MACROECONOMIC VARIABLES AND CAPITAL STRUCTURE: PUBLIC FINANCE AND INSURANCE COMPANIES IN LATIN AMERICA AND ASIA[1]

VARIÁVEIS MACROECONÔMICAS E ESTRUTURA DE CAPITAL: SETOR FINANCE AND INSURANCE DE CAPITAL ABERTO DA AMÉRICA LATINA E DA ÁSIA

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ABSTRACT
Objective: This article analyzes the relationship between macroeconomic variables and the capital structure of public finance and insurance companies in Latin America and Asia.
Fundamentals: Modern finance theory and macroeconomics
Method: Multiple regression with Newey-west estimate for a sample of 372 public finance and insurance companies from Latin America and Asia.

Results: The data analysis showed that the interest rate, exchange rate and GDP had a negative relationship with the capital structure. In other words, the increase (decrease) in the interest rate, exchange rate and/ or GDP will have a negative (positive) impact on the CS. It is concluded that macroeconomics interferes with the capital structure of financial institutions in Latin America and Asia.

Contributions: The results may contribute to external users, especially investors and creditors of public finance and insurance companies in Latin America and Asia. This study also contributes to the discussion on the impact of macroeconomics on the capital structure, specifically complementing previous studies.

Keywords: Capital Structure. Macroeconomic Variables. Financial Institutions. Latin America. Asia.

RESUMO

Objetivo: Este artigo analisa a relação entre as variáveis macroeconômicas e a estrutura de capital das empresas do setor *Finance and Insurance* de capital aberto da América Latina e Ásia.

Fundamentos: Teoria moderna de finanças e macroeconomia.

Método: Regressão múltipla com estimativa de Newey-west para uma amostra de 372 empresas do setor *Finance and Insurance* de capital aberto da América Latina e Ásia.

Resultados: A análise dos dados mostrou que a taxa de juros, a taxa de câmbio e o PIB reportaram relação negativa com a estrutura de capital. Em outras palavras, o aumento (diminuição) da taxa de juros, da taxa de câmbio e / ou do PIB terá um impacto negativo (positivo) na CS. Conclui-se que a macroeconomia interfere na estrutura de capital das instituições financeiras da América Latina e Ásia.

Contribuições: Os resultados podem contribuir para usuários externos, especialmente investidores e credores de empresas do setor *Finance and Insurance* de capital aberto da América Latina e Ásia. Este estudo também contribui para a discussão sobre o impacto da macroeconomia na estrutura de capital, complementando especificamente estudos anteriores.

Palavras-chave: Estrutura de capital. Variáveis macroeconômicas. Instituições financeiras. América latina. Ásia.

1 INTRODUCTION

Macroeconomics is oriented towards public policies and its function is to question the influence of government policies on variables such as unemployment, inflation, and exchange rates (Froyen, 2013). In this context, companies focusing on continuity and maximization of results seek resources from investors or financial institutions. Companies used to select their capital structure according to their own taxes, which generated a cost/benefit in financing the company (Titman & Wessels, 1988).

The first studies on capital structure in field of modern finance theory were carried out by Modigliani and Miller (1958) and demonstrated its irrelevance to the value of companies. Still, the modified model by Modigliani and Miller (1963), which is also based on investor behavior and capital market, goes beyond the effects of leverage on the cost of capital and correlates tax advantages for debt financing. Further studies were then conducted, such as those of Jensen and Meckling (1976) and Myers and Majluf (1984). The way in which the company obtains resources in the market depends on several factors (Crisóstomo & López-Iturriaga, 2011). For instance, the volatility risk premium predicts future equity returns (Bollerslev, Tauchen, & Zhou, 2009).

Thus, macroeconomics is directly linked to commercial/financial activities, as variables such as Gross Domestic Product (GDP), exchange rate, and interest rate fluctuate according to the economic and social situation of a country or economic bloc through economic policy (Miles & Scott, 2005). Hackbarth et al. (2006) recommend that companies align their financing policy when macroeconomic conditions impact cash flows.

Companies adjust their capital structure faster during good macroeconomic times (*e.g.*, economic growth), and recent studies provide evidence for the existence of capital structure goal (Drobetz, Schilling, & Schröder, 2015). In this context, the following research problem arises: Are macroeconomic variables related to the capital structure of public finance and insurance companies in Latin America and Asia?

