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# Capital Structure and Share Liquidity in Latin America: A Panel Data Approach

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**Abstract**

The objective of this study was to analyze the existence of a relationship between stock liquidity and capital structure of publicly traded companies in Latin America, specifically Argentina, Brazil, Chile, Colombia, Mexico, and Peru, between 2011 and 2018. For data analysis, the panel data methodology was used, selected from the pooled data models, fixed effects and random effects. The Presence, Trading Volume, and Liquidity Index on the stock exchange were used as dependent variables. Indebtedness Index, Size, Tangibility, Market to Book, and ROA were the independent variables used. The results indicate a positive relationship between size and future expectation of the firms, measured through the Market to Book, and all liquidity indicators on the stock exchange. Regarding the presence on the stock exchange, there was a negative relationship with indebtedness, tangibility, and level of profitability of the analyzed companies.

**Keywords:** indebtedness, equity liquidity, Latin America, capital structure, panel data

## 1. Introduction

This paper aims to analyze the relationship between capital structure and share liquidity in Latin American companies. In other words, it is intended to investigate which factors are decisive for the stock liquidity and the impact of the capital structure on the stock liquidity of Latin American companies.

For the theoretical basis of the hypotheses that permeate this study, the Pecking Order and Trade-off theories were selected because they define the assumptions of interaction between indebtedness and profitability. Although these theories do not present a comparison between debt and stock liquidity, factors such as asymmetry of information between company managers and investors, tax benefits related to interest expenses, and reduction of income tax can be elements of analysis in the relationship between structural decisions of capital.

The Pecking Order theory assumes the existence of information asymmetry between the various stakeholders existing in companies, especially between company managers and investors, or between shareholders and creditors. This asymmetry, according to Iquiapaza and Amaral (2008), motivates investors to buy shares only when they are offered at a discount since buyers tend to treat them as if they are overestimated in the market. Perobelli and Famá (2003) also argue that the higher the profit of a company, the lower its level of indebtedness. According to Myers (1984), the Pecking Order theory is a counterpoint to the Trade-off theory. According to the principles of the Pecking Order, there is a hierarchy of preferences in choosing the source of funding. First, it opts for the use of retained earnings; subsequently, fundraising through third-party capital (debt) is more interesting; and, finally, the issue of shares in the market is chosen in order to finance investment alternatives. This order is based on the aforementioned information asymmetry present in the management of companies. The choice of the source of capital follows a decreasing order of accountability, in which the lower the level of disclosure of information necessary to raise funds from a given source of capital, the more attractive it will be for management decision makers the use of resources from that source. Thus, the preference will be, first, for the resources generated internally, later for the capital of third parties and, finally, for the use of own capital, through

the issuance of shares in the capital market. This preference may impact the demand or the market value of the shares. Thus, it is expected that, the greater the indebtedness, the lower the liquidity level of shares, due to the asymmetry of information between investors and company managers. However, Cheung et al. (2020) observed a positive relationship between share liquidity and access to third-party capital. They concluded, based on the results of the study, that companies with greater share liquidity, by providing more information to the market, reduce the information asymmetry, which causes a decrease in risk and, consequently, in the cost of third-party capital. This phenomenon encourages the use of third-party capital.

Still according to the trade-off theory (Nakamura & Bastos, 2009), the higher the level of indebtedness of a company, the greater its profit. This is due to tax reductions resulting from the tax benefit provided by indebtedness. In addition, third-party capital sources, as they take less risk, are usually cheaper than equity, which directly contributes to increased profitability, compared to the investment opportunity cost.

Deangelo and Masulis (1980) developed a model with the objective of recognizing an optimal level of financial leverage from the tax benefit of the debt. The authors argue that financial deductibility encourages companies with less volatility and a higher level of profit to have more indebtedness and leverage, and also argue that a company's level of financial leverage should be inversely related to the level of expenses such as depreciation and amortization, since that these are tax deductible.

Brealey and Myers (2006) state that each company has an optimal capital structure, defined based on the profitability and tangibility of its assets. According to the authors, low profitable companies with less tangibility of assets tend to finance themselves with their own resources, while more profitable companies with more tangible assets make more use of third-party resources, causing debts to discipline managers and reduce agency costs.

Myers (2001) observed the tendency of more profitable firms to present low levels of indebtedness, which contradicts the trade-off theory. The author points out that this theory does not explain the negative relationship between profitability and leverage. However, it is expected that the greater the indebtedness, the greater the stock liquidity, due to the increase in profit caused by tax deductions from financial expenses, although the level of indebtedness is proportional to the financial risk of the firm.

Damodaran (2004) cites as an advantage point of the higher level of indebtedness the obligation on the part of the managers of the company to have greater discipline in the choice of projects, since there is an obligation to pay interest and the debt itself.

From the analysis of the trade-off and Pecking Order theories, there are contrasting explanations in relation to the preference for the capital source. The trade-off points out that third-party capital will be chosen for favoring the company's performance by reducing taxes. On the other hand, the Pecking Order, argues that the capital of third parties will only be chosen if there is not enough internal generation of resources to make the necessary investments. An interesting point to note is that neither theory puts equity as a priority source of funds.

Thus, one may ask: is indebtedness a signal sent to the market that the company is having difficulties in generating cash internally? Or can access to third-party capital, represented by the level of indebtedness, be considered an indication that the company has a positive financial disclosure level? In addition, how does the capital market, represented by the level of liquidity of the shares, react to changes in the level of indebtedness?

## 2. Bibliographic Review

### *2.1 Liquidity and Return on Equity (ROE)*

According to Correia, Amaral, and Bressan (2008), a considerable number of studies were carried out from the 1980s onwards, with the objective of observing which factors influence the interaction between liquidity and stock yield. During this period, the production of studies begins in order to investigate whether, in addition to the systematic risk assumed in the CAPM model - Capital Asset Pricing Model (financial asset pricing model), there are other factors that would explain the return on securities in the market.

From Amihud and Mendelson (1986) a model was created with the objective of investigating the relationship between return and spread (difference between the price offered and demanded for a security). The empirical research of this study referred to the interactions between systematic risk, return and liquidity (bid-ask spread) and the authors demonstrated that profitability is an increasing function of risk and illiquidity. Due to the clientele effect, in which stocks with higher returns are held by investors for a longer period, it is observed that the lower the liquidity of the securities, the greater the returns and the possibility of these securities being sold at a higher price later. Based on this research, Amihud and Mendelson (1986) concluded that the liquidity of assets must be considered when making investment decisions and should be an integral part of the valuation of assets.

Famá and Bruni (1999) analyzed the relationship between stock liquidity and their returns in São Paulo Stock Exchange (Bovespa), between 1988 and 1996. The authors concluded that the results obtained were consistent with the existing theoretical foundation, such as that by Amihud and Mendelson (1986), since there was a strong negative correlation between returns and liquidity, that is, the lower the liquidity, the higher the stock returns. In addition, there was a greater correlation between stock liquidity and return than between systematic risk and return. This information demonstrates the relevance of analyzing stock liquidity on return, already observed by Amihud and Mendelson (1986) and, based on the work by Famá and Bruni (1999), also verified in the Brazilian stock market.

