The effect of cash retention and investment on the operational performance of Brazilian exporting and domestic companies in periods of economic growth and recession

O efeito da retenção de caixa e investimento na performance operacional de companhias brasileiras exportadoras e domésticas em períodos de crescimento econômico e recessão

El efecto de la retención de efectivo y la inversión en el desempeño de las empresas brasileñas exportadoras y nacionales en períodos de crecimiento económico y recesión

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Abstract
The objective of this paper is to verify what is the effect of cash retention and investment in fixed assets on the operational performance of Brazilian exporting and domestic companies listed in B3, in a period of economic growth and Brazilian economic recession, covering the period from 2005 to 2018. The findings show that, during the period of economic recession, Brazilian exporting companies with higher cash retention and higher investment in fixed assets presented superior operational performance than other companies that adopted different strategies of investment of resources. Still more internationalized exporting companies with higher cash retention and investment in fixed assets performed better than the less internationalized ones. As a major contribution, the research shows that exporting is not enough for superior operational performance, but that diversification must be accompanied by resource application strategies that provide better results, as recommended by the Resource-Based View Theory (VBR).
Keywords: Cash; Investment; Internationalization; Operational performance

Resumo
O objetivo do trabalho é verificar qual o efeito da retenção de caixa e investimento em ativo imobilizado na performance operacional das empresas brasileiras exportadoras e domésticas listadas na B3, em período de crescimento econômico e recessão econômica brasileira, compreendendo o período de 2005 a 2018. Os achados demonstram que, no período de recessão econômica, as empresas brasileiras exportadoras com maior retenção de caixa e maior investimento em ativo imobilizado apresentaram performance operacional superior às demais empresas que adotaram estratégias distintas de aplicação de recursos. Ainda, as empresas exportadoras mais internacionalizadas, com maior retenção de caixa e investimento em ativo imobilizado obtiveram melhor performance operacional do que as menos internacionalizadas. Como principal contribuição, a pesquisa mostra que não basta exportar para se obter performance operacional superior, mas

que a diversificação deve vir acompanhada de estratégias de aplicação de recursos que proporcionem melhores resultados, conforme preconiza a Teoria Visão Baseada em Recursos (VBR).
Palavras-chave: Caixa; Investimento; Internacionalização; Performance operacional

Resumen
El objetivo de este documento es verificar el efecto de la retención de efectivo y la inversión en activos fijos en el desempeño de las empresas exportadoras y nacionales brasileñas que figuran en B3, durante un período de crecimiento económico y recesión económica brasileña, que abarca el período comprendido entre 2005 y 2018. Los hallazgos demuestran, en el período de recesión económica, las empresas exportadoras brasileñas con una mayor retención de efectivo y una mayor inversión en propiedades, planta y equipo mostraron un desempeño operativo superior en comparación con otras empresas que adoptaron diferentes estrategias para invertir recursos. Además, las empresas exportadoras más internacionalizadas, con mayor retención de efectivo e inversión en activos fijos, obtuvieron mejores resultados que las menos internacionalizadas. Como contribución principal, la investigación muestra que exportar no es suficiente para obtener un rendimiento superior, sino que la diversificación debe ir acompañada de estrategias de aplicación de recursos que brinden mejores resultados, según lo recomendado por la Teoría de la visión basada en recursos (VBR).
Palabras clave: Efectivo; Inversión; Internacionalización; Rendimiento

1 Introduction

The study on cash retention by companies has attracted attention in the corporate finance literature. For the present study, the level of cash available to the company is considered cash and cash equivalents that can be quickly converted into cash. Managers maintain a substantial portion in cash to reinvest in physical assets and distribute them to shareholders (Jamil, Anwar, Afzaal, Tariq, & Asif, 2016).

Cash on hand allows the low cost of financing for the company, so increasing external financing in imperfect capital markets can generate more costs than maintaining sufficient cash reserves for investments in physical assets and shareholder payments (Jamil et al., 2016). According to the pecking order theory, companies finance their investments primarily with their resources and, when these are insufficient, they use external resources (Jarallah, Saleh, & Salim, 2018).

Thus, withholding cash insufficient balance can be an important resource for managers to take advantage of investment opportunities with lower transaction costs, and greater comparative cash retention between companies can lead to better relative performance. There is an increasing number of companies that consider the accumulation of cash in hand as an important tool to support the business growth and development process, without being subject to financial restrictions (Rocca & Cambrea, 2018).

The Resource-Based Vision (VBR) economic theory suggests that how the company controls and manages its resources is the main factor for superior performance, tending to be more competitive with the creation of valuable, heterogeneous, and dynamic resources (Barney, 1991). Investment intangible assets, for example, for the expansion of companies' activities may represent a strategy to increase performance.

Also, in the context of globalization of markets, internationalization of companies, integration of financial markets, and strong competitiveness, the space for inefficiency in business management are reduced, which can be a cause of instability and bankruptcy (Rocca & Cambrea, 2018). According to Lin, Chen, Hsieh & Chien (2018), internationalization can be a growth strategy for companies.

In this sense, expanding the company's business to the foreign market can improve economic and financial performance, increasing profitability and, consequently, investing in cash and tangible assets to support the business development process.