Thus, this research analyzes the relationship between macroeconomic variables and the capital structure of public financial institutions in Latin America and Asia.

It is noteworthy that most of the studies analyzed in the survey contemplate the effect of only one macroeconomic variable on the capital structure of financial institutions (with diverging results), considering companies from only one region, be it Asia or Latin America. Therefore, this research goes further than the literature by concomitantly presenting the effect of GDP, interest rate, and exchange rate on the capital structure of finance and insurance companies in Latin America and Asia.

The study is justified by a different and complementary view, either by highlighting the concurrent use of macroeconomic variables or by considering companies from Latin America and Asia. In addition, as a theoretical contribution, complementing the evidence from studies by (i) Kayo and Kimura (2011) in which the manager cannot ignore the macroeconomic environment in decision making, (ii) Mokhova and Zinecker (2014) highlight that macroeconomic factors may vary among countries and affect corporate debt, (iii) Albanez (2015) points out that companies seek funds with low interest rates provided by development banks and (iv) and Tang and Yang (2017) state that macroeconomic risk affects entrepreneur's investment and financing decisions. On a practical level, the results may contribute to external users, especially investors and creditors of public finance and insurance companies in Latin America and Asia.

2 FUNDAMENTALS

Martucheli, Faria and Souza (2020) state that the capital structure is the result of important strategic decisions by a company, considering the external environment and sector of activity. Capital structure refers to the way companies use equity and third-party capital to finance their assets (Brito et al., 2007). Thus, the way the company is financed may or may not influence its value. The most traditional theory is that the capital structure is influenced by the value of the company, as the cost of capital for third parties must remain stable up to a certain level; beyond this limit, the increase in the risk of company bankruptcy is considerable (Durand, 1952).

In another view, the form of financing of a company is irrelevant to its final value, with its cost of capital being the same for any indebtedness (Modigliani & Miller, 1958). In a later study, Modigliani and Miller (1963) state that the investor's behavior starts to consider the tax advantage of third party capital in the capital structure. Using a more indebted structure, creditors, shareholders, and managers enter into a conflict of interest. These conflicts are generated because creditors add funds to companies without controlling them, possible changing shareholder attitude towards risk, since he/she receives all residual profit after paying the costs and expenses of the company (Jensen & Meckling, 1976).

Starting with Modigliani and Miller (1958), several researches were carried out considering information asymmetry, tax benefits and opportunities in the capital market (Bernardo, Albanez & Securato, 2018) From the well-known Theory of Trade-Off, Durand (1952) states that the company

should be indebted until its total cost reaches a minimum value, considering a third-party capital cheaper than the cost of equity capital linked to the increase in the cost of capital of third parties. This theory was later updated by Modigliani and Miller (1958), with the choice of capital structure being indifferent because cash flows and associated risks would determine the value of the company.

Moreover, the Pecking Order Theory exposed by Myers and Majluf (1984) defends the financing of companies on incorporated resources, resources originated by debts, and those obtained through company shares. As mentioned by Pinheiro *et al*. (2017): "If these resources were not enough, the company would give preference to external financing, with share issuance in the last case".

Over time, the Market Timing Theory highlights that the possibility of selling overvalued shares in the capital market induces companies to use a larger share of shareholders' equity (Baker & Wurgler, 2002). According to Drobetz, Schilling, and Schröder (2015), there is still no consensus in the literature on how quickly companies adjust their capital structure after leverage shocks. Estimating the adjustment speed can help to solve theories that explain the capital structure. The tradeoff model demonstrates that small adjustment costs can generate large fluctuations in companies (Drobetz, Schilling, & Schröder, 2015).

2.1 Capital Structure And Macroeconomic Variables

According to Booth *et al*. (2001), relevant variables to explain the capital structures of developed countries like the United States of America and the European continent are useful in developing countries like Brazil. However, there are systematic differences in the way in which these indices are affected by factors in each country, such as, for example, GDP growth rate, inflation rates, exchange rate variation, and the development of capital markets, even with large differences in institutional factors.

Terra (2007) highlights that despite being significant in explaining capital structure, country-specific macroeconomic and institutional factors do not seem to matter in leverage decisions. In turn, Kayo and Kimura (2011) concluded that firm variables are relevant in determining the capital structure of companies from developed and emerging countries, as there is evidence of important variables at the industry level in which the manager should not ignore the importance of the external environment and interactions at different corporate policy levels.

