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ANALYSIS OF THE IMPACT OF MACROECONOMIC VARIABLES ON THE FINANCIAL PERFORMANCE OF COMPANIES IN THE SECTORS OF CONSUMER CYCLICAL AND NON-CYCLICAL OF BM&FBOVESPA

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ABSTRACT

All companies are influenced by macroeconomic variables, more or less sharply, as they are subject to the economic conditions of the regions where they operate. Thus, this reasoning is no different for companies that sell goods and services to end users, such as companies belonging to the consumption sector Cyclical (production and sale of durable goods) and Non-Cyclical (production and sale of non-durable goods) sector of BM&FBovespa). In light of the Business Cycle Theory, the aim of this study was to assess the impact of macroeconomic variables on the financial indicators of companies in the Consumer Cyclical sector and Non-Cyclical BM&FBovespa, since they have to companies in the first sector are more affected by economic fluctuations than companies in the second sector. In this sense, there was a quantitative, descriptive and analysis of documentary data. The study used calculation of canonical correlation coefficients, using statistical software SPSS (Statistical Package for Social Sciences). The survey sample consisted of 103 companies that negotiate their roles in the BM&FBovespa, divided into the sectors of Consumer Cyclical (64 companies) and Consumer Non-Cyclical (39 companies). The study's findings point to an acceptance of the theory that cyclical companies are more impacted by changes in the Brazilian economy, since the results obtained by the canonical correlation indicates that the economic-financial indicators of Cyclical sector companies are more correlated to macroeconomic variables than the indicators of the companies not Cyclical.

Keywords: Cyclical Consumption. Consumer Cyclical not. Macroeconomic Variables. Performance Indicators.

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1 INTRODUCTION

The Brazilian economy has been facing a series of variations in its macroeconomic indicators in recent years, mainly in the Gross Domestic Product (GDP), which measures the growth of the economy in general; in the exchange rate, which is the rate at which transactions are translated into foreign currency; in the rate of the SELIC (Brazilian Portuguese abbreviation for Special Settlement and Custody System of Central Bank of Brazil), the basic interest rate of the Brazilian economy; and inflation, as measured by indicators that express increase in prices of products and services in a given region and period (Banco Central do Brasil, 2016; IBGE, 2016).

These constant changes in the economy lead to numerous uncertainties for households and companies. Uncertainties about the economy performance based on inflation increases, growth reduction and unemployment rise, for example. These uncertainties affect families' consumption decisions, which may prefer to keep money on bank savings accounts rather than spending on consumer goods. In the business field, investments are compromised, since companies tend to cut productive capacity increase options during periods of economic activity (Haddow, Hare & Hooley, 2013; Costa, 2014).

With regard to B3 [(in full, B3 – Brasil Bolsa Balcão S.A. or B3 – Brazil, Stock Exchange and Over-the-Counter Market), formerly BM&FBOVESPA, the Stock Exchange located at São Paulo], one of the sectors of activity that is most vulnerable to macroeconomic variations is Cyclical Consumption. In theory, companies' revenues in this sector are directly affected by fluctuations in the economy, especially in periods of recession or economic expansion. Included in this group are companies that produce and market durable goods, the billing of which varies according to the short-term income level of the consumer market, since they are goods that have high income elasticity, that is, income effect on consumption (Pindyck & Rubinfeld, 2009; Calixto, Oliveira & Kretzer, 2015).

Another group that represents the companies whose main economic activity is the production and/or commercialization of consumer goods is the Noncyclical Consumption sector. It can be defined, in theory, as the least affected by macroeconomic variations. Organizations included in this sector have as main product nondurable consumer goods such as food, beverages, cleaning and hygiene materials and so on. Products and services from these companies do not undergo income elasticity effects since even if there are variations in the population's income, consumption of such goods and services tends to remain stable (Vasconcellos & Garcia, 2014; Calixto *et al.*, 2015).

Studies in the area of a country's macroeconomic variations have been carried out since the beginning of the twentieth century. This area can be characterized by the Economic Cycles Theory, which proposes that countries' economic activity undergoes fluctuations in terms of products. There is no consensus among authors of this research branch to explain such variations but the most accepted lines among scholars are that money (income) and nonmonetary factors, such as productivity and labor, are the motives that most propagate these fluctuations (Santos, Teixeira & Dalmácio, 2008).

As stated by Santos *et al.* (2008), one of the first ones to study this phenomenon was (American economist) Wesley Clair Mitchell, who published relevant works on the subject. The idea that business cycles could affect business performance was one of Mitchell's key thinking trends. The author believed that each organization's sector of activity made it more or less affected by these cycles (Mitchell, 1927; Santos *et al.*, 2008).

