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Asset divestments, economic crisis, and the future performance of companies

Desinvestimentos de ativos, crise econômica e o desempenho futuro das empresas

Desinversión de activos, crisis económica y rendimiento futuro de las empresas

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ABSTRACT
This paper investigated the impact of asset divestments made by financially constrained companies on their future performance, as well as their potential for reversing past losses. After applying the pairing of the companies listed, the estimation of the relationships of the variables took place through GMM and LOGIT. The research findings indicate that there is evidence that the sale of assets by companies with financial constraints contributes to future performance. A contribution of this research is for managers who have empirical results that have not yet been discussed in the Brazilian literature and that can serve as support in decision-making on the policy of selling or maintaining assets.
Keywords: economic crisis; financial restrictions; performance; investments; divestments.

RESUMO
A pesquisa investigou o impacto dos desinvestimentos de ativos realizados por empresas com restrições financeiras sobre o desempenho futuro, bem como seu potencial de reversão de prejuízos passados. Após aplicação de pareamento das empresas listadas na B3, as estimações das relações das variáveis deram-se por meio de GMM e LOGIT. Os achados da pesquisa indicam aumento da probabilidade de reversão prejuízos passados por empresas jovens em função da venda de ativos. Uma contribuição desta pesquisa é para os gestores que têm resultados empíricos ainda não discutidos na literatura brasileira e que podem servir de suporte na tomada de decisão sobre a política de venda ou de manutenção de ativos.
Palavras-chave: crise econômica; restrições financeiras; desempenho; investimentos; desinvestimentos.

RESUMEN
La investigación analizó el impacto de las desinversiones de activos realizadas por empresas con limitaciones financieras en el rendimiento futuro, así como su potencial para revertir pérdidas pasadas. Luego de aplicar el emparejamiento de las empresas, se realizó la estimación de las relaciones de las variables a través de GMM y LOGIT. De esta investigación indican que existe evidencia de que la venta de activos por parte de empresas con restricciones financieras contribuye al desempeño futuro. Una contribución de esta investigación es para los administradores que tienen resultados empíricos que aún no han sido discutidos en la literatura brasileña y que pueden servir de apoyo en la toma de decisiones sobre la política de venta o mantenimiento de activos.
Palabras clave: crisis económica; limitaciones financieras; rendimiento; inversiones; desinversiones.

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1 INTRODUCTION

The objective of the paper was to investigate whether asset divestments made by companies with financial constraints positively affect future performance, and whether such divestments provide the reversal of recorded losses from previous periods in future profits of companies listed on B3 (Brasil, Bolsa, Balcão). Akinyera (2015) considers that, among the numerous triggers of economic crises, bad representations, high leverage, and risky investments would be outstanding reasons capable of shaking the global economy. Nassif (2017) adds that issues related to corruption scandals and institutional aspects (Fuertes-Callén & Cuellar-Fernádez, 2019; Sarjono, Titisari & Pawenang, 2021) potentiate the uncertainties caused by crisis scenarios (Farmer, 2017), igniting, thus, the red flag of moral hazard (Damasceno, 2019). Farmer (2017) argues that such uncertainties trigger distrust of financial markets, cause credit shortages and, consequently, restriction of funding sources (Damasceno, 2019). This event contributes to declining levels of investment (Barbosa, 2017; Farmer, 2017; Sarjono et al., 2021) and consumption (Barbosa, 2017) in ways that resonate with firm performance (Egbunike & Okerekeoti, 2018) and lead firms to cancel valuable investments (Campello, Graham & Harvey, 2010; Franzotti & Valle, 2020).

Lima, Assaf, Perena and Silva (2011) reported that financial restrictions caused by economic crises contribute to a increase in the indebtedness of companies, which favors the occurrence of bankruptcies. Under this scenario, Paunov (2012) reports that younger companies are the most vulnerable to funding restrictions, a fact that leads them to abandon innovation projects and investments, and prevents them from evolving (Whited & Wu, 2006; Paunov, 2012).

Chen and Zhang (2007) and Kolev (2016) indicate asset divestments as an important strategy for business performance in the face of market setbacks. Kolev (2016) records that asset divestments, in general, have a positive impact on company performance. In the business area, managers need to make decisions that often involve the flow of resources (Akinyera, 2015; Farmer, 2017; Nassif, 2017; Egbunike & Okerekeoti, 2018; Fuertes-Callén & Cuellar-Fernádez, 2019; Sarjono, Titisari & Pawenang, 2021) and even the sale of assets (Campello, Graham & Harvey, 2010; Franzotti & Valle, 2020). Managers have more information than shareholders (Jensen & Mecking, 1976; Shaikh & O'Connor, 2020). Sometimes, managers need to make decisions involving the sale of assets for various reasons (Campello, Graham & Harvey, 2010; Franzotti & Valle, 2020), but shareholders do not have information about the real reasons involved in the investment and divestment decisions regarding assets, due to the information asymmetry existing between the principal and the agent (Jensen & Mecking, 1976; Shaikh & O'Connor, 2020).

