



Capital Structure Analysis of EBXGroup's Companies: Combining Theory and Practice

Análise da Estrutura de Capital das Empresas do GrupoEBX: Unindo Teoria e Prática

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RESUMO

De acordo com a teoria de *market timing*, as companhias tendem a emitir ações ou dívidas de modo a explorar janelas de oportunidade, e esse comportamento é um determinante significativo da estrutura de capital das empresas. Com base nessa assertiva e nas evidências recentes encontradas no mercado brasileiro, este trabalho tem por objetivo analisar o comportamento de *market timing* de seis empresas do Grupo EBX (MPX, MMX, OGX, LLX, OSX e CCX), com ações cotadas na BM&FBovespa, até meados de 2013. Para tanto, utilizou-se a metodologia de estudo de caso e, como principais fontes de evidências, indicadores relacionados à estrutura de capital e ao mercado de ações. Foi inserida, também, uma abordagem econométrica utilizando-se o estimador de efeitos fixos para dados em painéis. Os resultados encontrados apontam que as decisões financeiras tomadas pelos gestores das empresas do Grupo EBX indicam tentativas de explorar janelas de oportunidades relacionadas, sobretudo, ao mercado de ações, mensuradas tanto pelo *price-to-earnings* (PE) de Shiller, um índice agregado de mercado, quanto pelo índice *market-to-book* (M/B) de cada empresa analisada. Este trabalho contribui para a discussão sobre *market timing* no Brasil, ao unir teoria e prática, de maneira intuitiva e dinâmica, trazendo aspectos relativos às empresas e às condições de mercado.

Palavras-chave: Estrutura de capital; Grupo EBX; *Market timing*; Janelas de oportunidade.

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ABSTRACT

According to market timing theory, companies tend to issue stocks or debts to take advantage of opportunity windows, and this behavior is a significant determinant in company capital structure. Based on this assertion and on recent evidence found on the Brazilian market, this paper seeks to analyze the market timing behavior of the six publicly-traded companies of the EBX Group (MPX, MMX, OGX, LLX, OSX and CCX), up to mid-2013. For this purpose, the methodology used was that of a case study and as the main source of data, the indicators related to capital structure and the stock market. An econometric approach using a fixed effects estimator for panel data was also inserted. The results show that the financial decisions made by managers in the EBX Group indicate attempts to exploit the opportunity windows related to the stock market, mainly measured by Sheller's price-to-earnings ratio (Sheller PE), an aggregate market index, as well as the market-to-book ratio (M/B) of each company analyzed. This paper contributes to the discussion about market timing in Brazil, combining theory and practice in an intuitive and dynamic way, as well as brings aspects related to companies and market conditions.

Keywords: *Capital structure; EBX Group; Market timing; Opportunity windows.*

1 INTRODUCTION

According to market timing theory, firms' capital structure is a consequence of attempts to issue securities (stocks or debts) at times deemed appropriate for issuing (Baker & Wurgler, 2002). In this theory, companies prefer debts when stock prices are overvalued by the market. International evidence indicates that this behavior is an important determinant in financial decision-making and companies' capital structure (Ritter, 1991; Baker & Wurgler, 2002; Alti, 2006; Huang, Uchida & Zha, 2016).

In Brazil, authors such as Rossi Junior and Jiménez (2008), Rossi Junior and Marotta (2010) and Albanez and Lima (2014) have found results indicating that Brazilian companies issue securities in order to exploit temporary "opportunity windows" encouraged by market timing behavior. However, the findings regarding this phenomenon are contradictory or mixed. Mendes, Basso and Kayo (2009), and Padilha and Silva (2016) did not find significant effects of market timing on Brazilian companies' capital structure.

What is certain is that market timing theory has been providing coherent answers to questions such as "What drives a company to take resources without having projects to invest?" or "High values of resources raised in an Initial Public Offering (IPO) in contrast to negative returns after issuance: a matter of luck or chance?" However, especially in Brazil, many studies find it difficult to analyze historical series in a low dynamic market, with a low number of issued shares. Therefore, this paper proposes a different approach. The proposal here is to analyze a single group of companies, in an intuitive way, in light of market timing behavior and by using case study methodology.

Case studies fit well into analysis of contemporary events by providing direct, flexible, broad and systematic observation (Yin, 2010). In the end, an econometric approach is also used to give more robustness to the analysis. The EBX Group was picked to be the case studied in this paper, through its six companies listed on the São Paulo Stock, Mercantile and Futures Exchange (BM&FBovespa) until mid-2013: MPX, MMX, OGX, LLX, OSX and

CCX. The acronyms MPX, MMX, OGX, LLX, OSX and CCX refer to the companies MPX Energia S.A., MMX Mineração e Metálicos S.A., OGX Petróleo e Gás Participações S.A., LLX Logística S.A., OSX Brasil S.A., and CCX Carvão da Colômbia S.A., respectively.

The interest in studying the EBX Group was due to the high number of events it presented during the period under analysis, due to its intense relation with the capital market, which attracted attention among a wide range of economic agents, generating a considerable amount of information, and because it was one of the main corporate groups operating in Brazil.

According to data and information taken from the EBX Group's website, up to the year 2000, about US\$ 20 billion in value had been created by the group on the mineral market, with the company's value more than tripling between 1991 and 1996. In the 2000s, the EBX Group's companies established a trust relationship with investors and creditors when the companies started to have their shares traded on the stock exchanges. However, in a short time, the various positive record numbers gave place to negative record numbers. In the first quarter of 2013, companies MPX, MMX, OGX, LLX, OSX and CCX reported a loss of R\$ 1.15 billion, according to data released by Economatica ®. According to the same data survey, only OGX lost 62.79% of its market value in 2013.

Thus, the objective of this paper is to analyze the evolution of the capital structure in the EBX Group's companies in relation to market timing behavior. To this end, the present study has as a research question: "Are the decisions taken by publicly traded companies of the EBX Group and related to changes in their capital structure indicative of market timing behavior?" When answering the research question, this paper contributes in three key respects: (i) providing a better understanding and applicability of market timing behavior on the Brazilian market as a determinant in financing decisions and companies' capital structure; (ii) providing a systemic and practical view of the main hypotheses of market timing theory when evaluating EBX Group's companies; (iii) providing insights and contributions to the development of the theory, for example by adding to the discussion the Shiller's price-to-earnings ratio (Shiller PE) to represent capital market conditions.

