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THE INFLUENCE OF MACROECONOMICS ON ROE: AN ANALYSIS IN LATIN AMERICAN FINANCE AND INSURANCE COMPANIES

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ABSTRACT
This research aimed to analyze the effect of macroeconomic indicators on the return on equity of Finance and Insurance publicly traded companies in Latin America. The sample was composed of 147 companies from four emerging economies (Argentina, Brazil, Chile and Mexico). The analysis interval refers to annual periods from 2010 to 2017. This information was analyzed through the panel regression model. The results shows that the exchange rate negatively influences the return on equity. On the other hand, the Gross Domestic Product and the interest rate are not related to the profitability of the return on equity. The present study has implications in the literature advancement by demonstrating the influences of the exchange rate on the return on equity in important economies in Latin America.
Key words: Return on equity; financial sector; Latin America.

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Introduction

The macroeconomics is considered important for the global scenario since it brings together the economic aggregates, in which it is transmitted from different indicators that are employed by users for decision-making (VASCONCELLOS, 2015). These indicators correspond to Gross Domestic Product (GDP), interest rates, unemployment rates and others, in which Blanchard (2011) points out that the macroeconomic indicators, such as the interest rate, influences the market because investors understand that changes in the macroeconomic environment will affect the financial performance of companies in future periods.

Brown, Huang and Wang (2016) argue that the stock market responds to macroeconomic news, whereas that external users understand that they can affect the organizations' financial performance. In addition, Andersen *et al* (2007) argue that this market reaction depends on economic cycles. Therefore, macroeconomic indicators influence the stock market as investors react to macroeconomic news through the change in stock prices.

Studies have shown how this occurs in different countries of emerging and developed economies (DIAMANDIS; DRAKOS, 2011; FLORACKIS *et al.*, 2014, PEIRÓ, 2016, ASSEFA, ESQUEDA, MOLLIK, 2017 and SOUSA *et al.*, 2018). These surveys demonstrate the influence of different stock price indicators, as investors understand that the changes in these indicators affect the financial performance of companies when considering future periods.

Idrus (2018), instead, states that the profitability is a relevant item for companies so they can maintain continuity of theirs operations, especially in uncertain macroeconomic environments. Njoroge (2013) and Jiang (2018) state that profitability ratios, such as equity, are relevant for investors, since they show the profitability of a corporation and reveals the amount of profit of a company related to what was invested by shareholders.

Macroeconomic indicators are statistics published regularly by the government, aiming to indicate the current economic condition (IRUNGU; MUTURI, 2015). So, the performance (profitability) of companies can be influenced by macroeconomic indicators, such as inflation rate, exchange rate, Gross Domestic Product (GDP), unemployment rate, consumer price index, national currency strength, interest rate, commodities prices (BELLALEAH, LEVYNE, MASOOD, 2013).

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In addition, Kothari (2001) points out that the capital market responds to economic events that companies are subject to quicker than financial reports, since they are published from time to time. Other studies highlights the effect of macroeconomic indicators on profitability, such as interest rate (AHMED *et al.* , 2018), inflation rate (REILLY, 1997; KATIRCIOGLU, OZATAC, TASPINA, 2018), GDP and the inflation rate (NADLOVU, ALAGEDDED, 2015) and GDP, inflation rate and unemployment rate (SAMHAN, KHATIB, 2015) and other macroeconomic indicators (ADU, DOMFEH and DENKYIRAH, 2016, RAI *et al*., 2018), GDP, inflation rate and the unemployment rate (SAMHAN, KHATIB, 2015) and other macroeconomic indicators (NDLOVU; ALAGIDEDE, 2015).

Considering this, it can be noticed that most of the studies, so far, consider only the effect of only one macroeconomic index on the ROE, and, in some cases, diverge on the results. Thereby, this research advances in the literature when presenting the influence of GDP, exchange rate and interest rate, together, in the ROE. Thus, this research aims to analyze the effect of macroeconomic index in the ROE of Finance and Insurance publicly traded companies in Latin America.