Among the reasons for the divestment decision are strategic decisions and inefficient structural arrangements (Kolev, 2016), profit deterioration (Davies et al., 2018), corporate restructuring (Chen & Zhang, 2007), crisis (Lee, 2018), and manager's opportunistic behavior (Shaikh & O'Connor, 2020). In other words, managers can disinvest because the assets are not so profitable, because of opportunistic behavior by the manager, because the assets are outside the companies' strategy, because the company is going through a phase of financial difficulty, or even because the company changes its investment strategy (Chen & Zhang, 2007; Kolev, 2016; Davies et al., 2018; Lee, 2018; Shaikh & O'Connor, 2020). And, in the national literature, there is still no empirical evidence on the effect of asset divestment on future results. The decision to invest is often not known to shareholders due to information asymmetry between principal and agent (Jensen & Mecking, 1976; Shaikh & O'Connor, 2020). Thus, the following research question is outlined: do asset divestments carried out by companies with financial constraints positively affect future performance?

This investigation is justified as it fills a gap in national literature combining the elements of economic crisis, financial constraints, future performance, and asset divestments. Although the international literature addresses the theme of asset divestments and economic crises on business dynamics (Kolev, 2016; Campello, Graham & Harvey, 2010; Chen and Zhang, 2007), it was not possible to identify a study with a similar approach in Brazil. Thus, a contribution of this research is for managers who, in this research, have empirical results not yet discussed in the Brazilian literature and which can serve as support in decision making for the policy of selling or maintaining assets and their effects on future results. Another contribution is for the shareholder who did not have information about the effect of the sale of assets on future results and that often the news of the sale of assets can generate noise between the principal and shareholders. This occurs both for young and mature companies.

2 THEORETICAL REFERENCE

Managers have more information than shareholders (Jensen & Mecking, 1976; Shaikh & O'Connor, 2020). Sometimes managers need to make decisions involving the sale of assets for various reasons (Campello, Graham & Harvey, 2010; Franzotti & Valle, 2020), but shareholders do not have information about the real reasons involved in the investment and divestment decisions regarding assets, due to the information asymmetry existing between the principal and the agent (Jensen & Mecking, 1976; Shaikh & O'Connor, 2020). On the one hand, companies invest for the most varied reasons: to increase production, technological innovation, productive efficiency, synergy in the business chain, industrial expansion (Fortunato et al., 2012), or

profitability (Scherer; 1965; Ross, 1995; Loss & Sarlo, 2006; Fortunato et al., 2012). On the other hand, there is already literature on the reasons for the divestment decision: strategic decisions and inefficient structural arrangements (Kolev, 2016), profit deterioration (Davies et al., 2018), corporate restructuring (Chen & Zhang, 2007), crisis (Lee, 2018), and manager's opportunistic behavior (Shaikh & O'Connor, 2020).

2.1 Economic crisis

The 2008 economic crisis, known as the Lehman Brothers Banking (LBBC) crisis, was considered by Akinyera (2015) as one of those that emblematically shook the global economy. In line with the arguments of Akinyera (2015), bad representations, high leverage, and risky investments, among the numerous causes of economic crises, would be the main motivations that overwhelmed national and transnational economies. Thus, raising the red flag for moral hazard (Damasceno, 2019).

In the area of moral hazard (Damasceno, 2019), it is recorded that the scenario of recession experienced in Brazil in 2014 had it as a driving force. During this period, events related to a corruption scandal, as well as legal and institutional aspects, led the country to an economic crisis of greater severity than that recorded in the last century (Nassif, 2017). This fact culminated in a significant contraction of GDP (Nassif, 2017) and a relevant reduction in investment and consumption levels (Barbosa, 2017). Such occurrences raise the illusions of Shaikh (1978) about the failures in economic relations produced by crises, since they translate into uncertainties that affect the profits of companies by interfering directly in the risk appetite of companies, which, consequently, influences the reduction of investments (Farmer, 2017). This, for Damasceno (2019) is clearly compressible, as "The financial health of banks and real economic activity are deeply connected and setbacks in the course of banking business can spill over to firms, damaging investments and operations."

Damasceno (2019) also warns about how the scarcity of bank credit supply leads companies' short-term operating activities to the exposure of high financing costs; and this fact proves to be a relevant point of attention for companies' financing decisions (Rajan & Zingales, 1995).

Still regarding the strength of economic crises on funding restrictions (Paunov, 2012) and the high costs of these sources (Damasceno, 2019), Lima et al. (2011) argue that the increase in the level of indebtedness of companies contributes to bankruptcy situations. In fact, the financial hardships caused by funding restrictions (Gomes, Brugni & Beiruth, 2021) are presented in a somewhat nebulous way, because, if on the one hand, there are corporations on the verge of bankruptcy, on the other there are young companies impelled to evolve due to lack of funding (Whited & Wu, 2006; Miranda, Ferreira, Abrantes & Macedo, 2022).

From this perspective, Paunov (2012) adds that younger companies are more vulnerable to funding constraints and negative demand shocks to the point of compelling them to abort investment and innovation projects. Giraudo, Giudici and Grilli (2019) highlight that, normally, young innovative companies face problems of financial constraints due to the degree of risk of the projects and the high failure rates (Coad & Rao, 2008). Damodaran (2009) points out that the high probability of failure of young companies, combined with the small volume of revenue, among other factors, contributes to the recording of significant operational losses. For this reason, perhaps, that Pinto, August and Gama (2011) have attributed to the age of the company the title of strategic intangible, valuable for the survival of companies. This fact can give mature companies greater negotiating power, which signals respect for the commitments assumed (Pinto et al., 2011).

2.2 Performance

The literature on performance clarifies that this is a strategic issue for the business world, since internal and external factors, whether positive or negative, impact the course of business. With regard to internal factors, the relevance of (i) clearly specified current business and management plans is highlighted, as they can affect future results (Taouab & Issor, 2019); (ii) senior management knowledge of the core business (Aspara e t al., 2015); and (iii) performance measures that support the decision-making process (Gimbert, Bisbe & Mendoza, 2010).