Recent international studies show that the area of economic cycles is still a subject of research. Enqvist, Graham and Nikkinen (2014) have analyzed the impact of working capital management on the profitability of some Finnish companies over a number of business cycles and have found that macroeconomic conditions have measurable influences on the working capital/profitability ratio. As for Frösén, Jaakkola, Churakova and Tikkanen (2016), they have demonstrated in their study about companies that have an emphasis on long-term customer relationships (business-to-business) that macroeconomic variations have a notable influence on these organizations' performance.

When analyzing the relationship between macroeconomic aggregates and economic-financial performance, it is important to know the indicators that express organizations'

performance. For this procedure, techniques known as balance sheet analysis or financial statements analysis are used, which is the way to extract information from companies for decision making. Based on data contained in the statements, balance sheet analysis produces information that shall be useful for a more reasoned process of analyzing companies' economic-financial situation and consequently for decision-making by managers (Matarazzo, 2008).

After developing several studies on the subject, a shortage of papers analyzing the relationship between variables GDP, exchange rate, SELIC rate and inflation with companies' performance in Cyclical Consumption and Noncyclical Consumption sectors listed on B3 was observed. In the context covered, the research problem that arises in the present study is: *What is the impact of macroeconomic variations on companies*' *economic-financial performance in the Cyclical Consumption and Noncyclical Consumption sectors listed on B3 between 2008 and 2015?*

From the context discussed, it is possible that variations in economy performance can lead to variations in companies' performance and, especially when economic curves show falls, jobs generation and income distribution may be compromised (Enqvist *et al.*, 2014). As a social contribution, the present study seeks to analyze how the performance of consumer companies in Brazil is affected by macroeconomic variations and whether this represents risks to the economically active population seeking employment.

In relation to the study practical contributions, it seeks to provide a parameter of analysis for companies' officers and managers that fit into the Cyclical Consumption and Noncyclical Consumption sectors. It also seeks to help reduce uncertainties in future planning and modify organizations' areas that deserve to be highlighted, as there are variations in the country's economic activities.

In order to meet the study objective, which has been to verify the impact of macroeconomic variables on B3's economic-financial indicators, the present study is divided into sections that include: introduction; theoretical foundation, which describes the theory of economic cycles and relevant studies; research method and procedures; data analysis and the final section, which presents final thoughts.

2 THEORETICAL FOUNDATION

The present theoretical reference is based on the explanation of the Economic Cycles Theory and the description of some studies relevant to the development of this work.

2.1 Economic Cycles Theory

"Business cycles" or "economic cycles" can be defined as fluctuations in nations' economic activities across a broad range of macroeconomic variables such as products, jobs, prices, consumption, investment and technological innovations (Long & Plosser, 1983). As explained by Santos *et al.* (2008), there is no consensus among classical authors of this research branch explaining such variations. The most accepted trends among scholars are that money supply (the population's income), investments, productivity, labor, technological innovations and variations outside the economy, such as climate change, are the reasons that most propagate the cycles.

Serious efforts to explain business crises and economic downturns began in the mid-eighteenth century amid violent trade fluctuations after the (series of major conflicts pitting the French Empire and its allies, led by Napoleon I) Napoleonic Wars (1803–1815). For more than a century, Western Europe was steeped in intervals of speculative economics, saturated markets and bankruptcy epidemic but at that time no conclusive idea that this was a trend that would recur many times later had been developed (Mitchell, 1927).

From the nineteenth century on, (German philosopher, economist, historian, political theorist, sociologist, journalist and revolutionary socialist) Karl Marx and (Scottish economist, philosopher and author) Adam Smith, political philosophers who possessed vast economic knowledge, began to pay attention to economic movements in the rhythmic trade variations and formulated the first questions about business cycles. Such formulations served as a basis for authors such as Mitchell (1913 and 1927), Schumpeter (1939), Burns and Mitchell (1946),

Lucas (1977), Kydland and Prescott (1982 and 1990) and Long and Plosser (1983), among others, to develop their studies about economic cycles and consolidate this branch as a relevant research area (Mitchell, 1927; Schumpeter, 1939).

One of the oldest and most influential authors who studied economic cycles in depth and tried to understand this phenomenon origins and causes was Wesley Clair Mitchell. For the author, the crucial characteristic of a modern capitalist economy is that everything revolves around currencies, that is, production only takes place if there is some expectation of profit for companies with the sale of such products. Without profit generation, production declines, unemployment rises and a generalized crisis sets in. In times of economic downturn, companies go bankrupt, assets are liquidated and the ground is set for a new recovery, prosperity, new crises and new economic depressions (Mitchell, 1913; Sherman, 2001).

