Effect of investments on fundamentals and market reaction on pre-operational and operational Brazilian companies for the period 2006-2012

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RESUMO

Efeito dos investimentos nos fundamentos e na reação de mercado de empresas brasileiras pré-operacionais e operacionais do período de 2006 a 2012

O trabalho fornece evidências sobre a reação do mercado às decisões de investimento de empresas cujo valor acionário é predominantemente atribuído às opções de crescimento. A pesquisa exploratória levantou empresas pré-operacionais e seus pares operacionais dos mesmos segmentos da economia. Investigou-se a existência de diferenciação estatística a partir de indicadores financeiros que refletissem os ativos instalados e os ativos de crescimento para, em seguida, estudar a reação do mercado às variações do ativo não circulante como elemento de sinalização acerca das decisões de investimento. Destaca-se nas empresas pré-operacionais o processo de formação do ativo operacional e o valor acionário quase exclusivamente dependente dos ativos de crescimento. Como resultado, os testes de diferenciação confirmaram que as empresas pré-operacionais têm seu valor especialmente derivado das opções de crescimento. A reação do mercado foi maior nas empresas pré--operacionais, apresentando retornos anormais negativos, enquanto que nas operacionais tais retornos foram positivos, o que pode indicar que a qualidade do investimento é julgada a partir da divulgação financeira. Ademais, a divulgação é aguardada pelos investidores de empresas operacionais para ajustarem seus preços. Conclui-se que os resultados estão de acordo com as evidências empíricas e que atenção especial deva ser dada aos investimentos de formação de capital de longo prazo pelos participantes dos mercados financeiros.

Palavras-chave: investimento de capital, estudo de evento, ativos instalados, opções de crescimento.

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1. INTRODUCTION

The investment decisions in the company are recognized as the main sources of value creation. Without investments, the growth becomes limited and few opportunities for profit increase are created. Furthermore, investment provides capital formation leading to the continuity of the company's operations, the renewal of supply and a superior competitive position.

Foreseeing the success of investments in the company is one of the capital markets functions. In this sense, investment announcements are constantly evaluated and incorporated into the shareholder value of the company according to investor expectations.

Although it is expected that stock investors fully incorporate to the stock value of the company the net present value of the investment announced, it does not happen for several reasons, including: lack of credibility of the managers, errors when estimating the assumptions, asymmetry information between managers and investors, uncertainty on monetary and tax policies, uncertainty about demand and future supply, among others (Kiley, 2004; Campbell & Shiller, 1998; Hu & Schiantarelli, 1998; Hubbard, 1998; Woods & Randall, 1989). But if the complete incorporation of value does not occur, there is evidence that the market reacts positively to the announced investments (Lucchesi & Famá, 2007; Antunes & Procianoy, 2003; McConnell & Muscarella, 1985), depending on the own company circumstances (Chung, Wright, & Charoenwong, 1998; Szewczyk, Tsetsekos, & Zantout, 1996; Blose & Shieh, 1997; Chan, Gau, & Wang, 1995).

In general, it is recognized that the company's value consists of the value generated by the installed assets and the opportunities for growth, also known as growth assets or growth options, or even as investment opportunities. In essence they do not generate operating cash flows in the present, but represent expectations of future generation as the investments are announced. The problem is the practical difficulty to separate these two elements (Hirst, Danbolt, & Jones, 2008; Alonso-Andrés, Azofra-Palenzuela, & Fuente-Herrero, 2006; Myers & Turnbull, 1977).

Thus, investment in pre-operating companies should be highlighted because their share value is entirely dependent on expectations about its success. There is no history of earnings or operational capital installed to support their value, and their securities aptly named growth options, referring to the financial options that investors acquire with the expectation that its future price reaches the desired levels. Therefore, pre-operational companies segment offers a good opportunity to analyze the results related to the value generated by growth opportunities.

The research explores the market reaction to investments made by companies whose value is based on growth opportunities. The purpose, when analyzing the effect of investments in these companies and the reaction of investors, is that it can indicate possible market efficiency failures in the pricing of assets and contribute to its corrections. Thus, it follows the research line for identification of special features in companies and the application of tests to the verification of the market reaction to investment announcements (Chung et al., 1998; Szewczyk et al., 1996; Chen & Ho, 1997; Blose & Shieh, 1997). Brailsford and Yeoh (2004) emphasized the importance of analyzing these reactions within specific contexts as a way of obtaining explanations of their behavior and, in particular, in the presence of growth opportunities.

The justification for this work lies in the few studies on the effects of investment in the company's value on the stock market and especially in the absence of an approach to pre-operational companies as a proxy of value based on growth opportunities.

2. THEORETICAL FRAMEWORK

What investors capitalize when they buy shares? Finance theorists have raised this question repeatedly. To say it is simply a result of the capitalization of future cash flows tells only part of the story. In 1961, Miller and Modigliani understood that the value of the company derived from installed assets and investment opportunities. These two components are responsible for the future cash flows.

Several authors of corporate finance have this idea as elementary (Ross, Westerfield, & Jaffe, 2007; Copeland, Weston, & Shastri, 2005; Damodaran, 1997; Brealey & Myers, 1992). Additionally, Myers and Turnbull (1977) suggested the company as a portfolio of tangible and intangible assets representing, respectively, the installed production capacity and options to acquire additional units of capacity in future periods.

Thus, installed assets generate cash flows in the present and maintain it for a certain, and generally predictable, period of time. However, the renewal and increase of cash flows in the future would come from growth opportunities.

Regarding the proportion of the value of growth opportunities, Pindyck (1988) says: "As we will see, numerical simulations suggest that for many firms 'growth options' should account for a substantial fraction of market value, and the more volatile is the demand, the larger is this fraction" (p. 970). About its origin, he explains that the options are assets that can arise from several sources: results of a patent, real estate, natural resources, management of resources, reputation, market position, manufacturing scalability etc.

As for risk, Myers and Turnbull (1977) and Luehrman (1998a, 1998b) consider the present value of growth opportunities as the sum of the options value on the investments and the risk of an option cannot be considered the same as the assets risk to which it is subject. Therefore, it is suggested that the risk of growth assets is bigger than the risk of installed assets.

Although the distinction between the value of installed assets and growth assets is a relevant concept for assessing

shareholders' equity (Miller & Modigliani, 1961), capital structure (Myers, 1984; Myers, 1977), cost of capital and capital investment decisions (Chung & Kim, 1997; Majd & Pindyck, 1987; Myers & Turnbull, 1977), there are practical difficulties in evaluating these two elements separately, as noted in literature (Hirst et al., 2008; Andrés-Alonso et al., 2006; Danbolt, Hirst, & Jones, 2002; Chung & Kim, 1997).