This paper differs from others by focusing on a case study, with companies from the same conglomerate, which despite their specific characteristics, have their financial decisions centralized by the same holding company - EBX Group. Thus, the market timing theory is used to understand a set of decisions based on a real case, through the evolution of the companies' capital structure in the same economic group. The market timing theory has been shown as one of the main capital structure theories and is in increasing development, however, it is not as consolidated in the literature in comparison to more traditional theories such as trade-off and pecking order.

For a broad and contextual analysis, in addition to variables directly related to the capital structure such as leverage and the market-to-book ratio, this study proposes the use of the Shiller PE ratio as an indicator of stock market valuation. The results found by this study indicate that EBX Group's companies have made their financing decisions influenced by attempts to take advantage of the opportunity windows, mainly related to the stock market. Descriptive and graph analyses proved to be powerful analytical tools, and Shiller PE and M/B were significant determinants of the analyzed companies' capital structure.

The paper is organized into six sections. Following this introduction, the second section contains a literature review. Section 3 presents the methodological aspects and the research tools used. In section 4, there are the analyses and the results, while in section 5, the discussion of the results found. Concluding remarks are contained in section 6. The bibliographical references are presented at the end of the paper.

2. MARKET TIMING THEORY

Equity market timing or simply market timing is a capital structure theory based on the opportunistic behavior of corporate managers who tend to issue securities (stocks or debts) at times considered favorable for issuance. The theory emerged as an alternative to the classical trade-off and pecking order theories. Alti (2006) considers Taggart's (1977) paper as the oldest study on equity market timing. Taggart's objective (1977) was to test financial-decision models on the use of the main resources by North American companies between 1957 and 1972. The author notes that companies consider temporary market conditions in their financing decisions - if stock prices are down (compared to historical market values), it will choose the issuing of debts in relation to the issuing of shares and vice versa.

Other papers such as those by Jalilvand and Harris (1984), Marsh (1982), and Asquith and Mullins (1986) used historical stock market values and found evidence pointing to corporate managers using market timing behavior.

Ritter's (1991) paper examined the long-term performance of 1,526 IPOs (Initial Public Offerings) conducted in the United States between 1975 and 1984. Unlike Taggart (1977) and Jalilvand and Harris (1984), for example, the author used stock returns after the issuing of shares to detect companies' market timing strategies. Ritter (1991) reported that the long-term return of the shares placed on the market through the 1,526 IPOs was lower than the benchmark index (NASDAQ and AMEX-NYSE) by about 30% in the three-year period after the companies become publicly traded. Firms that became public companies in periods of high volume of IPOs (hot market) and newer companies did worse, performing below average.

For Ritter (1991), Loughran and Ritter (1995), Rajan and Servaes (1997) and Huang *et al.* (2016), companies issue stocks when investors are more optimistic about earnings growth prospects. Initially, investors pay dearly for stocks, as informational asymmetry dwindles, stock prices decline. Therefore, the Initial Public Offering (IPO) or Seasoned Equity Offering (SEO) may be an attempt to seize an opportunity window as a way to reduce the cost of capital for the issuer, to the detriment of investors' return expectations.

Alti (2006) emphasizes that temporary market conditions have an impact on financing decisions. The author verified that in periods of high volume of IPOs - companies tend to issue more shares and reduce leverage more than companies in periods called cold market (low volume of IPOs), making use of market timing behavior.

One of the most cited evidence in the literature was found through anonymous surveys conducted in companies in the United States and Canada during 1999. Graham and Harvey (2001) interviewed 392 CFOs (Chief Financial Officer) and, in the results, two thirds of the CFOs considered market timing behavior as relevant. In light of this and the other papers cited, a theory based on market timing behavior was proposed by Baker and Wurgler (2002). The authors refer to equity market timing as the practice of issuing stocks when their prices are high and repurchasing them when their prices are low, in relation to their equity values and their historical market values. The strategy is intended to exploit temporary fluctuations in the cost of capital relative to the cost of other forms of capital, which is only possible in the presence of an inefficient market.

Baker and Wurgler (2002) used a sample of 2,289 companies during the period from 1968 to 1999. They adopted the external finance weighted-average market-to-book ratio (M/B_{efwa}) as a measure of market timing opportunity perceived by managers. In addition, size, tangibility, profitability and the lagged M/B ratio itself were used as control variables. As a

dependent variable, financial leverage measures were used. By means of traditional regressions in capital structure studies, the authors found a negative and significant relationship between leverage and M/B, this is because the higher the market-to-book ratio the higher the issuance of stocks, and therefore the higher the share issuance the lower the leverage. In addition, through M/B_{efwa} , Baker and Wurgler (2002) found that the impact of market timing on firms' capital structure persists for at least 10 years.

2.1 Evidence of market timing in Brazil

In Brazil, most of the studies examined the market timing behavior of Brazilian companies with public traded shares on BM&FBovespa. Rossi Junior and Jiménez (2008) tested the equity market timing theory on the Brazilian market from 1996 to 2006. Investment funds were analyzed and an average of 250 companies per quarter was used, all publicly traded. The results found in the research show that when the equity cost is relatively lower than the cost of other sources of funds or when the market value of the company is overvalued in comparison with the equity value, companies issue shares to finance the deficit in funds. The opposite occurs if the companies present low M/B.

On the other hand, Mendes *et al.* (2009) adapted the article by Baker and Wurgler (2002) for the Brazilian market. The authors used data from Brazilian non-financial companies that carried out IPO during the period from 1996 to 2002. Even if the expected relationship between leverage and the M/B ratio was found, the drop in the level of leverage to market value shortly after the IPO contrasts with its growth in the following years, without presenting the persistence necessary to confirm the theory for the Brazilian market. According to the authors, in Brazil, the issue of the internal generation of resources and the search for a constant goal between debt and equity have a greater influence on the decision to "go to the market" (Mendes *et al.* 2009, p.98).

Minardi and Sanvicente (2009) investigated the determinants of the capital structure through interviews conducted in 370 Brazilian companies, mainly private and medium-sized companies. The method used was similar to Graham and Harvey's (2001) for US and Canadian companies. The evidence found by the authors did not point in favor of a theory alone, however, market timing attempts were evidenced by the interviewees.