As for external factors, Lee (2018), Fuertes-Callén and Cuellar-Fernádez (2019) and Sarjono et al. (2021) report that the institutional policy of the territory where the company operates is a categorical agenda for the performance of companies, since the economic development of the country influences the profitability of companies (Egbunike & Okerekeoti, 2018). In view of this, Sarjono et al. (2021) state that investment plans can be stimulated or not, given that future uncertainties and costs, which are often irreversible, affect investment decisions (Souza, Montezano & Lameira, 2020).

Therefore, organizational performance translates into a parameter of companies' strategic acuity in achieving their goals and results over time, as current investment performance also matters for future performance (Rabinovich, 2021). In this sense, Sarjono et al. (2021) consider operational activity as one of the main performance measurement instruments.

Depending on the dimension of interest, financial, operational and/or market value, business performance can be measured through indicators such as Tobin-Q, ROE and ROA (Souza et al., 2020; Abu, Okpe & Awen, 2021; Imeokparia, Adesanmi & Olubukola, 2021). The Tobin-Q explores the company's performance from the stock market perspective, that is, it relates the company's investments to the stock market. The indicator is calculated by the ratio

between the company's market value and the replacement cost of its physical assets (Carvalho, Maia, Louzada & Gonçalves, 2017).

The ROE indicator measures the company's performance from the perspective of adding value to shareholders. Its calculation is obtained by the ratio between the company's net income and equity (Almaqtari, Al-Homaidi, Tabash & Farhan, 2018). The ROA indicator is widely used in the literature as a proxy for measuring business performance from the perspective of the return generated by assets, as well as monitoring performance over the years (Bhasa, 2015). Its calculation is obtained by dividing earnings before interest and taxes by total assets (Fuertes-Callén & Cuellar-Fernádez, 2019).

The potential for capturing ROA in terms of investor behavior, especially in view of the effects caused by economic setbacks, such as credit shortages, reduced investment levels, and falling demand (Paula & Pires, 2017; Damasceno, 2019), was investigated by Almaqtari et al. (2018) and Kanwal and Nadeem (2013).

The research findings indicated mutability in the significance of the impact of factors external to the company on ROA. Sometimes this is is significant (Almaqtari et al., 2018), sometimes it is insignificant (Kanwal & Nadeem, 2013). This can reveal how much the uncertainties produced by the shocks of the economic environment (Farmer, 2017) and by the institutional arrangement of the country (Lee, 2018; Fuertes-Callén & Cuellar-Fernádez, 2019) interfere in the dynamics of companies' investments (Zylbersztajn, 2019). 1995; Klapper & Love, 2011; Paunov, 2012).

2.3 Investment *versus* disinvestment and development of hypotheses

Companies invest for a variety of reasons, such as increasing production, technologically innovating, productive efficiency, synergy in the business chain, industrial expansion, and because it is a constant need for business continuity (Fortunato et al., 2012). In this field of ideas, Scherer (1965) states that firms innovate and undertake because they consider it to be profitable. Therefore, Fortunato et al. (2012) emphasize the importance of the quality of decisions related to investments, given the link between investments and the results of corporate operations. Furthermore, these decisions influence the choice of the type of project financing (Fortunato et al. 2012), such as equity (retention of profits) or debt capital (debt). In this field of analysis, Ross (1995) recalls that investment projects may, on certain dates, present a negative net present value; that means they are unfeasible. However, depending on economic conditions, this perspective will change. Signaling that, in fact, the viability or not of the projects refers to the moment of consuming the wealth, in addition to determining where to invest (Loss & Sarlo, 2006).

In regards to divestments, Kolev (2016) highlights that the sale of assets indicates strategic decision-making with considerable repercussions on the profitability of companies, because they consolidate the internal structure (Kolev, 2016). Therefore, understanding the reasons that lead corporations to discontinue projects and divest assets is critical (Konara & Ganotakis, 2020). From this angle, Kolev (2016) states that divestments are related to inefficient structural arrangements and unsatisfactory previous performance, whether at the corporate or business unit level. This would be more than enough reason to drive companies to sell assets (Kolev, 2016).

The magnitude of the adaptations of the structural arrangements (Kolev, 2016) and the need for strategic changes (Wiersema & Bantel, 1993) also reverberate the dimension of the transformations that occurred in the external environment. As a result, Barney (1991) argued that these transformations tend to depreciate the know-how of companies. So much so that Chen and Zhang (2007) warn that the business sales strategy is a unique form of corporate restructuring, since, under the pretext of correcting the devaluations that occurred in the market, on many occasions, divestments cause appreciable changes in the value of companies' market.

Still on the asset sale strategy, Kolev (2016) suggests that divestments should be appreciated in the light of the theory of transaction cost economics (ECT). This theory focuses on company transactions, paying attention to the factors of the environment in which they take place (Zylbersztajn, 1995). It is in this aspect that the weighting of Kolev (2016) becomes evident, since as Lee (2018) asserts under crisis setbacks, management tends to privilege profit targets. Therefore, executives are encouraged to make more efforts in the short term (Davies et al., 2018). This "pro-divestment" dynamic can encourage opportunistic behavior, widely debated in the Agency Theory literature (Shaikh & O'Connor, 2020) and generate additional burdens to contracts aimed at the performance of the asset sales campaign (Davies et al. al., 2018). In this way, Anderson's (2006) conclusions about the need for organizational adjustments due to contract costs are coined. The divestment policy can affect the performance of companies: (i) Senior management's knowledge of the core business is important for the design of investment plans (Aspara et al., 2015); (ii) assets must reflect the logic of sustainable profitability (Aspara et al., 2015); (iii) financial constraints lead companies to cancel valuable investments (Campello et al, 2010); and (iv) divestments, in general, contribute to business performance (Dittmar & Shivdasani, 2003; Kolev, 2016). In view of the above, the first research hypothesis is presented:

H1: Divestments of assets carried out by companies with financial constraints positively impact future performance.