The study by Jun, Marathe and Shawky (2003) aimed to analyze the relationship between liquidity and stock returns in a group of 27 developing countries, during the years 1992 to 1999. As a result, they observed the existence of a positive correlation between the returns of stocks and market liquidity. Based on their studies and research by Bekaert and Harvey (1997), the authors supported the view that developing countries have stock markets with a lower level of integration with the global economy.

Correia, Amaral, and Bressan (2008) carried out a study with the objective of verifying the influence of liquidity in the formation of stock prices, using securities of Brazilian companies traded on the Bovespa between 1995 and 2004. Through multiple data regression analysis in a panel, the authors concluded that the relationship between market return and the stock liquidity parameter is positive, which is consistent with studies carried out with developing countries, such as the one elaborated by Jun, Marathe, and Shawky (2003).

Amihud (2002), on the other hand, analyzed the relationship between stock return and its liquidity over time, using the shares traded on the New York Stock Exchange (NYSE) between 1963 and 1997. It was concluded that there is a negative correlation between the liquidity of the market and the return of the shares. The author also noted that the effects of liquidity and stock returns differ according to the size characteristics of the portfolio: the effects of lack of liquidity tend to be greater in returns from smaller portfolios. From the results of the research, the author also verified that the excess return of the stock, also known as the risk premium, can be considered part of a premium for the illiquidity of the security. This result is consistent with the study by Amihud and Mendelson (1986), in which the return on an asset increases proportionally to its liquidity.

Rueda (2011) analyzed the relationship between transaction costs and liquidity in the stock market and the impact on the share price, using the Colombian Stock Exchange in three different short transaction periods, starting on April 24 2007, and ending on May 30, 2008. From that point on, the author observed a direct relationship between liquidity and stock market activity, as well as between liquidity and stock yield, however, an inverse relationship was observed between liquidity and volatility. After the start of trading of Ecopetrol shares on November 28, 2007, there was also a reduction in liquidity on the stock exchange, due to the high proportion of transactions with that specific company rather than with shares of other companies.

Silva (2009) intended to study the relationship between stock liquidity and the level of disclosure of publicly traded Brazilian companies, active in the Steel and Metallurgy sector. From his study, it was observed that there is a significant and positive relationship between stock liquidity and the level of disclosure, which decreased the return required by shareholders, that is, there is a reduction in the cost of capital. The conclusion of the study by Silva (2009) corroborates previous works that carry out studies analyzing similar variables.

Briefly, regarding studies about the relationship between liquidity and stock returns, Amihud and Mendelson (1986) questioned the assumption that only systematic risk would be necessary to understand the behavior of the return on assets. The authors concluded that observing the liquidity of the securities is also a relevant factor for understanding the return on assets. Based on their empirical research, they define that the greater the liquidity of the securities, the greater the return, due to the clientele effect. The study by Amihud (2002), using the shares traded on the NYSE, was consistent with the theoretical assumption, as well as Famá and Bruni (1999), who reached a negative correlation between liquidity and return, using data from Bovespa between 1988 and 1996.

However, in the study by Jun, Marathe, and Shawky (2003), which used 27 developing countries between 1992 and 1999, the correlation between liquidity and return is not negative, because the greater the volume of trading in a stock, the greater their returns. This type of relationship between liquidity and return is confirmed in the results obtained by Correia, Amaral and Bressan (2008), who used Bovespa's shares between 1995 and 2004, and Rueda (2011), who used the shares traded on Colombian stock exchange in three different periods, between 2007 and 2008.

Although the results by Famá and Bruni (1999) and by Correia, Amaral and Bressan (2008), in their studies on liquidity versus return on Bovespa, are conflicting in relation to the above mentioned authors, this may indicate not only that developing countries have a different relationship compared to developed countries. But also, that a

same developing country may have different relationships between liquidity and stock returns, depending on the period analized and the macroeconomic and internal variables that influenced it.

*2.2 Stock liquidity and Capital Structure*

Authors such as Terra (2007), Lesmond, O'Connor, and Senbet (2008), Bastos and Nakamura (2009), Lipson and Mortal (2009), and Donato (2011) conducted research in order to understand the variables that influence the capital structure decisions of companies and what would be the composition of an ideal financing structure. The influence on companies' financing decisions, regarding their capital structure, is an interesting observation factor that begins to be studied in Modigliani and Miller (1958), whose study concluded that the company's capital structure would be irrelevant for the determination of its value. This conclusion is contrary to the paradigm of the time, in which an optimal capital structure was sought.

According to the theory prevailing at the time, as the cost of indebtedness is less than the cost of equity, the company should use third-party capital to a point of equilibrium, which would be achieved taking into account that the cost of indebtedness would remain stable up to a certain level of indebtedness and, after this point, it would increase proportionally in relation to the risk of financial difficulties.

However, Modigliani and Miller (1963) reached another conclusion, this time considering a factor which was absent from the first study: the effect of the debt tax benefit. The authors noted in their new study that, due to the interest on debt being discounted from taxable profit in the form of expenditure, there was a gain on financial leverage. Although the authors themselves, in this study, did not advise the total use of debt in the capital structure, they also looked for ways that offered lower capital costs, such as reinvested profits, Modigliani and Miller (1963) point to a strong argument in favor of the use of third-party capital by companies.

The conflict between the company's owner and controller and its impacts on the capital structure begin to be explored with more emphasis from Jensen and Meckling (1976). According to the authors, the agency cost originates in two types of conflict: between shareholder and creditor and between shareholder and manager. While the first conflict arises from the chance of non-compliance between creditors and shareholders / managers and the possible asymmetry of information between them, the second originates from the conflicting personal goals between the company's administrator, who prioritize the improvement of their working conditions; and the shareholder, who seeks to maximize his/her wealth. Although the authors argue that agency costs are inevitable, they propose that an optimal capital structure can be acquired by achieving the maximum reduction in agency costs, that is, agency costs should be a factor to be taken into consideration for the formation of the capital structure of companies.

Rajan and Zingales (1995) investigated the relationship between the factors influencing the capital structure of the industrialized countries of the G-7 (Germany, Canada, France, Italy, Japan, and the United Kingdom) and the United States, using data from dates between 1987 and 1991. Using tangibility, Market to book, size of firm and profitability as independent variables and, as dependent variables, accounting, and market indebtedness, the authors found a positive relationship between tangibility and indebtedness for all countries, a relationship negative between Market to book and indebtedness for all countries, with the exception of Germany, and finally a negative relationship between profitability and indebtedness, which corroborates the Pecking Order theory.

Perobelli and Famá (2002) carried out a study with the objective of investigating which factors determine the indebtedness of Brazilian companies, using 165 companies between 1995 and 2000 as the sample. It was found a negative relationship between short-term indebtedness and size, which can be an indication of the lack of access of small companies to long-term financing with attractive rates in Brazil. A negative relationship between short-term debt and profitability was also observed, which may indicate the use of profit for highly profitable companies rather than of short-term debt.