Using the work of Alti (2006), Rossi Junior and Marotta (2010) analyzed whether the market timing behavior affects the volume of shares issued in the IPO. The authors created two samples: one made up of companies that launched IPO in a hot market period and other comprising IPOs from companies in cold market periods. The results indicate that companies seek to issue more shares in hot periods than in cold periods because stocks may be overvalued in the presence of a hot market. It has also been found that companies issuing shares in hot periods are less profitable, suggesting that underperforming companies take advantage of windows to raise funds through IPOs at BM&FBovespa.

Further, in also analyzing IPOs of Brazilian companies, between 2001 and 2011, Albanez and Lima (2014) suggest that Brazilian companies use market timing behavior by taking advantage of opportunity windows. Firms prefer stocks instead of debt when their market value is high compared to book values, and this difference decreases after the IPO.

In general, papers on market timing in Brazil points to the use of this practice by companies on the domestic market (Rossi Junior & Jiménez, 2008; Rossi Junior & Marotta, 2010; Albanez & Lima, 2014). However, other studies raise doubts as to whether this

behavior is a significant determinant of capital structure in publicly traded Brazilian companies (Minardi & Sanvicente, 2009; Mendes *et al.*, 2009).

Since the influential article by Baker and Wurgler (2002), many studies have been published on the subject. The model proposed by Baker and Wurgler (2002) seems to fit in better with developed markets, whereas in emerging markets there is a need for adjustments and inclusion of alternative variables to exploit the phenomenon in other ways, adapting it to the reality of each market (Albanez & Lima, 2014). Therefore, this paper also proposes the use of Shiller PE as another determinant of leverage along with M/B ratio, in order to also identify the managers' perception of the overall performance of the Brazilian stock market. Since the M/B represents the managers' perception of the current market value of a specific company and is closely linked to the characteristics of the firms, Shiller PE is directly linked to the market conditions that are important in the market timing analysis.

According to case study methodology, it is expected that this paper will contribute to a better understanding and applicability of market timing behavior on the Brazilian market and emerging markets similar to Brazil - capital markets with concentrated stock control, less protection to shareholders and low degree of enforcement (Botero, Djankov, La Porta, López-de-Silanes, & Shleifer, 2004; Claessens & Yurtoglu, 2013). In recent years in Brazil, there have been many opportunity windows related to the capital market, and these have developed and gained representativeness as a source of financial resources for companies, providing a favorable scenario for the development of market timing theory (Cooper & Morgan, 2008; Albanese & Lima, 2014).

3. CASE STUDY METHODOLOGY: MULTIPLE CASES

A case study is a research strategy that investigates an empirical subject following a set of pre-established procedures –it involves planning that ranges from the definition of the type of question and the objective of the research to data collection and analysis. Yin (1994) highlighted five key components of a case study: i) research focus; ii) study propositions; (iii) analysis units; iv) logical connection of data and propositions; and (v) criteria for interpreting results.

Briefly, the first component - research focus - refers to the clear definition of the research question, considering the objective proposed. The second component - study propositions - is responsible for directing the research in the right direction. Propositions help in the search for relevant references, and mainly reflect an important theoretical question.

Supported by market timing theory by Baker and Wurgler (2002) and the empirical evidence found in other studies, this paper uses the relationship between variables as the main evidence that points to market timing attempts. According to the theory, for example, the decrease in financial leverage in the years after the IPO may indicate that the primary issuing of shares was purely opportunistic behavior, that is, the company did not need to raise funds, but as the cost of capital was undervalued by the market, and it seized the moment. On the other hand, if the market-to-book ratio declines in the years following the IPO, it may be an indication that opportunistic behavior was quickly perceived by the market.

The third component - analysis units - defines the case (or multiple cases) to be studied. The analysis units of this study are the six companies of the EBX Group with shares listed on BM&FBovespa: MPX, MMX, OGX, LLX, OSX and CCX. The fourth component - logical connection of data and propositions - expects variables such as leverage, market-to-book and

Shiller PE to help explain the evolution of the capital structure of EBX Group's companies, respond to the question of study, and achieve the objective proposed. The fifth and final component of a case study research - criteria for the results interpretation - expects that, after collecting the data and other pertinent information, the interpretation of the results will be done in a clear and sufficient way, based on the literature reviewed as well as to comply with this study's aim.

The methodological model used by this paper is similar to that proposed by Yin (1994), for studies of multiple cases. The model begins with the definition and planning of the study, which is made up of the theoretical development: presentation of previous studies, theory and theoretical hypotheses. Then, in a more operational process, Yin (2010) suggests that the cases election and projection of data collection be conducted. It is hoped that, from the theoretical hypotheses proposed and the data sources defined, it is possible to explore the data to find evidence that contributes to the research question and to promote relevant contributions (Cooper & Morgan, 2008).

In multiple-case studies, several individual studies are conducted simultaneously considering the same criteria for analysis, eventually generating an individual report for each case with the main analyzes, characteristics and implications. Finally, in the analysis and conclusion, the results of each case are crossed, looking for a logical sequence of clues, with the purpose of drawing conclusions about the whole scenario analyzed (Yin, 2010).

3.1 Data sources, constructs, and operational definitions of variables

This paper uses as its main source of data the quarterly financial statements of the companies analyzed, along with other sources, such as financial and market indicators, in order to obtain a chain of evidence on the evolution of the capital structure of the publicly traded companies of the EBX Group in light of market timing behavior.

a) Financial leverage. This paper uses two measures of leverage, one at book value and another at market value. As the analysis is based on the market, the market value indicator plays a fundamental role in the evaluation of the analyzed companies' perception. However, it is only possible to calculate the market leverage after the company has opened equity on the stock exchange, so it is necessary to use the book leverage for pre-IPO analysis. The use of these two measures of leverage also allows the control of possible spurious correlations between the interpretation of leverage and effective management practices. The two measures were calculated using the consolidated quarterly data (accounting and market) collected from the Economatica® database, according to equations (1) and (2).

- $Lev1 = \text{Financial Debts} / \text{Book Value of Assets}$ (1)
- $Lev2 = \text{Financial Debts} / \text{Market Value of Assets}$ (2)

Where: Lev1: Book leverage; Lev2: Market leverage; Financial Debts: Loans, bonds and financial leasing obligations (short and long term); Market Value of Assets: Assets minus book value of equity plus market value of shares.

b) Market-to-book (M/B). According to the theory, the market-to-book ratio exerts an important influence on the companies' capital structure. It is used as a proxy to measure managers' perception in the use of opportunity windows, that is, to verify the existence of this

behavior. We expect a negative relationship between leverage and M/B, since the market-to-book ratio affects leverage through net issuing of shares. Therefore, the higher the market-to-book ratio the greater the net issuing of shares, and therefore the higher the net issuing of shares, the lower the leverage. The M/B of the six publicly traded companies of the EBX Group was collected quarterly from the Economatica® database and was calculated according to equation (3).