According to Zheng *et al*. (2012), corporate financing options tend to impact the investment decisions and growth prospects of a company, and informal cultural constraints tend to have a broader influence than formal laws. Thus, the authors put the national culture as a variable to make decisions about the capital structure, mainly the capital structure of foreign subsidiaries, where the national culture can have an important effect on the debt contracting environment.

The study by Mokhova and Zinecker (2014) elucidate that administrators and managers make their financial decisions according to the source of capital structure financing, based on macroeconomic conditions and country specificities, finding in their research a positive relationship between interest rate and capital structure. On the other hand, Dincergok and Yalciner (2011) argue that there is a negative relationship between interest rate and capital structure, and that the national public debt positively (negatively) influences the capital structure of emerging (developed) countries.

Serghiescu and Văidean (2014) state that access to financing and its cost represent important dimensions of competition between companies. Moreover, decisions about the choice of capital structure are essential to maximize the value of the company and, therefore, stimulate growth in the benefits of existing shareholders. According to Martins and Terra (2014), although Financial Development and Institutional Quality are highly influential on the credit and equity

market, one can notice a relationship between macroeconomic variables (*i.e.*, GDP, interest rate, exchange rate, and inflation rate) and the share market. In time, Bernardo, Albanez and Securato (2018) highlight that macroeconomic factors are fundamental for determining the capital structure.

For Öztekin (2015), legal and financial institutions are the first determinants to measure how fast a medium-sized company adjusts its leverage. Jõeveer (2013) argues that about half of the variation in country-specific leverage determinants in Eastern Europe is explained by known macroeconomic and institutional factors, while the rest is explained by immeasurable institutional differences. Balios *et al.* (2016) claim that the capital structure of small businesses is not affected by the macroeconomic environment in times of economic crisis. Consider large companies, in the view of Zeitun, Temimi e Mimouni (2017) the economic crisis reports major changes in the capital structure.

Not considering the period of economic crisis, Esmailpour, Sara e Rahimpour (2019) highlight that macroeconomic variables affect a capital structure of various business sectors.

The study by Albanez (2015) points out that institutional factors in Brazil can affect the financing of companies. The author states that share issuance is sometimes more advantageous than using debt, contrary to the pecking order theory. For the Chinese economy, Tang and Yang (2017) demonstrated that one of the factors that most impact business and decision making in investment, financing, and entrepreneur default under the capital structure is that as the duration of recessions decreases, an entrepreneur must accelerate investment, issue more debt, and choose a higher leverage ratio. Cardoso and Pinheiro (2020) highlight that the business sectors and are affected differently by macroeconomic variables.

When analyzing the capital structure of banks, Gale and Gottardi (2017) concluded that it is important to recognize the role of banks as intermediary, as bank deposits cannot be considered only debts. They also highlight that the capital structure in the banking and corporate sectors are interrelated. Several studies highlight the importance of macroeconomics for the capital structure in many countries and periods. Thus, we have the hypotheses of the study:

H$_1$: There is a positive relationship between interest rate and capital structure.

H$_2$: There is a positive relationship between gross domestic product and capital structure.

H$_3$: There is a negative relationship between exchange rate (in US dollars) and capital structure.

Thus, the present research complements empirical evidence of the relationship between macroeconomic variables and the capital structure in public financial companies in Latin America and Asia. The study corroborates the results found by Mokhova and Zinecker (2013), Serghiescu and Văidean (2014), Albanez (2015), and Tang and Yang (2017).

3 METHOD

This is a descriptive study with a quantitative approach, in which the variables are subject to statistical tests, using data from financial institutions in Latin America (Argentina, Brazil, Chile, and Mexico) and Asia (China, India, and Japan). Quantitative research uses statistical tools, that is, the researcher formulates hypotheses for confirmation (Creswell, 2014). This is done in order to find the possible relationships between macroeconomic variables (GDP, Exchange Rate, Interest Rate) and capital structure.