Terra (2007) investigated the relevant macroeconomic factors to determine capital structure in a sample of more than 700 companies from seven Latin American countries: Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela, from 1986 to 2000. Using the panel data method, the author observed that the idiosyncratic factors of each company are more important for determining capital structure than inherent factors to each country.

Lesmond, O'Connor, and Senbet (2008) analyzed the relationship between stock liquidity and capital structure, using as sample information from 276 non-financial companies that leveraged using third-party capital, between 1980 and 2006. The authors concluded that financial leverage leads to an increase in stock liquidity, reducing the cost of capital and the possibility of trading shares based on inside information. Observing the substitution of third-party capital for own capital, the authors concluded that this modality increases liquidity costs (bid-ask

spread) due to the increase in information asymmetry.

Bastos and Nakamura (2009) investigated the determinants of the capital structure in a sample of 297 companies in Brazil, Mexico, and Chile, between 2001 and 2006. The authors found a strong relationship between the capital structure in these countries and current liquidity, profitability, Market to book, and size factors. They also found that the Pecking Order theory would be more suitable to explain the obtained results with the sample of companies from Brazil and Mexico, while the trade-off theory would be more appropriate to explain the results of the companies in Chile.

Lipson and Mortal (2009) analyzed the relationship between liquidity of shares and capital structure in a sample of publicly traded companies between 1986 and 2006. Using the argument that stock liquidity decreases the cost of capital by reducing the return rate required on equity, the authors concluded that the expected behavior was for companies to make more use of equity, reducing leverage. Lipson and Mortal (2009) also argued that companies with a lower degree of leverage and more liquid shares, when obtaining market capital, prefer their own resources as a form of investment.

According to Donato (2011), among the issues discussed in relation to capital structure, the hypothesis that the value of the firm would depend on its forms of financing and which specific and macroeconomic factors influence the choice between third-party capital and equity to finance its investments stands out. The author's study aimed to investigate the relationship between Brazilian stock market liquidity and capital structure. Publicly traded companies from 1998 to 2009 were used, using the panel data methodology through the Economática® database. A positive relationship was observed between stock liquidity and the firms' indebtedness policy, i.e., in the analyzed sample, companies with higher stock liquidity tend to have a higher level of long-term indebtedness. In her analysis, Donato (2011) also cited the scarcity of studies related to stock liquidity and capital structure in relation to the large amount of theoretical and empirical research that seeks to understand the determining factors in corporate financing decisions.

Despite the existence of a large number of studies related to determining factors for the capital structure of companies, observed by Donato (2011), the scarcity of studies that relate capital structure and stock liquidity persists. Since 2009, when the sample of the author's study ended, several macroeconomic phenomena and changes in the paradigm of companies have occurred'. Thus, the objective of this study is to observe if there were changes in the relationship between the two factors. It is important to point out that recent studies analyzing capital structure have as theoretical basis the seminal work by Modigliani and Miller (1958), who argued that the capital structure of companies would be irrelevant for the determination of its value. Later corrected by the same authors, Modigliani, and Miller (1963), when they acknowledged that taxes and tax benefits from them affect capital structure. And, added to the need to consider the agency costs for the composition of the capital structure, according to Jensen and Meckling (1976).

Dang et al. (2019) and Cheung et al. (2020) when analyzing the relationship between stock liquidity and capital structure reached conflicting results. For Dang et al. (2019), firms with a high level of stock liquidity tend to present a lower level of indebtedness. Cheung et al. (2020), on the other hand, concluded that stock liquidity reduces the level of asymmetry and stimulates indebtedness. Thus, Table 1 presents a summary of the studies that empirically analyze the capital structure.

Table 1. Summary of the studies that empirically analyze the capital structure

| Author(s) | Sample | Sample Period | Observation Factors |
|---|---|---|---|
| Rajan and Zingales (1995) | G-7 (Germany, Canada, France, Italy, Japan, and United Kingdom), and the United States of America | 1987-1991 | Negative relationship between profitability and indebtedness, which corroborates the Pecking Order theory. |
| Perobelli and Famá (2002) | Open capital non-financial enterprises in IBOVESPA | 1995-2000 | Short-term relationship between size and indebtedness can be explained by the lack of acess to small Brazilian enterprises and to long-term financing means |
| Terra (2007) | Enterprises from Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela | 1986 to 2000 | Idiossincratic factors of each enterprise are more important to determine the capital structure than inherent factors to specific countries |
| Lesmond, O'Connor and Senbet (2008) | Open capital non-financial enterprises in NYSE | 1980 to 2006 | Positive correlation between third-party capital and stock liquidity |
| Bastos and Nakamura (2009) | 297 enterprises from Brazil, Mexico, and Chile | 2011 to 2006 | Strong relationship between the capital structure on the three countries and the factors: current liquidity, profitability, market to book and size. |
| Lipson and Mortal (2009) | Open capital enterprises in NASDAQ | 1986 to 2006 | Positive relationship between equity and stock liquidity |
| Donato (2011) | Open capital non-financial enterprises in IBOVESPA | 1998 to 2009 | Positive relationship between third-party capital and stock liquidity |
| Dang et al. (2019) | Different enterprises from 41 countries | 2000 to 2010 | Negative relationship between stock liquidity and leverage |
| Cheung et al. (2020) | American enterprises | 1991 to 2013 | Positive relation between stocks' liquidity and leverage |

Source: Elaborated from several authors (2019).

## 3. Method

The purpose of this study is to investigate the relationship between capital structure and the stock liquidity level of publicly traded companies in Latin America. For this, financial data from 518 non-financial companies from six Latin American countries - Argentina, Brazil, Chile, Colombia, Mexico, and Peru - were analyzed, whose shares were traded on the exchanges of each of these countries. The data were obtained through the Economática® system, collected in December 2019 and belonging to the 2011-2018-time interval. Financial companies were excluded from the database, those with negative equity or that presented some inconsistency in their financial information.

As a parameter for measuring stock liquidity, a variable dependent on the study, three measures provided by the Economática® system were used, namely the Presence on the Stock Exchange (PB), the Trading Volume on the Stock Exchange (VN) and the Liquidity Index on the Stock Exchange (ILB).

The stock market presence (PB) variable is calculated from the ratio between the number of days that the company's shares were traded on the stock exchange and the total number of trading days on the stock exchange in the year, as a percentage. This indicator aims to present a way of measuring the trading volume of the companies in the sample. The equation for the PB variable is presented in Equation 1.

The text size of formula should be similar with normal text size. The formula should be placed in the middle and serial number on the right. For example:

$$B = 100 * \frac{DN}{DP} \tag{1}$$

in which DN represents the number of days the company has traded its shares and DP, the total number of trading days in the year.

The Trading Volume (VN) represents the degree of relevance of a company's shares in relation to the market. Equation 2 refers to this variable.

$$VN = 100 * \frac{AN}{AC} \tag{2}$$

in which AN is the number of shares traded and AC, the number of shares of the company in circulation.