Pinto et al. (2011) argue that the age of the companies represents a strategic asset that, in addition to contributing to the perpetuity of the business, confers negotiation power. Which, in theory, can contribute to the recording of smaller losses by mature companies. In view of the above, the second research hypothesis is presented:

H2: Divestments of assets increase the probability of reversing past losses into future earnings. With this hypothesis, we aimed to explore the potential contribution of asset divestment campaigns to revert past losses into future profits with a focus on the group of mature companies.

Damodaran (2009) points out that, due to the high probability of failure and small volume of revenue, younger companies accumulate significant volumes of operating losses. In view of the above, the third research hypothesis is presented, which deepens the investigation into the reversal of losses as a result of asset sales, in this case, carried out by young companies:

H3: Divestments of assets carried out by young companies increase the probability of reversing past losses into future profits.

3 METHODOLOGY

3.1 Typology and sample selection parameters

The research undertaken is categorized as empirical, quantitative and descriptive. Secondary data were used for hypothesis testing. The objective of the research was to investigate whether asset divestments made by companies with financial constraints positively affect future performance and whether such divestments provide the reversal of recorded losses from previous periods in future profits of companies listed on the B3 (Brasil, Bolsa, Balcão) stock exchange. The sample consisted of non-financial companies listed on the B3 in the period between 2008 and 2019. Data collection took place through the Economatica® database.

The construction of the database went through some steps that are described in Table 1, the initial sample contained 4,536 observations. Observations of financial companies, missing values, and negative equity were excluded from the sample. Thus, the final sample totaled 1,858 observations.

Table 1
Database treatment

	Number of observations
Total observations extracted from the Economic Base	4,536
Exclusion of the finance and insurance sector	-900
Exclusion of companies with missing information (missing values)	-1,778
Final total of observations	1,858

Source: Prepared by the authors.

Table 2 contains information on the main variables by year. The average of the Divestment dummy variable presents the percentage of companies per year that presented divestment where we see that the year with the highest percentage of divestment was 2016, where 54.02% carried out asset divestments. The average profitability of companies per year, measured by ROA, varies from -2.27% (in 2013) to 7.6% (in 2010). The average size (logarithm of total assets) of companies has increased over the years, from 14.3 (in 2009) to 15.03 (in 2019). The average age of the companies in this sample ranges from 18.86 years (in 2009) to 28.97 years (in 2019). The average, per year, of the percentage of companies controlled by the majority shareholders is always close to 60%.

Table 2
Description by year

Years	Nº of Obs.	Mean				
		Divestment	***ROA***	***Size***	***Age***	***Shareholder***
2009	145	0.3862	0.0685	14.30	18.86	0.6522
2010	162	0.2716	0.0760	14.64	19.35	0.6271
2011	173	0.1676	0.0369	14.59	20.27	0.6384
2012	175	0.2686	0.0029	14.65	21.21	0.6278
2013	181	0.3425	-0.0227	14.66	21.69	0.6388
2014	178	0.2921	0.0848	14.75	22.69	0.6457
2015	177	0.3785	-0.0136	14.77	24.02	0.6569
2016	174	0.5402	0.0217	14.79	25.19	0.6465
2017	166	0.4819	0.0513	14.89	26.51	0.6376
2018	167	0.3832	0.0289	14.91	27.83	0.6246
2019	160	0.2188	0.0171	15.03	28.97	0.5968

Source: Prepared by the authors.

Table 3 contains information on the main variables by sector, for which the classification of companies by sector made by B3 was used. The sector with the least representation is the Information Technology sector, with 22 observations; and the most representative sector is the Cyclic Consumption sector. The largest number of companies/year that divested their assets was 40.04% of companies in the Cyclic Consumption sector, and the smallest amount was 6.06% of companies classified in Others. In terms of profitability, the sector with the highest

average profitability was Public Utilities, with an average ROA of 8.05%. The largest sector, on average, was the Communications sector. The average age of companies by sector varies between 20.09 years (Health) and 30.63 years (Others). The Public Utilities sector has the highest average percentage of control of the largest shareholders, the majority shareholders hold 77.27% of the companies, on average. In the Information Technology sector, the majority shareholders hold 40.66% of companies, on average.

Table 3
Description by sector

Sectors	Nº of Obs.	Mean				
		Divestment	***ROA***	***Size***	***Age***	***Shareholder***
Industrial Goods	357	0.3389356	0.020158	13.89525	22.77871	0.598258
Communications	33	0.1515152	0.017386	16.71994	31	0.704819
Cyclical Consumption	522	0.4003831	0.031097	14.28512	22.84291	0.611773
Non-Cyclical Consumption	141	0.2553191	0.013643	15.51947	20.56738	0.606249
Basic Materials	228	0.3947368	0.021656	15.23049	27.03509	0.604043
Others	33	0.0606061	-0.13202	9.758256	30.63636	0.727671
Oil. Gas And Biofuels	62	0.3064516	-0.05644	16.09903	21.5	0.567685
Health	101	0.1485149	0.041241	14.10834	20.09901	0.559221
Information Technology	22	0.3636364	0.068126	14.43175	17	0.406653
Public Utility	359	0.3481894	0.080556	15.80549	23.6156	0.772708

Source: Prepared by the authors.

