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SUBJECT AREA: FINANCE AND ECONOMICS

## Value or Growth Strategy? Empirical Evidence in Brazil

*Estratégia de Valor ou de Crescimento? Evidências Empíricas no Brasil*

*¿Estrategia de Valor o de Crecimiento? Evidencias Empíricas en Brasil*

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### ABSTRACT

This article aimed at verifying the existence of value versus growth and at identifying the variables that best explain their impact on Brazilian stock profits. To this end, we tested book-to-market, price-earnings and price-to-cash flow variables. Two methodological approaches were employed: portfolio analysis, in which portfolios were formed according to each variable of interest; and regression analysis with panel data, based on individual assets. The sample was made up of companies with shares traded in BM&FBovespa during the 1995-2008 period. According to results found, growth stocks presented higher profits than value stocks. Thus, we may conclude that the well-documented value versus growth is not valid in Brazil, since empirical evidence supported growth strategies. Due to the long

research period, results may signal prevalence of growth strategy in the long term. Furthermore, the high volatility of emerging countries' capital markets was emphasized, as pointed out by Fama and French (1998). Moreover, to establish investment strategies that allow for greater profits, it was found that the variable that best identifies growth stocks is the book-to-market ratio.

**Keywords:** Value versus growth. Stocks. Investment strategies.

### RESUMO

Este artigo teve como objetivo verificar a existência do efeito valor-crescimento e identificar as variáveis que melhor explicam sua incidência nos retornos das ações brasileiras. Para isso, foram testadas as variáveis *book-to-market*, lucro/preço

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e fluxo de caixa/preço. Foram utilizadas duas abordagens metodológicas: análise de portfólio, na qual as carteiras foram formadas de acordo com cada variável de interesse; e análise de regressão com dados em painel, baseada em ativos individuais. A amostra foi composta por empresas com ações negociadas na BM&FBovespa, no período de 1995 a 2008. De acordo com os resultados obtidos, as ações de crescimento apresentaram retornos superiores às ações de valor. Com isso, pode-se concluir que o bem documentado efeito valor-crescimento não se caracteriza no Brasil, uma vez que as evidências empíricas mostraram-se favoráveis às estratégias de crescimento. Em função do longo período estudado, os resultados obtidos podem estar sinalizando o predomínio da estratégia de crescimento no longo prazo. Além disso, ressalta-se a alta volatilidade dos mercados de capitais de países emergentes, conforme destacam Fama e French (1998). Ademais, para estabelecer estratégias de investimento que possibilitem maiores retornos, verificou-se que a variável que melhor identifica as ações de crescimento é o índice *book-to-market*.

**Palavras-chave:** Efeito valor-crescimento. Ações. Estratégias de investimento.

## RESUMEN

Este artículo tiene por objetivo verificar la existencia del efecto valor-crecimiento e identificar las variables que explican mejor su impacto sobre el rendimiento de las acciones brasileñas. Para ello, hemos probado las variables *book-to-market*, lucro/precio y flujo de caja/precio. Se han aplicado dos enfoques metodológicos: el análisis de la cartera, carteras que se crearon de acuerdo con cada variable de interés y el análisis de regresión con datos de panel sobre la base de activos individuales. La muestra se obtuvo de empresas con acciones negociadas en BM&FBovespa, en el período de 1995 a 2008. De acuerdo con los resultados, las acciones de crecimiento tuvieron un mayor rendimiento que las acciones de valor. Por lo tanto, podemos concluir afirmando que el bien documentado efecto valor-crecimiento no existe en Brasil, ya que la evidencia empírica mostró su apoyo a las estrategias de crecimiento. Debido a

que el período de tiempo estudiado fue extenso, los resultados pueden indicar el dominio de la estrategia de crecimiento a largo plazo. Por otra parte, destaca la alta volatilidad de los mercados de capitales en los países emergentes, como destacan Fama y French (1998). Además, para establecer estrategias de inversión que permitan una mayor rentabilidad, se deduce que la variable que mejor identifica las acciones de crecimiento es el índice *book-to-market*.

**Palabras clave:** Efecto valor-crecimiento. Acciones. Estrategias de inversión.

## I INTRODUCTION

Evidence that value investment strategies outperform growth strategies has been intensely discussed. The difference between profits from value and growth stocks is called value premium. Rating of both these kinds of stocks is established according to fundamental variables, such as the *book-to-market* (B/M), the earnings/price (E/P) and the cashflow/price (CF/P) ratios, amongst others. Because these variables refer both to companies' book and market equities, future prospects can be identified from their internal context as well as from investors' points of view.