- $M/B = \text{Price per Share} / \text{Net Asset Value per Share}$ (3)

c) Shiller PE or CAPE. Shiller's price-to-earnings (Shiller PE) or CAPE ratio (Cyclically Adjusted Price to Earnings ratio) will also be used as a proxy for market timing, in addition to the M/B, since it serves as the general indicator of stock market valuation.

The CAPE is calculated by dividing prices per share over their real average earnings over the last 10 years, all adjusted for inflation, according to equation (4). Campbell and Shiller's model predicts below-average returns when the CAPE is above its historical average, indicating that the market is overvalued, and on the contrary, above-average returns are expected when the CAPE is below its historical average due to a momentary underestimation (Campbell & Shiller, 1998).

Used initially to predict stock returns, the CAPE ratio is also useful for checking whether the stock market is overvalued or undervalued relative to the average historical earnings per shares. The 10-year adjustment proposed by Campbell and Shiller (1988) is intended to reduce the distortion of the high and low cycles of stock prices, which show high volatility.

To identify predicted behaviors in market timing theory, the Shiller PE ratio, which indicates when the stock market is overvalued or undervalued, can be used. Considering the "overvalued market" state, lower leverage is expected from publicly traded companies, since the manager will seize the opportunity to issue shares rather than incur debt. On the contrary, in the face of an "undervalued market", as evidenced by a Shiller PE below its historical average, the stock market may not be as attractive to companies and thus, if they make use of market timing behavior, higher leverage is expected through third-party debt. Therefore, a negative relationship between CAPE and leverage is expected.

- $CAPE = \text{Price per Share} / \text{Historical Average of Real Earnings per Share}$ (4)

Besides the graph and descriptive analyses performed, regression models with unbalanced panel data are used. For this, the Size and Tangibility (Tang) control variables are inserted in the analysis to reduce the correlation of the error with the interest variable and, consequently, reduce the stochastic error of the proposed regression model. Size and tangibility (Tang) were calculated using consolidated quarterly data collected from the Economatica® database, according to equations (5) and (6).

d) Size. The company size is usually positively related to indebtedness, since larger companies tend to be more diversified, with a higher reputation and a lower bankruptcy risk, which consequently favors debt collection (Rajan & Zingales, 1995). At the same time, size may serve as a proxy for disclosure quality, increasing investor's interest in the case of issuing shares, since such shares are more likely to be priced at the time of issuance (Baker & Wurgler, 2002). Thus, an ambiguous relationship is expected between size and leverage. The following measure will be used:

- $Size = \ln(\text{Total Assets})$ (5)

e) **Tangibility.** Usually, tangible assets serve as collateral for debts (contracts covenants), the more tangible assets, the lower the creditor's risk and the larger the debt tends to be (Rajan & Zingales, 1995; Albanez, 2015). Therefore, a positive relationship between tangibility and indebtedness (leverage) is expected. The proxy for Tang that will be used in this study is:

- $Tang = \text{Fixed Assets} / \text{Total Assets}$ (6)

3.3 Econometric models

Two equations are proposed to verify the relationship of the market-to-book and Shiller PE with the companies' capital structure of the EBX Group: equations (7) and (8). The model is derived from traditional equations in studies on capital structure, where leverage is explained by the M/B ratio (Baker & Wurgler, 2002; Albanez & Lima, 2014). However, Shiller PE will also be used as an explanatory variable, as a general indicator of evaluation of stock market valuation. While the M/B seeks to capture the perception of the manager of a particular firm before the valuation of the latter on the stock market, the Shiller PE demonstrates the managers' global perception.

Keeping the variables M/B and Shiller PE (or CAPE) in the same equation is similar to what Baker and Wurgler (2002) did, when they maintained the M/B and added the weighted average of the M/B, justifying that the first is often used as a control variable to capture growth opportunities. Therefore, both the M/B and the CAPE show possible opportunity windows on the stock market. The model also has two control variables: company size (Size) and tangibility (Tang).

- $Lev1_{it} = \alpha + \beta_1(M/B)_{it} + \beta_2(CAPE)_{it} + \beta_3(Size)_{it} + \beta_4(Tang)_{it} + \varepsilon_{it}$ (7)

- $Lev2_{it} = \alpha + \beta_1(M/B)_{it} + \beta_2(CAPE)_{it} + \beta_3(Size)_{it} + \beta_4(Tang)_{it} + \varepsilon_{it}$ (8)

Where: Lev1: Book leverage; Lev2: Market leverage; M/B: market-to-book ratio; CAPE: Shiller PE; Size: Company size; Tang: Tangibility.

The data for the regressions were organized in an unbalanced panel and the frequency of the collected sample is quarterly, totaling 111 observations, beginning and ending according to Table 1. According to Wooldridge (2006), in the panel data methodology it is necessary to test the models to determine which approach to follow, the following stand out: pooled, fixed effects and random effects. Thus, during the research, the tests of Chow, Breusch-Pagan and Hausman were performed and are presented in Table 3, in section 4.4: Results of econometric analysis. According to the test statistics, we opted for the fixed effects model approach.

Table 1 - Sample data

Firms	Start	End
MPX	Mar-2008	Sep-2013
MMX	Dec-2006	Sep-2013
OGX	Sep-2008	Sep-2013
LLX	Dec-2008	Sep-2013
OSX	Jun-2010	Sep-2013
CCX	Sep-2012	Sep-2013

4 ANALYSES AND RESULTS

4.1 Data analyses

This section starts with Table 2, which shows the variables' means divided into three periods, except for CCX, which was divided into two periods due to the small number of observations of the company. The intention is to show the variables' behavior at the time of issuing of shares (Mean I) and after issuing, in the medium/long term, (Mean II and Mean III). For example, MPX was divided into three periods: in the first, there are data from the first eight observations ($n = 1-8$); in the second, the following eight observations ($n = 9-16$); and in the third period, the data are from the last eight observations ($n = 16-23$). Note that for all periods to have eight observations, the 16th observation appears in both Mean II and Mean III. A similar method was followed for the other companies analyzed.