The sample included 372 public finance and insurance companies (considering the NAICS classification). Annual information (from 2010 to 2018) available in the Thomson Reuters Eikon database was used. The period is justified because it encompasses the Full-IFRS period in Brazil. In turn, macroeconomic data were obtained from the Word Bank database. Therefore, the research presents the capital structure (CS) as a dependent variable, in addition to macroeconomic variables (GDP, Exchange Rate, and Interest Rate), where the capital structure was considered as: CS = Liabilities/Equity.

Using Eviews 9 software, the data were analyzed as follows: (i) statistical description in terms of mean, maximum, minimum, and standard deviation (SWEENEY; WILLIAMS; ANDERSON, 2013) and; (ii) multiple regression and examination of assumptions: (1) normality (i.e. Central Limit Theorem); (2) heteroscedasticity (i.e. White correction); (3) multicollinearity (i.e. Variance Inflation Factors test (VIF)); (4) stationary (i.e. Increased Dickey-Fuller – Fisher (ADF-F), Levin, Lin and Chu (LLC), and Im, Pesaran and Shin tests (IPS)); and (5) autocorrelation (i.e. Durbin-Watson test) (*e.g.*, WOOLDRIDGE, 2014; GUJARATI, PORTER, 2011).

It is worth mentioning that the GDP stationarity was obtained in annual percentage variation and the hypothesis of autocorrelation was not rejected through the three estimates (i.e. Pooled, fixed effect and random effect). In the face of autocorrelation, the Newey-West estimate was adopted, robust for autocorrelation and heteroscedasticity. Considering multiple regression, the following equation was used:

$$CS = \beta 1\% GDP + \beta 2ER + \beta 3\% IR$$

Where: CS = Capital Structure;
GDP = Percent Change in Gross Domestic Product;
ER = Exchange Rate;
%IR = Interest Rate.

4 RESULTS

The descriptive statistics in Table 1 show that: (i) the research variables have a high standard deviation, justified by the diversity of companies in the sample; (ii) the local currency averaged US$ 0.0942 in the analysis period; (iii) the average interest rate in the period was 4.799% p.y., considered high in comparison with developed countries, and; (iv) the Operating Cash Flow (OCF) (control variable) averaged US$ 1.55 billion.

Table 1 – Descriptive Statistics (*in millions of reais).

Country	Variable	Mean	Maximum	Minimum	Standard Deviation
Grouped	CS	10.68	188.71	0.01	10.88
	GDP (in billions of US dollars)	3,077	13,200	217.53	3,354
	ER (in US$)	0.11	0.60	0.001	0.14
	IR (p.y.)	0.07	0.44	-0.0006	0.08
	OCF (in US$)	1.74e+9	1.60e+11	-1.34e+11	1.20e+10
Argentina	CS	7.01	13.45	2.26	2.78
	GDP (in billions of US dollars)	557.06	637.60	425.91	58.06
	ER (in US$)	0.12	0.25	0.02	0.07
	IR (p.y.)	0.23	0.44	0.09	0.11
	OCF (in US$)	3.68e+08	3.03e+9	-1.12e+9	6.89e+8
Brazil	CS	5.42	57.22	0.01	6.38
	GDP (in billions of US dollars)	2,203	2,614	1,769	308.60
	ER (in US$)	0.39	0.60	0.25	0.12
	IR (p.y.)	0.10	0.14	0.06	0.02
	OCF (in US$)	9.09e+08	3.88e+10	-2.44e+10	4.8e+10
Chile	CS	5.09	27.48	0.03	6.48
	GDP (in billions of US dollars)	256.94	284.75	217.53	20.66
	ER (in US$)	0.0017	0.0021	0.0014	0.0002
	IR (p.y.)	0.034	0.050	0.014	0.011
	OCF (in US$)	-1.01+08	2.36e+09	-2.83e+09	5.81e+8
Mexico	CS	7.10	100.96	0.09	9.56
	GDP (in billions of US dollars)	1,172	1,298	1,051	82.54