The liquidity index (ILB) on the stock exchange is calculated from Equation 3:

$$ILB = 100 * \frac{DN}{DP} * \sqrt{\frac{n}{N} * \frac{v}{V}} \tag{3}$$

in which ILB is the Liquidity Index on the Stock Exchange, DN is the number of days on which trading took place, DP is the number of days to be observed, in the number of trades with the stock in the chosen period, N the number of trades with all the shares in the observed period, v the volume of money with the share within the observed period and V the volume of money with all shares within the sample period.

The capital structure, in turn, was analyzed based on the ratio between Total Liabilities and Total Assets, representing, therefore, the percentage of third-party capital in the capital structure of the firms analyzed. In addition to the debt measure, the analyzed model included other independent variables, as can be seen in Table 3. Among them, Firm Size, Tangibility, Immobilization, Market to Book, and Return on Assets stand out.

Table 2 shows the variables used and their corresponding definitions.

In order to investigate the relationship between debt and stock liquidity, a panel data model was used with data on the variables of the chosen companies. The panel data methodology allows the analysis of several units (companies, in this case) over time, thus having two dimensions: cross-section (spatial) and temporal. In this way, it is possible to analyze how the cross-section units behave over time.

Table 2. Variables used in the study

| Variables | | Definitions |
|---|---|---|
| Dependent variables | ILB | Stock Market liquidity index ( $ILB = 100 * \frac{DN}{DP} * \sqrt{\frac{n}{N} * \frac{v}{V}}$) |
| | PB | Presence in Stock Exchange (100*DN/DP) |
| | VN | Trade Volume (100*AN/AC) |
| Independent variables | END | Net equity percentage (PT/AT) |
| | TAM | Size of the firm (AT logarithm) |
| | TANG | Tangibility (IMOB/AT) |
| | MTB | *Market to book* (AM/AT) |
| | ROA | Return on assets (LOPL/AT) |

The ILB, PB, VN, END, TAM, TANG, MTB and ROA acronyms represent, in order, the variables Liquidity Index on the Stock Exchange; Presence on the Stock Exchange; Trading Volume; Indebtedness; Size; Tangibility; Market to Book and Return on Assets.
Source: Elaborated by the authors.

Among the advantages of this method, according to Hsiao and Tahmiscioglu (1997), the possibility of a greater number of observations can be cited, decreasing the collinearity between the explanatory variables, and increasing the degrees of freedom. According to Gujarati and Porter (2011), in panel data regression models there is the detection of effects, impossible to be observed in cross-sectional data and time series, such as changes in variables after a specific event.

The regression analysis with Panel data was chosen in order to verify the relationship between capital structure and the indicators representing stock liquidity. Considering the nature of the database, which is characterized as a short panel, that is, a panel with a smaller temporal dimension than the cross-section, the use of POLS models with robust clustered standard errors is justified, with between estimator, fixed effects, fixed effects with clustered robust standard errors, random effects and random effects with clustered robust standard errors, according to Fávero (2013). And the selection of the best model will be carried out using the Breusch-Pagan tests, the Chow F test and the Hausman test.

When using panel data, it is necessary to address the issue of unobserved heterogeneity (factors which are not directly observable). For example, intrinsic characteristics of firms that cannot be directly measured. These factors, which are fixed in time, may or may not be correlated with the explanatory variables. If the factor is not correlated with the explanatory variables, we can use the fixed effects estimator, which eliminates unobserved heterogeneity (and all the constants in the model) by estimating a transformed equation (subtracting the average of the variables over the entire period) analyzed - within estimator. The random effects model, on the other hand, assumes that the unobserved heterogeneity is not correlated with the error term and estimates with the compound error term (idiosyncratic error plus unobserved heterogeneity). To check which model is more appropriate, we can use the Hausman test (1978). This test basically consists of comparing the estimates of fixed and random effects in order to verify if there is a correlation between the unobserved heterogeneity and the explanatory variables. The null hypothesis of the Hausman test is that the estimator of random effects is consistent. It should be noted that the pooled-OLS (pooled least squares) estimator does not consider the issue of unobserved

heterogeneity. Finally, given that the idiosyncratic error term may contain heteroscedasticity and / or autocorrelation, we also proceed the estimation with the robust options for these problems (robust standardized clustered errors).

To represent stock liquidity in this study, three variables were chosen and, for each variable, a model equation, equations 4, 5 and 6. The first model uses as dependent variable - the Stock Exchange Liquidity Index (4), the second - Stock Exchange Presence (5), and the third - Trading Volume (6). As there are three variables related to stock liquidity, the same number of regression models were analyzed, in addition to the explanatory variables of interest representing indebtedness, size, tangibility, market to book performance and return on assets. The regression models in panel data used in the present are data by:

$$ILB_{it} = \beta END_{it} + \beta TAM_{it} + \beta TANG_{it} + \beta MTB_{it} + \beta ROA_{it} + \varepsilon_{it} \quad (4)$$

$$PB_{it} = \beta END_{it} + \beta TAM_{it} + \beta TANG_{it} + \beta MTB_{it} + \beta ROA_{it} + \varepsilon_{it} \quad (5)$$

$$VN_{it} = \beta END_{it} + \beta TAM_{it} + \beta TANG_{it} + \beta MTB_{it} + \beta ROA_{it} + \varepsilon_{it} \quad (6)$$

in which i represents the company and t the year; END is the indebtedness index, calculated by the ratio between total liabilities and total assets; TAM is the size of the firm, measured by the logarithm of total assets; TANG represents tangibility, measured by the ratio between fixed assets and total assets; MTB is the market to book, an indicator of market profitability that represents future market expectations; ROA is the return on assets; and $\varepsilon$ is the error.Include in these subsections the information essential to comprehend and replicate the study.

**4. Data Analysis**

The results of the descriptive and regression analyzes with panel data are presented below. Table 3 presents the descriptive analysis separated by variables and countries.

Table 3 shows that the liquidity ratio on the stock exchange in Colombia, on average, is higher than in other Latin American countries, as well as the standard deviation. Colombian company Ecopetrol, on the Colombian stock exchange since 2007, has the highest liquidity index in the stock market among Colombian companies. Therefore, it causes a discrepancy in relation to the liquidity index of other countries. According to Rueda (2011), between December 3, 2007 and May 30, 2008, for example, there were 97,818 transactions with Ecopetrol shares, almost three times more than the second company in the ranking, Fabricato, with 33,380 transactions. The volume of shares traded by Colombian companies is also higher than in other countries, influenced by Ecopetrol. It is important to highlight that Colombia has the smallest number of companies in the sample, its base being composed of a company with a remarkably high liquidity index, Ecopetrol, together with others with an index close to zero. For this reason, the disparity in relation to other countries and the high standard deviation. Brazil has the lowest stock market liquidity and trading volume in the sample. Its highest liquidity ratios were found in Petrobras' negotiations.

The indebtedness of Argentinean companies is, on average, higher compared to the other countries in the sample. Bernardo (2016), when investigating the composition of indebtedness and capital structure of companies in Latin America, found in Argentina greater short-term leverage, which can be explained by the fact that companies in that country are smaller and have reduced access to long-term financing. Bernardo (2016) also mentions that Argentina had the highest inflation rate in the period, with 18%, and the lowest rate of participation of companies in GDP, with 50%.