Fama and French (1998) point out that companies with high B/M, E/P and CF/P (value) indexes tend to get lower profits, whilst those with low B/M, E/P and CF/P (growth) indexes present consistently higher profits. In a way, this highlights controversy regarding value versus growth, stating that profits from value companies are greater than those from growth companies. All this raises a lot of discussion and countless different interpretations.

Basically, two different approaches try to justify the existence of the value premium. Fama and French (1993, 1995) argue that value strategies outperform growth strategies because they are riskier. Thus, investors in value stocks are rewarded for taking higher risks. On the other hand, the behavioral approach (LAKONISHOK;

SHLEIFER; VISHNY, 1994; HAUGEN, 1995; LA PORTA et al., 1997) suggests that value strategies produce higher profits due to investors' irrationality. Accordingly, by overestimating companies' performances in the past, investors overvalue growth stocks and underestimate value stocks, justifying the greater future profits of the former over the latter.

Apart from different perspectives regarding value versus growth, several variables have been tested in order to explain variations in the average profit of stocks. Considering the two factors proposed by Fama and French (1992), certain studies use firm size (VM) and B/M as proxies for value versus growth (CHAN; HAMAQ; LAKONISHOK, 1991; FAMA; FRENCH, 1998). Additionally, other specific company variables are suggested, such as E/P and CF/P (LAKONISHOK; SHLEIFER; VISHNY, 1994), price/sales (P/S) and debt/equity (D/E) (BARBEE; MUKHERJI; RAINES, 1996; LELEDAKIS; DAVIDSON, 2001), dividend yield (D/P) (FAMA; FRENCH, 1998) and liquidity (ATHANASSAKOS, 2009).

In order to avoid possible data snooping, a lot of research on value versus growth has been carried out outside the United States. Capaul, Rowley and Sharpe (1993), researching six countries in the 1981-1992 period, argue that the value premium is consistent amongst international stock profits. Considering a longer period, Fama and French (1998) researched the world's 13 main markets and 16 emerging countries in the 1975-1995 period. There are also papers that study the value premium in specific countries such as Japan (CHAN; HAMAQ; LAKONISHOK, 1991; CAI, 1997), Australia (GHARGHORI; STRYJKOWSKI; VEERARAGHAVAN, 2012) and Canada (ATHANASSAKOS, 2009).

Fama and French (1998) found that the value premium does exist in emerging markets. The authors point out, however, that these markets are highly volatile and show little correlation with excess profits. Capaul, Rowley and Sharpe (1993) warn that the lack of a theory to explain the better performance of value stocks makes it impossible to

predict whether this phenomenon will continue, be reduced or disappear completely in the future.

Accordingly, this paper intends to verify the existence of value versus growth and identify the variables that best explain its impact on stock profits in Brazil. We hope to contribute to developing this field of research, mainly because of the paper's methodological approach and because it encompasses a larger period than that of previous research published in Brazil. Moreover, we hope to help investors select investment strategies, since we provide insights to identify value and growth companies in Brazil.

The paper is organized as follows: the section below provides a quick review of literature on the subject, at national and international levels. Next are presented the study's methodological procedures, results, conclusion and, last but not least, references.

## 2 LITERATURE REVIEW

The Efficient Market Hypothesis, a basic concept in the development of Modern Finance Theory, refers to the way relevant information becomes incorporated into asset prices. According to Fama (1970), markets are considered efficient whenever agents quickly assimilate available information, never allowing for abnormal company asset profits that result from this information. A balanced market's assumptions are sufficient conditions for the Efficient Market theory. Thus, it has been controversial amongst researchers who analyze the asset pricing process (COPELAND; WESTON; SHASTRI, 2005; LO, 2007).

The efficient market hypothesis can only be tested by an asset pricing model. The Capital Asset Pricing Model (CAPM) was developed by Sharpe (1964), Lintner (1965) and Black (1972). According to this model, the required profit rate for any risky asset is a result of three variables: beta, which measures assets' sensitivity to market portfolios; the rate of profits on risk-free assets; and a risk premium, resulting from the difference between market portfolios' expected profits and risk-free rates.