As can be seen in Table 2, the book leverage (Lev1) increases after the IPO window, its Mean II is greater than its Mean I for almost all companies, with the exception of CCX. In the long term, after the IPO (Mean III), some companies increase even more Lev1 (MPX, LLX, OSX), while others do not (MMX and OGX). While the market leverage (Lev2), on average, increases from period to period for all companies in the sample (Mean III > Mean II > Mean I), except for CCX.

This increase in debt levels is because companies can attract more debt after becoming publicly traded. Authors such as Taggart (1977), Jalilvand and Harris (1984) and Ritter (1991) point out that this is mainly due to the decrease in the asymmetry and the expectation of profit growth for IPO companies.

According to Baker and Wurgler's (2002) market timing theory, companies prefer to issue shares if their prices are overvalued by the market. According to Table 2, the M/B ratio that measures the managers' perception of possible opportunity windows obtained a higher mean in the period of the IPO (Mean I) in four of the six companies (MMX, LLX, OSX and CCX). The CAPE variable, which also measures the managers' perception of the opportunity window in the stock market, always presents a higher value in the Mean I - IPO period in all companies. That is, on average, CAPE decreases over time (Mean I > Mean II > Mean III).

The high M/B and CAPE during periods of IPOs (Mean I) suggest that the EBX Group's companies issued stocks in times of opportunity windows, either because the company was overvalued or because the market was heated - hot market. Alti (2006) suggests that in times of heated stock market, companies tend to make use of market timing behavior to issue shares.

Table 2 shows that, on average, both the Size and Tang variables increased in all companies (Mean III > Mean II > Mean I), except for CCX. Thus, it is possible to expect a positive relationship between these two variables and the levels of indebtedness, especially with Lev2, since debt also increased on average. Thus, Size and Tang would be linked to the reduction of the bankruptcy risk by providing greater guarantee to the creditor, leading to a greater power of debt collection, as pointed out by Rajan and Zingales (1995).

Table 2 – Descriptive statistics segregated according to period

Firm	Estatistic	Lev1	Lev2	M/B	CAPE	Size	Tang
MPX N=23	Mean I (n = 1-8)	0.25	0.24	1.53	16.15	15.00	0.31
	MeanII (n = 9-16)	0.48	0.33	2.86	14.58	15.64	0.58
	MeanIII (n = 16-23)	0.65	0.47	2.94	11.04	15.99	0.72
MMX N=28	MeanI (n = 1-10)	0.35	0.15	4.44	17.68	14.69	0.22
	MeanII (n = 10-19)	0.55	0.23	-1.71	15.50	14.82	0.12
	MeanIII (n = 19-28)	0.28	0.27	1.22	11.29	15.76	0.34
OGX N=21	MeanI (n = 1-7)	0.00	0.00	3.70	15.08	16.12	0.00
	MeanII (n = 8-14)	0.14	0.04	5.96	14.13	16.27	0.01
	MeanIII (n = 15-21)	0.13	0.06	3.61	10.96	16.53	0.48
LLX N=20	MeanI (n = 1-7)	0.16	0.09	3.90	15.00	14.12	0.36
	MeanII (n = 8-14)	0.33	0.17	3.70	13.83	14.50	0.52
	MeanIII (n = 14-20)	0.54	0.46	1.81	10.96	15.00	0.56
OSX N=14	MeanI (n = 1-5)	0.22	0.11	2.34	15.26	15.01	0.31
	MeanII (n = 6-10)	0.40	0.36	1.36	11.57	15.55	0.66
	MeanIII (n = 10-14)	0.53	0.64	0.56	10.56	16.08	0.82
CCX N=5	MeanI (n = 1-3)	0.29	0.37	0.70	11.12	13.90	0.54
	MeanII (n = 3-5)	0.19	0.35	0.47	10.04	13.74	0.43

4.2 Capital structure of EBX Group's companies: leverage and M/B

This section analyzes the evolution of the capital structure of the EBX Group's companies based mostly on their leverage ratios (Lev1 and Lev2) and market-to-book (M/B). For this, Figure 1 illustrates the behavior of these variables for each company in the sample. The IPO period is highlighted because it represents the main point of reference for the analysis. In the cases of LLX and CCX, the starting point of the analysis is the spinoff of the companies that gave rise to them.

It begins with the analysis of MPX. Prior to the IPO date, MPX's liability was formed almost entirely from short-term debt. The consolidated financial statements as of December 31st, 2007 show that out of MPX's total liabilities: 99% were current liabilities and only 1%, non-current liabilities. After the IPO, according to Figure 1 (a), MPX increased its means levels of indebtedness (Lev1 and Lev2), stimulated by long-term debt. Since the company is in the expansion process, according to the literature, it is able to attract more debt because its shares are traded on the stock market due to the decrease in informational asymmetry (Taggart, 1977; Ritter, 1991).

It should be noted that MPX presented a reduction of the M/B ratio after the IPO (Figure 1 (a)). This reduction was significant when compared to the M/B of Dec-07 (3.8) with the M/B of Dec-08 (0.50). The drop in the M/B ratio may indicate a reduction in investors' expectations about the company's future after the IPO. As of Dec-08, the market value of MPX began to increase progressively, except for some periods with a small decline, reaching its apex in March-12, when the M/B reached the mark of 5.5. It is noteworthy that in March-

12 there was a partial spin-off of MPX with the creation of the CCX and capital restructuring, a fact that may have influenced the fall of the M/B to 2.2 in June-12. The partial spin-off of MPX at the moment the M/B reached its apex may be an indication that this moment presented itself as an opportunity window.

The second company reviewed here is MMX. Figure 1 (b) shows that MMX's market leverage declined for more than a year after the IPO, from 0.10 in Sep-06 to 0.03 in Jun-08. However, shortly after this period, levels of indebtedness increased while the partial spin-off that gave rise to LLX occurred. It stands out in the history of MMX the fact that it generated many other companies of the EBX Group. Two moments of high financial leverage (Lev1 and Lev2) of MMX are worth highlighting: between Dec-08 and Dec-09 and from Sep-12 to Jun-13. The first moment seems more linked to financial restructurings while the second to the troubled period of the Group, characterized by the expected results that did not materialize.