At this point, the following question arises: would pre-operational companies have their value totally based on growth opportunities? Yes, this is the understanding. According to Pindyck (1998), the tangible and intangible assets existing in the constitution of the company should be the source of value of these options.

Consequently, we consider in this work that the pre-operational companies are those having small or no operational activity and raising long-term funds in the financial market to implement its capital investment projects.

In this regard, company's activity is practically the investment project itself, including in terms of management control. In this sense, Anthony and Govindarajan (2002) understand that the project should be something different from the normal company operation, having a single goal, a limited time, the need for adaptations, greater influence of the external environment, having its performance evaluated by the expected result. Therefore, in the case of a pre-operational company, the financial control reflects the project and its evolution.

It is assumed that the market value of the pre-operational company is based on the expectation that, with the completion of the project execution, the company has integrated assets and is able to generate cash flows in the amount and within the expected term. Such assets individually may have a market price, but only their integration and development with other assets generate value for the investor.

2.1. Aspects of an investment project

The information deduced by investors as relevant for the analysis of the value of investment projects covers aspects such as life cycle, externalities, incremental cash flows, irreversibility, flexibility and risk. These aspects become more important when the underlying project presents large size and long duration, requiring continuous analysis of the investor, as new data is known.

a) Project life cycle

A project that follows a life cycle should have a beginning, a middle and an ending. Specifically, an investment project appears and disappears within the administrative process, consisting in the following phases: i) exploratory, which is the identification of ideas and pre-feasibility studies; ii) prioritization, with feasibility studies for selecting the alternatives; iii) approval, with technical and operational details; iv) execution, which is the transformation of financial capital into productive capital; and v) completion, with the project results being incorporated into the company (Weaver, 2011; Hormozi, McMinn, & Nzeogwu, 2000).

Generally, when a project is offered to investors, it involves having passed through the first stages, until the stage of technical and operational details. The need for obtaining financial resources must occur before the execution phase begins, because that is where there is the transformation of financial assets in operating fixed assets, enabling the cash flow generation of the project. At this stage, it requires specification of work to be done, the time estimated for each activity and cost budgets, and the control of expenses, implying the issuance of monitoring reports of the project execution (Anthony & Govindarajan, 2002; Hormozi et al., 2000).

b) Externalities

Externalities are consequences that the project brings to other assets of the company or to the market (Weaver, 2011; Woods & Randall, 1989; Kester, 1984; Yawitz, 1977). Therefore, in the formation of capital, it creates a new asset, which is expected to generate value, both for the potential cash flow increase in the foreseen horizon and for the future growth opportunities. However, this process can destroy some value of the company's current assets by loosing market value significance in favor of the new asset. In addition, the destruction can come from competitors who change their offer in response to the new asset.

c) Flexibility

Pindyck (1988) explains that a big part of the market value of the company is due to the possibility of increased demand in the future. Thus, a project is considered flexible if it allows expansion of production capacity when there is a market opportunity, but also if it is possible to adjust it to an unanticipated situation. (Eschenbach & Cohen, 2006).

Thus, potential use features that giving flexibility to the project involves gradual investment, open technologies, variable funding, change scale, change of scope, change in production using different inputs, change of the start date, choice of abandonment, choice of resumption or choice of selling. Thus, the project value is uncertain and depends on how the future looks like and the company's ability to change. Such alternatives can influence agents' expectations as to the formation of asset prices (Titman & Martin, 2010; Ross et al., 2007; Majd & Pindyck, 1987).

d) Irreversibility

Irreversibility is an opposite concept to the flexibility (Ross et al., 2007). To Pindyck (1988), most equity investments are partially irreversible because it is not possible to disinvest. This occurs because of the specificity of the assets that can only be used for that type of industry or because the investment does not result in a marketable asset.

The author explains that, when the investment is irreversible and there is no position to make sure investors' return, spending on investment involves the exercise of an option that is lost and should be included as part of the investment opportunity cost.

e) Incremental flows

The decision to accept an investment project that maximizes the market value of the company involves the determination and assessment of incremental cash flows of the project in relation to the company's cash flows should result in a positive net present value (Guthrie, 2006).

Its relationship with the project life cycle, externalities, flexibility and irreversibility is of consequence because such elements are decisive for the identification of incremental flows.

f) Risk

Financial theory says that the appropriate rate for discounting cash flow of investment project must reflect the cost of capital opportunity for that kind of investment. Thus, a project that has increased risk should be discounted at a higher rate than other lower risk project (Titman & Martin, 2010; Eschenbach & Cohen, 2006; Pratt, 1998).

However, a good measure of risk for a specific project is difficult and the theory only outlines what in fact is put in place (Eschenbach & Cohen, 2006; Ross, 1986; Mao & Hellwell, 1969). In addition, the opportunity cost of capital can fluctuate and significantly affect the present value of investment (Abel & Blanchard, 1986).

2.2. Communication of investment and market reaction

According to Martelanc, Pasin and Pereira (2010), from the point of view of capital budget, the value of an investment project can be added to the company's value at the time of its completion, which means after the decision to invest was made and after the funding sources were raised.

However, on the capital market point of view, the valuation of the company may occur even before the announcement of an investment project (Woods & Randall, 1989). In general, investors analyze the credibility of development, because the managers could announce the investment but may not have the intention to execute it (Woolridge & Snow, 1990; Woods & Randall, 1989). In the situation of complete credibility, the positive value of the project would make the stock price raise at the same time (Ross et al., 2007).

The immediate reaction of the share price to a new level may not be complete in order to incorporate all the expected present value of the project. Ignorance about the project characteristics and uncertainty can stop definitive movements in prices. However, as the project development progresses and the expected conditions are consolidated, it is to be expected that the market value of the company reflect the present value of the investment.

However, knowledge about the project is through the flow of information disclosure by the company. Within this context, information happens to have an asymmetry problem, addressed by the agency theory, which implies market efficiency deviations. This would occur because administrators may want to achieve their own goals, even at the expense of investors, according Pindyck and Rubinfeld (1999).

Although disclosure is mandatory, administration may choose to give it voluntarily. Dye (1986) explains that administrators obtain private information on their management activity and can convert this information, of proprietary nature, in public information. However, such disclosure may not occur if the content of the information have an adverse effect on future profits of the firm (Dye, 1985). In addition, the incomplete disclosure would occur because there is no clarity about what is proprietary and non-proprietary information, since disclosure of some types of information may partly reveal a proprietary information (Dye, 1986).