Previous studies have researched the relation between cash retention and performance (Mikkelson & Partch, 2003; Fresard, 2010; Adjei, 2011; Forti, Peixoto, & Freitas, 2011; Rocca & Cambrea, 2018), investment and performance (Appuhami, 2008; Tomczyk, Lee, & Winslow, 2013; Jaisinghani, Tandon, & Batra, 2018) and internationalization and performance (Hsu & Boggs, 2003; Bausch & Krist, 2007; Jong & Van Houten, 2014), but did not investigate the relationship of these elements performance on the same model.

Forti et al. (2011), when analyzing the effects of cash retention on the performance of publicly-traded Brazilian companies, identified that the accumulation of cash had a positive effect on operating performance (measured by ROA - Return on Assets), whose model was based on Fresard (2010), adapted to the Brazilian context.

In the international environment, Rocca & Cambrea (2018) analyzed the relationship between cash retention and the operational performance of 261 Italian companies from the period 1980 to 2015. They also observed a positive effect of the cash accumulation on operational performance.

The theoretical contribution of the studies was carried out by Forti et al. (2011) and Rocca & Cambrea (2018) when investigating the relationship between cash retention and the operating performance of the analyzed companies. However, the two studies did not assess this relationship from the internationalization of companies and their behavior in periods of economic growth and recession. Also, this research adds an analysis of the moderation effect between internationalization, cash retention, and investment in fixed assets

on the companies' operational performance. In this work, internationalized companies were considered those that made exports in the analyzed period.

Thus, the present study is justified for filling this gap in the studies in question, especially assessing the influence of economic growth periods and recession in the relationship of cash and investment retention with the operational performance of Brazilian exporting and domestic companies listed in B3. We highlight the occurrence of two distinct economic periods in a short period in Brazil, one of economic growth from 2005 to 2008, and the other of recession from 2009 to 2018, which supports the option for the application of this study in that country.

For all of the above, the following research problem arises: what is the effect of cash retention and investment in fixed assets on the operational performance of Brazilian exporting and domestic companies listed on B3 in periods of economic growth and recession? With that, it was added to the model proposed by Forti et al. (2011) the degree of export variable and the dummies variables of exporting companies, higher / lower cash retention, higher / lower investment in fixed assets, and higher / lower degree of internationalization.

Therefore, the objective of this study is to verify the effect of cash retention and investment in fixed assets on the operational performance of Brazilian exporting and domestic companies listed on B3 during periods of economic growth and recession. In the present study, the operational performance was measured by ROA (Return on Assets), as a way of measuring the operating performance of the analyzed companies.

For this, 314 companies were analyzed, comprising the years from 2005 to 2018, a period in which the occurrence of economic growth and recession periods in Brazil can be captured. The hypothesis presented in the theoretical framework were tested using data regression in a fixed-effects panel and system-GMM method, according to the proposed econometric model.

2 Theoretical Framework

This topic presents the criteria adopted to define periods of economic growth and recession in Brazil. Also, it addresses the relation between cash retention, investment, and internationalization with the companies operational performance, bringing previous studies and the main results obtained.

2.1 Economic growth and recession in Brazil

For Farhi, Prates, Freitas, and Cintra (2009) the financial crisis that started in 2007, in the United States, took on a dimension capable of transforming itself into a systemic crisis, putting the international financial architecture to the test. Didier, Love, and Péria (2010) state that the period of the international crisis occurred between the years 2007 and 2008, due to the fall of the US banking system, marked by a wider financial recession since the Great Depression, spreading rapidly after the fall of Lehman Brothers in September 2008 between neighboring institutions and markets.

Also according to these authors, the US crisis-affected countries to different intensities, some at a higher level than ever in the North American market, such as, for example, in Bulgaria, Iceland, Serbia, and Ukraine, based on the analysis of the shares return value in 83 countries from July 2007 to April 2009.

In Brazil, the Gross Domestic Product (GDP) started a downward trend in the 3rd quarter of 2008, dragging on until the end of 2018, despite showing a reaction in 2010. Figure 1 shows the historical series of Brazilian GDP for the period 2004 to 2018.
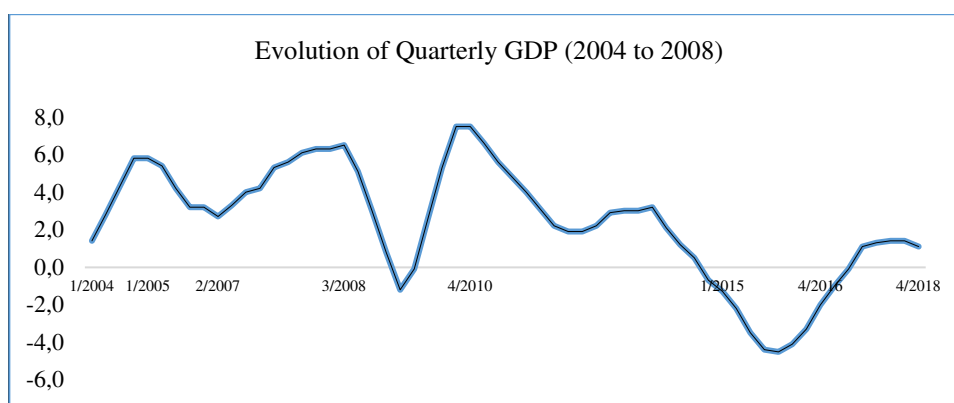
Figure 1: Evolution of Quarterly GDP (2004 to 2018)
Source: IBGE (2019)

It is noteworthy that the Brazilian economic recession peaked in 2015 and 2016, in which the performance of the national GDP decreased by 3.5% in 2015 and 3.6% in 2016. Because of the Brazilian GDP data, if we consider that from 2005 to 2008 there was a period of growth and from 2009 to 2018 a period of economic slowdown, designated in this work as the Brazilian economic recession.