The size variable was calculated from the natural logarithm of the total assets of the companies, thus establishing that the size of the firms has an intrinsic relationship with the quantity of assets. In Mexican companies, the highest average was observed, while Brazilian ones have the highest standard deviation. The high standard deviation found in Brazilian companies is due to the difference in size, measured by total assets, of publicly traded Brazilian companies. While companies like Petrobrás, Banco Itaú and Vale have a high asset value, in the billions of reais, there are also companies in the sample with significantly low total assets.

Table 3. Descriptive analysis of Latin American countries

| | | Total | AR | BR | CL | CO | MX | PE |
|---|---|---|---|---|---|---|---|---|
| ILB | Mean | 0.583 | 0.506 | 0.283 | 0.690 | 1.448 | 0.829 | 0.575 |
| | Std. Dev. | 1.538 | 1.273 | 0.709 | 1.670 | 3.647 | 1.592 | 1.417 |
| | Min | - | - | - | - | - | - | - |
| | Max | 26.396 | 11.922 | 8.502 | 11.950 | 26.396 | 11.053 | 12.638 |
| PB | Mean | 60.487 | 80.420 | 69.696 | 50.681 | 60.814 | 71.261 | 32.982 |
| | Std. Dev. | 42.077 | 29.742 | 40.543 | 40.494 | 39.788 | 39.630 | 39.022 |
| | Min | - | - | - | - | - | - | - |
| | Max | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 |
| VN | Mean | 0.584 | 0.583 | 0.280 | 0.680 | 1.429 | 0.778 | 0.630 |
| | Std. Dev. | 1.576 | 1.650 | 0.753 | 1.657 | 3.619 | 1.593 | 1.498 |
| | Min | - | - | - | - | - | - | - |
| | Max | 26.324 | 14.647 | 9.483 | 11.172 | 26.324 | 12.052 | 11.658 |
| END | Mean | 0.537 | 0.631 | 0.591 | 0.484 | 0.485 | 0.554 | 0.446 |
| | Std. Dev. | 0.199 | 0.184 | 0.208 | 0.186 | 0.181 | 0.181 | 0.165 |
| | Min | - | 0.131 | 0.042 | 0.003 | 0.122 | - | - |
| | Max | 0.999 | 0.995 | 0.999 | 0.970 | 0.883 | 0.989 | 0.981 |
| TAM | Mean | 5.900 | 5.513 | 6.058 | 5.760 | 6.206 | 6.219 | 5.487 |
| | Std. Dev. | 0.791 | 0.770 | 0.801 | 0.779 | 0.669 | 0.659 | 0.666 |
| | Min | 2.597 | 3.975 | 3.784 | 2.762 | 4.700 | 3.940 | 2.597 |
| | Max | 8.521 | 7.437 | 8.521 | 7.462 | 7.838 | 7.938 | 6.895 |
| TANG | Mean | 0.352 | 0.349 | 0.250 | 0.374 | 0.335 | 0.356 | 0.539 |
| | Std. Dev. | 0.247 | 0.250 | 0.221 | 0.235 | 0.251 | 0.223 | 0.219 |
| | Min | - | - | - | - | - | - | - |
| | Max | 0.980 | 0.866 | 0.963 | 0.881 | 0.903 | 0.980 | 0.931 |
| MTB | Mean | 1.219 | 1.647 | 1.223 | 1.128 | 0.984 | 1.434 | 0.975 |
| | Std. Dev. | 0.845 | 1.031 | 0.765 | 0.895 | 0.533 | 0.765 | 0.876 |
| | Min | - | 0.266 | 0.042 | 0.021 | 0.223 | 0.258 | - |
| | Max | 9.011 | 8.450 | 6.169 | 9.011 | 3.022 | 5.834 | 6.419 |
| ROA | Mean | 0.072 | -0.006 | 0.095 | 0.068 | 0.054 | 0.077 | 0.062 |
| | Std. Dev. | 0.138 | 0.199 | 0.160 | 0.106 | 0.071 | 0.097 | 0.128 |
| | Min | -1.440 | -1.440 | -1.190 | -0.609 | -0.150 | -0.617 | -1.371 |
| | Max | 4.381 | 0.614 | 4.381 | 1.194 | 0.338 | 1.113 | 0.696 |
| | N | 3822 | 283 | 1292 | 770 | 193 | 660 | 624 |
| | n | 518 | 37 | 183 | 101 | 25 | 90 | 82 |

The description of the variables is available in Table 5. The AR, BR, CL, CO, MX and PE acronyms represent, in order, the countries: Argentina; Brazil; Chile; Colombia; Mexico and Peru. The ILB, PB, VN, END, TAM, TANG, MTB, ROA acronyms represent, in order, the liquidity index variables on the stock exchange; stock exchange presence; trading volume; indebtedness; size; tangibility; market to book and return on assets. N refers to the number of observations and n refers to the number of companies.

Source: Elaborated by the authors.

Regarding the tangibility of assets variable, it was observed that Brazilian companies obtained the lowest average value, while Peruvian companies, the highest. Bastos, Nakamura and Basso (2009), when investigating the determinants of the capital structure of Latin American companies, found a negative and significant relationship between tangibility and indebtedness, something that goes against the rational expectation that companies with more tangible assets could use them as securities in financing and obtain a higher level of indebtedness.

When analyzing the market to book variable, which can be defined as the ratio between the market value and the equity value of a company, it is noted that Argentine companies have the highest average and standard deviation in the sample. Both Rajan and Zingales (1995) and Bastos, Nakamura, and Basso (2009) found in their studies a great influence of the market to book on the degree of financial leverage of the companies that composed their samples. Regarding the ROA variable, Argentine companies have a lower average and greater standard deviation compared to other countries, given that some companies present this index markedly negative.

Table 4 shows the use of the estimated regression models for each of Equations 4, 5 and 6 using the POLS models with clustered robust standard errors (POLS), with estimator between (BE), fixed effects (FE), fixed

effects with clustered robust standard errors (FE_r), random effects (RE) and random effects with clustered robust standard errors (RE_r), according to the methodology proposed by Fávero (2013).