For the development of model 1 and 2, here represented by Equations 1 and 2, normality assumptions were verified, outliers were verified and treated with the Winsorization technique, using Stata 17. All quantitative variables with outliers were winsorized by the 1% level, except for dummy variables. Correlation analysis and multicollinearity tests were performed (variance inflation factor – VIF) and variables with multicollinearity indicators were removed from the model. The heteroscedasticity test was also carried out and the results were estimated with robust correction for heteroscedasticity, using Stata 17. Figure 1 shows Equations 1 and 2, as well as the respective variables, their descriptions and literature that supports the inclusion of each variable.

To test the research hypotheses, models (1) and (2) were proposed.

$$ROA_{it+1} = \beta_0 + \beta_1 Divest_{it} + \beta_2 Alt\_(bad)_{it} + \beta_3 DesinvxAlt\_(bad)_{it} + \beta_k \sum_{k=4}^{12} \text{Controls} + \xi_{it} \quad (1)$$

In Equation 1, the impact of asset divestments made by companies with financial constraints on future performance (ROA_{it+1} was tested. In this case, the estimation of the relationship of variables was performed using a dynamic panel (GMM). Therefore, β_3 was expected to be positive, indicating that asset divestments carried out by companies that suffer financial constraints contribute positively to the future performance of companies, in order to corroborate hypothesis 1.

In Equation 2, the potential contribution of asset divestments in reversing past losses into future profits was tested.

$$DLoss_{it+1} = \beta_0 + \beta_1 Divest_{it} + \beta_2 Young_{it} + \beta_3 DivestxYoung_{it} + \beta_k \sum_{k=4}^{12} \text{Controls} + \xi_{it} \quad (2)$$

H2 and H3 were tested to assess the impact of asset sales on the reversal of losses for companies in general and for the group of young companies, respectively. The estimation of the relationship of the variables was carried out by means of logistic regression (LOGIT).

With regard to Equation 2, to isolate the effect of divestments made by companies with financial constraints from these estimates, these estimates were considered in Equation 2 through the control variables $Alt\_(bad)_{it}$ and $DivestAlt\_(bad)_{it}$, which represents the interaction of the Divest and Alt_Bad dummies, which represent companies that have divested, but are classified by the Altman model as companies with poor financial health. Thus, β_1 was expected to be positive, indicating that asset divestments carried out by companies in general increase the probability of reversing past losses into future profits in order to confirm hypothesis 2 and 3 to be positive, signaling that sales of assets held by young companies increase the probability of reversing past losses into future profits. Figure 1 shows Equations 1 and 2 and information on the variables that make up each model:

$$ROA_{it+1} = \beta_0 + \beta_1 Divest_{it} + \beta_2 Alt\_(bad)_{it} + \beta_3 DivestxAlt\_(bad)_{it} + \beta_k \sum_{k=4}^{12} Controls + \xi_{it} \quad (1)$$

$$DLoss_{it+1} = \beta_0 + \beta_1 Divest_{it} + \beta_2 Young_{it} + \beta_3 DivestxYoung_{it} + \beta_k \sum_{k=4}^{7} Controls + \xi_{it} \quad (2)$$

Variable	Description	Reference
ROA_{it+1}	$ROA_{it+1} = \frac{LAIR_{it}}{Total\ Assets_{it}}$ Variable explained through which the positive impact on future performance is expected to be captured as a result of asset divestments. In accordance with the literature, the lag of the ROA variable was included as an explained variable in Equation 1.	Cao, Myers & Sougiannis (2011); Fuertes-Callén & Cuellar-Fernádez (2019);
Dloss	Dummy variable to which a value of 1 (one) will be assigned when the loss is reverted to profit and 0 (zero) for other cases. Variable considered explained in Equation 2	Cao, Myers & Sougiannis (2011)
Divest	Dummy variable to which the value 1 (one) will be assigned when the variation of INVEST from t to t+1 is less than zero.	----------
ROA	$ROA_{it} = \frac{LAIR_{it}}{Total\ assets_{it}}$ Explanatory variable that represents the lag of the variable ROA_{it+1}, that is, the control variable in Equation 1.	Fuertes-Callén & Cuellar-Fernádez (2019)
$Alt_$bad	Dummy variable to which a value of 1 (one) will be assigned when the company is insolvent and 0 (zero) for other cases. Explanatory variable in Equation 1 and control variable in Equation 2.	Swalih, Adarsh & Sulphey (2020)
$Divest x Alt_$bad	Dummy variable that indicates the years 2008 and 2014 as periods of crisis, that is, explanatory variable in Equation 1 and control variable in Equation 2.	Damasceno (2019); Fuertes-Callén & Cuellar-Fernádez (2019)
$Crisis$	Dummy variable that indicates the years 2008 and 2014 as periods of crisis, that is, control variable in Equation 1 and 2.	Damasceno (2019); Fuertes-Callén & Cuellar-Fernádez (2019)
Size	Natural logarithm of the previous year's total assets. Control variable in Equation 1.	Fuertes-Callén & Cuellar-Fernádez (2019)
Age	Logarithm of the difference between the year of this research and the year the company was created. Control variable in Equation 1.	Paunov (2012)
Young	Young companies aged ≤ 10 years. Explanatory variable in Equation 2.	Lee (2014)
Leverage	Total liabilities (PC + PNC) divided by the previous year's total assets. Control variable in Equation 1.	Ibhagui & Olokoyo (2018); Fuertes-Callén & Cuellar-Fernádez (2019)
Shareholder	Percentage of shares under the control of the 5 largest shareholders. Control variable in Equation 1.	Leaño & Pedraza, (2018); Huang (2020)
$Market\_Book$	Market value of the share divided by the book value per share. control in Equation 1.	Sant'Anna, Louzada, Queiroz & Ferreira (2015)

Figure 1. Description of model variables
Source: Prepared by the authors.