As a deepening of his first impressions regarding business cycles, Mitchell published another book in 1927 in which he sought to explain more clearly the problem involving economic cycles and their configurations. According to Mitchell, there is a succession of factors that lead to variations in countries' economic activities. These factors start with periods of prosperity, which lead to crises due to poor planning from businesses, government and households and thus periods of economic recession and depression, which, after some time, shall give rise to conditions leading to new recovery so that the cycle is restarted.

Joseph Alois Schumpeter (Austrian political economist) (1939), in his book on business cycles, brings a complementary view to that of Mitchell (1927) on the causes of this phenomenon. For him, in addition to internal factors of the economic system, such as changes in consumers' tastes, production quantity or quality and modification in commodities supply, for example, there are factors external to the economy that cause the cycles, such as climate, discovery of new sources of precious metals, unexplored lands, opening up to new countries, among others, that had been the cause of business cycles in the past.

A few years later, Arthur Frank Burns and Wesley Clair Mitchell (1946), by virtue of the prerogative that business cycles last one to ten or twelve years and are not divisible into shorter cycles of a similar character, seek to measure business cycles by means of a detailed exposition of methods for measuring cyclic behavior. The authors have also developed some research using these same methods to follow possible changes in the behavior of macroeconomic variables over time (Burns & Mitchell, 1946; Koopmans, 1947).

In this study, Burns and Mitchell reinforce the statement that economic cycles are a type of fluctuation found in countries' global economic activity that organize their work in companies and specifically aim for profit. A cycle consists of variations that end up affecting all sectors of an economy and always happen in a similar way: prosperity, which leads to crises, then economic recessions and depressions and then again there are periods of prosperity and expansion, crises, recessions and so on (Burns & Mitchell, 1946).

After criticism by Koopmans (1947) that the study by Burns and Mitchell was developed so that certain hypotheses were accepted as true, the business cycle branch ceased to be an active area in macroeconomic research in the following decades. The Keynesian model prevailed that shocks of supply and demand are the cause of business cycles. However, in the 1970s, Robert E. Lucas, the author who revolutionized macroeconomic studies with the postulate that monetary factors are the main cause of economic cycles, corroborates the Keynesian model theories (Santos *et al.*, 2008).

Other authors who stood out in the explanation of business cycles were Finn Kydland and Edward C. Prescott. In 1982, these authors published a study that again changed the interpretation of economic cycles. With the use of quarterly data from the postwar US economy and statistical models that were groundbreaking for the time, which considered mainly time-to-build (time that a capital asset takes to be built), Kydland and Prescott sought to explain the cyclical variations of a set of economic time series.

Following the same line of reasoning from Lucas and Kydland and Prescott, Long and Plosser (1983) also argue that shocks in supply and demand are the mechanisms that most propagate cycles, since additional and unexpected increases in population's income make the pursuit of durable and nondurable goods increase. By means of this, production is adjusted so that there are not enough products on the market...

Another significant change in the understanding of business cycles has come with the study by Long and Plosser (1983). Scholars are the first to use the term Real Business Cycles in their studies. Such a theory emphasizes that there are large random fluctuations in the rate of technological change and, from this, individuals rationally change their levels of work and consumption. Therefore, shocks of supply and productivity caused by technological variations are the main determinants of countries' economic variations and not price level and money supply, as advocated by the previous Economic Cycles Theory (Long & Plosser, 1983; Mankiw, 1989).

From this study, the new theory was consolidated regarding business cycles and other researchers followed the new study line. Mankiw (1989) emphasizes that this new theory does not provide a plausible explanation for economic fluctuations and therefore it should not be used by political decisions to evaluate the proposed macroeconomic policies effects. In Plosser's view (1989), although the Real Business Cycles Theory is rooted in the analysis of technological or productivity shocks, it cannot be confined to this since there are other factors that also interfere in nations' economic activities.

2.2 Relevant studies

Santos *et al.* (2008) have developed a study aiming at analyzing the relation between economic cycles in Brazil and publicly-held corporations' economic-financial performance in the country. The sample consisted of all the companies listed on B3 between the first quarter of 1995 and the last quarter of 2005. As a related macroeconomic variable, real GDP per capita was used. As for measuring the companies' economic-financial performance, a set of nine indicators was used, divided between liquidity, indebtedness and capital structure, profitability and profitability indexes and also volatility indexes. Cross-correlation tests were used to measure the degree of interaction between business cycles and companies' performance. It was concluded from these analyses that the financial sector was the one that most presented some relation with the economic cycle. It indicates that this sector directly influences GDP. Another verification of the study is that indicators of net worth and operating margin profitability were the ones most presenting correlation with GDP. And in some sectors a great correlation, such as in iron and steel, mining and metallurgy industries. Other indicators showed little or no correlation with the economic cycle measured by GDP.