Prior to the IPO date, in June 2006, MMX's Owner's Equity was only 6% in relation to the company's total assets and its current liabilities were three times higher than non-current liabilities. Following the issuing of shares, the Owner's Equity was 65% of the total assets, evidencing how the IPO funding was representative for MMX. Figure 1 (b) shows the MMX's market-to-book ratio increase after the IPO. The M/B reached its record value on Jun-08, the period prior to the company's spinoffs and restructuring. From Dec-08 to Dec-09, MMX obtained a negative M/B, that is, the company's Owner's Equity was negative during this time interval. This was possibly motivated by the company's restructuring, which was mitigated after the capital increase of R\$ 1.9 billion in February 2010.

It does not make much sense to analyze a negative M/B, and for that reason, this period slightly undermines this analysis, after the capital contribution that left the Owner's Equity positive, the M/B was above 7 on Mar-10, it did not stay on that plateau for a long time. From March 2013 to September 2013, the MMX market value was lower than its book value: positive M/B and less than 1. In light of the changes in MMX's capital structure, the decrease in Lev2 after the IPO and its own funding through the issuing of shares, the high negative correlation between M/B and Lev2 stands out; the market timing theory may be evidence of the existence of opportunistic gains in switching between stocks and debts (Baker & Wurgler, 2002).

LLX, the third company analyzed in this section, came into existence on Sep-08 and does not present a measure of accounting leverage (Lev1) before this period (Figure 1 (d)). It should be emphasized that the company did not present a significant increase in Lev1 and Lev2 in the short term. Leverage started a significant upswing only after March 2011, when in June 2013, the company's liabilities were more than half of the asset's market value. The non-increase in debt after the IPO may indicate that share issuing was motivated by opportunistic behavior - the company did not need to raise funds, but since the cost of capital was undervalued by the market, it seized the moment (Ritter, 1991; Baker & Wurgler, 2002). Since the LLX's M/B ratio, which increased well sharply and reached its highest mark in Dec-09, it moved towards the value that equals M and B, that is, when the market-to-book ratio is equal to 1, thus indicating the company's significant loss of market value in just over three years.

The fourth company analyzed has its indexes shown in Figure 1 (e), OSX performed IPO in the first quarter of 2010, when it rose four times higher the amount than the total assets' book value in December 2009. For this reason, the Owner's Equity was 76% of the company's assets after the IPO, before the issue was only 4% of the assets.

On Dec-09, for each R\$ 1.00 of OSX's assets there was almost R\$ 0.94 of onerous liabilities. As equity represented 4% of total assets, the liability was formed almost entirely from financing and short-term loans, a scenario that remained in the periods following the IPO. OSX stands out for having the highest indebtedness index among the companies analyzed in this paper. Regarding the M/B ratio, its apex was reached with the initial shares, after which, except for a few quarters of a small increase in the index, the M/B decreased quarter by quarter, closer and closer to zero. In the last two quarters of analysis, the OSX's M/B was 0.1, when the market value of the company corresponded to 10% of its book value.

This value loss in the last periods analyzed occurred in all publicly traded companies in the EBX Group, mainly due to the crisis in investors' confidence with the front conglomerate to the detriment of the business enterprises' return expectations. For information, companies MPX, MMX, OGX, LLX, OSX and CCX recorded a loss of R\$ 1.15 billion in the first quarter of 2013, according to data released by consultancy Economática®. The verticalization of the EBX Group's business followed the rule of creating as many companies as needed to meet products and service demands from both the market and the conglomerate's own companies. As investors are more optimistic about the potential for earnings growth of young companies, the IPO can be an attempt to take advantage of the reduced cost of capital before investors' great expectations (Ritter, 1991).

It was decided to analyze OGX and CCX lastly due to certain peculiarities that they present. OGX (Figure 1 (c)) was created in April 2006 after a partial spin-off from MMX. Its primary share issuing raised R\$ 6.7 billion, a record number on the Brazilian capital market at that time. There is no leverage (Lev1 and Lev2) during almost the entire OGX analysis period, according to Figure 1 (c). This implies that the company did not make use of third-party resources with a burden, except for some quarters of 2011 and 2012. Remembering that leverage considers only onerous liabilities: short- and long-term financing and debentures. In OGX's case, other liabilities increased substantially over the years after share issuing, as is the case with the "Suppliers" account. OGX's period of positive leverage is related to the issuance of debt securities abroad.

OGX spent much of its life in the pre-operational phase. The first drilling of an oil well took place only in September 2009, while oil production only occurred in 2012. Even if the company did not produce anything at the time of the IPO, OGX had a portfolio made up high potential diversified blocks and therefore investors' major expectations reflected in the record amount of IPO funding.

The drop in the OGX's M/B ratio after the primary share issue was for only one period. OGX's shares appreciated approximately 500% from Jun-08 to Sep-10 of the IPO at the apex of the M/B. The fact is that at the end of June 2012, expectations began to decrease due to the company's lower-than-expected production and in a short time OGX came to surround another historical record at the time, this time a negative mark, to be the first company belonging to the São Paulo Stock Exchange Index (IBovespa) to file for bankruptcy. OGX alone lost 62.79% of its market value in 2013, according to the Economática® survey. In June 2014, the company's judicial reorganization plan was approved, which also changed its name.

To finalize this individual analysis of the companies and to outline the behavior of the conglomerate, the CCX is analyzed. CCX presents the shortest period when compared to the other companies in the sample; it corresponds to almost two years, since the company only started to have stock on the stock market after the partial spin-off from MPX (Figure 1 (f)). It is notable that CCX was created at the apex of the MPX's M/B ratio. From the viewpoint of market timing behavior, this could have been presented as an opportunity window (Rossi

Junior & Jiménez, 2008). Because it offers few periods and data for analysis, CCX's assessment is more punctual and difficult, since it is difficult to find trends in the variables over the short period.