With regard to the control variables, these variables were included, as, in the literature, there are indications of a relationship with the explained variable. In this sense, and in line with the literature that addresses the economic crisis (Damasceno, 2019; Fuertes-Callén & Cuellar-Fernádez, 2019; Barbosa, 2017; Paula & Pires, 2017; Akinyera, 2015), the years 2008 and 2014 was considered a period of crisis.

In order to control the effect of financial output on the relationship studied, the dummy variable Alt_Bad was included. Thus, for companies that indicated the possibility of bankruptcy, the Altman Z-Score methodology for emerging markets (Swalih et al., 2020) was applied, identifying them through the dummy variable Alt_Bad. This methodology separates companies into three categories: solvent (favorable situation); situation of uncertainty (probability of bankruptcy); and insolvent (risk of bankruptcy) as detailed in Table 4.

Table 4
Altman *Zscore*

Function "$Z: 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4 + 3.25$".	
On what: Z = Altman insolvency factor of the function; X1 = Working Capital / Total Assets (Working Capital = current assets - current liabilities); X2 = Retained earnings / Total Assets; X3 = Earnings before interest and taxes/Total Assets X4 = Shareholders' Equity/Total Liabilities; 3.25 = represents the constant that directly impacts the default situation.	
Classification	**Record**
Solvency "favorable situation"	*ZScore* > 2.60
Uncertainty zone "bankruptcy probability"	1.1< *ZScore* > 2.60
Insolvency "risk of bankruptcy"	*ZScore* < 1.10

Source: Prepared by the authors.

The sample was submitted to the Propensity Score Matching (PSM) technique per year, considering the following characteristics: (i) size; (ii) age; (iii) shareholding composition; (iv) leverage; and (v) market-to-book; whose measurement metrics are shown in figure 1, but the results have not changed.

When it comes to the previous year's operating performance, ROA has been included in the analysis to measure and evaluate firms' operating performance (Bhasa, 2015; Paunov, 2012; Klapper & Love, 2011). When taking into consideration the assets of firms, according to Fuertes-Callén and Cuellar-Fernádez (2019), firm size can affect the performance of firms. Leverage was also used as a control variable, because, according to Ibhagui and Olokoyo (2018), total debt relative to firms' assets can affect performance. Market-to-book was included as a control variable because the value of the firm relative to the PL can affect the performance of firms (Sant'Anna, Louzada, Queiroz & Ferreira, 2015). Finally, shareholder concentration was included as a control variable because firm performance can be monitored by shareholders and in firms in which shareholder control is in the hands of many shareholders, performance can have more monitoring and this can affect firm performance (Leaño & Pedraza, 2018); Huang, 2020).

4 ANALYSIS AND DISCUSSION OF RESULTS

4.1 Descriptive analysis, correlations and mean test

Table 5 presents the results of the descriptive statistics of the sample for the variables analyzed.

Table 5
Descriptive statistics after Propensity Score Matching

Variables	N	Mean	Standard deviation	Minimum	p25	Median	p75	Maximum
ROA (t+1)	695	0.01	0.18	-1.45	-0.05	0.03	0.08	1.10
DPrej	695	0.11	0.32	0.00	0.00	0.00	0.00	1.00
ROA t	730	0.02	0.25	-1.45	-0.05	0.02	0.08	3.25
Divest	730	0.86	0.34	0.00	1.00	1.00	1.00	1.00
Crisis	730	0.07	0.26	0.00	0.00	0.00	0.00	1.00
Alt_Bad	730	0.19	0.40	0.00	0.00	0.00	0.00	1.00
DivestxAlt_Bad	730	0.17	0.38	0.00	0.00	0.00	0.00	1.00
Size	730	14.57	1.85	8.50	13.42	14.67	15.81	19.40
Leverage	730	0.78	0.80	0.09	0.44	0.61	0.80	8.85
Market_Book	730	1.63	2.84	-4.71	0.35	0.91	1.87	17.28
Shareholder	730	0.64	0.19	0.06	0.51	0.65	0.78	1.00
DivestxYoung	730	0.02	0.13	0.00	0.00	0.00	0.00	1.00
Young	730	0.02	0.14	0.00	0.00	0.00	0.00	1.00
Age	730	2.67	1.12	0.00	2.71	3.04	3.37	3.71

Source: Prepared by the authors.

All continuous variables were winsorised at 1% to account for outliers. On average, 11% of the sample observations indicate that there was a reversal of past losses (Dloss) and, on average, 86% of the sample observations represent asset divestments. On average, 19% of the observations are represented by insolvent companies, which, in Table 5, are represented by the variable Alt_Bad. 2% of the companies analyzed on average are young companies, in other words, the Brazilian market has a low concentration of young companies. On average, 17% of the observations are composed of insolvent companies that adhered to the asset divestment strategy (DivestxAlt_Bad); and, on average, 2% of the observations in the sample represent young companies that sold assets (DivestxYoung). The results presented in Table 5 indicate that young companies disinvent less than more mature companies.

