proportion of dividends in relation to profit.

Moutinho et al (2019) investigated whether the free cash flow/price indicator is capable of predicting the stock return of publicly traded companies in the Brazilian market. Quarterly data from 2008 to 2016 for 245 common shares and 157 shares of other classes were analyzed. The main results obtained were: the statistical significance of the free cash flow/price to predict the stock return with one and three quarters of lag by the dynamic panel method, conclusion similar to that found by Lewellen (2004). The dividend yield, according to Moutinho et al (2019), obtained an inverse relationship with the stock return.

The dividend policy comprises, on the part of business managers, the decision to pay dividends to shareholders or retain the profits generated internally in the period. It is one of the most important decisions in managerial work and

should seek to maximize investor wealth (AGRAWAL; JAYARAMAN, 1994).

Hahn et al (2010) emphasize that each company has different objectives and goals, the distribution of dividends varies according to the interests of those in charge and also the economic situation. Bartram et al (2012) demonstrate that shareholders prefer the company to pay a greater fraction of its earnings since a lower retention rate reduces opportunities for managers to waste money on unprofitable projects or in other ways that are not advantageous to shareholders.

In recent years, the interest of academic and business circles on the relationship between corporate governance and the policy of distributing profits to shareholders has been growing. La Porta et al (2000) report that companies located in countries with greater legal protection for minority shareholders (based on common law) pay higher dividends when compared to countries where legal protections are less strict (civil law). Carvalho da Silva (2002) states that Brazil belongs to the tradition of French law (civil law), which offers the least legal protection to investors. Therefore, a high concentration of capital in companies is to be expected, especially with regard to voting capital.

According to La Porta et al (2009), the dividends to be received by the shareholder depend on a legal system and rigorous practices of Corporate Governance, which are created to minimize the conflicts of interest that predominate in the relationship established between the company and the stakeholders. Such mechanisms tend to encourage a dividend policy that tends to reward investors with higher percentages for investing their capital in the company.

Johnson and Shleifer (2001) consider the payment of a higher dividend payout a means of establishing a reputation for treating minority shareholders appropriately. Bohren and Odegaard (2001) found that the control and ownership structure influence the economic performance of Norwegian companies. A greater concentration of control and the use of non-voting shares are related to a loss of market value. In addition, the authors found evidence

that firms where the majority shareholder has a large stake in the company tend to distribute higher dividends.

One of the first Brazilian studies relating dividend policy and agency conflict was carried out by Prociunoy (1995), who analyzed agency conflicts between controlling and minority shareholders in companies traded on the São Paulo Stock Exchange, through the behavior of dividend policy after the tax changes that took place between 1988-1989. The payment of dividends, in addition to being related to the control and ownership structure, works as a governance mechanism. In this way, companies that adopt corporate governance practices usually have good remuneration policies for their shareholders, paying high percentages of dividends annually.

Farinha (2002) analyzed the dividend distribution policy in the United Kingdom and found that there is a relationship between the payout and the control and ownership structure, since the payment of dividends contributes to the reduction of agency conflicts in the firm, consistent with Easterbrook (1984) and Jensen (1986). Farinha (2002) also found a positive relationship between payout and ownership concentration above 30%. Recent studies by Fluck (1998) and Myers (2000) present models of dividend payment related to the agency theory, concluding that the company's management pays dividends in order to avoid monitoring actions by the shareholders. In addition, Jensen (1986) considers the payment of dividends as a way to allocate the company's cash, avoiding investment in projects that do not maximize value to the company.

Nunes (2015) analyzed the cash flow statements and their indicators of the two main companies in the meat and derivatives segment listed on BM&FBovespa, BRF S.A. and JBS S.A in the period between 2012 and 2014. The author demonstrated that both companies have a good capacity to generate operational resources to distribute dividends to their shareholders, dispensing with the use of third-party capital to satisfy their investors. However, because it has a smaller number of shares, BRF has a greater

potential for return to shareholders, operationally generating more than two reais per share, while JBS needs to further dilute its dividends, generating R\$0.69 per common share. In addition, JBS maintains its stable capacity to generate more than R\$4.00 operationally for each real declared in dividends, pointing to an improvement, even with a gradual increase in dividends to be distributed annually, while BRF presented a small drop in 2013, mainly the large distribution of dividends carried out in the year, but in 2014 it reduced the distribution and improved its capacity to distribute dividends, consequently increasing its cash surplus.