Table 4. Panel Data Models - dependent variables: Liquidity Indicators on the Stock Exchange

| Variable | **POLS** | **BE** | **FE** | **FE_r** | **RE** | **RE_r** |
|---|---|---|---|---|---|---|
| | | | **Stock exchange Liquidity Index (ILB)** | | | |
| END | -0.063 | 0.079 | -0.046 | -0.046 | -0.047 | -0.047 |
| | (0.210) | (0.292) | (0.136) | (0.162) | (0.124) | (0.142) |
| TAM | 0.973 | 0.927 | 0.352 | 0.352 | 0.708 | 0.708 |
| | (0.126) | (0.072) | (0.084) | (0.137) | (0.053) | (0.124) |
| TANG | 0.080 | 0.120 | -0.269 | -0.269 | -0.156 | -0.156 |
| | (0.177) | (0.232) | (0.142) | (0.198) | (0.121) | (0.154) |
| MTB | 0.152 | 0.153 | 0.130 | 0.130 | 0.149 | 0.149 |
| | (0.058) | (0.081) | (0.025) | (0.032) | (0.024) | (0.032) |
| ROA | -0.152 | -0.159 | 0.029 | 0.029 | -0.014 | -0.014 |
| | (0.184) | (0.455) | (0.110) | (0.067) | (0.107) | (0.071) |
| AR | -0.370 | -0.400 | | | -0.202 | -0.202 |
| | (0.553) | (0.313) | | | (0.228) | (0.194) |
| BR | -1.037 | -1.000 | | | -0.743 | -0.743 |
| | (0.571) | (0.247) | | | (0.159) | (0.173) |
| CL | -0.346 | -0.375 | | | -0.139 | -0.139 |
| | (0.566) | (0.256) | | | (0.171) | (0.185) |
| CO | | | | | 0.316 | 0.316 |
| | | | | | (0.263) | (0.539) |
| MX | -0.694 | -0.706 | | | -0.372 | -0.372 |
| | (0.597) | (0.259 | | | (0.180) | (0.211) |
| PE | -0.190 | -0.211 | | | | |
| | (0.561) | (0.268) | | | | |
| Cons | -4.726 | -4.549 | -1.536 | -1.536 | -3.360 | -3.360 |
| | (0.655) | (0.483) | (0.496) | (0.771) | (0.320) | (0.640) |
| N | 3,822 | 3,822 | 3,822 | 3,822 | 3,822 | 3,822 |
| $R^2$ | 0.274 | 0.319 | 0.014 | 0.014 | | |
| $R^2$ (overall) | | 0.274 | 0.186 | 0.186 | 0.269 | 0.269 |
| $R^2$ (between) | | 0.319 | 0.221 | 0.221 | 0.312 | 0.312 |
| $R^2$ (within) | | 0.010 | 0.014 | 0.014 | 0.013 | 0.013 |
| F | 8.27 | 23.77 | 9.62 | 4.62 | | |
| Sig. F | 0.000 | 0.000 | 0.000 | 0.0004 | | |
| chi2 | | | | | 253.53 | 61.06 |
| Sig | | | | | 0.000 | 0.000 |
| BP | | | | | 7501.1 | |
| | 0.000 | | | | 0.000 | |
| Chow | 22.61 | | 22.61 | | | |
| | 0.0000 | | 0.0000 | | | |
| Hausman | | | 32.76 | | 32.76 | |
| | | | 0.0000 | | 0.0000 | |
| Variable | **POLS** | **BE** | **FE** | **FE_r** | **RE** | **RE_r** |
| | | | **Presence in Stock exchange (PB)** | | | |
| END | 3.695 | 9.272 | -16.30 | -16.30 | -13.07 | -13.07 |
| | (7.239) | (7.638) | (3.105) | (5.284) | (2.887) | (4.678) |
| TAM | 23.404 | 22.798 | 15.295 | 15.295 | 20.676 | 20.676 |
| | (1.914) | (1.889) | (1.905) | (4.971) | (1.312) | (2.928) |
| TANG | -11.99 | -10.02 | -14.35 | -14.35 | -13.50 | -13.50 |
| | (5.697) | (6.068) | (3.237) | (6.266) | (2.864) | (5.152) |
| MTB | 13.283 | 15.968 | 8.624 | 8.624 | 9.296 | 9.296 |
| | 1.473) | (2.126) | (0.566) | (1.011) | (0.544) | (0.920) |
| ROA | -29.77 | -38.81 | -11.76 | -11.76 | -12.88 | -12.87 |
| | (7.657) | (11.906) | (2.510) | (3.849) | (2.460) | (3.462) |

| | | | | | | |
|---|---|---|---|---|---|---|
| AR | 24.863 | 21.820 | | | 40.129 | 40.129 |
| | (7.867) | (8.203) | | | (5.953) | (5.807) |
| BR | 8.995 | 8.643 | | | 21.135 | 21.135 |
| | (5.786) | (6.477) | | | (4.131) | (4.739) |
| CL | -0.727 | -0.914 | | | 9.021 | 9.021 |
| | (5.978) | (6.698) | | | (4.469) | (4.427) |
| CO | | | | | 10.070 | 10.070 |
| | | | | | (6.884) | (6.628) |
| MX | 4.858 | 4.675 | | | 18.368 | 18.368 |
| | (6.109) | (6.781) | | | (4.695) | (5.223) |
| PE | -8.076 | -8.441 | | | | |
| | (6.437) | (7.026) | | | | |
| Cons | -93.67 | -96.19 | -25.62 | -25.62 | -76.01 | -76.01 |
| | (11.59) | (12.65) | (11.30) | (29.34) | (7.97) | (15.90) |
| N | 3,822 | 3,822 | 3,822 | 3,822 | 3,822 | 3,822 |
| $R^2$ | 0.398 | 0.445 | 0.089 | 0.089 | | |
| $R^2$ (overall) | | 0.395 | 0.327 | 0.327 | 0.384 | 0.384 |
| $R^2$ (between) | | 0.445 | 0.355 | 0.355 | 0.420 | 0.420 |
| $R^2$ (within) | | 0.067 | 0.089 | 0.089 | 0.087 | 0.087 |
| F | 74.049 | 40.600 | 64.514 | 16.653 | | |
| Sig. F | 0.000 | 0.000 | 0.000 | 0.000 | | |
| chi2 | | | | | 684.44 | 319.31 |
| Sig | | | | | 0.000 | 0.000 |
| BP | 7705.4 | | | | 7705.4 | |
| | 0.000 | | | | 0.000 | |
| Chow | 28.29 | | 28.29 | | | |
| | 0.0000 | | 0.0000 | | | |
| Hausman | | | 38.28 | | 38.28 | |
| | | | 0.0000 | | 0.0000 | |

| Variable | **POLS** | **BE** | **FE** | **FE_r** | **RE** | **RE_r** |
|---|---|---|---|---|---|---|
| | | | **Negotiation Volume on Stock exchange (VN)** | | | |
| END | -0.086 | 0.048 | -0.046 | -0.046 | -0.053 | -0.053 |
| | (0.216) | (0.299) | (0.143) | (0.162) | (0.129) | (0.129) |
| TAM | 0.992 | 0.948 | 0.336 | 0.336 | 0.719 | 0.719 |
| | (0.131) | (0.074) | (0.088) | (0.135) | (0.055) | (0.055) |
| TANG | 0.100 | 0.144 | -0.261 | -0.261 | -0.139 | -0.139 |
| | (0.190) | (0.237) | (0.149) | (0.194) | (0.126) | (0.126) |
| MTB | 0.155 | 0.150 | 0.145 | 0.145 | 0.165 | 0.165 |
| | (0.059) | (0.083) | (0.026) | (0.035) | (0.025) | (0.025) |
| ROA | -0.132 | -0.125 | 0.049 | 0.049 | 0.001 | 0.001 |
| | (0.192) | (0.465) | (0.116) | (0.071) | (0.112) | (0.112) |
| AR | -0.258 | -0.285 | | | -0.187 | -0.187 |
| | (0.565) | (0.321) | | | (0.233) | (0.233) |
| BR | -1.016 | -0.978 | | | -0.804 | -0.804 |
| | (0.566) | (0.253) | | | (0.163) | (0.163) |
| CL | -0.331 | -0.356 | | | -0.203 | -0.203 |
| | (0.560) | (0.262) | | | (0.175) | (0.175) |
| CO | | | | | 0.241 | 0.241 |
| | | | | | (0.269) | (0.269) |
| MX | -0.727 | -0.739 | | | -0.489 | -0.489 |
| | (0.592) | (0.265) | | | (0.184) | (0.184) |
| PE | -0.108 | -0.131 | | | | |
| | (0.559) | (0.275) | | | | |
| Cons | -4.867 | -4.689 | -1.462 | -1.462 | -3.387 | -3.387 |
| | (0.695) | (0.494) | (0.520) | (0.757) | (0.331) | (0.331) |
| N | 3,822 | 3,822 | 3,822 | 3,822 | 3,822 | 3,822 |
| $R^2$ | 0.268 | 0.315 | 0.015 | 0.015 | | |
| $R^2$ (overall) | | 0.268 | 0.174 | 0.174 | 0.263 | 0.263 |