The present study is justified by presenting a different perspective by demonstrating the effect of different macroeconomic indicators on the ROE of companies from emerging economies. By analyzing these economies, the International Monetary Fund (2017) points out that the Latin American economy recorded low economic growth in recent years, but the economic and financial situation of financial institutions showed improvement, with high profitability due to the interest rate of the region. In addition, this study is also justified and presented through a theoretical contribution to complement the evidence presented in the works of Ahmed *et al.* (2018), Reilly (1997) Katircioglu, Ozatac and Taspina (2018) Adu, Domfeh and Denkyirah (2016) Rai *et al* .(2018) and, finally, Samhan and Khatib (2015).

In the practical scope, this research presents some contributions, such as the finding of the negative relation between the exchange rate and the share prices. In this way, the market reacts negatively at the specialized moment in the *Finance and Insurance* sector does not consider the increase of the American currency in comparison with the domestic one as detrimental to the future cash flows of the companies that has the consequence of the fall in the price of the actions. Otherwise, the other macroeconomic indices (interest rate, inflation and GDP) do not influence stock

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prices. With this, the results could contribute to external users, especially the investors in Finance and Insurance publicly traded companies in Latin America.

Regarding the structure of this research, besides the present introductory section, we have the theoretical foundation and methodological trajectory, added of the analysis and discussion of the results. In addition, the conclusions are presented with their implications and suggestions, in addition to the references used in the body of this study.

Theoretical foundation

Macroeconomic variables such as inflation, exchange rates and interest rates, as well as GDP are important to verify aspects of an economy (Vasconcellos, 2011). When considering the perspectives of macroeconomic indices, companies make decisions regarding the expansion or non-expansion of investments related to their operations in the face of the horizon of increasing profits (BLANCHARD, 2011).

Blanchard (2011) complements, highlighting that the changes in macroeconomic indices may influence the capital market by shifting share prices, as investors look for changes in corporate performance. Given this context, several studies verified the reaction of the stock price from the changes in the macroeconomic scenario of a country or economic bloc.

Andersen *et al.* (2007) report that the share price of three developed capital markets (*i.e.* US, UK and Germany) respond to the news that involves changes in the scenario or major macroeconomic indicators, in which the reaction of investors depends on the macroeconomic cycle. One of the macroeconomic variables that influence the capital market is the interest rate, in which Atanasov (2016) verified that changes in US interest rates have an effect on stock prices, since this may change the outlook for behavior investment and performance.

Other studies have inferred the stock market sensitivity from changes in interest rates, in which Assefa, Esqueda and Mollik (2017) found a negative relation, unlike Peiró (2016) who found a negative relationship between these two variables. Other studies show that inflation rates also influences the stock price reaction, as shown by Chen's (2009) studies, where the relationship is positive in China, and by Brown, Huang and Wang (2016), in which they found a negative relation between this macroeconomic index and the capital market reaction in the USA.

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Given the scenario of intensification of the globalization in the last decades, the exchange rate is also related to the share price, as demonstrated by the work of Diamandis and Drakos (2011), in which they verified this association in Latin American countries, except in Brazil. Thus, we can see the effect of the exchange rate change on the stock price, nevertheless, economic growth is related to the reaction of the investors *and e.g.*, as approached by Florackis *et al*. (2014), where the expectation of the GDP indices influences the greater liquidity of the shares in the United Kingdom.

The stock market presents expectations regarding the performance of companies through the economic changes. Therefore, these researches are consistent when analyzing the work of Kothari (2001), reporting that the financial statements reflects the economic events. In this way, financial reports may reflect changes in the external environment.

In advance, studies have examined the association between accounting and macroeconomic variables, such as Gallo and Hann (2016), highlighting the relationship between the monetary policies news and the companies' share prices, in face of changes on profit expectations, but investors cannot fully anticipate corporate profits, which are impacted by changes in monetary policies.