Thus, depending on the country economic situation, companies cash management and investment strategies may change. Moments of economic growth can allow managers greater margins of error in defining strategies for managing companies' resources, on the other hand, periods of the economic recession may require managers to be more efficient in generating profitability for companies.

2.2 Cash retention and performance

Companies maintain cash reserves to incur lower financing costs, since increasing external financing costs more, making managers prefer to maintain cash reserves (Mikkelson & Partch, 2003; Jamil et al., 2016). Maintaining large cash reserves allows companies to take advantage of the growth opportunity to trade in contingent moments that would restrict access to the capital market (Almeida, Campello, & Weisbach, 2004), and may increase the benefits of cash reserves, with positive effects on performance (Rocca & Cambrea, 2018).

Jung, Foege & Nuesch (2019) when analyzing what influence external contingencies have on companies' cash retention strategy, concluded that complex and dynamic environments have a strong positive relationship between cash retention and operational performance. The authors show that environmental contingencies shape the relation between cash retention and operating performance. Also, according to these authors, the cashier can play a facilitating role in the company strategic alignment with the environment in which it operates.

Smietanka, Bloom & Mizen (2018) identified that UK companies in a period of economic uncertainty retained more cash, analyzing periods before and after the 2007-2008 crisis. These authors suggest that cash retention increases the greater the economic uncertainty, which behavior can be justified as a precaution (Opler, Pinkowitz, Stulz, & Williamson, 1999) and conclude that economic uncertainty affects cash retention decisions, investments, and dividend payments.

Crisis periods cause companies to change their cash retention policies. Lee and Song (2010) using a sample of West Asian companies from 1990 to 2006, analyzed the cash retention of these companies before and after the Asian financial crisis. The authors found that the companies observed more than doubled their cash retention after the crisis. They also identified a negative relation between cash retention and investment in fixed assets. Showing that companies have adopted a more conservative investment strategy.

The maintenance of cash reserves can differ between internationalized and domestic companies. According to Ramírez and Tadesse (2009) multinational companies increase the need for liquid assets, as it prolongs the duration of their operating cycle, and supporting export activities requires a less rigid credit policy, as well as higher inventory levels, which contributes to the highest level of working capital. Also, according to the authors, internationalized companies maintain more cash reserves than domestic ones.

The relation between cash retention and operational performance has received attention in research in the finance area. According to Rocca & Cambrea (2018), theoretical arguments and conflicting empirical evidence make it difficult to explain the relationbetween cash retention and operational performance. According to these authors, the accumulation of liquidity has positive effects on operational performance, since the company would have advantages related to greater financial flexibility, less financial constraint, and lower transaction costs, in order to improve business performance.

Mikkelson & Partch (2003) examined the operating performance of companies that, for five years, kept more than 25% of assets in cash and cash equivalents. The authors concluded that the persistent maintenance of large cash reserves did not harm the operating performance of the companies observed.

Fresard (2010), in his study on the relationship of cash retention and market share gains of American industries in the period from 1973 to 2006, found a positive and significant relation between the maintenance of large cash reserves and the operational performance, measured by the ROA, of the analyzed companies, highlighting that the cash policy encompasses an important strategic dimension.

In a context of crisis, Adjei (2011) analyzed 765 US firms in the period from 2006 to 2008 to test the effects of cash reserves on the companies performance during the subprime mortgage crisis. He concluded that corporate performance declined significantly after the crisis began. Companies with low cash reserves experienced the biggest decline in performance after the start of the financial crisis. However, the author found no differences in the decline in performance after the onset of the crisis, when comparing companies with and without financial restrictions.

Rocca & Cambrea (2018) investigated the relationship between cash retention and operating performance of 261 Italian companies covering the period from 1980 to 2015. They detected a positive effect of the cash accumulation on the operating performance of these companies, also in a period of crisis, whose results align with the theory of transaction costs and the relevance of financial flexibility.

In Brazil, Forti et al. (2011) to analyze the relationship between the maintenance of cash reserves and the operational performance of publicly-traded Brazilian companies, tested the panel data of 167 companies in the period from 1995 to 2009, verified a robust and statistically significant relation between cash reserves and performance.

2.3 Investment in fixed assets and performance

Most studies from developed countries state that the Resource-Based View (VBR) is the main theory used to explain the performance of companies (Jaisinghani et al., 2018). This economic theory holds that how the company controls and manages its resources is the main factor for superior operational performance, tending to be more competitive with the creation of valuable, heterogeneous, and dynamic resources (Barney, 1991). Also, according to this author, resources are all assets, capacities, knowledge, among others, managed by the company to increase its efficiency.

These resources contribute for the company to create conditions to have superior operational performance in the course of its activities. Thus, investing resources in growth opportunities has been a strategy used by companies in different sectors, as projects with positive net present value must have a positive impact on the company performance (Jaisinghani et al., 2018). Therefore, the ability to create a competitive advantage can be generated by investments in physical and intangible assets (Jaisinghani et al., 2018).

During the period of crisis, the cash flow of companies decreases, causing them to need reserves or debts to finance their investments (Adjei, 2011). If a company has to use external funds in times of crisis, the probability of obtaining financing is lesser because of the credit restriction and will bear higher costs to finance its investments (Adjei, 2011). According to a study by Smietanka et al. (2018) companies with higher cash flow and sales in previous periods tend to invest more in fixed assets. However, the greater the economic uncertainty, the lower the investment.