The study by Bastos, Nakamura and Basso (2009) was aimed at verifying determinants of the capital structure in publicly-held corporations in Latin America, taking into account companies' specific factors as well as macroeconomic and institutional factors. To that end, they used 388 publicly-held corporations from five of the seven largest economies in Latin America measured by 2005 GDP (Mexico, Brazil, Argentina, Chile and Peru). Findings of the study pointed out that the current liquidity and asset return indices were the companies' specific factors that helped determine their capital structure. Regarding macroeconomic and institutional factors, the variable GDP growth was the most relevant. It presented a negative relation with the companies' total indebtedness since in times of economic growth companies tend to have more internal resources to finance their investments.

Costa, Schmitt, Leite and Silva (2011) have sought to show in their work how macroeconomic variables have influenced the cash level of Brazilian companies listed on B3. For this analysis, the authors used financial statements from 82 companies chosen at random from among those trading shares on B3 between 2002 and 2009, compared to macroeconomic variables GDP, SELIC and Brazilian National Index of Broad Consumer Prices (IPCA, in the Portuguese abbreviation). At the end of the study, the authors found in a preliminary descriptive statistical analysis a negative correlation between the average level of cash and the variations of the IPCA and the SELIC rate. After applying statistical tests, it was confirmed that IPCA, SELIC rate and GDP were significant to determine the companies' level of availability.

A study developed by Costa and Gomes (2011) has aimed at analyzing the influence of economic cycles on Brazilian publicly-held corporations' performance. The sample of this research was publicly-held corporations in Brazil, referring to periods from 1986 to 2008, reaching a total of 5,581 observations. This period was chosen because it represented major global financial crises, as well as the numerous variations in Brazilian economic plans.

Companies' performance was measured by the dependent variable ROA (net profit in relation to assets). A statistical model was used to verify the relationship between performance and macroeconomic variations. From the observations, the authors concluded that the firm effect (individual characteristics of each company) is still the one most responsible for the most relevant part of organizations' performance, although large periods of time tend to cause macroeconomic variables to have greater power of explanation of firms individually. In addition, year and branch business effects were also relevant in the companies' performance.

Coelho (2012), in her dissertation about the relationship between performance indicators and macroeconomic variables, has aimed to investigate how changes in exchange rate, GDP, inflation and interest rate impact companies' current level of liquidity. The survey sample comprised companies listed on B3 that had shares traded between the 2003-2011 period and that were not owned by financial and insurance sectors. Quarterly data were collected from 141 companies from 13 different sectors. In conclusion, results obtained by the author show that the level of liquidity of the companies analyzed is impacted by macroeconomic variations. In addition, it was verified that variables GDP and interest rate (SELIC) correlate with current liquidity indices in a positive way, while exchange rate and inflation variables are negatively related.

In their study, "The relationship between the profits of publicly-held corporations and macroeconomic variables," Fabris and Fontana (2012) have analyzed the short-term and long-term relationship between the macroeconomic variables and the quarterly profit series (operating, net and per share income) of the main Brazilian companies listed on B3. Based on that study, data from companies AmBev, BRF S.A., Gerdau, Petrobras, Souza Cruz and Vivo between the first quarter of 2000 and the last one of 2010 have been used. As a result, it was observed that corporate profits and macroeconomic variables tend to balance in the long run, especially net and operating income. Through that study, parameters were estimated for correcting errors that contribute to the realization of short-term profit forecasts.

Albuquerque, Silva and Maluf (2014) have carried out a study with the objective of verifying if there is a relation between the prediction of future income from Brazilian iron and steel companies against macroeconomic information such as GDP, SELIC rate and inflation. As a sample, four national iron and steel companies were used: Gerdau, CSN (Companhia Siderúrgica Nacional), Usiminas and Vicunha, with analyses between the second quarter of 2002 and the last one of 2010. The methodology used in the study is known as autoregressive–moving-average (ARMA) model and is intended to ensure that all exogenous variables (GDP, inflation and SELIC rate) can be simultaneously considered in comparison to the dependent endogenous variable (income). As a result, the authors have found that the SELIC rate is the macroeconomic variable that most influences future turnover of companies in the iron and steel sector since high interest rates slow down investments in the industry, while lower interest rates tend to cause investment growth. The variables GDP and inflation, although less significant, have also influenced the expectation of corporate income.