With this, surveys have examined the relationship of company performance through the macroeconomic changes. Bouzgarrou, Jouida and Louhichi (2018) analyzed the French market between 2000 and 2012. The authors found out that foreign banks are more profitable in a period of economic crisis than French banks, especially foreign banks from developed economies, in which they showed higher profitability when compared to those of emerging economies. While analyzing the impact of the global economic crisis on banks' performance in the Middle East and North Africa region, Caporale, Lodh and Nandy (2017) found that profits are not related to the company size, but are negatively influenced by the interest rate and positively by GDP.

Konchitchki and Patatoukas (2014), while analyzing profits and GDP in the US, have found that these indicators are associated, and that profits can predict GDP in the upcoming quarter. By considering the changes in the interest rate, Aydemir and Ovenc (2016) verified changes with profits rates in the banking companies of Turkey and the United Kingdom from 2002 to 2014. The authors found evidence that interest rates and profit have a short-term relationship, but the changes in interest rates have a positive impact on profit when considering the long term, as well as that, banks' performance is more sensitive in the UK than in Turkey.

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Also, when analyzing the effect of the interest rate changes in the net margin of the banks of 47 countries, Claessens, Coleman and Donnelly (2018) point out that at the moment of interest rate reduction there is, on average, a decrease in eight percentage points in the net margin of these companies. In another point of view, other studies verified the impact of predictability of inflation in companies, such as Brown, Huang and Wang (2016) did, by analyzing Chinese companies, that at the moment of greater predictability of the inflation index, there is more volume of investments by the companies, since a more stable environment can be predicted and the organizations can be more sure of the returns of theirs investments.

Gunay, Metin-Ozcan and Yeldan (2005) point out that inflation has a positive impact on company profits, unlike trade liberalization, which is not related to the profits of the companies analyzed since the 1980's in Turkey. When analyzing the behavior of shares, as well as the ROE, in which Reilly (1997) found that dividends are impacted by the return on shareholders' equity and that this profitability index is associated with inflation. Katircioglu, Ozatac and Taspina (2018), point out that oil price changes in Turkey starts from a single line, significantly affecting profitability through indirect inflation.

In its turn, Ndlovu and Alagidede (2015) found a positive relationship between interest rate and ROE. It was also observed that inflation is inversely related to ROE. So this study is attributed to 73 companies in the financial sector on 2002. According to Samhan and Khatib (2015), it did not reach meaningful results between ROE and inflation, there being no positive significance between ROE and GDP, and, finally, a meaningful negative relation between ROE and unemployment rate in the financial performance of Jordan Islamic Bank (JIB) in the period from 2000 to 2012. Thus, the hypotheses of the study are:

H_1: There is a positive relation between the interest rate and the ROE.

H_2: There is a positive relation between the Gross Domestic Product and the ROE.

H_3: There is a negative relation between the exchange rate (in US dollars) and the ROE.

Thus, the present research basis is a complement of the empirical evidences of the association between different macroeconomic variables and the profitability of the shareholders' equity in the Latin American financial sector. This study is

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complementary to the results found by Reilly (1997), Ndlovu and Alagidede (2015) and Samhan and Khatib (2015).

Methodological trajectory

The research can be classified as descriptive, since it has been demonstrated the association between the macroeconomic indicators and ROE. In addition, this research has a quantitative approach, knowing that the relationship of different macroeconomic indicators with the ROE was realized through the analysis with panel data, besides being tested the hypotheses of this study.

The research universe corresponds to 430 companies in the Finance and Insurance sector, considering the North American Classification System (NAICS) classification of the countries analyzed in this research (Argentina, Brazil, Chile and Mexico). However, the companies that presented the necessary information regarding the objective of this study participated in the sample of this research. With this, the sample was composed of 147 companies from four countries (Argentina, Brazil, Chile and Mexico). Data were collected from 2010 to 2017, but due to the calculation of the variation of some variables during the annual period for the analysis, the analyzed interval corresponds to annual periods from 2011 to 2017. It should be emphasized that the analysis period was from 2010, since this was due to the beginning of the adoption of the IFRS.