Silva and Kirch (2022), when studying the dividend policy of the animal protein sector with non-operating profits, demonstrated that the sector's yield was lower when compared to the set of other sectors, but without differences in payout. In addition, shares in this sector appreciated above the set of other companies, which could explain the differences between yield and payout.

According to the literature review presented above, the following hypotheses were reached:

H0a: There is no difference in free cash flows between companies in the animal protein sector and other sectors.

H1a: There is a difference in free cash flows between companies in the animal protein sector and in other sectors.

Still in view of the above, in relation to companies in the animal protein sector, two hypotheses were formulated:

H0b: Free cash flow is not correlated with the yield of companies in the animal protein sector.

H1b: Free cash flow is related to the yield of companies in the animal protein sector.

In addition, they will be evaluated along with free cash flow and yield, the variable annual variation in the price of the asset.

3 METHODOLOGY

The publicly traded companies listed on São Paulo Stocks Exchange (B3) were selected on the Yahoo Finance website (YAHOO FINANÇAS, 2022). The time period covered was from January 2, 2018 to December 31, 2021. The data used to calculate the study's two main variables were also extracted from this website: free cash flow, yield, and price change.

Given the large annual variability between free cash flows, the first difference between year D0 and the previous year (D-1) was calculated. The yield was calculated from the sum of the dividends paid in the current year divided by the value of the share on the day of its payment and added up within the year. In addition, data were obtained on the variation in stock prices on the last day of each year, calculating the annual variation. Thus, the data were produced from variations between the years 2021-2020, 2020-2019 and 2019-2018 was obtained.

Data analysis was performed using Chi-Square test and the ordinary least squares test using the Eviews software. For the meat industry, a dummy variable was used (value 1, when belonging to the sector). The level of statistical significance was set at 0.1.

4 RESULTS AND DISCUSSION

Five companies from the animal protein sector (MEAT group) and 104 from other sectors (OTHERS group) with at least 2 successive statements of cash flow, yield and annual asset price variation (hereinafter identified as DPRECO) were selected. Companies with IPOs carried out in 2021, therefore, were not used. On the other hand, companies undergoing merger and acquisition processes that ceased to exist in 2021 and 2020, if they had data available by the end of the current year, were still used. The variation in cash flow (DFCL) is stated in thousands of Reais, in the same way as it was collected.

Multivariate regression analysis, using ordinary least squares (OLS), demonstrated a statistically significant direct relationship between DFCL and yield, but this was not confirmed when using the MEAT group as a dummy (Table 1). A possible reason would be the low sampling of this group. Thus, in view of the above, it is possible to accept both the null hypotheses H0A and H0B, which is in disagreement with the results of Forti and Freitas (2014).

The model also did not detect any relationship between stock returns either in the OTHERS group or in the MEAT group, which is in disagreement with Moutinho's results. et al (2019), that obtained an inverse relationship of

Table 1 - Ordinary Least Squares Analysis

Independent Variable	C	DFCL	Yield	MEAT
Dependent Variable				
YIELD	0.034**	1.69E-09*		
YIELD	0.035**			-0.008
YIELD	0.034**	1.72E-09*		-0.009
DPRECO	0.186**			0.258
DPRECO	0.236**		-1.127	
DPRECO	0.235**	1.40E-08	-1.221	
DPRECO	0.193**	1.19E-08		
DPRECO	0.223**	1.33E-08	-1.176	0.242
DPRECO	0.224**		-1.086	0.25
DPRECO	0.183**	1.13E-08		0.253

Abbreviations: MEAT: group of companies in the animal protein sector; C: intercept; DFCL: free cash flow on first difference; DPRECO: annual variation of the share price; *p < 0.1, **p < 0.01.

Table 2 - Sample before and after removing outliers

Group	Variable	Mean \pm standard error	n
MEAT			
	DFCL	1,121,151 \pm 828,885	15
	DFCL_S	1,115,288 \pm 527,341	13
	DPRECO	0.476 \pm 0.164	15
	DPRECO_S	0.514 \pm 0.186	13
	Yield	0.029 \pm 0.015	15
	Yield_S	0.025 \pm 0.016	13
OTHERS			
	DFCL	-352,061 \pm 1,450,047	295
	DFCL_S	173,295 \pm 92,691	265
	DPRECO	0.183 \pm 0.0384	295
	DPRECO_S	0.193 \pm 0.041	265
	Yield	0.035 \pm 0.002479	295
	Yield_S	0.032 \pm 0.002	265

Abbreviations: MEAT: group of companies in the animal protein sector; OTHERS: other companies; DFCL: free cash flow on first difference; DPRECO: annual variation of the share price; _S: result after removing the outliers (see text).

dividend yield with the stock return.