| | | | | | | |
|---|---|---|---|---|---|---|
| $R^2$ (between) | | 0.315 | 0.208 | 0.208 | 0.308 | 0.308 |
| $R^2$ (within) | | 0.009 | 0.015 | 0.015 | 0.013 | 0.013 |
| F | 7.916 | 23.311 | 9.830 | 4.904 | | |
| Sig. F | 0.000 | 0.000 | 0.000 | 0.000 | | |
| chi2 | | | | | 249.14 | 59.07 |
| Sig | | | | | 0.000 | 0.000 |
| BP | 7631.3 | | | | 7631.3 | |
| | 0.000 | | | | 0.000 | |
| Chow | 28.29 | | 28.29 | | | |
| | 0.0000 | | 0.0000 | | | |
| Hausman | | | 33.70 | | 33.70 | |
| | | | 0.0000 | | 0.0000 | |

Estimates were made using the regression model with panel data. The models were estimated according to Equations 4, 5 and 6. The dependent variables were Liquidity Index, Presence, and Trading Volume on the stock exchange. A detailed description of each of the variables can be found in Table 4. Standard errors are reported in parentheses. And the selection of models, reported in Table 5, was carried out using the Breusch-Pagan (BP), F Chow (Chow) tests, and the Hausman (Hausman) test, as shown in the table.

Source: Prepared by the authors.

To guide the choice of the best model, we use the Breusch-Pagan test, Chow F test and the Hausman test. The F Test of Chow compares the pooled models with the random effect models. Thus, this test allows the exclusion or not of the pooled models. As previously explained, the Hausman test allows to evaluate if the random effect model or the fixed effect model is the most adequate. Having excluded the pooled models, we can proceed to the comparison between the fixed effect models and the random effect models by Hausman's test.

For the 3 estimated equations (Equations 4, 5 and 6) the hypothesis that the POLS model was the most adequate was rejected, thus choosing the random effects model. Following the Chow and Breusch-Pagan F tests, it was possible to select between the POLS model and the random effects model. For the three models tested in this study the choice was directed to the fixed effects model. Finally, the Hausman test was used to select between the coefficients estimated by fixed and random effects, confirming that the regression models with data in panel estimated by fixed effects were the most appropriate for the three analyzed models. In addition, to circumvent heteroscedasticity problems in the model, we chose to use the robust cluster standard deviations. Note that the estimates are the same, but with adjustments in the variance-covariance matrix.

Table 5 shows that the Indebtedness explanatory variable was negatively related to the dependent Liquidity Index on the Stock Exchange, Presence on the Stock Exchange, and Trading Volume variables. However, the Indebtedness was significantly related only to the variable Presence on the Stock Exchange. Thus, companies with a higher level of indebtedness tend to have less presence on the stock exchange, that is, fewer trading days in relation to the total. A possible explanation for this phenomenon can be found in the Pecking Order Theory, developed by Myers (1984), and cited by Perobelli and Famá (2003) and Iquiapaza and Amaral (2008). It points out that companies opt for indebtedness only when there is not enough cash generation with internal resources to finance their projects. Something that is corroborated by the work by Lipson and Mortal (2009), who, when using NASDAQ publicly traded companies, observed in it that companies with less debt and stock liquidity prefer the use of own resources as a form of investment. In addition to this phenomenon, Myers (1984) highlights that decision makers choose to issue shares only when there is no possibility of indebtedness and not enough cash generation by operations, following a hierarchy of preferred financing based on the level of disclosure of financial information required by each source of capital. We can also highlight the work by Lesmond, O'Connor and Senbet (2008), using NYSE as sample; and Donato (2011), using the Brazilian stock market, who found a positive and significant relationship between indebtedness and stock liquidity, which is contrary to the findings of this study. On the other hand, Dang et al. (2019), when analyzing the impact of stock liquidity on the capital structure of companies from 41 countries, concluded that companies with a high level of stock liquidity tend to present a lower level of financial leverage. Such results go against findings by Cheung et al. (2020) that observed a positive relationship between stock liquidity and access to third-party capital. The authors point out that stock liquidity implies less asymmetry, which reduces the risk of predictability of future cash flows and, consequently, reduces the risk, thus stimulating leverage.

A positive and significant relationship was observed among the variables Stock Market Liquidity Index, Stock Market Presence and Trading Volume and the Size explanatory variable - the larger the companies in the sample studied, the greater the indicators of liquidity of their shares on the stock markets. Considering that the sample of this study is composed exclusively by publicly traded companies, this result was expected, because larger

companies have easier access to the capital market, have greater visibility in the market and their shares are traded in greater volume. In addition, these companies can make large investment projects with long-term returns. These investments require large volumes of investments and long-term financing. In this context, larger companies may not be able to finance their investments only with their internally generated profits, so it is necessary to seek alternatives for long-term financing, such as debt through the issuance of long-term securities, such as debentures, or the issuance of shares. Donato (2011) notes a positive relationship between size and long-term debt, while Bastos and Nakamura (2009) observe a significant relationship between size and debt in their database of Latin American companies. When dealing with the issuance of shares as a financing option, which increases stock liquidity, Silva (2009) finds a significant and positive relationship between the variables stock liquidity and size, using Brazilian publicly traded companies from the Steel and Metallurgy sector as sample, which is consistent with the results of this study.

There is a negative relationship between tangibility and Stock Exchange Presence, meaning that the more tangible assets Latin American companies have, the lower the stock exchange liquidity index. When analyzing the relationship between asset tangibility and long-term debt, Bastos and Nakamura (2009) find a positive and significant relationship between Brazilian, Mexican and Chilean companies from their sample, which, according to the authors, can be explained by greater access to this means of financing through the use of tangible assets as collateral. Using only Brazilian companies as sample, Donato (2011), notes a significant and positive relationship between the tangibility and long-term debt variables, and the author explained this relationship in a similar way as Bastos and Nakamura (2009), citing the use of tangible assets as collateral. According to Myers (1984), companies with more tangible assets have greater access to indebtedness and would resort less to the issuance of shares, since using third-party capital there is less financial information provided to the market. This phenomenon may be the explanation for the negative relationship among tangible assets and the variables representing stock liquidity used in this article.