As a recent research, one has the study by Lopes, Costa, Carvalho and Castro (2016), which has aimed to analyze the behavior of the market value of Brazilian publicly-held corporations in relation to their economic-financial situation during two major global financial crises (2008 and 2012). At the end of the research, the authors concluded that the relationship between market value and net worth (NW) behaved differently in the two years analyzed. In 2008, companies that had a market variation in relation to below-average NW had higher liquidity, lower indebtedness and lower profitability than companies that had a market variation compared to above-average NW. In 2012, results were reversed, i.e., companies that had a market variation in relation to below-average NW had lower liquidity, higher indebtedness and higher profitability than above-average companies. From that point on, the authors point out that companies that had higher financial leverage in 2008 were better evaluated by the market in that year while companies with higher liquidity were the ones with the highest market value in 2012.

3 RESEARCH METHOD AND PROCEDURES

Regarding the problem approach, this research is classified as quantitative due to using statistical techniques such as coefficients and indexes. Silva (2010) presents the idea of quantitative research as the one that uses sophisticated study techniques such as improved use of statistics. For this reason, mathematics takes a prominent place in investigations that are classified as quantitative (Silva, 2010).

Regarding objectives proposed, the present research is characterized as descriptive. For Silva (2010), a descriptive research has as its main objective to establish relations between variables from the characteristics of a certain population or phenomenon. In this type of research there are standardized techniques for obtaining the necessary data and it is of crucial importance that the researcher has a certain degree of responsibility for the research to present scientific validity.

This study is defined as a documentary research. Such a procedure is based on materials that have not received any kind of handling from scholars and so can be shaped based on the objective the research intends to achieve. In this type of research, the objective is to select, handle and interpret information in its raw state, seeking to extract some meaning from it and attribute some value to it (Raupp & Beuren, 2014).

The population of this research is all 143 companies that make up the Cyclical Consumption and Noncyclical Consumption sectors of B3, according to the sectoral classification report on the website. Regarding this research sample, it can be defined as non-probabilistic. Thus, the sample of the present study fits elements of the population of companies of B3's Cyclical Consumption and Noncyclical Consumption sectors.

In August 2016, there were 64 companies listed in the Cyclical Consumption sector that traded their shares on B3 and had financial statements published as required by legislation applicable to this type of organization. These companies are classified in this sector because their revenues differ, in theory, according to the performance of the economy in which they are inserted. These are companies that produce durable consumer goods that do not have consumer priority in case of a decrease in the population's income.

For B3's Noncyclical Consumption sector, the sample consisted of 39 companies listed in August 2016, subdivided into eight operating subsectors, according to the target activity of each one. Such companies fit in this sector as they produce and/or market non-durable consumer goods that are of great importance for people. For this reason, regardless of the economic situation of the region in which they are installed, these organizations' income is less impacted by the economic environment where they are inserted.

The data collection instrument of this research aims to obtain the data that shall be the economic-financial performance indicators of companies in the Cyclical Consumption and Noncyclical Consumption sectors, based on data published on the B3 website. Data were collected that formed the nine economic-financial performance indicators analyzed in the study, such as: current liquidity, general liquidity, level of indebtedness, composition of indebtedness, EBIT (earnings before interest and taxes) (operating) margin, net margin, asset profitability, net worth profitability and net operating income variation. Santos *et al.* (2008) and Stüpp (2015) mention that such indicators for financial statements analysis are widely used as explanatory variables for companies' economic-financial performance.

With the aid of the (investment platform) Economatica® database, data were collected to aid in the calculation of variables present in Table 3. These data included the period from 2008 to 2015 and were obtained in July 2016.

Justification for the period used to collect data for the present study is the fact that at the end of 2007, Law No. 11,638/07 was enacted, which provided for changes in the Brazilian Business Corporation Law (Law No. 6,404/76) and determined that Brazilian companies adopt the International Financial Reporting Standards (IFRS). This event has led to some changes in preparation and disclosure of financial statements from financial institutions and publicly-held corporations in the country (KPMG Auditores Independentes, 2008).

In relation to macroeconomic variables, which were used as the basis for measuring economic fluctuations, there are the GDP, inflation (measured by the IPCA), the SELIC rate and the exchange rate. These indicators can be obtained from official institutes' databases, such as

the Brazilian Institute of Geography and Statistics (IBGE, in the Portuguese abbreviation) and the Central Bank of Brazil.

Thus, the data obtained in the present documentary research were tabulated in Microsoft Office Excel® 2010 spreadsheets in order to organize them in a systematic way that facilitated later analyses. Then, the tabulated data were processed using statistical software SPSS (Statistical Package for the Social Sciences) version 23 to calculate the canonical correlation between the dependent and independent variables of the study.

The statistical method used was the canonical-correlation analysis (CCA), as defined by Hair, Anderson, Black, Babin and Tatham (2009). It is a logical extension of an analysis carried out through multiple linear regressions (a relationship between a single dependent variable with two or more independent variables). In canonical correlation, the objective is to simultaneously correlate several metric dependent variables (variables that undergo influence from others and are measured in a quantitative form) with independent variables (causative of changes in relation to the dependent variables), also metrics. This method of dependence is the most general technique from which all others derive (Fávero, Belfiore, Silva, & Chan, 2009; Hair *et al.*, 2009).