Thus, the administration avoids disclosure of proprietary information to establish contextualized signs. These signs show how management views the prospects of the company and thus reduce the asymmetry of information, helping the market in the formation of expectations regarding future results of the company.

Market reaction to the disclosure of investments has been widely studied and it suggests, in general, a positive reaction to unexpected investment announcements. Here are some researched papers on the subject.

The empirical results of the literature does not always support the positive relationship between investment and company value as pointed out by Chan et al. (1995). One possible explanation for the lack of market reaction to certain corporate event announcements is given by Titman (2002), for whom the investor could simply make mistakes in his assessments, and learning could be relatively slow to price certain events. However, Brailsford and Yeoh (2004) point out that the market reaction to announcements of equity investments is particularly influenced by the growth opportunities, which would explain the current inconsistency in literature.

Given the above, it is understood that investors should find it more difficult to evaluate companies running large investment projects and for long periods. However, there is reaction to these investments, but not necessarily positive.

The following chapter describes the methodology used in the study of two samples of companies, distinguished as operational (Ope) and pre-operational (Pope) in which we show the market reaction to announcements of changes in noncurrent assets. The work continues with the application of the event study technique, whose contribution is the assessment and measurement of the event results specified for two sets of companies with different characteristics, but similar activity segments.

Table 1

Articles Related to Market Reaction to Investments

Author (Year)	Problem	Results
Lucchesi and Famá (2007)	Check the existence of market reaction to investment announcement, taken at the beginning of the fiscal year and during the year.	Evidence of abnormal returns, especially for announcements at the beginning of the fiscal year.
Brailsford and Yeoh (2004)	Check market reaction to announcements of capital investments in the presence of growth opportunities, cash flow and control variables (investment size, performance management, shareholder control and leverage).	Evidence that the abnormal returns have the presence of growth opportunities as the dominant influence.
Antunes and Procianoy (2003)	Check for the market reaction to the announcements variation of non-current assets and fixed assets.	Evidence of abnormal returns for the non- current assets and fixed assets.
Chung et al. (1998)	Check for the market reaction to announcements made by investment firms categorized by the quality of its past investments through Tobin's q.	Evidence of favorable reaction for the high quality and unfavorable for low-quality businesses.
Szewczyk et al. (1996)	Check for the market reaction to announcements of investments in R & D by companies classified by Tobin's q, by the size of free cash flow and technological level.	Evidence of positive abnormal return for companies classified with higher Tobin's q, positive for high-tech companies and negative for low-tech companies.
Chen and Ho (1997)	Check for the market reaction to corporate investment announcements classified by Tobin's q and by the size of free cash flow.	Evidence of abnormal return for companies with higher Tobin's q.
Blose and Shieh (1997)	Check for the market reaction to announcements of investment companies classified by Tobin's q.	Evidence of positive abnormal return for companies with higher Tobin's q.
Chan et al. (1995)	Check for the market reaction to announcements of asset reallocation.	Positive evidence for favorable impact on cash flow and negative to unfavorable impact on growth options.
Woolridge and Snow (1990)	Check for market reaction to announcements of strategic investments.	Positive evidence to the announcements.
McConnell and Muscarella (1985)	Check for the market reaction to announcements of plans for capital investments.	Positive evidence for announcements of increase in investments and negative for announcements of reduction.

3. METHODOLOGY

We used the exploratory research with statistical analysis. The model brings together differentiation tests of samples on the main financial indicators of a fundamental analysis, market reaction testing to the information disclosed, known as event studies, and statistical analysis to identify the intensity of reaction between samples. The data collection period covered the years 2006-2012 and the survey was performed in 2012.

3.1. Samples

We identified Brazilian companies whose operational activities were in an embryonic stage and that had made in recent years capitalization through the issuance of shares for the development of their investment projects. The process resulted in nine pre-operational companies (Abyara, BHG, Agro Brazil, HRT, OGX, LLX, MMX, MPX and Agro Vanguard). These companies are owned by the following economic subsectors (BM&FBovespa, 2012): real estate brokerage; hospitality; real estate operations; oil, gas and fuels; transport; mining; electricity and agriculture.

Furthermore, we identified nine operating companies of the same economic subsectors used to compose the previous sample at BM&FBovespa (2012): LPS Brazil, Othon Hotels, BRMALLS, Petrobras, Manguinhos, Brazil Santos, Vale, Tractebel and SLC.

The data for the compilation of quarterly financial indicators and the daily prices of the shares were obtained from Economática database. To ensure the robustness of the event study analysis, disclosure dates were collected from statements submitted to the Brazilian Securities and Exchange

Commission website (CVM), and excluded the observations in which the reporting date surpassed more than ninety (90) days the date basis of the financial statement.

3.2. Differentiation samples model

For the differentiation of samples, we used the nonparametric Mann-Whitney test for two samples. The sum of the ranks must indicate whether an average indicator of a sample is higher or lower than that another sample (Stevenson, 2001).

The variables used in the characterization of the samples are described below.

From the collected quarterly financial data, the following variables were calculated:

a) AC / AT [ACAT]: ratio of current assets to total assets;
b) C and AF / AT [CAFAT]: ratio of cash equivalents (cash and financial applications) in relation to total assets;
c) ANC / AT [ANCAT]: ratio of non-current assets compared to total assets;
d) RL / AT [RLAT]: asset turnover, ratio of net sales and total assets;
e) LL / RL [LLRL]: net margin sales, ratio of net income and net revenue;
f) D / PL [DPL]: financial leverage ratio of total gross debt and equity;
g) VM / PL [VMPL]: indicator of the growth opportunities of the company. It is analogous to the indicator Price / Book Value per share (P/BV) and
h) (AT − PL + VM) / AT [ATPLVMAT]: indicator of the growth opportunities of the company.

The VMPL and ATPLVMAT indicators were applied by Silva Junior (2002) and Tavares (2008), respectively, in their work.

The quarterly financial data of the companies were consolidated for each sample, obtaining their sample averages in the calculation of variables. This procedure corrected the outliers' presence resulting from the existence of negative equity or with very small values relative to market value. One or more tests made (Doomik-Hansen, Shapiro-Wilk, Lilliefors or Jarque-Bera) indicated normality for the calculated variables.

3.3. Event study model

For the market reaction, we performed the technique study of events, based on Campbell, Lo, and Mackinlay (1997) work. According to the authors, through it, we can measure the effect of an economic event on the value of the company, taking as assumption that markets act rationally, immediately reflecting the information obtained in asset prices. Thus, the stocks market price move as a result of new information, or economic events.