The data were collected from the Thomson Reuters Eikon database, following sector segregation proposed by the North American Industry Classification System (NAICS). The dependent variable in this study corresponds to ROE. In turn, the independent variables of the analysis correspond to the GDP, Market Rate (in US dollars) and Interest Rate, in addition to the control variable, Size. The dependent variable and the independent of the model in panel data are stated in Table 1.

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Table 1: Dependent and independent variables that make up the model

Dependent Variable			
Variable	**Description**	**Operation**	**Justification**
ROE	Mensures the profitability of a Corporation and reveals the ratio compared to the amount invested by shareholders	Net Income / Equity	
Independent Variable			
Variable	**Description**	**Operation**	**Justification**
GDP	Mensures economics growth during the calender year	Anual percentage change	Primo et al. (2013), Konchitchki, e Patatoukas (2014), Adu, Domfeh e Denkyirah, (2016); Rai et al. (2018) e Jumono e Mala (2019).
Exchange Rate (ER)	Mensures the value of the domestic currency against the US dollar	Conversion of local currency to US dollars	Acaravci (2014); Almaqtari et al. (2018)
Interest Rate (IR)	It serves to measure the basic interest rate of the country in question	First difference of Interest rate disclosure by the countries in percentage	Ndlovu e Alagidede (2015), Aydemir e Ovenc (2016), Claessens, Coleman e Donnelly (2018) e Ahmed et al. (2018)
Size (SZ)	It measures the size of the company analyzed, according to the total asset in US dollars	First difference of Total Assets at the end of the year	Wooldridge (2011)

Source: Made by the authors (2018)

The informations on ROE, interest rate, GDP and exchange rate were initially analyzed through the descriptive data analysis. In sequence, data analysis was performed through multivariate analysis in panel data. In relation to this analysis, the model was chosen from the characteristics of the standard deviations of the variables. The descriptive analysis showed that the variances standard deviations pointed to the characteristic “between”.

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The observations were submitted to the multicollinearity test, considering the Pearson correlation test and, in sequence, the Variance Inflation Factor (VIF) test. This last test, VIF, indicated that the values were lower than 5 (five). With this VIF's test result, the independent variables of the model are not multicollinear (WOOLDRIDGE, 2011; FÁVERO; BELFIORE, 2014). In addition, in order to analyze the possible problems regarding the analysis over time, the data were submitted to analysis of stationarity of the data, from the test of ADF-Fisher and PP-Fisher, as Baltagi (2005) points out. Evidence showed that metric variables did not present unit root along the analyzed interval.

Analysis and discussion of results

First, the descriptive statistics, according to Table 2, highlights that: I) ROE has a very high coefficient of variation (*i.e.*, greater than 20%), justified by the sample of small and large companies on the sector; II) interest reported an average rate of 7.13% for the sample countries; III) GDP and assets showed a high coefficient of variation in the reporting period (2010 to 2017).

Table 2: Descriptive Statistics

VARIABLE	Mean	Median	Maximum	Minimum	Standard Deviation
ROE	-0.072	0.081	2.658	-6.572	0.9888
IR	0.0713	0.050	0.311	0.030	0.0417
GDP	1,189,763	1,186,598	2,614,573	217,538	910,122
ER	0.1714	0.0678	0.6026	0.0012	0.1952
SZ	6.05e+09	6.00e+09	4.39e+11	3,407	3.12e+10

Source: Made by the authors.