Table 6 presents the correlation between the continuous variables explored in this research.

Table 6
Correlation matrix

Variables	ROA (it+1)	Alt_Bad	Size	Leverage	Market-to-book	Shareholding concentration	Age
ROA (it+1)	1						
Alt_Bad	-0.16***	1					
Size	0.08***	-0.46***	1				
Leverage	-0.10***	0.55***	-0.41***	1			
Market-to-book	0.09***	-0.15***	0.06***	-0.17***	1		
Shareholding concentration	0.002	0.01	-0.17***	0.05**	-0.05**	1	
Age	-0.03	0.16***	-0.08***	-0.062***	-0.05**	0.035	1

Source: Prepared by the authors
***<0.01, **0.05, * 0.1.

The univariate correlation matrix (Pearson) is presented in Table 6. The results indicate that there is a significant correlation between the variables Size, Leverage, Market_Book and the explained variable ROA_{it+1}. However, this relationship does not reach percentages that compromise the estimation, but even so, the VIF analysis was carried out and an average VIF of 2.4 was found, that is, there is no evidence of multicollinearity. The results in Table 6 suggest that there is a negative and statistically significant association at 99%, 95% and 90% confidence levels between the explained variable ROA_{it+1} and the explanatory variable Alt_Bad, and this means that companies with financial difficulties tend to have lower future performance, but the results of the Pearson correlation analysis is a limited analysis, as it only looks at the correlation in a univariate way and without considering controls (Table 6).

Table 7 shows the test of mean that was conducted after proceeding with the test of variance that indicates variance of ROA_{it+1}, occurs equally when comparing the group of companies that divested with the group of companies that did not divest. And similarly, the test of variance indicated that the variance of ROA_{it+1} occurs equally when comparing the crisis and non-crisis period. Thus, the mean test was performed considering equal variance.

Table 7
Mean Difference Test

Groups	Mean Performance ROA_{it+1}	Comments	P-valor
Divestment	0.002	595	0.13
No Divestment	0.04	1103	
Crisis	0.03	178	0.29
No Crisis	-0.01	1520	

Source: Prepared by the authors.

On average, future performance, measured by the variable $ROA_{it+1}$is the same when comparing companies that have divested and companies that have not. Likewise, the future performance of companies is not statistically different when comparing the crisis period with the other periods.

Table 8 presents the multivariate regression analysis, using the GMM estimator. Regarding the impact of asset divestments, carried out by companies with financial constraints, on future performance, the result measured by β_3 and purified by the application of the t test (sum of β_1 and β_3), as shown in Table 8, indicates that there is no evidence to confirm hypothesis 1 of this research.

The research findings on asset divestments carried out by companies with financial constraints can possibly be explained by the fact that the divested assets were related to inefficient structural arrangements, whose previous unsatisfactory performances (Kolev, 2016) drained resources from other business segments. (Dittmar & Shivdasani, 2003), so that they no longer correspond to the logic of sustainable profitability (Aspara et al., 2015), within a business context of the selling companies. As a result, their departure from the portfolio suggests little contribution to the companies' future performance (Table 8).

The association, negative and significant, between asset divestments in general and the future performance of companies, measured by β_1 according to Table 8, was contrary to the statement by Kolev (2016). The captured result can perhaps be clarified by rescuing the reflections of Ross (1995) and Loss and Sarlo (2006) whose arguments argue that, depending on the moment (Ross, 1995), and the segment that you want to invest in (Loss & Sarlo, 2006), investment projects can present a negative net present value. Analogously to this reasoning, and when considering that the performance of assets speaks to their market value, it is possible that the amounts collected from the sale of such assets signal the risk appetite of acquirers (Farmer, 2017) by incorporating the costs of these assets. to the business (Souza et al., 2020).

Table 8
Model 1 results

$ROA_{it+1} = \beta_0 + \beta_1 Divest + \beta_2 Alt\_Bad_{it} + \beta_3 DivestxAlt\_Bad_{it} + \beta_k \sum_{k=7}^{12} controls + \varepsilon_{it}$ (1)	
Variable	**Perfomance**
Divest	-0.1857*
Alt_Bad	-0.0352
DivestxAlt_Bad	0.0973**
Crisis	-0.0038
ROA	0.1448***
Size	-0.1036***
Age	0.0597**
Leverage	0.0076
Shareholding concentration	-0.0062
Market-to-book	0.0008
Constant	1.5084***
Comments	552
Chi Square	89.83
Estimator	GMM
T-test (sum of coefficients B1+B3)	
B1+B3=0	
chi2 (1) = 0.75	
Prob > chi2 = 0.3852	

Source: Prepared by the authors.
*** p<0.01, ** p<0.05, * p<0.1

The association, negative and significant, between asset divestments in general and the future performance of companies, measured byβ_1 according to Table 8, was contrary to the statement by Kolev (2016). The captured result can perhaps be clarified by rescuing the reflections of Ross (1995) and Loss and Sarlo (2006) whose arguments argue that, depending on the moment (Ross, 1995), and the segment that you want to invest in (Loss & Sarlo, 2006), investment projects can present a negative net present value. Analogously to this reasoning, and when considering that the performance of assets speaks to their market value, it is possible that the amounts collected from the sale of such assets signal the risk appetite of acquirers (Farmer, 2017) by incorporating the costs of these assets. to the business (Souza et al., 2020).