The execution of the event study model follows some steps: event definition to be studied, criteria for selection of the samples, measurement of normal and abnormal returns, estimation procedure, test procedure, presentation of the empirical results and interpretations (Campbell et al., 1997).

The event to be studied in this work is the variation of the non-current assets (ANC) disclosed in quarterly and annual reports in both samples. The first sample is for pre-operational companies (Pope) and the second for operational companies (Ope). The ANC must provide a wide measure of capital formation and its variation would be greater for Pope companies regarding Ope companies because those are in an investment implementation process. Thus, the reaction to capital formation announcements should also be higher for the Pope companies than for Ope companies. The variation of the ANC was calculated as follows:

$$\Delta ANC_{i,t} = \frac{ANC_{i,t} - ANC_{i,t-1}}{ANC_{i,t} - ANC_{i,t-1}}$$

The date of the event used coincides with the date of release of quarterly and annual reports to CVM. The event window was set at five days returns before and five days returns after the event date. Moreover, the estimation window of abnormal returns is 35 (thirty-five) days. The timeline for the realization of this event study is as follows:
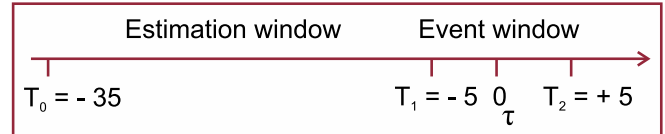

Figure 1: Timeline of the Event Study

Where:
$\tau = 0$: event date;
$\tau = T_0$ to $\tau = T_1 - 1$: estimation window and
$\tau = T_1$ to $\tau = T_2$: event window.

Daily returns were calculated from the closing price of its most traded stocks extracted from Economática database, using the trade-to-trade procedure, described by Maynes and Rumsey (1993). The logarithmic returns from the following formula was calculated:

$$R_{i,t} = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right)$$

Where:
$R_{i,t}$: logarithmic return of stock i, in date t;
$P_{i,t}$: stock price i, in date t and
$P_{i,t-1}$: stock price i, in date t-1.

Expected returns for assets were calculated using the model of the Capital Asset Pricing Model (CAPM), originally developed by Sharpe (1964) and Lintner (1965), which is based on a linear model of single risk factor obtained by the asset's return covariance with the market portfolio and may represent the formation of asset prices. Such models are preferred in the event studies because in addition to theirs statistics premises, they consider the behavior of investors and enable a more accurate measurement of expected returns, taking into account the economic conditions (Campbell et al., 1997; Mackinlay, 1997).

The market model for the asset i is obtained by simple linear regression between the logarithmic returns of asset i and the logarithmic market returns. According to Campbell et al. (1997), it is represented by:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \epsilon_{i,t}$$

Where:
$R_{i,t}$: expected return on the stock i, in date t
α_i: intercept of the linear regression line for the stock i
β_i: slope of the linear regression line for the stock i
$R_{m,t}$: market return observed in date t and
$\epsilon_{i,t}$: error of the linear regression to the stock i, in date t

The abnormal return for stock i is the difference between the return observed of the stock and its expected return. According to Campbell et al. (1997), it may be defined as:

$$AR_{i,t} = R_{i,t} - E(R_{i,t} / X_t)$$

Where:
$AR_{i,t}$: abnormal return of the stock i, in date t
$R_{i,t}$: observed return of the stock i, in date t and
$E(R_{i,t} / X_t)$: expected return of the stock i, in date t, given the X event, in date t

The sample mean of abnormal returns for the period of event window $\tau(T_1,T_2)$ is defined as follows (Camargos & Barbosa, 2003):

$$\overline{AR}_t = \frac{1}{N} \sum_{i=1}^{N} AR_{i,t}$$

And the variance of abnormal returns for the period of event window $\tau(T_1,T_2)$ is defined as follows (Camargos & Barbosa, 2003):

$$Var(\overline{AR}_t) = \frac{1}{N} \sum_{i=1}^{N} \sigma_{s_i}^2$$

Where $\sigma_{s_i}^2$ is defined as (Campbell et al., 1997):

$$\sigma_{s_i}^2 = (1 - R_i^2) \, Var[R_{i,t}]$$

Wherein R_i^2 is obtained in the regression of the observed returns of the stock i in the estimation window $\tau(T_0, T_1 - 1)$ with the observed market returns. And $Var[R_{i,t}]$ is the sample variance of the realized returns of the stock i, observed within the event window $\tau(T_1,T_2)$.

The application of market model considers the daily variation of stock returns. The determination and acceptance of simple regression line, performed by the method of ordinary least squares, depended on the smoothed assumptions by the introduction of robust standard errors with respect to heteroscedasticity and autocorrelation of errors (Cottrell & Lucchetti, 2012; Gill & Eid 2011; Lima, Laurini, & Minardi, 2009). It was assumed that the market models ($R_{i,t}$) obtained by linear regression result in parameters that have a p-value less than 10%.

The accumulation of abnormal returns criterion is performed by adding the individual returns of the event window. Literature (Campbell et al., 1997; Mackinlay, 1997) refers to it as the Cumulative Abnormal Return (CAR), its expression is given by:

$$CAR_i(\tau_1,\tau_2) = \sum_{\tau = \tau_1}^{\tau_2} AR_{i,t}$$

Where:
$CAR_i(\tau_1,\tau_2)$: cumulative abnormal return in the period between the dates τ_1 and τ_2, of the stock i and
$AR_{i,t}$: abnormal return of the stock i, in the date t.
The average cumulative abnormal return of a sample, $[\overline{CAR}(\tau_1,\tau_2)]$, with N events is given by (Camargos & Barbosa, 2003):

$$\overline{CAR}(\tau_1,\tau_2) = \frac{1}{N^2} \sum_{i=1}^{N} CAR_i(\tau_1,\tau_2)$$

The variance of the cumulative abnormal return of a sample is (Camargos & Barbosa, 2003):

$$Var[\overline{CAR}(\tau_1,\tau_2)] = \frac{1}{N^2} \sum_{i=1}^{N} \sigma_i^2(\tau_1,\tau_2)$$

Wherein the variance in the event window, $\sigma_i^2(\tau_1,\tau_2)$, is expressed by (Camargos & Barbosa, 2003):

$$\sigma_i^2(\tau_1,\tau_2) = (\tau_2 - \tau_1 + 1) \sigma_{s_i}^2$$

The cumulative abnormal returns of the Pope and the Ope samples – $CAR_i(\tau_1,\tau_2)$ – were tested for normality. The tests (Doornik-Hansen, Shapiro-Wilk, Lilliefors Test and Jarque-Bera test) rejected the normality for the Pope and Ope samples, almost all p-value close to zero.