Kahle & Stulz (2013), when investigating access to capital and investment in the period of the North American financial crisis, found that the bank or credit supply shock in the last two quarters of 2007 and the first two quarters of 2008 did not lead to a decrease in the capital expenditures of the surveyed companies. According to these authors, companies can invest using other sources of funds, such as cash, sell assets, obtain more commercial credit, among others.

Regarding the relation between investment in physical assets and operational performance, certain authors (Appuhami, 2008; Tomczyk et al., 2013) state that investment in fixed assets has a significant impact on the company's current and future operational performance. However, other authors (Jackling & Johl, 2009; Goh & Rasli, 2014) believe that this relation can harm the company operational performance.

2.4 Companies internationalization and performance

In an open economy, companies are directly and / or indirectly exposed to the influences of globalization (Vithessonthi, 2016). According to Lin et al. (2018) the internationalization of companies is one of the most crucial growth strategies for companies. In this sense, it is common to ask whether the internationalization process improves the performance of companies (Vithessonthi, 2016). Previous research (Bausch & Krist, 2007; Jong & Van Houten, 2014; Hsu & Boggs, 2003; Ruigrok, Amann, & Wagner, 2007; Singla & George, 2013) analyzed the relationship between the degree of internationalization and performance, with inconclusive results.

For example, Jong & Van Houten (2014) identified that the degree of internationalization has a positive effect on operational performance. Singla & George (2013) show that internationalization is negatively associated with operational performance. Vithessonthi (2016) examined the relationship between the degree of internationalization and the operational performance of listed companies in the Southeast Asian region. The results found show that the degree of internationalization (export revenue over total revenue) is not associated with the operating performance (return on assets) of the companies analyzed.

It is observed with the literature review that previous studies do not answer the problem raised in this work. Unlike the previous studies presented, this paper analyzes the relation of interaction between internationalization, cash retention, and investment in fixed assets with the operational performance of companies. According to Singla & George (2013), studies need to combine elements of the organizational context to develop new perspectives on aspects of the internationalization-performance relationship of companies from emerging economies.

For all the above, it is apprehended that periods of economic recession generate a decrease in cash flow, which can increase the costs of raising external resources. As a result, more conservative companies, as a precaution, maintain cash reserves and reduce investments in fixed assets to take advantage of the opportunity for growth in contingent moments, resulting in a superior operating performance relative to other companies. From the above, the following hypothesis arises:

Hypothesis 1: in a period of economic recession, among domestic companies, those with greater cash retention and less investment in fixed assets, on average, present better-operating performance.

On the other hand, Brazilian exporting companies, in a period of Brazilian economic recession, can take advantage of the expansion of their operations to the foreign market and adopt a more aggressive strategy, combining internationalization with cash and investment management, generating superior operational performance in domestic companies. In this sense, the following hypothesis is raised:

Hypothesis 2: in a period of economic recession, exporting companies with greater cash retention and greater investment in fixed assets, on average, have better operating performance compared to domestic

companies.

Also, the diversification of activity to the foreign market in a period of Brazilian economic recession may contribute to the generation of relative superior operating performance, according to the degree of internationalization of exporting companies. That said, the following hypothesis arises:

Hypothesis 3: in a period of economic recession, among exporting companies, those with a higher degree of internationalization, greater cash retention, and greater investment in fixed assets, on average, present better-operating performance.

Depending on what the literature recommends, companies tend to keep cash as a precaution and invest in a project that generates positive net present value. In effect, the funds would be invested with the expectation of generating a positive result and future cash flow. Because of this, topic 4 presents the results of the data regressions with the explanatory variables lagged in one year, to verify whether the cash retention and investment in fixed assets in previous periods impacted the operational performance of future years.

3 Methodological Procedures

This topic demonstrates the procedures used to define the sample, periods of economic growth, and recession, as well as the variables and econometric model.

3.1 Definition of the sample and periods of economic growth and recession

The definition of the sample was based on the collection of accounting data from multinational and domestic, non-financial Brazilian companies, listed in B3, available in the Economática database, covering the period from 2005 to 2018. Then, the exclusion was carried out by financial, fund, and insurance companies, according to the procedure adopted by Forti et al. (2011). After the exclusion, a sample of 314 companies observed was arrived at.

To calculate the degree of exportation of the companies, the data referring to the export revenue were collected on the B3 website, more specifically in the reference forms 7.6. The available export revenue data are from 2010 to 2018, due to the unavailability of data from previous periods, which is a limitation of the research.

Alternatively, for the indication of multinational companies (exporters) in the period from 2005 to 2008, the list of companies identified in the National Register of Legal Entities was verified in the database of the Ministry of Economy, Industry, Foreign Trade and Services. (CNPJ), which configured year after year as exporting companies. In this work, therefore, multinational companies are considered to be those that export goods or services.

Based on the evolution of the performance of the Brazilian GDP, two distinct economic periods experienced by Brazil from 2005 to 2018 were defined, economic growth from 2005 to 2008 (4 years) and the other recession from 2009 to 2018 (10 years).

3.2 Definition of variables and econometric model

The proposed model is related to the object of the present work since it investigates the relationship between cash retention and investment in fixed assets with the operational performance of companies, for internationalization, and their behavior in different economic periods Operational performance is measured by ROA, widely used in the literature (Fresard, 2010; Forti et al., 2011; Rocca & Cambrea, 2018).