The CAPM is a single factor model that proposes a positive and linear relationship between a beta title and its expected profits. Given that the market portfolio is efficient in terms of average and variance, any differences in stocks' expected profits can be fully explained by differences in beta – that is, other variables add nothing in terms of explaining expected profits (FAMA; FRENCH, 2004). The assumption that stock profits refer only to beta and that no other variables possess any additional explanatory power has been challenged, however, since the 1970s.

The work of Black, Jensen and Scholes (1973) aimed at carrying out additional tests to CAPM that were capable of avoiding some of the previous studies' problems, which they believe occurred due to incompatibility between the estimation method employed and the structure of the stock profit generating process. By relaxing the assumption that investors can borrow or lend unlimited amounts at a risk free rate, the authors formulate a model that suggests the existence of a second factor in establishing profits, the “beta factor”, which corresponds to the expected profit of a portfolio whose covariance with market profits is zero. The authors reveal that this model is best suited to the nature of the data structure and believe that there are economic assumptions that are compatible with this second factor that also are consistent with the balanced capital market.

An alternative to the CAPM is the Arbitrage Pricing Theory (APT) developed by Ross (1976). This theory assumes that profits on securities are produced by a number of general and sector market factors – that is, that the systematic risk is due to other economic factors, not just to beta. In this sense, one of APT's main advantages is its ability to handle a variety of factors, which may make it more representative of reality (ROSS, 1976).

From then on, several studies have been carried out so as to test multifactor models capable of improving the explanatory power of stock profits, even in cases where CAPM beta was statistically significant. The main argument

was that these factors reflect underlying economic aspects, which produce systematic risk in profits not captured by CAPM beta (FAMA; FRENCH, 1993). Fama and French (1993) revealed that stock prices with high B/M rates and low market value tend to present joint increase and decrease movements, suggesting that a common risk factor exists.

Lakonishok, Shleifer and Vishny (1994), on the other hand, do not deny the possibility that there are pricing factors associated with value and growth stocks, but present an alternative argument based on evidence that the value premium associated with Fama and French (1993) portfolios is simply too high, and its covariance with macroeconomic factors too low (and in some cases negative) to be considered compensation for systematic risk. In short, theoretical discussion focuses on the possibility of these factors in fact representing an economically relevant aggregate risk (DANIEL; TITMAN, 1997).

In this context, two perspectives of analysis substantiate research on value versus growth: the first based on Fama and French's argument (1993, 1995, 1996) that value strategies present higher profits than growth strategies to compensate their higher risk level; and the second based on Lakonishok, Shleifer and Vishny's argument (1994) that value stocks present higher realized profits due to investors being too optimistic about past expectations that growth stocks' good performances will occur in the future. Thus, growth stocks (also called “glamour stocks”) end up luring gullible investors that raise their prices due to high demand and consequently reduce their real profits.

## 2.1 Value versus growth

For decades, investment scholars and professionals have argued that value strategies outperform the market. Their basic premise is to invest in stocks that are traded below their real value. Companies with below average prospects are classified as value companies; and

companies with strong performances in the past – and expected good performances in the future – are classified as growth companies. Value companies are characterized by high rates of price fundamentals (profits, dividends, cashflow

and book-to-market ratio), whereas growth companies present low rates (GHARGHORI; STRYJKOWSKI; VEERARAGHAVAN, 2012). Figure 1 summarizes the main empirical evidence on value versus growth, internationally.

Empirical evidence	Period	Variables tested	Methodology
Chan, Hamao and Lakonishok (1991)	1971 – 1988	B/M, firm size, E/P and CF/P	Portfolio analysis and regression analysis
Fama and French (1992, 1993)	1962 – 1989	B/M, firm size, E/P and leverage	Portfolio analysis and regression analysis
Capaul, Rowley and Sharpe (1993)	1981 – 1992	Price/Book Equity	Portfolio analysis and regression analysis
Lakonishok, Shleifer and Vishny (1994)	1963 – 1990	E/P and CF/P	Portfolio analysis and regression analysis
Barbee, Mukherji and Raines (1996)	1979 – 1991	P/S and D/CP	Portfolio analysis and regression analysis
Daniel and Titman (1997)	1962 – 1989	B/M, firm size	Portfolio analysis and regression analysis
Cai (1997)	1977 – 1991	B/M, firm size, E/P and CF/P	Portfolio analysis
Fama and French (1998)	1975 – 1995	B/M, E/P, CF/P, D/P	Portfolio analysis and regression analysis
Gharghori, Strykowski and Veeraraghavan (2012)	1993 – 2004	B/M, firm size, E/P, P/S, CF/P and leverage	Portfolio analysis and regression analysis
Athanassakos (2009)	1985 - 2005	B/M, E/P, firm size and liquidity	Portfolio analysis
Zhang (2009)	1966 – 2005	B/M, firm size	Main components' analysis