Aiming to overcome the low sample size, the chi-square test was chosen to test the hypotheses. Due to the great dispersion of the data, however, it was decided to remove the outliers, that is, data positioned at the extremes of the sample. Anyone who was above the 98th percentile or below the 2nd percentile was discarded. Table 2 shows the data before and after the exclusion, with a significant decrease in the standard error, mainly in the OTHERS group.

The study variables were divided by the parameters shown in table 2, leading to the formation of 3 distinct groups: those below the lower limit, those above the upper limit (together they form the extreme group) and the intermediate group. The values were established to discern different situations: first, the DFCL limits set at one million, where it is assumed that, for example, a company with a DFCL greater than one million is in a different financial situation than a company with a DFCL with negative

variations of more than one million during the year. Second: yield greater than 8% (upper limit) shows a dividend policy with high payout in relation to the share value, while yield equal to zero (lower limit) shows a situation in which there is no profit produced by the company, as if not, the legislation requires the payment of mandatory dividends. Finally, annual asset price variations of more than 20% would characterize a good deal by an investor, while the opposite (a drop of more than 20% in the year) would characterize a loss.

Thus, using the chi-square test, the different groups formed can be compared using three combinations: a) data above the upper limit compared to the others (ie, all below the upper limit); b) data below the upper limit compared to the others (that is, all above the lower limit) and c) the combination of data above the upper limit and below the lower limit compared to the intermediate values. In this same order, the results are shown in tables 4, 5 and 6.

Table 3 - Delimitation of variables

Variable	Inferior limit	Upper limit
DFCL	< -1,000,000	> 1,000,000
yield	0	Superior a 8%
DPRECO	Price drop of more than 20%	Price increase of more than 20%

Abbreviations: DFCL: Free Cash Flow on First Difference; DPRECO: annual variation of the share price.

Table 4 – Chi-Square Test between DFCL and yield

	Analyzed Group	Variables Studied	Correlation
Test 1	OTHERS	DFCL vs yield	
Upper limit			direct
Inferior limit			direct
Sum of limits			inverse
Test 2	MEAT	DFCL vs yield	
Upper limit			inverse
Inferior limit			direct
Sum of limits			inverse
Test 3	MEAT vs OTHERS	DFCL	
Upper limit			MEAT > OTHERS *
Inferior limit			MEAT > OTHERS
Sum of limits			MEAT > OTHERS

Abbreviations: MEAT: group of companies in the animal protein sector; OTHERS: other companies; DFCL: free cash flow on first difference; DPRECO: annual variation of the share price; *p < 0.1, **p < 0.01.

Table 4 compares, using the chi-square test, the DFCL with yield in the MEAT and OTHERS groups, in addition to comparing the DFCL between the MEAT and OTHERS groups; there was also more positive variation of DFCL greater than 1 million in the OTHERS group than in the MEAT group, which shows that there is a difference in DFCL between the OTHERS and MEAT groups, thus negating the null hypothesis H0a. There were no correlations within the MEAT and OTHERS groups regarding yield and DFCL, thus accepting the null hypothesis H0b, which is in disagreement with the work of Adjaoud and Ben-Amar (2010), Fonteles et al (2012), Jiraporn et al (2008), Mota (2007) and Santana (2005).

Table 5 compares, using the chi-square test, the DFCL with DPRECO in the MEAT and OTHERS groups, in addition to comparing the DPRECO between the MEAT and OTHERS groups. There was no DFCL less than -1 million with DPRECO less

than -20% in the other group, and this finding was not found in the MEAT group, which shows that there is a difference in DFCL between the OTHERS and MEAT groups. In addition, there was a direct correlation between DFCL and price in the OTHERS group when comparing the sums of the extremes with the intermediate values, this finding was not found in the MEAT group, which shows that there is a difference in DFCL between the OTHERS and MEAT groups, denying therefore, the null hypothesis H0a.