The model proposed by Forti et al. (2011) for the analysis of the relationship between cash retention and investment in fixed assets with the operational performance of domestic and exporting companies, the export-grade variable (EXP), the dummy variable of exporting companies (dEXP), a dummy of companies with a greater and lesser degree of internationalization (dGEXP), a dummy of companies with greater and lesser cash retention (dCAI), a dummy of companies with greater and lesser investment in fixed assets (dINV), as well as removing the payment variable from dividends for not being part of the scope of this research. Thus, performing the interaction/moderation of variables related to cash retention, investment in fixed assets, and internationalization. Dummy variables for the time were also included in the models.

Model (1) was created to test the relationship between cash retention and investment in fixed assets and operational performance, comparing domestic companies with each other, as well as exporters and domestic companies.

$$ROA_{it} = B_0 + B_1CAI_{it} + B_2INV_{it} + B_3TAM_{it} + B_4END_{it} + B_5VEN_{it} + B_6dEXP + B_7dCAI + B_8dINV + B_9(dEXP* dCAI*dINV) + B_{10}Ano_t + u \tag{1}$$

Model (2), on the other hand, was designed to test the relationship between cash retention and investment in fixed assets with operational performance according to the degree of internationalization of exporting companies.

$$ROA_{it} = B_0 + B_1CAI_{it} + B_2INV_{it} + B_3TAM_{it} + B_4END_{it} + B_5VEN_{it} + B_6EXP_{it} + B_7EXP^2_{it} + B_8dGEXP + B_9dCAI +$$

$$B_{10}dINV + B_{11}(dGEXP*dCAI*dINV) + B_{12}Ano_t + u \qquad (2)$$

The variables collected from the financial statements are from the end of the year, from balance sheets and consolidated statements of income. Table 1 presents a summary of the variables used in the study.

Table 1:
Summary of study variables

Variable		Definition	Expected Sign	Base study
Dependent				
Operational performance	ROA	Return on assets. Calculated by operating profit before interest divided by total assets.		Forti et al. (2011); Rocca e Cambrea (2018)
Explanatory				
Cash retention	CAI	Cash and cash equivalents divided by total assets.	(+)	Fresard (2010); Forti et al. (2011)
Investment	INV	Investments made. (Immobilized - Immobilized-1) / Immobilized-1.	(-)	Forti et al. (2011)
Size	TAM	Neperian logarithm of total assets	(+)	Forti et al. (2011))
Indebtedness	END	(Long Term Debentures + Long Term Debts) / Total Assets.	(-)	Forti et al. (2011)
Sales increasing	VEN	(Vendast - Vendast-1) / Vendast-1.	(+)	Forti et al. (2011)
Export grade	EXP	Export revenue / total revenue.	(-)	Singla e George (2013)
Exporter	dEXP	Dummy variable, assuming a value of 1 for exporting companies and 0 for domestic companies		
Degree of Internationalization	dGEXP	Dummy variable, assuming a value of 1 for companies with a higher degree of internationalization and 0 for a lesser degree.		
Cash retention	dCAI	Dummy variable, assuming a value of 1 for companies with greater cash retention and 0 for lesser retention.		
Investment	dINV	Dummy variable, assuming a value of 1 for companies with higher investment and 0 for less investment.		

Source: Elaborated by the authors (2019)

The CAI variable represents the cash maintenance volume of each company in a standardized way (cash value, banks and immediate liquidity investments of the company less the average cash value of the sector in which it operates, divided by its standard deviation) with assets (available about total assets), as was standardized in the study by Forti et al. (2011).

Also, for greater comparability within the sectors, as they are the object of analysis in this research, the variables INV and EXP were standardized. The variable INV represents the volume of investments made by each company in a standardized way (fixed assets (t) less fixed assets (t-1) divided by fixed assets (t-1)) minus the average investment value of the sector in which the company operates divided by its standard deviation. The variable EXP represents the degree of exportation of each company in a standardized way (export revenue about total revenue) minus the sector average in which the company operates divided by its standard deviation.

For the definition of dummy variables of the degree of internationalization (dGEXP), cash retention (dCAI), and investment in fixed assets (dINV), the median by sector of the degree variables values of export (EXP), retention of cash (CAI) and investment in fixed assets (INV). The companies with the highest degree of internationalization, cash retention, and investment in property, plant, and equipment, were those that presented values above the median by sector and, on the other hand, those that presented below values were considered to have the least degree of internationalization, cash retention and investment in fixed assets.

The vif test (variance inflation factor) of the set of regressors was performed with the dependent variable to verify possible problems of multicollinearity of the control variables. The test demonstrated that the mean vif did not exceed 10, indicating that there was no problem of multicollinearity in the models proposed for all regressions performed. Besides, the Breusch Pagan, Chow, and Hausman tests were performed, which showed that the fixed effects model was best suited for data regression.

To make the results more robust, data regression was performed using the system-GMM model, which in addition to treating the fixed effects of each company, allows all regressors to be potentially endogenous (Forti et al., 2011).

4 Analysis of Results

This section presents the descriptive statistics of the study numerical variables. Also, the results obtained with the data regression are demonstrated and discussed.