**Chart 1** – International research on value versus growth.

**Source:** the authors.

Value versus growth was first observed in Japan by Chan, Hamao and Lakonishok (1991). They studied the differences in the profits of Japanese stocks as to the underlying behavior of four variables: E/P, firm size, B/M and CF/P. Their results reveal a significant relationship between these variables and expected profits in the Japanese market. Among the four considered variables, however, B/M and CF/P have the most relevant positive impact on expected profits. The

authors also included stocks with negative profits in their research, and registered that they produce fundamentally higher profits.

Fama and French (1992, 1993) question the CAPM by presenting empirical evidence that beta's capacity to explain average stock profits is small or null. Instead, they suggest and test other variables that may be more appropriate: firm size, B/M, E/P and financial leverage. As mentioned earlier, Fama and French (1995, 1996) suggest

a rational explanation for value versus growth, claiming that value strategies present higher profits than growth strategies so as to compensate for their higher risk level.

Years later (FAMA; FRENCH, 2006), the authors carried out research to verify how the value premium varies according to the size of the company, considering Loughran's (1997) evidence that there is no value premium in value stocks from high market value US companies after 1963. In the first sub-period analyzed (1926-1963), the value premium was virtually identical for companies with high and low market values. In the second sub-period (1963-2004), a strong value premium was also identified, with few differences between stocks from companies with high and low market values. This result was confirmed by a sample of data from 14 countries over the 1975-2004 period. In this way, Fama and French (2006) suggest that the weak relationship between B/M rates and high market value stock profits, registered by Loughran (1997), can be a "random aberration", probably due to scarce value stocks (with high B/M rates) and high market value.

In contrast, Lakonishok, Shleifer and Vishny (1994) found little or no evidence that value strategies are in fact riskier. They used variables E/P and CF/P when trying to explain the variation of US stock profits. Subscribers of a behavioral approach, the authors argue that value strategies produce greater profits because of errors in investors' expectations regarding the future performance of stocks.

From the same perspective, Daniel and Titman (1997) carried out research in the US market to verify whether there are in fact company characteristics directly associated with firm size and B/M; and if there is a risk premium associated with these factors. In other words, they sought to test whether the high profits of companies of low market value and high B/M rates could be attributed to factor loading. Thus, they proposed a "Characteristic-based Pricing Model". Their results reveal that there is no risk

factor associated with company characteristics, nor a premium value associated with any of one of Fama and French's (1993) three factors. To the authors, this evidence suggests that value stocks' high profits cannot be explained as compensation for the risk taken by investors when investing in this type of asset, but rather by characteristics that are usual in this kind of company: same line of business, same industry or same region (DANIEL; TITMAN, 1997).

Cai (1997) also evaluated the performance of growth and value strategies, in order to reconcile Fama and French's (1993, 1995, 1996) and Lakonishok, Shleifer and Vishny's (1994) conflicting results and prove which of these two arguments is more appropriate to explaining value versus growth. Based on data from the Japanese market in the 1977-1991 period, the author found that, through various strategies, value stocks outperform growth stocks for five years following portfolio formation. Growth portfolios are made up of growth stocks that presented steady growth as to earnings and cashflow, and whose investors expected this strong performance to continue in the future. They did not meet market expectations, however, whereas value stocks surprised investors with better performances. Accordingly, this evidence from the Japanese market is consistent with Lakonishok, Shleifer and Vishny's argument (1994).

Capaul, Rowley and Sharpe (1993) carried out research in six countries (France, Germany, Switzerland, UK, USA and Japan) in the 1981-1992 period, demonstrating that the value premium is consistent across the six main international markets (at that time). The authors do not make any statements as to the phenomenon's continuity, given the lack of theoretical consensus to explain its existence. Due to the phenomenon's global nature, they do recommend, however, that investors pay attention to their stances concerning these two types of assets, in the future.

Fama and French (1998) also carried out international research in which they analyzed

value versus growth in 13 of the world's main international markets and in 16 emerging countries over the 1975-1995 period. Using several variables (B/M, E/P, CF/P and D/P), they found that value versus growth is a global phenomenon. To the authors, this evidence confirms their earlier argument that value stocks' premium is in fact real.