Therefore, non-parametric tests were performed as described below.

First, we investigated whether each sample has CAR different from zero, which should indicate whether the financial reports divulgation event causes a significant reaction in market prices.

Campbell et al. (1997) say that nonparametric tests have free requirements regarding the distribution of returns and suggest the sign test. The application of the test will verify that the expected proportion of positive abnormal returns for the null hypothesis is 0,5 (H_0: p = 0,5). This means it is also likely that the CAR is positive or negative. The alternative hypothesis in this case is H_1: p ≠ 0,5.

The test statistic is calculated from the number of cases where the normal return is positive, N^+, and from the total number of cases, N. The test statistic is J, and we have the following equation:

$$J = \left(\frac{N^+}{N} - 0,5 \right) \cdot \frac{\sqrt{N}}{0,5} \sim N(0;1)$$

In this way the test statistic, J, is calculated for the two samples, Pope and Ope.

3.4. Hypotheses

$H_{0,A}$: There is no difference between the averages of financial variables of pre-operational and operational companies.

The alternative hypothesis establishes a relationship of inequality between the averages of financial variables of pre-operational companies and operational companies. Unequal relations, verified by Mann-Whitney test, and its rationale are described below.

$H_{0,B}$: There is no difference between the averages of cumulative returns ($\overline{CAR}$) of Pope and Ope, that is, the difference is zero.

The alternative hypothesis $H_{1,B}$, should indicate that the average of the Pope's cumulative returns is higher or lower than Ope's.

It is important to emphasize that the hypothesis B was separated into two phases in order to initially check the overall effect that the financial disclosure has on both companies' samples to, then, verify the effect of a specific disclosure of information, which is the disclosure of investments through the selection of the main variations in non-current assets.

4. ANALYSIS OF RESULTS

This topic is divided into two parts. The first part reports the results obtained from the analysis of differentiation between the Pope and Ope samples. In the second we analyze two events: financial reporting and disclosure of investments. Furthermore, in the event study, we perform analysis of the reaction intensity, separated by type of sample.

4.1. Differentiation of samples

The table below reports some aspects of research variables:
It was performed a means test comparing the variable groups with each other.

Table 2

Research Hypotheses and Expected Results for Pope and Ope Indicators

Variable	Hypothesis	Result	
		Expected	Argument
ACAT	$H_{0,1}$	Pope > Ope	Net financial resources for the formation of corporate capital Pope represent significantly higher portion.
CAFAT	$H_{0,2}$	Pope > Ope	Idem.
ANCAT	$H_{0,3}$	Indifferent	The net non-current assets of the companies Pope grows at a faster rate while the Ope has assets being depreciated and may have a balance of goals.
RLAT	$H_{0,4a}$	Pope < Ope	The absence of revenues and profits in the pre-operational period affects the Pope profitability indicators. Moreover, not activated spending could adversely affect the outcome.
LLRL	$H_{0,4b}$	Pope < Ope	Idem.
DPL	$H_{0,5}$	Pope < Ope	Capital formation requires high capitalization, especially from own resources, which should result in lower debt to the Pope.
VMPL	$H_{0,6a}$	Pope > Ope	The market value of the pre-operational companies is grounded in the value of growth opportunities as opposed to operational companies that have most of their value coming from the installed assets.
ATPLVMAT	$H_{0,6b}$	Pope > Ope	Idem.

Table 3

Descriptive Statistics for Average Variables of the Pope and Ope Samples

Variable		N	Minimum	Maximum	Mean	Standard Deviation
ACAT	Pope	24	,08	,81	,5029	,16623
	Ope	24	,19	,31	,2347	,03409
CAFAT	Pope	24	,07	,72	,4148	,15683
	Ope	24	,04	,11	,0763	,02155
ANCAT	Pope	24	,19	,92	,4927	,16245
	Ope	24	,37	,48	,4191	,03331
RLAT	Pope	24	,01	,07	,0362	,01605
	Ope	24	,10	,63	,3361	,16418
LLRL	Pope	24	-4,04	2,58	-,2277	1,07241
	Ope	24	,15	,28	,1962	,03136
DPL	Pope	24	,12	8,18	,8719	1,97974
	Ope	24	,37	,65	,4551	,07657
VMPL	Pope	22	1,34	6,12	3,5865	1,29086
	Ope	24	1,04	3,95	2,2169	,77949
ATPLVMAT	Pope	22	1,25	4,49	2,6929	0,89851
	Ope	24	1,02	2,44	1,6134	,38219

Table 4

Mann-Whitney Test for Variables of Sample Means Pope and Ope

Variable	Ranks				Test statistic			
	Group	N	∑R*	(∑R)/N	M-W**	W***	Z	p-value
ACAT	Ope	24	348,00	14,5	48,000	348,000	-4,949	0,000
	Pope	24	828,00	34,5				
CAFAT	Ope	24	320,00	13,33	20,000	320,000	-5,526	0,000
	Pope	24	856,00	35,67				
ANCAT	Ope	24	512,00	21,33	212,000	512,000	-1,567	0,117
	Pope	24	664,00	27,67				
RLAT	Ope	24	876,00	36,5	0,000	300,000	-5,938	0,000
	Pope	24	300,00	12,5				
LLRL	Ope	24	780,00	32,5	96,000	396,000	-3,959	0,000
	Pope	24	396,00	16,5				
DPL	Ope	24	761,00	31,71	115,000	415,000	-3,567	0,000
	Pope	24	415,00	17,29				
VMPL	Ope	24	403,00	16,79	103,000	403,000	-3,540	0,000
	Pope	22	678,00	30,82				
ATPLVMAT	Ope	24	372,00	15,5	72,000	372,000	-4,222	0,000
	Pope	22	709,00	32,23				

*∑R: Sum of the ranks.**M-W: Mann-Whitney. *** W: Wilcoxon.

Observing the average posts and test statistics, we find that the test results met all expectations as set out in Table 2, according to financial theory advocates. Noteworthy are the results for the VMPL and ATPLVMAT variables, confirming the procedure of taking the value of pre-operational companies as a proxy of the value of growth options.

4.2. Event studies

Abnormal returns are calculated from the difference between the observed returns and the expected returns. Table 5 reports the average and variance of abnormal returns calculated from the Pope and Ope samples. The same procedure of calculating averages and variances was performed for the first and fourth quartiles of each sample.