4.1 Descriptive statistics of the study variables

Table 2 lists the means, medians, standard deviations, and minimum and maximum values of the study variables. Descriptive statistics of the variables are presented with the treatment of outliers by the winsorization technique. The specifications of the variables can be seen in Table 1.

Table 2:
Descriptive statistics of the study variables

| | Domestic | | | | | | | | | | | | |
| | Growth | | | | | | Recession | | | | | | |
	ROA	CAI	INV	TAM	END	VEM	ROA	CAI	INV	TAM	END	VEN	EXP
Average	0,01	0,11	0,13	13,4	0,21	0,14	-0,00	0,07	-0,01	14,2	0,27	0,03	-
Median	0,03	0,06	0,02	14,1	0,19	0,07	0,02	0,04	-0,03	14,7	0,25	0,03	-
Standard deviation	0,10	0,11	0,29	2,82	0,16	0,22	0,10	0,08	0,19	2,16	0,19	0,19	-
Min.	-0,22	0,005	-0,14	7,17	0,002	-0,10	-0,23	0,001	-0,31	9,90	0,01	-0,27	-
Max.	0,13	0,38	0,82	16,9	0,57	0,60	0,11	0,27	0,35	16,9	0,72	0,36	-
Note	593	574	467	600	439	447	1917	1861	1583	1917	1383	1590	-
	Exporters												
Average	0,04	0,12	0,11	14,4	0,20	0,08	0,02	0,08	0,006	14,76	0,23	0,01	0,22
Median	0,05	0,10	0,05	14,1	0,15	0,05	0,02	0,06	-0,02	14,5	0,20	0,01	0,15
Standard deviation	0,07	0,10	0,20	1,57	0,16	0,14	0,06	0,06	0,12	1,68	0,19	0,13	0,20
Min.	-0,08	0,005	-0,11	12,1	0,005	-0,09	-0,09	0,003	-0,15	12,33	0,004	-0,19	0,004
Max.	0,13	0,33	0,52	17,2	0,61	0,36	0,12	0,20	0,26	17,6	0,72	0,23	0,71
Note	370	370	355	370	326	355	992	989	977	992	795	976	637

Note: The values of the variables are expressed in decimal terms.
Source: Elaborated by the authors (2019)

Considering the variables of interest in this study, Table 2 shows that among domestic companies, on average, operating performance (ROA), cash retention (CAI), and investment in fixed assets (INV) were higher in the period of the economic growth than in the recession. Among exporting companies, these same variables also showed higher values in the period of economic growth compared to the period of recession.

In the period of economic growth, exporting companies presented, on average, higher operating performance (ROA) and cash retention (CAI) than domestic companies. In the recession period, exporting companies presented, on average, higher operating performance (ROA), cash retention (CAI), and investment in fixed assets (INV) than domestic companies. Both in the period of economic growth and the period of recession, exporting companies showed greater operational performance than domestic ones.

4.2 Results of model regressions (1)

This section presents the relation between moderations and the operational performance of exporting and domestic companies. Table 3 shows the results of the regressions - model (1) - of panel data with fixed effects for companies grouped in clusters and system-GMM method, by the period of economic growth and recession, with and without lag in the explanatory variables. The specifications of the variables can be seen in Table 1. The coefficients, the constant, and the adjusted R2 for each regression are shown. Also, presented are the p-values of the Lagrange multiplier test of Breusch and Pagan random effects to test the use of random or pooled OLS effects, the Chow test for the use of fixed or pooled OLS effects, and, finally, of the Hausman test for the use of fixed or random effects. In the system-GMM method, lagged variables were used as instruments to treat endogeneity problems. The system-GMM method proved to be more robust for the results of the regressions.

For the analysis of the results shown in Table 3, the system-GMM method was considered. Analyzing the results related to the period of economic growth, with a lag of the variables, only the dummy variable of investment in fixed assets presented statistical significance, keeping a negative relationship with the ROA, indicating that the companies with greater investment in fixed assets in the previous fiscal year had lower profitability in the following year compared to those with less investment.

In the period of economic recession, empirical evidence shows that the variables of cash retention, size, sales growth, and investment have a positive relation with ROA, with statistical significance. Indicating that the greater the cash retention, size, sales growth, and investment in fixed assets, the greater the profitability of the sample companies. These results are in line with the findings of Fresard (2010); Forti et al. (2011); Rocca & Cambrea (2018) about the cash retention variable; Forti et al. (2011) regarding the variables size, sales growth, and investment in fixed assets.

It is observed in Table 3 that in a period of economic recession, with a lag of the variables, the size was negatively related to profitability and sales growth was positively related to the profitability of the sample companies, with statistical significance. These results show that the greater the sales growth and the smaller the size, the greater the company operating performance in the subsequent fiscal year.