4 DATA ANALYSIS

In this section we present description (as tables) and analysis of the data that were obtained through application of the canonical correlation test of the variables. This test consisted of the calculation of the canonical correlation coefficient and the level of significance (p-value) of the group of macroeconomic variables in relation to economic-financial indicators of the companies of B3's Cyclical Consumption and Noncyclical Consumption sectors. Table 1 shows the canonical correlation of the macroeconomic variables listed in the study with the group of performance variables of the Cyclical Consumption sector companies.

From an analysis of Table 1, it can be seen that four different linear combinations were calculated by SPSS (Column 1), which represent the group of macroeconomic variables (IPCA, SELIC, exchange rate and GDP). The Eigenvalues and Wilks' Lambda columns indicate the covariance (dependence) matrix of each variable responsible for the correlation between them (Magro, 2012). The p-value, in turn, indicates the significance of the linear combination, which, according to Hair *et al.* (2009), is at the level of 0.05 (5%).

Table 1
Canonical correlation of macroeconomic variables with the group of economic-financial performance of companies in the Cyclical Consumption sector

	Correlation Canonical	**Self-worth**	***Wilks Lambda***	**D.F.**	***P-value***
1	.762	1.385	.314	36.000	.000
2	.389	.178	.749	24.000	.686
3	.266	.076	.883	14.000	.848
4	.224	.053	.950	6.000	.729

Source: Research data.

Thus, it can be observed that there was a significant canonical correlation of the first linear combination (0.762) with a level of significance at 0.05 (p-value of 0.000). Therefore, this coefficient of canonical correlation of 0.762 indicates that there is a considerable relation between the variables of the model. Table 2 shows the coefficients of the canonical variables derived from the relationship between the macroeconomic variables and the economic-financial indicators of the companies of the Cyclical Consumption sector.

As observed in Table 2, the highest correlation of the four linear combinations occurred in the first column. Therefore, analysis of the coefficients of Table 2 shall also be developed based on column one. Coefficients of the other columns refer to the calculation of the other three linear combinations but since the objective of the model is to present the variables that

have maximum correlation with each other, only the first column in the analysis is used (Magro, 2012).

Table 2
Coefficients for the canonical variables of the macroeconomic and economic-financial indicators of the companies of the Cyclical Consumption sector

Groups	Variable	Linear combinations			
		1	**2**	**3**	**4**
Economic-financial indicators	LC	-.102	-.391	.629	.515
	GL	.154	-.060	.053	-.281
	LI	-.001	-.153	-.083	-.351
	CI	.048	-.128	-.220	.275
	EBIT MG	.085	.353	-1.106	.201
	NM	.188	.125	.181	-.976
	ROA	-.261	1.087	.183	.892
	RONW	-.066	-.333	.642	-.874
	NOI VAR	.973	-.436	.449	.278
Macroeconomic Variables	IPCA	.464	1.204	-1.050	-.150
	SELIC	-.058	-.106	.890	-.832
	EXCHANGE RATE	-1.492	-.466	.432	.532
	GDP	-.498	.653	.516	.810

Source: Research data.

When the macroeconomic variables are related to the economic-financial indicators of column one (1), there is a directly proportional correlation between the macroeconomic variable IPCA and the economic-financial performance indicators General Liquidity (GL), Composition of Indebtedness (CI), EBIT Margin (EBIT MG), Net Margin (NM) and Net Revenue Variation (NRV). This last variable is more related with a coefficient of 0.973. Thus, the greater or lesser the IPCA, the greater or lesser also the economic-financial performance indicators (GL, CI, EBIT MG, NM, NVR) (Fávero *et al.*, 2009).

In a similar way, one can also observe a directly proportional relationship between the macroeconomic indicators SELIC rate, exchange rate and GDP with the economic-financial indicators Current Liquidity (CL), Level of Indebtedness (LI), Return on Asset (ROA) and Return on NW (RONW). Thus, the greater or lesser the SELIC rate, the exchange rate and GDP, the greater or lesser shall be the economic-financial performance indicators (CL, LI, ROA, RONW).

As a way of comparing the canonical correlations of the companies of the Cyclical Consumption sector with the companies of the Noncyclical Consumption sector, we shall now proceed to analyses of the latter group. Table 3 shows the canonical correlation of the macroeconomic variables (IPCA, SELIC, exchange rate and GDP) with the group of variables of economic-financial performance of companies in the Noncyclical Consumption sector.