According to the table above, the ratio of the average variance between the two samples, $Var(\overline{AR}_{t,Pope})/Var(\overline{AR}_{t,Ope})$, indicates that the sum of the average abnormal returns in the

window event proved superior to the sample Pope, with 3,310, 2,034 and 5,823.

Figures 2, 3 and 4 complement the explanation of the Table 5 data.

Figure 2 shows all the sample elements whose event is the release of financial statements. In it, we see the result of greater variability of the daily abnormal returns of the overall sample Pope compared to figures in the general sample Ope, resulting in a higher ratio of the average variance between the two samples. And the cumulative abnormal return (CAR%) in the event window indicates an increase of 0,1% abnormal returns to Ope sample and -3,2% for the sample Pope, from the financial reporting.

Figure 3 below shows the cumulative abnormal returns obtained from the disclosure event of minor changes in noncurrent assets. The sharply erratic behavior displayed may be related to the composition of the sample including small positive percentage changes of the ANC and negative

Table 5

Abnormal Return: Mean and Variance of Samples

| | Average abnormal returns ($\overline{AR}_t$) | | | | | | | | | | | $Var(\overline{AR}_t)$ |
	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	
Pope	-0,002	-0,001	-0,006	-0,009	0,005	-0,003	-0,004	-0,002	-0,007	-0,005	0,002	1,94E-05
Ope	0,002	-0,003	0,002	0,003	0,002	-0,003	-0,003	0,003	0,002	-0,002	-0,003	5,85E-06
Pope / Ope	-0,997	0,337	-2,531	-3,060	3,004	0,854	1,464	-0,812	-2,837	2,459	-0,516	3,310
Pope Accum	-0,002	-0,003	-0,009	-0,018	-0,013	-0,016	-0,020	-0,022	-0,029	-0,033	-0,032	-
Ope Accum	0,002	0,000	0,002	0,005	0,007	0,003	0,000	0,003	0,006	0,004	0,001	-
1Q Pope	-0,006	-0,003	-0,008	-0,019	0,004	0,013	0,007	0,010	0,004	-0,003	0,010	7,93E-05
1Q Ope	0,001	-0,003	-0,001	-0,004	0,001	-0,016	0,004	0,000	0,003	0,004	-0,009	3,90E-05
1Q Pope / 1Q Ope	-9,442	0,924	8,805	5,181	5,270	-0,778	1,808	26,921	1,091	-0,760	-1,154	2,034
1Q Pope Accum	-0,006	-0,008	-0,016	-0,035	-0,031	-0,019	-0,012	-0,001	0,002	-0,001	0,010	-
1Q Ope Accum	0,001	-0,002	-0,003	-0,007	-0,006	-0,022	-0,018	-0,019	-0,015	-0,012	-0,020	-
4Q Pope	-0,008	-0,004	-0,007	0,002	0,006	-0,002	-0,018	-0,013	-0,009	-0,007	-0,016	1,44E-04
4Q Ope	0,001	-0,003	0,002	0,004	0,001	0,001	0,000	0,005	-0,001	-0,004	-0,002	2,48E-05
4Q Pope / 4Q Ope	-8,821	1,143	-3,391	0,475	8,448	-1,368	-45,711	-2,504	7,818	1,548	8,380	5,823
4Q Pope Accum	-0,008	-0,012	-0,019	-0,017	-0,011	-0,012	-0,030	-0,042	-0,051	-0,058	-0,073	-
4Q Ope Accum	0,001	-0,003	-0,001	0,004	0,005	0,006	0,005	0,010	0,009	0,005	0,003	-

percentage change of the ANC. The signal test found no statistical significance to this event.

Finally, Figure 4 shows the cumulative abnormal returns obtained from the event of disclosure of the biggest changes in noncurrent assets, the 4th Quartile. The cumulative abnormal return (CAR%) of 0,3% for Ope sample indicates that the market almost kept the stock price unchanged with the announcement of investments; on the other hand, for sample
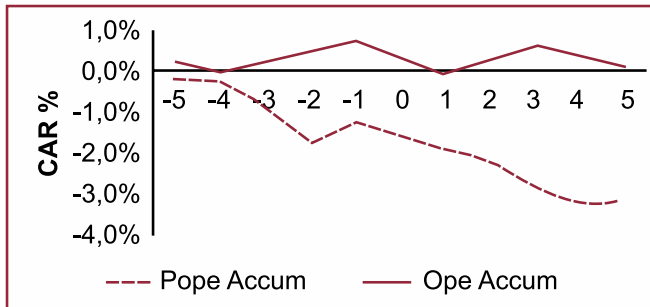

Figure 2: Cumulative Abnormal Returns of Complete Samples
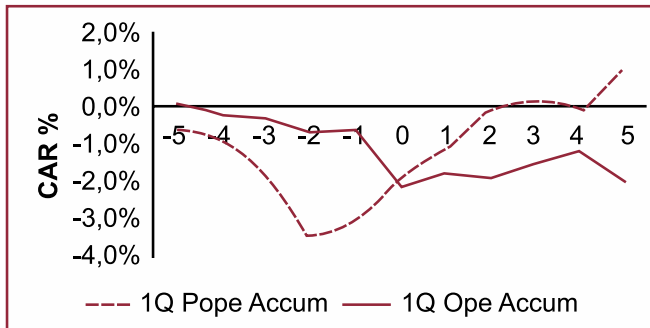
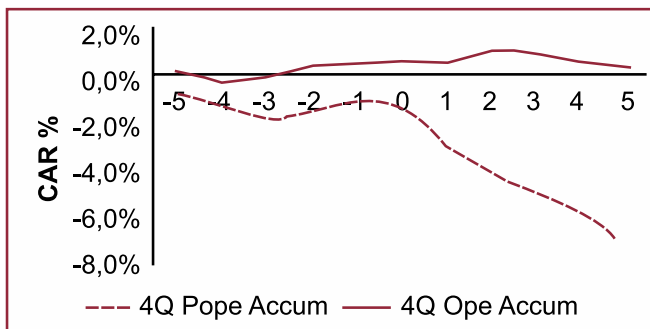**Figure 3: Cumulative Abnormal Returns of Samples of 1º. Quartiles**

Figure 4: Cumulative Abnormal Returns of Samples of 4th Quartiles

Pope, the market depreciated the price of the shares with a cumulative return of -7,3% in the event window by reason of the announcement of the investment.