Subsequently, the robustness tests of the model were performed. The VIF test demonstrating absence of multicollinearity, adoption of the Central Limit Theorem for normality, the ADFFisher and PPFisher tests detecting stationarity of variables (Interest, GDP and Assets in I (1) and ROE and Exchange in I (0)) and for heteroscedasticity the White's Correction was adopted. In time, to detect the best fit of the model, the Breusch-Pagan and F (Chow) tests were realized, detecting the best adjustment for the Cross-section Fixed, pointing to autocorrelation clues in the model using the Durbin Watson (DW) test. Finally, it was necessary to perform the

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estimations proposed by Newey-West (NW) (1987) with consistent standard errors for autocorrelation and heteroscedasticity, according to Table 4.

Table 4 – Analysis of the Regression of the ROE Independent Variable

	A (Total) ***NW***	**B (Total)** ***NW***
INTERCEPT	0,0801*	0,08155**
D(GDP)	1,86e-08	
ER	-0,9467**	-0,9598**
D(IR)	-1,1152	
D(SZ)	3,06e-13	2.40e-13
R^2	**0,0347**	**0,0340**
R^2 ajusted	**0,0253**	**0,0294**
F	**3,7098**	**7,3020**
(sig)	**0,0055**	**0,0000**

* Statistically significant indicators at 1% (P <0.01)
** Statistically significant indicators at 5% (P <0.05)
*** Statistically significant indicators at 10% (P <0.10)
Source: Made by the authors.

Two estimates, A and B, were performed, with the total assets of the companies in the first difference as the control variable in the research. In the Estimation A all the variables of the research were considered and in the Estimation B only variables that presented a significant relation to 10% with the ROE. Initially, the positive and significant relation to 5% with the intercept in the two estimates is characterized. However, the control variable first difference of total assets, *i.e.*, D (SZ) did not present a significant relation to 10% in Estimates A and B.

The hypothesis 2 was confirmed, in which the exchange rate presented a negative and significant relation to 5%, in the two estimates, with ROE, corroborating the works of Acaravci (2014) and Almaqtari et al. (2018) made in other countries. On the other hand, and were not confirmed, and no positive (negative) and significant relationship was found with the GDP and the interest rate at 10%, not corroborating with the works of Ahmed *et al*. (2018), Rai *et al*. (2018) and Jumono and Mala (2019).

The rejection of Hypotheses 1 and 3 can be justified (i) by the difference in the sample of the survey, which considered data from companies in Latin America in the period from 2010 to 2017, in comparison with other previously highlighted studies that highlighted other countries mostly developed and (ii) by sector regulation, distinct in several countries around the world.

Finally, the Exchange Rate Ratio is confirmed with the ROE of the company, only Hypothesis 2 with an R^2, greater than 3.3% in the two estimates made in the research for the purpose of confirming the results.

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Final Considerations

Macroeconomic indicators are relevant to the economy, in which it demonstrates the behavior of economic aggregates over a given period. The macroeconomic aspects, presented through these indicators, also affect the companies' financial performance. One of the items most affected by the macroeconomic indicators, which are analyzed by external users, corresponds to the profitability indexes of organizations, since they are used for decision-making.

In this sense, the objective of the research was to analyze the effect of macroeconomic indicators on ROE of companies in the Finance and Insurance publicly traded companies in Latin. The findings of this research consist in the negative and significant relation to 5% between the exchange rate and ROE, confirming Hypothesis 2.

On the other hand, the interest rate and GDP did not present a significant relation with the ROE of the companies. Thus, the results point to possible local differences, either in the regulation of the sector or in the economic development of the countries.

This research was not exempt of limitations, in which the selection of the companies corresponds to the sample available in Eikon, since we selected organizations that belong to the Finance sector and Insurance of countries of emerging economies. As a result, the results cannot be generalized to other sectors of these countries or to other countries, given the economic characteristics of the countries analyzed. As for suggestions and opportunities for future studies, it refers to the analysis of this study with other profitability indicators, as well as the analysis of the influence of macroeconomic indicators in other sectors of the Latin American economies.

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