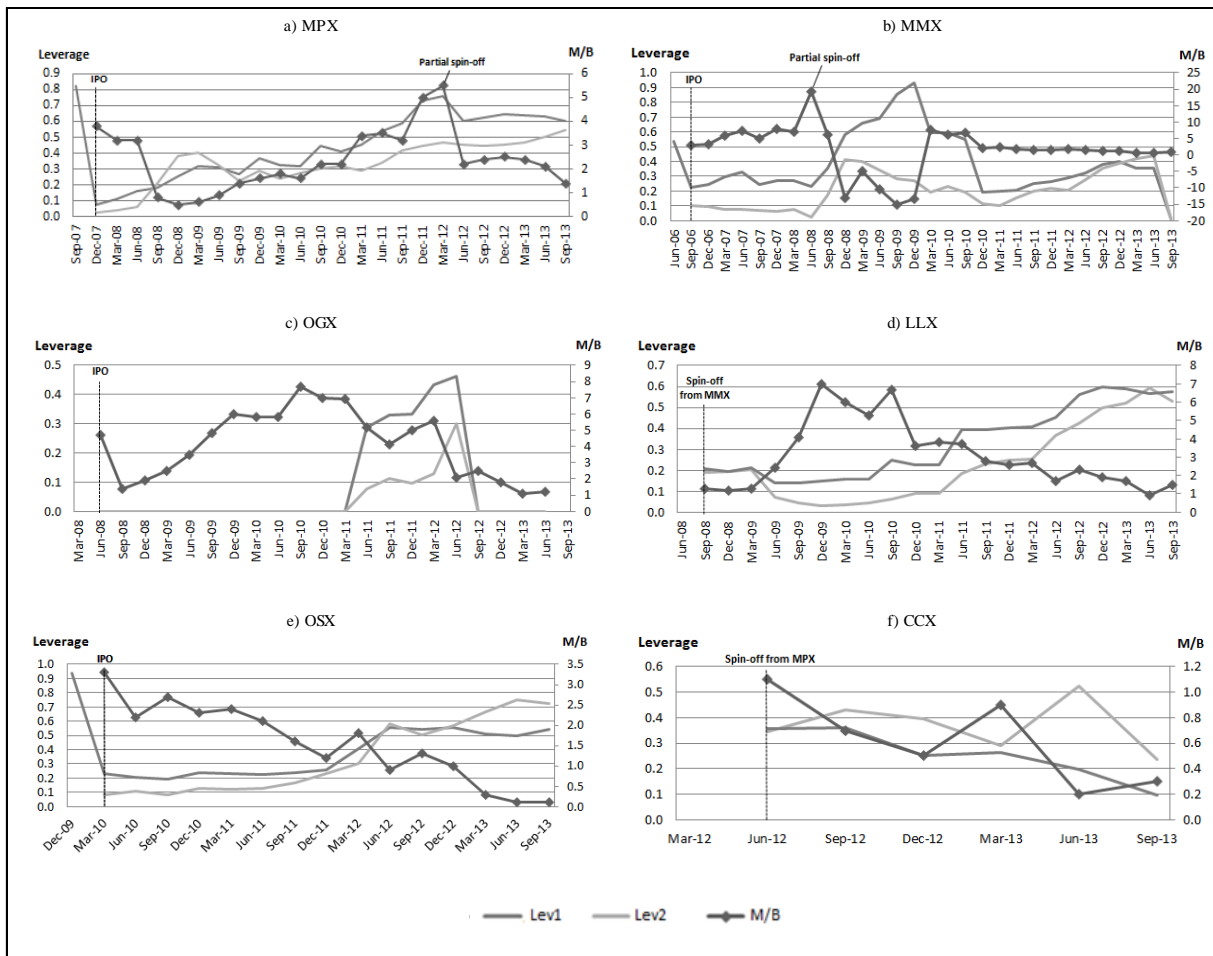


Figure 1 – Evolution of Leverage (Lev1 and Lev2) and market-to-book (M/B) of the EBX Group's companies

4.3 Historical Shiller PE on the Brazilian stock market

Shiller PE is an indicator used to assess whether the stock market is overvalued or undervalued. Given the difficulty to analyze whether the IPO happened at an opportune moment considering the histories of the companies analyzed, since market values are only possible after the IPO, it is intended to check here if the IPO occurred at an opportune time for the Brazilian stock market. In light of this, Shiller PE is interesting because it allows you to compare each specific IPO with stock market valuation at the same time.

For this, Figure 2 illustrates the evolution of Shiller PE's history on the stock market, brought by Klement (2012), and based on the methodology proposed by Campbell and Shiller (1988). The effects of the 2008 financial crisis that negatively impacted the BM&FBovespa are shown in Figure 2. Nevertheless, the EBX Group companies' IPO were carried out at times of "hot market" on the Brazilian market, evidenced by the Shiller PE above historic average, especially MPX and OGX's IPOs since the beginning of 2008 corresponds to the indicator's period more "above average", noting that, according to the theory, in hot periods

companies tend to issue more shares to take advantage of a possible price overvaluation (Alti, 2006).

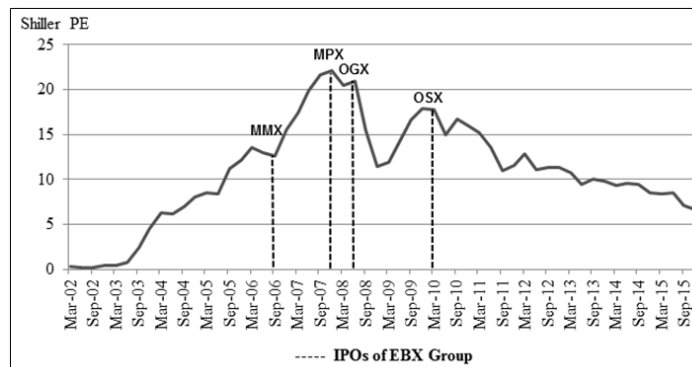


Figure 2 - Historical Shiller PE of the Brazilian stock market and the IPOs of the EBX Group's companies

Source: DataStream, modified.

4.4 Results of econometric analysis

Table 3 shows the statistics tests of the models estimated in the present study. Regarding model 1 with Accounting Leverage (Lev1), as expected, it is noted that the M/B influences Lev1 in a negative way at a level of 1% of significance, but the negative and significant relation for the Shiller PE was not obtained. Regarding the control variables, tangibility was positive and significant at 10% and the size did not present a significant statistic. The model presented R^2 of 0.2830, that is, the explanatory variables in the first model explain approximately 28% of Lev1.

Regarding the second estimated model, with market leverage (Lev2), it is observed that the M/B influences Lev2 negatively to a degree of 1% of significance as expected, a result also obtained in Lev1. Differently from the first model, Shiller PE presented a negative and significant coefficient, as expected, at a level of 1%. Regarding control variables, size and tangibility presented positive and significant relationships at 1% and 10%, respectively. The R^2 statistic for model 2 increased from the first to 0.6022, that is, with the dependent variable being measured at market value. In addition to Shiller PE presenting the expected negative relation, it caused the explanatory variables to increase the model's degree of explanation. Thus, the explanatory variables used in the second model explain approximately 60% of Lev2 of the EBX Group's companies.