The latter figure provides a more specific framework of market reaction to a certain event, the investment in non-current assets. However, the knowledge that the financial reporting of pre-operational companies is especially used as a basis for verifying the capital formation process by the market, as seen before, the approach of the two drawing figures, 2 and 4, is understandable.

The ratio of the cumulative abnormal returns confirms the insight provided by the figures above that $\overline{CAR}_{Pope}(\tau_1,\tau_2)/$ $\overline{CAR}_{Pope}(\tau_1,\tau_2)$ is higher than both the overall sample and in the 4th Quartile with values -32,839 and -25,424, as shown below. The negative sign is a negative abnormal return for the Pope samples.

Statistical significance was determined by the signs of tests suggested by Campbell et al. (1997). The statistical test J, suggested by the author, was applied to the overall sample, both Pope and Ope, to check the event's significance related to the release of financial statements. Additionally, the same test was applied to the smallest variations of Non-Current Assets (ANC) –1st Quartile–, and the largest variations of ANC –4th Quartile. In formal terms, the null hypothesis to be tested is: H_0: $\overline{CAR}$ = 0,5. The following table gives the results.

The results indicate that the financial reporting event was statistically significant only in the complete sample, in the sample Pope, with a p-value of 0,2%. It is understood that the financial reporting of pre-operating company is also a proxy for the disclosure of investments, but weaker, since such dissemination events is mainly, but not unique, informative content to their capital formation.

When analyzing the impact of the disclosing investment, we found that the returns were not affected when taken minor variations of noncurrent assets (ANC), the 1st Quartile, both for Pope sample and Ope sample. One possible explanation is the variations of the ANC that includes positive and negative variations, making the direction of the market reaction indefinite.

However, in the biggest changes in non-current assets, the 4th Quartile, there was a statistically significant reaction, both for Pope and Ope sample, indicating that the market has reacted to this information, a p-value of 0,1% and 0,2%, respectively.

Thus, when we observe that the cumulative abnormal returns are negative for companies Pope, both for the complete sample and for the 4th Quartile, one can conclude that the market made a correction in the expectations of value of pre-operational companies at the time of disclosure. This fix may be due to failure to comply with the investment schedule deadlines, a lower volume of capital formation than expected or changing future market expectations in terms of demand and supply, among others. Another explanation for the negative reaction is provided by Chung et al. (1998) in which the quality perceived by investors about the investments would be lower

Table 6

Cumulative Abnormal Return: Mean and Variance of Samples

	Pope	Ope	1Q Pope	1Q Ope	4Q Pope	4Q Ope
$\overline{CAR}_i(\tau_1,\tau_2)$	-0,032	0,001	0,010	-0,020	-0,075	0,003
$Var[\overline{CAR}_i(\tau_1,\tau_2)]$	2,13E-04	6,44E-05	8,72E-04	4,29E-04	1,59E-03	2,73E-04

	Pope/Ope		1Q Pope/1Q Ope		4Q Pope/4Q Ope	
$\overline{CAR}_i(\tau_1,\tau_2)$	-32,839		-0,492		-25,424	
$Var[\overline{CAR}_i(\tau_1,\tau_2)]$	3,310		2,034		5,823	

Table 7

Sign Test Result

	Complete Sample		1st Quartile		4th Quartile	
	Pope	Ope	Pope	Ope	Pope	Ope
N+	21	40	7	10	5	7
N	65	94	16	22	16	22
J	- 2,8528	- 1,4440	-1,0078	-0,7329	-3,0233	-2,9317
p-value[1]	0,2%	7,4%	15,7%	23,2%	0,1%	0,2%

Note: 1. Calculated by statistical function DIST.NORM.N() of Excel.

than expected. Consequently, considering that the current value of the pre-operational companies is based on asset growth, the negative reaction reflects the judgment of the investors in that moment, for the economic expectations from these assets.

4.2.1. Analysis of reaction intensity

Next, we want to compare the average Pope sample with the average Ope sample and check whether they are equal (null hypothesis). As an alternative hypothesis, it is considered that the Pope sample should present abnormal positive average returns greater than the Ope sample, but the Pope sample should have lower abnormal average returns than Ope sample. The explanation is that, in a favorable economic environment, pre-operational companies should deliver superior shareholder return than operating companies, because of the growth options. And, in the case of an unfavorable economic environment, pre-operational companies should have a lower stock return than the operating companies. In formal terms, we have the following null hypotheses:

a) for the complete sample of Pope and Ope:

H_0: $\overline{CAR}_{Pope} - \overline{CAR}_{Ope} = 0$

H_1: $\left| \overline{CAR}_{Pope} \right| > \left| \overline{CAR}_{Ope} \right|$

b) for the sample of 1st Quartile of Pope and Ope:

H_0: $\overline{CAR}_{Pope,1o,Quartile} - \overline{CAR}_{Ope,1o,Quartile} = 0$

H_1: $\left| \overline{CAR}_{Pope,1o,Quartile} \right| > \left| \overline{CAR}_{Ope,1o,Quartile} \right|$

c) for the sample of 4th Quartile of Pope and Ope:

H_0: $\overline{CAR}_{Pope,4o,Quartile} - \overline{CAR}_{Ope,4o,Quartile} = 0$

H_1: $\left| \overline{CAR}_{Pope,4o,Quartile} \right| > \left| \overline{CAR}_{Ope,4o,Quartile} \right|$

The results of Mann-Whitney test are shown in the table below.

For the complete sample, there is statistical evidence, at 5%, that the average of the cumulative abnormal returns of the two samples are different. By the average rank $(\Sigma R)/N$, we verify that the average of the cumulative abnormal returns of Pope sample is lower than for the Ope sample. Thus, there would be a more intense response to the financial reporting in Pope companies than in Ope companies for the collected sample.

For the 1st Quartile sample, there is no statistical evidence that the average of the cumulative abnormal returns of the two samples are different, a perception confirmed by the test given that this quartile is considered the one with the smallest variations of the ANC.

Table 8

Result of the Mann-Whitney Test for the Cumulative Returns of the Samples

Variable			Rank		Test Statistic			
(Sample)	Group	N	∑R*	(∑R)/N	M-W**	W***	Z	p-value
CAR	Pope	65	4421,00	68,02	2276,000	4421,000	-2,729	0,006
(Complete Sample)	Ope	94	8299,00	88,29				
CAR	Pope	16	319,00	19,94	169,000	422,000	-,207	0,836
(1st Quartile)	Ope	22	422,00	19,18				
CAR	Pope	16	258,00	16,13	122,000	258,000	-1,597	,110
(4th Quartile)	Ope	22	483,00	21,95				

*∑R: Sum of the ranks.**M-W: Mann-Whitney. *** W: Wilcoxon.