As can be seen in Table 8, the result of the impact of past performance on future performance, measured by β_5,

was positive and significant in accordance with the literature whose records indicate that current earnings are indicative of future earnings (Fuertes -Callén & Cuellar-Fernádez, 2019, Rabinovich, 2021). This is a result that corroborates the literature on the subject and reinforces that the probability of a company performing better in the future is affected by current performance (Table 5).

Table 9 presents the results on the reversal of results from loss to profit:

Table 9
Model 2 results - Equation 2

$$Dloss_{it+1} = \beta_0 + \beta_1 Divest_{it} + \beta_2 Young_{it} + \beta_3 DivestxYoung_{it} + \beta_k \sum_{k=4}^{12} controls + \varepsilon_{it} \quad (2)$$

Variale	DPREJ – Estimador Logit	Marginal Effect
Divest	0.7671	0.0767
Young	-9.4708***	-0.9463***
DivestxYoung	9.0748***	0.9067***
Crisis	-0.0961	-0.0096
Alt_Bad	0.2504	0.025
Market-to-book	-0.0372	-0.0037
DesinvxAlt_Bad	0.0399	0.004
Constant	-2.7244***	
Comments	695	
Pseudo R^2	0.0126	
T-teste (sum of coefficients B1+B3)		
B1+B3=0		
chi2 (1) = 46.09		
Prob > chi2 = 0.0000		

Source: Prepared by the authors.
*** p<0.01, ** p<0.05, * p<0.1

The increase in the probability of reversing past losses into future profits, given the divestments of assets carried out by companies in general, proved to be non-significant (Table 9). This result suggests that hypothesis 2 was not rejected. Perhaps this result may be an indication that the assets divested by companies in general are those that really do perform poorly over time (Kolev, 2016) and that their small potential for return may have influenced the performance of the divestment campaign to point of not contributing to reversals of past losses.

The potential contribution of asset divestments in increasing the probability of reversing past losses in future profits, for the group of young companies, showed a positive and significant association (Table 9), at confidence levels of 1%, 5% and 10 %, averaged by β_3 and confirmed by the t test of the sum ($\beta_1 + \beta_3$). This result suggests that there is robust evidence to support hypothesis 3 of the research. The captured relationship is in line with Dittmar and Shivdasani (2003). Business efficiency tends to improve after asset divestments (Dittmar & Shivdasani, 2003). Possibly, the strategy of selling assets by young companies shows how expressive the vulnerability of this group of companies is (Paunov, 2012), and consequent records of operating losses (Damodaran, 2009) given the high failure rates (Coad & Rao, 2009). 2008), the small volume of revenue, the requirement by investors to protect against eventual liquidations (Damodaran, 2009), which prevent them from evolving (Whited & Wu, 2006; Paunov, 2012).

The importance of asset sales campaigns carried out by young companies can be even more evident if the negative and significant association recorded by β_2 in Table 9 is observed. This result suggests that there is no increase in the probability of reversal of past losses by young companies relying only on the normal flow of its operations, without adopting the strategy of divestment of assets.

5 FINAL CONSIDERATIONS

This paper aimed to investigate whether asset divestments carried out by companies with financial constraints positively impact the future performance of companies listed on the B3 and whether such divestments led to the reversal of losses, recorded in previous periods, in future profits. This perspective was outlined based on studies by Chen and Zhang (2007) and Kolev (2016) that indicate that asset divestments can be an important strategy for business performance in the face of market setbacks. The decision to sell assets may be among the options adopted by managers and due to the existing information asymmetry, shareholders often do not have information about decisions of this size that involve the flow of resources (Akinyera, 2015; Farmer, 2017; Nassif, 2017; Egbunike & Okerekeoti, 2018; Fuertes-Callén & Cuellar-Fernádez, 2019; Sarjono, Titisari & Pawenang, 2021) and even the sale of assets (Campello, Graham & Harvey, 2010; Franzotti & Valle, 2020).

The impact of asset sales made by companies with financial constraints on future performance showed a positive and significant relationship, in line with expectations and with the basic research literature. The result of the list of asset divestments of all companies listed on B3, in the research period, was negative and insignificant, in contrast to the record of the literature that points out that, in general, divestments positively affect the performance of companies (Kolev, 2016).

Regarding the increase in the probability of reversing past losses through asset divestments, the association was

significant and positive for young companies only. In view of the associations registered by the survey, it is inferred that asset divestment campaigns can be strategic alternatives for young companies to face market setbacks.

This research contributes to the business management literature, as it empirically supports its postulates about asset divestments. Since theory, in the primacy of its essence, outlines paths and describes phenomena, however, in some circumstances, it does not reach by itself the explanations of the transforming elements of social and economic relations. It is also expected that the research will contribute to the elaboration of public and/or regulatory policies that promote business sustainability in adverse scenarios.

On the one hand, the main limitation of this study is in regards to the data availible, given the timidity of the Brazilian stock market compared to other markets, which historically limits the explanatory and predictive capacity of empirical research with secondary data. However, on the other hand, we highlight the fact that the theme has not yet been addressed, proving to be innovative, both from the practical point of view with the stakeholders of the companies studied, and from the theoretical point of view, which brings empirical evidence about a gap not yet studied in the literature. For future studies, it is suggested to extend the research in order to verify if the divested assets would be the inefficient ones, which drained the profit generated by the other business units. It is also recommended to verify whether manager characteristics affect performance, that is, managers with certain managerial skills, more experienced, and female managers who disinvest perform better than the others.

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