In the MEAT group, everyone who had a price variation greater than -20% had DFCL greater than one million, this finding was not found in the OTHERS group, which shows that there is a difference in DFCL between the OTHERS and MEAT groups, therefore denying , the null hypothesis H0a. Another finding of statistical significance, when comparing the lower limit between the MEAT group and the OTHERS group,

Table 5 – Chi-Square Test between DFCL and DPRECO

	Analyzed Group	Variables Studied	Correlation
Test 4	OTHERS	DFCL vs DPRECO	
Upper limit			inverse
Inferior limit		No data with DFCL < -1 million with DPRECO less than -20%	undetermined ^{1**}
Sum of limits			direct*
Test 5	MEAT	DFCL vs DPRECO	
Upper limit			inverse
Inferior limit		All of the MEAT group who had DPRECO greater than -20% had DFCL > -1M	direct**
Sum of limits			direct
Test 6	MEAT vs OTHERS	DPRECO	
Upper limit			MEAT > OTHERS
Inferior limit		In the MEAT group there was no DPRECO < -20%**	undetermined ¹ MEAT < OTHERS
Sum of limits			MEAT > OTHERS

Abbreviations: MEAT: group of companies in the animal protein sector; OTHERS: other companies; DFCL: free cash flow on first difference; DPRECO: annual variation of the share price; M: million; *p < 0.1, **p < 0.01.

Table 6 - Chi-Square Test between yield and DPRECO

	Analyzed Group	Variables Studied	Correlation
Test 7	OTHERS	yield vs DPRECO	
Upper limit			inverse
Inferior limit		There was no price variation of less than -20%	undetermined
Sum of limits		Extreme price variations are related to yields within limits	inverse**
Test 8	MEAT	yield vs DPRECO	
Upper limit			direct
Inferior limit		There was no DPRECO less than -20%**	undetermined
Sum of limits		All with intermediate DPRECO had extreme yields	direct**
Test 9	MEAT vs OTHERS	yield	
Upper limit			MEAT > OTHERS
Inferior limit			MEAT > OTHERS
Sum of limits			MEAT > OTHERS**

Abbreviations: MEAT: group of companies in the animal protein sector; OTHERS: other companies; DFCL: free cash flow on first difference; DPRECO: annual variation of the share price; *p < 0.1, **p < 0.01.

in the MEAT group there was no DPRECO lower than -20%

Table 6 compares, using the chi-square test, the yield with DPRECO in the MEAT and OTHERS

groups, in addition to comparing the yield between the MEAT and OTHERS groups. In the OTHERS group, extreme price variations are related to yields within limits. In the MEAT group, all with intermediate DPRECO had extreme yields. In both cases, therefore, an inverse relationship between yield and price variations can be considered, which is in line with the results of Moutinho et al (2019), who obtained an inverse relationship of dividend yield with the stock return. In addition, in the MEAT group, there was no DPRECO lower than -20% (differently in the OTHER group, where 229 out of 295, or 78% had DPRECO below -20%). The yield reached more extreme points in the MEAT group than in the OTHERS group.

Resuming, despite the positive association between yield and DFCL in publicly traded companies listed on B3, when evaluating the animal protein sector, no such finding was found. When evaluating the DFCL in a stratified way, it was demonstrated that in the OTHERS group there were greater positive variations of DFCL than in the MEAT group. In addition, a positive correlation was demonstrated between DFCL and asset prices in the OTHERS group, and this finding was not found in the MEAT group. These findings suggest the sector's own behavior, as demonstrated by Silva and Kirch (2022). Finally, both in the MEAT group and in the OTHERS group, an inverse relationship was demonstrated between yield and price variation.

5 FINAL CONSIDERATIONS

One of the great difficulties of this work was dealing with free cash flow values. Whether due to the company's size, industry or financial situation, the values varied greatly, which would prevent an accurate analysis using parametric statistical methods. As there was no interest in working with FCF proxies, as demonstrated by several authors in the theoretical framework, the use of first difference in the OLS analysis and in the chi-square test, as well as in the removal of outliers in the latter, proved to be useful, despite not fully solve this problem.

There are few studies that deal with the dividend policy in the animal protein sector, with Nunes (2015) being the only one to clearly relate cash flow to the payment of dividends. In Brazil, given the economic importance of this sector, associated with the concentration of production through large companies (and some of them publicly traded), it is essential to understand the dynamics of distributed dividends.

The prospects for this line of research on dividend policy within the animal protein sector are working with time series, comparing the sector between different stock exchanges around the world, in addition to seeking correlations between other relevant variables for the sector, such as exchange rate, inflation and commodity prices such as soy and corn, fundamental inputs.

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