Table 5. Regression models with panel data estimated by fixed effects with Cluster Standard Errors

| | Liquidity Index (ILB) | Presence in Stock Exchange (PB) | Trade Volume (VN) |
|---|---|---|---|
| END | -0.0462 | -16.3029*** | -0.0459 |
| | (0.1625) | (5.2837) | (0.1625) |
| TAM | 0.3523** | 15.295*** | 0.3359** |
| | (0.1373) | (4.9715) | (0.1355) |
| TANG | -0.2694 | -14.3481** | -0.2606 |
| | (0.1982) | (6.2661) | (0.1939) |
| MTB | 0.1297*** | 8.6243*** | 0.1454*** |
| | (0.0316) | (1.0111) | (0.0348) |
| ROA | 0.0294 | -11.7621*** | 0.0487 |
| | (0.0674) | (3.8494) | (0.0706) |
| Constant | -1.536** | -25.6165 | -1.4617* |
| | (0.7711) | (29.3437) | (0.7573) |
| sigma_u | 1.2442 | 32.9621 | 1.2766 |
| sigma_e | 0.6615 | 15.0757 | 0.6936 |
| Rho | 0.7796 | 0.8270 | 0.7721 |
| N. of obs. | 3822 | 3822 | 3822 |
| N. of groups | 518 | 518 | 518 |
| R2 | 0.0144 | 0.0891 | 0.0147 |
| R2 (overall) | 0.2205 | 0.3554 | 0.2078 |
| R2 (between) | 0.1860 | 0.3266 | 0.1735 |
| F (5,517) | 4.6200 | 16.6500 | 4.9000 |
| corr (u_i, Xb) | 0.2607 | 0.2760 | 0.2524 |
| Prob > F | 0.0004 | 0.0000 | 0.0002 |

Standard errors are shown in parentheses. The symbols ***, ** and * indicate significance of 1%, 5% and 10%, respectively. The ILB, PB and NV acronyms mean, in order, liquidity index on the stock exchange, presence on the stock exchange and trading volume. The END, TAM, TANG, MTB, and ROA acronyms mean, respectively: indebtedness; size; tangibility; market to book and return on assets. The results presented in the table were estimated by using the Fixed Effects Models with Robust Cluster Standard Errors (FE_r).

Source: Prepared by the authors.

The Market to Book (MTB) variable can be considered an indirect way to evaluate the market expectation regarding the future of a certain company. Thus, Market to Book (MTB) above 1 means that the market's future expectation of companies is positive. It means that the sum of the market value of the liability with the market value of the net worth of the company is higher than the value attributed to its assets. Thus, the higher the Market to Book (MtB), the higher the value of the company's shares in the market. As the Market to Book indicates the level of market valuation in relation to the book value of a given company, this positive and significant relationship indicates that, for the companies that are part of the present sample, the more valued they are in the market, the greater will also be the demand for their shares, consequently, increasing liquidity, trading volume and stock market presence. Bastos and Nakamura (2009) found a negative relationship between Market to Book and debt in their sample composed of companies from Chile, Mexico, and Brazil. Bastos and Nakamura (2009) explained this phenomenon both by the Pecking Order theory, since companies need financing that often cannot be composed entirely of own resources, thus using indebtedness and/or issuing shares; and by the trade-off theory, which relates the positive effect of indebtedness on profitability and, consequently, on share liquidity. However, the authors also cited the increased risks of financial difficulties and bankruptcy caused by the higher level of indebtedness.

ROA, a variable that represents how profitable a company is in relation to its total assets, presents a negative and significant relationship in relation to its stock market presence. The ROA can be an indication of the company's capacity to generate resources internally, considering that it is calculated by the relationship between operating profit and total assets. Thus, companies with higher profitability on assets have a greater capacity to finance part of their investments with internally generated cash. Therefore, with the possibility of greater financing from own resources, there would be less need to issue shares and less liquidity on the stock market.

Considering the results presented above, it is possible to emphasize the importance of the capital structure, besides other internal factors of the companies, for a greater understanding of the stock market behavior, at least for the Latin American companies that are part of the present sample. It was observed a negative relation between the variables representing the stock liquidity and a company’s indebtedness, a phenomenon that can be explained by the interactions cited by Myers (1984). Myers (1984) describes that, due to the phenomenon of company managers, decision makers want to disclose as little financial information as possible to maintain the asymmetry of information between them and the market, they have a preference for internally managed resources; then, for indebtedness, if their own resources are not sufficient; and, ultimately, for the issuance of shares.

## 5. Conclusions

Although several authors have conducted studies on the macroeconomic and internal factors that can influence the liquidity of stocks in companies, few studies have analyzed the relationship between the capital structure of Latin American companies and stock liquidity. Thus, the objective of this study was to analyze the relationship between capital structure and stock liquidity for Latin American companies, measured via three variables: Stock Market Presence, Stock Market Liquidity Index and Trading Volume. A sample of 518 non-financial companies between 2011 and 2018 from six Latin American countries - Argentina, Brazil, Chile, Colombia, Mexico, and Peru - was used.

From the present study, it was possible to analyze the questions regarding the market's perception of the indebtedness of publicly traded companies and to infer the impact of such perception on stock liquidity. By analyzing the hypothesis that indebtedness represents a signal to the market that the company has difficulties to internally generate cash, this seems to be the most plausible explanation according to the results of this study. In the analyzed sample, indebtedness was significantly negative related to liquidity, a phenomenon that corroborates with the Pecking Order theory. Coherent behavior with this understanding was observed in the relationship among ROA, representative of the capacity to generate cash, and the variable presence in the stock market. In other words, it can be inferred that the option for financing investments with equity will occur after the use of internally generated resources and after the possibility of financing with third-party capital have been exhausted.

As for the hypothesis of indebtedness being considered an indication that the company presents a positive level of financial information disclosure, the negative and significant relationship between the variables representing stock market liquidity and that of indebtedness is an indication of the opposite, since more indebted companies have less liquidity and, according to the Pecking Order theory, the level of indebtedness would be an indication that the company does not have enough cash to finance its own projects.

By analyzing the way the capital market reacts to indebtedness, it is possible to infer that access to third-party

capital can be understood by equity investors as an indication of difficulties in generating the operational resources which are necessary for the operation and financing of company projects. In this study, we observed a negative relationship between the indebtedness and cash generation capacity independent variables, measured indirectly by the ROA, and the presence in the stock market dependent variable. Companies that are more profitable, or have greater access to third-party capital are, therefore, less traded on Latin American stock exchanges. From the point of view of the Trade-off theory, considering the cost of each source of capital, it can be inferred that companies opt for the cheapest sources of capital before the option for issuing shares. From the point of view of the Pecking Order theory, the explanation would be that companies preferentially choose the capital sources that require a lower level of information. Thus, firstly, internally generated resources; then, capital from third parties; and, ultimately, the issuance of shares.

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