On the other hand, in 4th Quartile, whose verified results showed a market reaction in the two samples for the event of disclosure of greater variations of the ANC, it was not possible to say that the reaction of a group is statistically higher than the other, although the p-value has gone in that direction to be around 10%. Perhaps with a larger sample, stronger evidence would be found.

5. CONCLUSIONS

The premise that the value of pre-operational companies is based on the growth opportunities provided by investment projects allowed us to observe some evidences related to the period samples.

The first evidence was that investment projects affected the fundamentals of value-based indicators, differentiating pre-operational of the operational companies. As a result, the analysis based on the financial statements indicators should alert about the differences between these companies.

The second evidence was that the financial reporting event presented himself as a statistically significant event in the pricing of the shares of pre-operational companies as opposed to operational companies in the period analyzed.

The third evidence, more specifically, composed of announcement events containing only the greatest variations of investment, indicated a statistically significant market reaction for both companies. Moreover, when the accumulated returns are analyzed, there is a negative reaction in the pre-operational companies, but a positive reaction and near zero in operational companies. This means that the market has depreciated the value of pre-operational companies, by virtue of its investment announcement.

The fourth evidence was obtained from the analysis of the intensity of the market's reaction to samples of pre-operational and operational companies, but with limitations especially because of the lack of compatibility of the importance of the investments announced between samples. From the financial reporting event, the largest relative reaction was found in the pre-operational companies suggesting greater risk. This observation, together with the negative reaction to investments announcements, allows questioning if the stocks of the pre-operational companies are behaving as a financial option, representing only part of the value of the asset, showing higher volatility than the asset and losing its value when economic expectations worsen.

In general, the classical analysis of events study indicates a low level of market efficiency because there was reaction to the disclosure of an accounting past information and not to the fact when it occurs. However, it considers that the market expects the disclosure to assess the share price because there was no other way to dispose of such information, especially for the group of pre-operational companies whose value depends solely on growth opportunities. Then the market would be reacting to the fact, with a level of semi-strong efficiency.

The negative market reaction to the disclosure made by pre-operational companies, with the depreciation of the market value, may be linked to the distance of the expected quality of the investment, in other words, how investors see the decisions taken under the project and its future consequences, resulting in the loss of growth option value on the renovation of market expectations.

Accordingly, to make decisions that give flexibility where it is viable and to minimize the cost of irreversibility, without harming the operation and the life of the project or even without extrapolating the expected cost, are project purposes that maximize the wealth of the company. The achievement of these purposes may not be visible to investors during the execution of the project unless management has interest in disclosure. This makes the mandatory financial disclosure a more reliable source, however more generic, because it portrays periodically the very formation of capital in the case of pre-operational companies.

On the other hand, there is no simple relationship of cause and effect between the expansion of mandatory disclosure and the promotion of market efficiency, which results in better resource allocation by investors. In the case of investment projects, certain information may cause negative externalities from the enterprise market. Such a result could mean the failure of the whole enterprise, especially in the pre-operational companies since they have no cash flow and depend on expectations about the growth of assets. In addition, administrators are aware of this and seek to favorably manage market expectations by reporting non-mandatory information.

Thus, we present a suggestion for future work: the study of management expectations by pre-operational companies, the study of the competitive reaction to investment projects with ability to change the supply industry and the study of risk investment projects managed by pre-operational companies in relation to those managed by operational companies. As a final suggestion, stands out the study of the role of capital markets to provide long-term funds to finance pre-operational companies and their suitability to their specific risks.

Finally, it is important do say that the observed results are limited to the sample size, the controlling group, the accounting changes that have taken place and the collected sample. Done this, it is understood, however, that the direction of the results are of particular importance for public companies that undertake large investment projects, to investors and lenders who want to understand aspects of the assessment of these companies, to regulators that define their disclosure framework and others interested in their behavior. ◆

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ABSTRACT

Effect of investments on fundamentals and market reaction on pre-operational and operational Brazilian companies for the period 2006-2012

This paper provides evidence on the market reaction to corporate investment decisions whose shareholder value is largely attributed to growth options. The exploratory research raised pre-operational companies and their operational pairs on the same economy segments. It had the purpose of investigating the existence of statistical differentiation from financial indicators that reflect the installed assets and growth assets, and then study the market reaction to changes in fixed assets as a signaling element about investment decisions. The formation process of operational assets and shareholder value almost exclusively dependent on asset growth stands out in the pre-operational companies. As a result, differentiation tests confirmed that the pre-operational companies had their value especially derived on growth options. The market reaction was particularly bigger in pre-operational companies with abnormal negative stock returns, while the operational companies had positive returns, which may indicate that the quality of the investment is judged based on the financial disclosure. Additionally, operational companies' investors await the disclosure to adjust their prices. We conclude that the results are consistent with the empirical evidence and the participants in financial markets to long-term capital formation investments should give that special attention.

Keywords: capital investment, event study, installed assets, growth options.

RESUMEN

Efecto de las inversiones en los fundamentos y la reacción del mercado de las empresas pre-operacionales y operacionales de Brasil de 2006 a 2012

El trabajo proporciona evidencia sobre la reacción del mercado en las decisiones de inversión de las empresas, que el valor del accionista se atribuye en gran medida a opciones de crecimiento. La investigación exploratoria planteó empresas pre-operacionales y sus pares operativos en los mismos segmentos de la economía. Se investigó la existencia de diferenciación estadística de indicadores financieros que reflejan los activos instalados y activos de crecimiento para luego estudiar la reacción del mercado a los cambios en activos fijos como elemento de señalización sobre las decisiones de inversión. Se destaca en las empresas pre-operacionales del proceso de formación de los activos operativos y el valor del accionista depende casi exclusivamente en el crecimiento de los activos. Las pruebas confirmaron que el valor de las empresas pre-operacionales se deriva especialmente de las opciones de crecimiento. La reacción del mercado fue particularmente alto en las empresas pre-operacionales con rendimientos de las acciones negativas anormales, mientras que los otros tuvieron resultados positivos, lo que puede indicar que la calidad de la inversión se juzga basado en la divulgación de información financiera. Y la revelación es esperada por los inversores para ajustar sus precios. Los resultados son consistentes con la evidencia empírica y la atención especial se debe dar por los participantes en los mercados financieros a las inversiones de formación de capital a largo plazo.

Palabras clave: la inversión de capital, el estudio de evento, los activos instalados, las opciones de crecimiento.