Table 3 – Regression and tests results: model 1 and 2

Dependentvariables	Model 1			Model 2		
	Book Leverage (Lev1)			Market Leverage (Lev2)		
	Coef.	statistic-t	p-value	Coef.	statistic-t	p-value
Explanatoryvariables						
Constant	-0.9866	-1.18	0.2422	-1.5216	-2.86	0.0052***
Market-to-book (M/B)	-0.0167	-3.87	0.0002***	-0.0102	-3.74	0.0003***
Shiller PE (CAPE)	-0.0007	-0.09	0.9305	-0.0130	-2.71	0.0079***
Size	0.0845	1.62	0.1081	0.1244	3.76	0.0003***
Tangibility (Tang)	0.1840	1.75	0.0824*	0.1476	2.22	0.0289**
N		111			111	
Prob> F:		0.0000***			0.0000***	
R ² :		0.2830			0.6022	
Chow Test						
F(5):		7.32			10.85	
Prob> F:		0.0000***			0.0000***	
Breusch-Pagan Test						
Chi ² (5):		0.00			23.37	
Prob> Chi ² :		1.0000			0.0000***	
Hausman Test						
Chi ² (3):		28.08			25.12	
Prob> Chi ² :		0.0000***			0.0000***	

Rejection of the null hypotheses: ***significance level 1%; **significance level 5%; *significance level 10%.

5. DISCUSSION OF RESULTS

In general, EBX Group's companies increased their indebtedness levels, indicating expansion of activities through new investments. It should be noted that the verticalization of the conglomerate's business followed the rule of creating how many companies were needed to meet the demands of the first companies' products and services and so on (Moraes, 2013). This strategy, initially assumed by the group, coupled with the euphoria of analysts and investors, has led to record fund raising on the stock market. Increased debt collection over time and the high M/B incurred by companies at first may indicate relatively low funding costs (Taggart, 1977; Jalilvand & Harris, 1984; Ritter, 1991).

The fall of the M/B ratio after the IPO of five of the six companies provides evidence that they sought funds on the capital market when they were overvalued, corroborating the chances of market timing. Some even saw their market value rise in the medium term, driven by new expectations, often through the publication of a "Relevant Fact" to the market, common among the group companies. However, others such as OSX and CCX obtained their highest M/B at the time of the IPO. The vertical chain originally intended for the companies of the EBX Group was not solid in the medium/long term. The capital structure of the group's companies appeared to be guided by market timing behavior.

As in research from Baker and Wurgler (2002) and Albanez and Lima (2014), the estimated models contribute to explain the levels of leverage mainly to market leverage and the results found point to the negatively related leverage with M/B, while the graph analysis points to a positive relationship between market-to-book ratio and share issuing, since share issuing was made when the M/B was high in most cases. This negative relation between M/B and market leverage, in the presence of an imperfect market, allowed for the existence of gains by switching between stocks and debt, according to evidence in favor of the present

theory (Baker & Wurgler, 2002; Altı, 2006; Rossi Junior & Marotta, 2010; Albanez & Lima, 2014).

It can be reiterated that the inclusion of the Shiller PE ratio as another proxy for managers' perception of the stock market opportunity windows generated the hypothesis that managers not only analyze the M/B of the company, but also analyze a general indicator of stock market valuation. Thus, the Shiller PE variable contributes to the analysis proposed by this paper to corroborate the main assumptions of market timing theory in a more holistic analysis. As expected, the results indicate that in times of high M/B and Shiller PE, companies use less debt financing, preferring to raise funds on the stock market, which may represent opportunistic behavior in fundraising. In general, Figure 1 and Figure 2 illustrate the results found in the econometric analysis.

It should be emphasized that the results obtained in this study are due to a series of hypotheses and criteria adopted, which might bring some limitations despite the benefits such criteria have brought to the discussion. The main limitations are the lack of leverage and operating profits of some companies, as well as the negative M/B ratio presented by MMX, slightly hampering the search for evidence of market timing behaviors. As the study's proposal was to perform an analysis guided only by market timing theory, other theories and approaches that could also explain the financial decisions and the capital structure of the companies in the sample were not addressed, another important limitation to this paper. Furthermore, adding factors such as illegal practices, such as corruption and earnings manipulation, which were not incorporated in the research due to the difficulty of measurement, could also enhance the results and conclusions found here.

In conclusion, despite the small sample, limited to a case study, this research contributes to the understanding and development of market timing theory, mainly for the practical implications of this theoretical approach.

6. FINAL CONSIDERATIONS

This paper investigated the evolution of the EBX Group's capital structure, with shares listed on the BM&FBovespa by 2013, considering the market timing theory and market timing behavior. Among the methodological models used by this research are: the one proposed by Yin (1994) for case studies and an econometric model.

It was verified that most of the companies analyzed showed an increase in debt levels after the insertion of their shares in the capital market, due to the greater debt offer that public companies can attract because they have less information asymmetry. On the one hand, leverage rose, on the other hand, the fall in the M/B ratio after the IPO of five of the six companies indicated that the market overestimated their value, so that they raised funds with an undervalued cost of equity capital. It should be emphasized that the leverage and M/B have proved to be powerful tools in capital structure analysis. In addition, the Shiller PE pointed out that the EBX Group's companies' IPO were carried out at times when the index was above the historical average, in times of hot market, which encourage them to issue more shares than in periods of cold market. Good prospects for the future of the country and companies may have contributed to many economic agents being convinced of the conglomerate's potential.

This paper concluded that market conditions were decisive in the composition of the capital structure of the analyzed companies, that is, the financial decisions made by the

managers were motivated by attempts to explore temporary market windows, measured both by Shiller PE, the aggregate market index, as well as by the M/B of the companies.

Finally, since this study did not examine the success or failure of the EBX Group's market timing, nor quantified the time effect that this practice had on the group's companies' capital structure, such complementary analyses are recommended by way of suggestions for future research. In trying to isolate as much as possible the effects that market timing behavior has on financial decisions, capital structure is a major challenge for researchers. Other variables such as average market profitability and abnormal stock returns can be incorporated in future research, as well as different companies in other scenarios, to perform comparative analyses.

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