Table 3:
Results of regressions of the model (1) by period

Dependent variable ROA	Fixed Effects Model				System-GMM			
	Growth		Recession		Growth		Recession	
Variables	(t)	(t-1)	(t)	(t-1)	(t)	(t-1)	(t)	(t-1)
CAI	-0,003	-0,35	0,56	0,49	0,39	-0,96	**0,85****	0,54
TAM	-1,91	**-3,23****	**2,38*****	-0,08	-2,66	0,11	**2,30*****	**-0,80***
END	-8,19	-1,39	-2,26	**-3,17***	-5,91	-1,97	-0,62	-2,21
VEN	2,85	1,75	**6,88*****	**5,58*****	4,45	0,52	**7,09*****	**6,23*****
INV	-0,47	-0,08	0,35	-0,05	-1,07	0,63	**0,46****	-0,03
1.dEXP	0,16	**-3,19****	-0,20	-1,43	-3,23	-2,92	-1,46	-0,85
1.dCAI	0,20	-0,62	0,15	0,41	-0,58	-1,32	0,13	0,59
1.dINV	0,21	-1,30	-0,02	0,55	-0,53	**-2,62***	-,013	0,60
Interactions								
0.dEXP*1.dCAI*1.dINV	0,42	1,31	0,52	0,22	1,08	0,89	0,19	0,35
1.dEXP*0.dCAI*1.dINV	1,12	2,81	1,02	**1,61***	**2,99***	4,37	**1,54****	**1,73***
1.dEXP*1.dCAI*0.dINV	1,40	-0,73	1,51	**2,10***	-0,77	-2,96	**1,92****	**2,24****
1.dEXP*1.dCAI*1.dINV	1,47	1,65	**2,19***	**2,58****	2,14	1,97	**2,41****	**2,47****
_cons	32,40*	52,63**	-31,56***	5,55	44,9**	6,26	-30,4***	13,86*
VIF	3,10	3,29	2,29	2,21				
Breusch-Pagan	0,00	0,00	0,00	0,00				
Chow	0,00	0,00	0,00	0,00				
Hausman	0,00	0,00	0,00	0,00				
N	626	447	1892	1687	440	281	1621	1431
R² Adjusted	0,07	0,07	0,17	0,13	0,10	0,15	0,17	0,10

Note 1: *, **, *** = p <0.10, p <0.05, p <0.01, respectively.
Note 2: (t) = without lag; (t-1) = with lag.
Note 3: Regarding interactions: 1.dEXP = exporting company; 1.dCAI = greater cash retention; 1.dINV = higher investment in fixed assets; 0.dEXP = domestic company; 0.dCAI = less cash retention; 0.dINV = lower investment in fixed assets.
Source**:** Elaborated by the authors (2019)

Table 4 shows a summary of the findings of this study, without the lag of the variables, in comparison with previous studies.

Table 4:
Comparison of the results obtained with previous studies

Variable		Sign	Sign Previous Studies	Previous Study
Cash retention	CAI	(+)	(+)	Fresard (2010); Forti et al. (2011); Rocca e Cambrea (2018)
Size	TAM	(+)	(+) (-)*	Forti et al. (2011)
Indebtedness	END	(-)	(-)	Forti et al. (2011); Rocca e Cambrea (2018)
Growth	VEN	(+)	(+) (-)*	Forti et al. (2011)
Growth	VEN	(+)	(+)	Rocca e Cambrea (2018)
Investment	INV	(+)	(+)	Forti et al. (2011)

Note: * According to the method used in the test: pooled-OLS or system-GMM.
Source**:** Elaborated by the authors (2019)

Based on the carried out interactions, as shown in Table 3, it was demonstrated that in a period of economic growth, keeping the other constant variables exporting companies with less cash retention, and greater investment in fixed assets presented an operational performance superior to the other companies in the sample.

In a period of economic recession, the results show that the most conservative national companies, those with greater cash retention and less investment in fixed assets, did not obtain superior operational performance when compared to the other domestic companies in the sample, rejecting hypothesis 1.

Still, in a period of economic recession, exporting companies with greater cash retention and greater investment in fixed assets, compared to domestic ones, presented better operating performance, confirming hypothesis 2. The way companies manage their resources is the main factor for superior operational performance, tending to be more competitive (Barney, 1991). In times of crisis, companies can invest using other sources of funds, such as cash (Kahle & Stulz, 2013), enabling companies to invest resources in growth opportunities, and the ability to create competitive advantage can be generated by investments in physical assets (Jaisinghani et al., 2018). Also, market diversification through internationalization can be a growth

strategy for companies (Lin et al., 2018).

Taking into account the results in a period of recession, with a lag in the explanatory variables, it is also observed that exporting companies with greater cash retention and investment in fixed assets in the past had better profitability in the following year compared to domestic ones, confirming the hypothesis 2. Also, the strategy of greater cash retention and less investment in property, plant, and equipment among domestic companies were not decisive for the generation of better operating performance, and cannot confirm hypothesis 1 either.

4.3 Results of model regressions (2)

Table 5 shows the results of the regressions - model (2) - of the panel data with fixed effects for companies grouped in clusters and the system-GMM method, for the period of recession, with and without lag in the explanatory variables. The specifications of the variables can be seen in Table 1. The coefficients, the constant, and the adjusted R2 for each regression are shown. Also, presented are the p-values of the Lagrange multiplier test of Breusch and Pagan random effects to test the use of random or pooled OLS effects, the Chow test for the use of fixed or pooled OLS effects, and, finally, of the Hausman test for the use of fixed or random effects. In the system-GMM method, lagged variables were used as instruments to treat endogeneity problems. The system-GMM method proved to be more robust for the results of the regressions.