Table 3
Canonical correlation of macroeconomic variables with the group of economic-financial performance of companies in the Noncyclical Consumption sector

	Correlation Canonical	**Self-worth**	***Wilks Lambda***	**D.F.**	***P-value***
1	.590	.535	.534	36.000	.052
2	.314	.110	.819	24.000	.883

Continue

Table 3 (continued)

	Correlation Canonical	Self-worth	*Wilks Lambda*	D.F.	*P-value*
3	.263	.074	.909	14.000	.903
4	.153	.024	.976	6.000	.926

Source: Research data.

In Table 3, four sets of linear combinations were generated by SPSS, which represent the group of macroeconomic variables (IPCA, SELIC, exchange rate and GDP). It is observed that there was a moderate canonical correlation in the first linear combination (0.590), lower than that observed in the largest linear combination of macroeconomic variables with companies in the Cyclical Consumption sector. In addition, no combination showed significance at the level of 0.05 (5%). The nearest one reached 0.052, contrary to the information observed in the Cyclical Consumption companies, which presented a p-value significance of 0.000 in the first linear combination.

Despite this, the canonical correlation coefficient of 0.590 represents that there is a moderate relationship among the variables of the model, that is, the variations in the economic-financial indicators of companies in the Noncyclical Consumption sector are also explained by the first linear combination of the model, although none of them reached the significance level of 5%.

Table 4 shows the coefficients of the canonical variables derived from the relationship between the macroeconomic variables and the economic-financial indicators of the companies of B3's Noncyclical Consumption sector. The highest correlation of the four linear combinations occurred in the first column, observing the highest degree of correlation found, although there was no degree of significance in the combination.

When the macroeconomic variables are related to the economic-financial indicators of column one (1), there is a directly proportional correlation between the macroeconomic variable IPCA and GDP and the economic-financial performance indicators General Liquidity (GL), Level of Indebtedness (LI), EBIT Margin (EBIT MG), Net Margin (NM), Return on NW (RONW) and Net Revenue Variation (NRV), the latter variable being more related to macroeconomic variables, with a coefficient of 0.826. Thus, it is concluded that the greater or lesser the IPCA and GDP, the greater or lesser also the economic-financial performance indicators (GL, LI, EBIT MG, NM, RONW and NRV).

In addition, one can also observe a directly proportional relationship between the SELIC and exchange rate indicators with the economic-financial indicators Current Liquidity (CL), Composition of Indebtedness (CI) and Return on Asset (ROA). Thus, the greater or lesser the SELIC rate and the exchange rate, the greater or lesser the economic-financial performance indicators (CL, EC and ROA).

Table 4

Coefficients for the canonical variables of the macroeconomic and economic-financial indicators of the companies of the Noncyclical Consumption sector

Groups	Variable	Linear combinations			
		1	**2**	**3**	**4**
Economic-financial indicators	LC	-.142	.166	-1.824	.536
	GL	.105	-.633	1.828	-1.291
	LI	.146	-.456	-.826	.200
	CI	-.227	.309	-1.457	.695

Continue

Table 4 (continued)

Groups	Variable	Linear combinations			
		1	**2**	**3**	**4**
Economic-financial indicators	EBIT MG	.203	-1.071	-.472	-.119
	NM	.147	1.467	.352	-1.022
	ROA	-.286	.442	-.660	1.588
	RONW	.108	-.215	-.016	-.529
	NOI VAR	.826	.304	.143	.275
Macroeconomic Variables	IPCA	.334	.927	-1.111	1.073
	SELIC	-.983	-.177	-.128	-.731
	EXCHANGE RATE	-.414	.036	1.779	.049
	GDP	.078	1.199	.670	-.126

Source: Research data.

As evidenced in the literature, business cycles or the economy performance are able to influence the performance of companies that are inserted in this environment since many macroeconomic factors overlap and end up impacting organizations' activity levels. The most accepted trends among scholars are that money supply (the population's income), investments, productivity, labor, technological innovations and variations outside the economy, such as climate change, are the reasons that most propagate macroeconomic variations in a country (Long & Plosser, 1983; Santos *et al.*, 2008).

As predicted by the theory, macroeconomic fluctuations expressed by inflation indicators (IPCA), interest rate (SELIC), exchange rate and GDP were more significant in companies of the Cyclical Consumption sector than in the Noncyclical Consumption sector. From analysis of Tables 1 and 3, a greater correlation of the macroeconomic variables with companies of the Cyclical Consumption sector is observed (0.762 against 0.590 of the Noncyclical Consumption sector).

Results found in the present study corroborate results from some studies and are contrary to others found in the literature. For liquidity indicators, Costa *et al.* (2011) have evidenced a negative relation between the level of cash flow (which influences the companies' liquidity indicators) and the IPCA. Coelho (2012) has concluded in her study that companies' liquidity indicators positively correlate to the interest rate and GDP and negatively to the exchange rate and inflation, as in the present research.