	ER (in US$)	0.064	0.080	0.048	0.012
	IR (p.y.)	0.046	0.076	0.030	0.015
	OCF (in US$)	1.97e+07	1.91e+9	-3.02e+9	4.54e+8
China	CS	7.50	45.37	0.019	6.21
	GDP (in billions of US dollars)	10,413	13,200	6,100	2,000
	ER (in US$)	0.154	0.165	0.143	0.006
	IR (p.y.)	0.030	0.041	0.021	0.006
	OCF (in US$)	4.31e+09	1.53e+11	-1.34e+11	2.00e+10
India	CS	9.73	26.27	0.03	6.14
	GDP (in billions of US dollars)	2,122	2,689	1,675	342.5
	ER (in US$)	0.016	0.022	0.014	0.002
	IR (p.y.)	0.07	0.08	0.05	0.008
	OCF (in US$)	8e+07	2.36e+9	-1.73e+9	4.99e+8
Japan	CS	18.92	188.71	1.95	14.24
	GDP (in billions of US dollars)	5,232	6,203	4,394	588.0
	ER (in US$)	0.009	0.012	0.008	0.001
	IR (p.y.)	0.0003	0.0009	-0.0006	0.0006
	OCF (in US$)	2.78e+09	1.60e+11	-4.53e+10	1.39e+10

Source: Elaborated by the authors with research data.

Table 2 indicates the negative and significant relation at 1% between GDP and capital structure (not confirming the hipothesis 2) not corroborating the study of Tang and Yang (2017). In that study, the authors analyzed only Chinese companies, what possibly justifies the difference in both the sample and the analysis period. The intercept showed a positive and significant relation at 1%.

In turn, the macroeconomic variable, Exchange Rate, showed a negative and significant relation at 1% with the Capital Structure. Thus, confirming the hypothesis 3, the negative relationship corroborates the research of Drobetz, Schilling, and Schröder (2015), thus highlighting the relevance of macroeconomics to the capital structure of financial institutions.

Furthermore, the Interest Rate showed negative and significant relation at 1% with the Capital Structure (not confirming the hipothesis 1), not corroborating the study of Mokhova and Zinecker (2013), possibly by considering developing countries and regulation of the financial sector. In other words, the need for less regulation of the financial system. The research control variable, OCF (e.g. Castro & Martinez, 2009), showed a positive and significant relation at 1%. This means that a positive variation in OCF will positively impact the indebtedness of the financial institution. In other words, given the objective of verifying the impact of macroeconomic variables, OCF was considered as a control variable.

Table 2 – Regression Analysis of the Independent Variable CAPITAL STRUCTURE

	CS
	Newey-West
INTERCEPT	13.85***
GDP	-10.53***
ER	-14.60***
IR	-40.27***
OCF	7.61e-11***
R^2	0.1305
Adjusted R^2	0.1305
F	98.84
(sig)	0.0000

*Indicators statistically significant at 10% ($P<0.10$)

** Indicators statistically significant at 5% ($P<0.05$)

*** Indicators statistically significant at 1% ($P<0.01$)

Source: Elaborated by the authors with research data.

The study on CS, initially reported by seminal works (e.g. Modigliani & Miller, 1958; Myers & Majluf, 1984), focuses on its determinants (e.g. Mokhova & Zinecker, 2014). Specifically, move forward at the sectoral level (e.g. Kayo & Kimura, 2011). Finally, the study corroborates with the literature, specifically on the relationship between macroeconomics and financial institutions (*e.g.*, English et al., 2018), focusing only on performance (*i.e.*, stock return or financial statement performance). Therefore, this research helps to understand the effects of macroeconomics on the indebtedness of financial institutions.

5 CONCLUSION

Macroeconomic variables were significant relation at 1% with the capital structure of the Latin American and Asian financial institutions analyzed. Interest rate, GDP and exchange rate were negative and significant relation at 1% with the capital structure of financial institutions, not confirming the hipothesis 1 and 2.

In other words, not corroborating with the studies highlighted above, which is justified by the greater regulation of the financial sector in developing countries. Still, confirming the hypothesis 3, thus highlighting the relevance of macroeconomics to the capital structure of financial institutions.

The research contribution is advancing towards understanding significant relationships between macroeconomic variables and the capital structure of financial institutions in developing countries. The results of this research cannot be extrapolated, being restricted to the group of financial institutions in the research sample. On a practical level, it is essential for investors and creditors to consider the macroeconomic effects on the capital structure of financial institutions.

Further research should include: (i) a sample containing developed and developing countries; (ii) the concomitant presence of endogenous and exogenous variables to verify capital structure; (iii) using a longer period of analysis, *i.e.*, before and after IFRS, and; (iv) use of independent variables with lag.

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