Table 5:
Results of regressions of the model (2) for the recession period

Dependent variable ROA	Fixed Effects Model		System-GMM	
Variables	(t)	(t-1)	(t)	(t-1)
CAI	-0,12	0,42	0,52	0,43
TAM	0,78	**-5,87**	-1,22	**-6,45***
END	-1,81	-3,42	-1,39	**-6,44**
VEM	**8,52***	5,28	8,50	4,26
INV	-0,42	-0,31	-0,29	-0,38
EXP	-1,94	-0,52	-2,04	0,23
EXP2	-0,00	-0,37	0,80	-1,25
1.dGEXP	-1,24	-2,36	-1,86	**-4,23**
1.dCAI	-0,34	-0,55	0,03	-1,08
1.dINV	-1,08	-0,87	-0,73	-1,99
Interactions				
0.dGEXP*1.dCAI*1.dINV	**3,35**	**3,67**	**2,82***	**4,05**
1.dGEXP*0.dCAI*1.dINV	2,72	3,42	**3,77**	**4,50**
1.dGEXP*1.dCAI*0.dINV	1,38	2,22	1,69	2,51
1.dGEXP*1.dCAI*1.dINV	4,40	4,34	**4,34***	**6,20**
_cons	-8,29	91,39**	19,83	103,11***
VIF	3,45	3,19		
Breusch-Pagan	0,00	0,00		
Chow	0,00	0,00		
Hausman	0,00	0,00		
N	467	403	388	330
R^2 Adjusted	0,19	0,19	0,18	0,20

Note 1: *, **, *** = p <0.10, p <0.05, p <0.01, respectively.
Note 2: (t) = without lag; (t-1) = with lag.
Note 3: Regarding interactions: 1.dGEXP = higher degree of internationalization; 1.dCAI = greater cash retention; 1.dINV = higher investment in fixed assets; 0.dGEXP = lesser degree of internationalization; 0.dCAI = less cash retention; 0.dINV = lower investment in fixed assets.
Source: Elaborated by the authors (2019)

For the analysis of results shown in the Table 5, the system-GMM method was considered. According to the Table 5, in the period of economic recession, concerning interactions, at the level of significance of 5%, the results show that in a period of recession, exporting companies with a greater degree of internationalization, greater cash retention, and greater investment in fixed assets showed higher profitability, confirming hypothesis 3.

In the case of exporting companies, in times of economic recession, the operational performance was higher for companies that exported more and adopted a more conservative strategy with cash retention and aggressive regarding investment in fixed assets. According to Rocca & Cambrea (2018), the accumulation of liquidity allows companies to have greater financial flexibility, lower transaction costs, and less financial constraints, to improve the business's operational performance.

The greater degree of internationalization combined with greater cash retention and investment in property, plant, and equipment generated greater operating performance, although in the period of recession

the degree of exportation presents a negative, but not significant, relation with profitability. It can be seen that for the companies in the sample, it was not enough to export goods and services, but also to manage resources efficiently, in this case, cash and fixed assets, to achieve greater profitability.

With the lagged variables, at the 5% level of significance, exporting companies with a higher degree of internationalization, greater cash retention, and investment in fixed assets, obtained better operational performance than the other exporting companies in the sample, also confirming hypothesis 3 Inferring that the exporting companies with a higher degree of exports, cash retention and investment in fixed assets in the past, obtained superior operational performance in the following fiscal year.

5 Final Considerations

The objective of the present study was to verify the effect of cash retention and investment in fixed assets on the operational performance of Brazilian exporting and domestic companies listed on B3 during periods of economic growth and recession. 314 companies were analyzed, covering the years 2005 to 2018, a period in which periods of economic growth and recession can be observed in Brazil. The hypotheses were tested utilizing data regression in a fixed-effects panel and system-GMM method, according to the proposed econometric models

As an innovation proposed in this work, regressions were performed with the inclusion of the variable degree of export and interaction between the dummy variables (internationalization, cash retention, and investment in fixed assets) to analyze the behavior of these variables with the operational performance of domestic companies and exporters regarding the resource management strategy in a period of economic growth and recession.

The results of the regressions related to the model (1) showed that in a period of economic growth, exporting companies with less cash retention and greater investment in fixed assets presented superior operational performance than other companies in the sample. This result suggests that for companies to increase their operating performance, they must diversify their activities, decrease cash retention, and increase investment in fixed assets.

In a period of economic recession, the bigger the company, the cash retention, sales, and investment in fixed assets, the higher the profitability, as these variables showed a positive relationship with the operational performance. Mainly signaling that in times of economic slowdown, exporting companies that retain more cash and invest more in fixed assets tend to have higher operating performance, according to the carried out interactions.

As for the results of the regressions related to the model (2), in a period of economic recession, exporting companies with a greater degree of internationalization that adopted strategies aimed at greater cash retention and investment in fixed assets showed better operating performance. The results indicate, therefore, that the diversification in the application of cash resources and physical assets generated positive results in the profitability of the most internationalized companies.

Still considering the results of the regression of the model (2), about the interactions with a lag of the explanatory variables, the companies with a higher degree of internationalization, which retained more cash and invested more in fixed assets in the previous period, in the following year, were the that presented better operational performance.

Finally, cash retention strategies and investment in fixed assets proved to be valuable resources in generating profitability for exporting companies.

As a limitation of the research, it is possible to highlight the unavailability of data related to export revenue of companies listed in B3 in the period before 2010, and it is not possible to analyze the relationship between the degree of exportation of companies and operational performance. As a consequence, it was not possible to compare the relationship between internationalization and the operational performance of companies in the period of economic growth.

For future research, it is proposed to study the factors that determine the cash retention and investment in fixed assets of domestic and exporting companies in a period of internal and external economic recession, to identify differences or not in the investment strategy and management of resources at different economic times. It is also proposed to carry out the analysis developed in this research for the companies market performance, compared with the operational performance.

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