Regarding indebtedness indicators, the present study has found no significant relationship between macroeconomic variables and such indicators. Bastos *et al.* (2009) have not observed a significant relationship of inflation rates with the accounting indebtedness of Latin American companies either but have observed that there is an influence of GDP on companies' indebtedness, as well as Dani, Padilha, Santos and Almeida-Santos (2016), who emphasize that one of the main factors that influence companies' capital structure is the GDP, since economic growth brings greater availability of internal resources to companies that use more of their own capital for their financing.

For indicators of profitability (NM, EBIT MG, ROA, RONW and NRV), the present study indicates a high correlation of macroeconomic variables with Net Revenue Variation (NRV), corroborating previous studies that tend to affirm that there is relationship between the countries' economy and companies' economic-financial performance indicators, described below.

Santos *et al*. (2008) have identified a positive relationship between the return on assets (ROA) and companies' operating margin (EBIT MG) in relation to Brazilian publicly-held corporations' GDP. They indicate that if countries' economy performs well, it positively affects companies' results. Fabris and Fontana (2012) argue that macroeconomic variables and corporate profitability tend to balance in the long run, i.e., if countries' economy performs well,

companies tend to have good profitability. As for Albuquerque *et al.* (2014), they have found that the SELIC rate is the macroeconomic variable that most influences the future turnover of companies in the iron and steel sector and variables GDP and inflation, although less significant, have also influenced these companies' expected revenue.

A study by Deleersnyder, Dekimpe, Sarvary and Parker (2003) corroborates the present study findings. The authors argue that durable consumer goods (produced by Cyclical Consumption companies) tend to be less consumed in times of economic recession since the population tends to concentrate its consumption on non-durable consumer goods (produced by companies of the Noncyclical Consumption sector), most needed for survival. This explains a greater correlation of the Net Revenue Variation in relation to the macroeconomic variables in the Cyclical Consumption sector than in the Noncyclical Consumption.

5 FINAL THOUGHTS

The present study has aimed to analyze the impact of macroeconomic variations on the economic-financial performance of B3's Cyclical Consumption and Noncyclical Consumption companies between 2008 and 2015 in order to verify which of the two sectors is most impacted by variations in the domestic economy and whether the theory regarding the sectors is confirmed in relation to performance indicators.

In order to better organize the companies that negotiate their shares in the capital market, B3 uses their sector classification, according to the main activity that generates revenues for each one, thus forming company blocks that similarly act in the market. Within these sectors are the Cyclical Consumption and Noncyclical Consumption, whose main function is the sale of goods and services to the final consumer.

According to the literature, companies belonging to the Cyclical Consumption sector (clothing, footwear, automobiles, furniture, household appliances, among others) are influenced by changes in the economy, either by economic recessions or expansion, since they produce or sell goods that are not considered necessary or of which consumption can be reduced. On the other hand, companies belonging to the Noncyclical Consumption sector produce nondurable goods, such as food and beverages, and provide medical and hospital services, which are considered to be necessity goods and are expenses with little impact from the population's income level because they are consumed even in times of economic recession.

The study through canonical correlation, which consists in analyzing the linear relationship between two data sets, presented results that prove the theory that companies belonging to the Cyclical Consumption sector are more affected by the economy performance than companies in the Noncyclical Consumption sector.

When economic-financial indicators of companies of the Cyclical Consumption sector were correlated, there was one in the first linear combination of 0.762 with a level of significance at the level of 0.000. This indicates that the correlation is statistically significant. For the Noncyclical Consumption sector, the largest linear combination was 0.590 but with no statistical significance at the 5% level.

In addition, it was confirmed by the canonical correlation that the variation in net operating revenue was the corporate performance variable most impacted by the macroeconomic variables, with a correlation coefficient of 0.973 for the Cyclical Consumption sector and 0.826 for Noncyclical Consumption, which again confirms the greater impact of macroeconomic variables on Cyclical Consumption companies revenues. In addition, other important indicators that measure business performance, such as the profit margin, have not shown significant correlation in any of the two sectors analyzed in this study.

Therefore, it is suggested for future studies that researchers seek to list other performance variables of the Cyclical Consumption and Noncyclical Consumption companies that may be related to macroeconomic factors such as activity indicators (average sales receipt periods and payment of suppliers, operational cycle and financial cycle) and the dynamic analysis of working capital, among others. In addition, it is suggested to replicate this study in other sectors of B3 companies (basic materials, industrial, financial, health,

telecommunications, public utility goods) in order to verify if there is a relationship between such companies' performance and the Brazilian economy, as verified in this study.

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