Barbee, Mukherji and Raines (1996) suggest that two other variables are more appropriate than B/M when assessing specific companies: the price/sales (P/S) and the debt/equity (D/E) ratios. They argue that, unlike B/M, these variables suffer little influence from depreciation and inventory accounting methods.

Gharghori, Strykowski and Veeraraghavan (2012) tested the existence of value versus growth and the variable that best characterizes their impact in the Australian market. Using data from January 1993 to December 2009, the authors confirmed the phenomenon's existence in that specific market. All variables employed (B/M, E/P, CF/P and P/S) were statistically significant; in multivariate regressions, however, the B/M ratio proved to be the best proxy. The authors also divided the sample into companies that presented negative and positive results (profits and cashflows) and, within these two subgroups, the best proxies for value versus growth were the B/M and CF/P ratios, respectively .

Athanassakos (2009) analyzed the existence of value versus growth in Canada from 1985 to 2005. The author found a strong occurrence of the phenomenon over the analyzed period, persisting in periods of market rising and falling as well as in recessions and recoveries. The author points out that Canada's value premium can be compared to USA's, suggesting that, despite differences between these two markets, the structure of the Canadian market had no differential effect on the value premium.

Finally, Zhang's research (2009) analyzed Fama and French's (1993, 1996) and Daniel and Titman's (1997) conflicting evidence. The author used the principal components method

to build compound factors for individual assets and portfolios. The results reveal that main components analysis of individual assets did not successfully explain firm size and B/M effects. In contrast, he found that portfolio analysis was better than Fama and French's factors (factor loadings were clearly connected to firm size and B/M ratios), and also passed the test of the model introduced by Daniel and Titman (1997). The author's main conclusion is that the effects of firm size and B/M are consistent with the rational asset pricing theory, although underlying systematic factors are no more important than accounting as to profit variation.

All this having been said, we can observe that, despite not having reached any consensus as to its causes, traditional value versus growth can be classified as an international phenomenon. It is important, however, to point out the existence of characteristics that are specific to emerging markets and which may affect its characterization, such as high volatility and small correlation with excess profits (FAMA; FRENCH, 1998). Next, we present main empirical evidence from the Brazilian market, also summarized in Figure 2. Generally, these studies show different results regarding variables tested and their power to explain value versus growth.

The work of Mellone Jr. (1999) found that variables B/M and E/P are strongly capable of explaining profits and that variables firm size and leverage are apparently irrelevant. In contrast, the results of Costa Jr. and Neves (2000) suggest that the most noteworthy fundamental variables are firm size and B/M, and that, although the E/P ratio is significant, it presents less explanatory power than the other variables.

Rodrigues' two-factor models (2000) lead to results that are similar to Fama and French's (1992), indicating the relevance of B/M's and firm size's contribution in the explanation of stock profits. However, the degree of these variables' significance reveals itself rather contradictory when comparing portfolios made up of value and growth stocks. The work of Rostagno, Soares and

Soares (2006) indicates that portfolios sorted by E/P and Ebitda ratios are the value strategies with the greatest profit. The importance of the E/P

ratio is also verified by Saito, Savoia and Sousa (2009), with shares from the Brazilian electricity sector.

Empirical evidence	Period	Variables tested	Methodology
Mescolin, Braga and Costa Jr. (1997)	1986 – 1996	B/M, E/P, D/P	Statistical evidence was not tested
Mellone Jr. (1999)	1994 – 1998	Beta, firm size, B/M, leverage and E/P	Portfolio analysis and regression analysis
Ramos, Picanço and Costa Jr. (2000)	1989 – 1994	Beta, B/M	Portfolio analysis
Costa Jr. and Neves (2000)	1986 – 1996	Beta, firm size, B/M, E/P	Regression analysis
Rodrigues (2000)	1991 – 1999	Beta, B/M, firm size	Portfolio analysis and regression analysis
Braga and Leal (2002)	1991 – 1998	B/M, firm size	Portfolio analysis
Rostagno, Soares and Soares (2005)	1995 – 2001	B/M, E/P, D/P, P/S	Portfolio analysis
Pedreira (2005)	2001 – 2004	B/M	Portfolio analysis
Rostagno, Soares and Soares (2006)	1994 – 2003	B/M, E/P, D/P, P/S, EBITDA/P, liquidity	Portfolio analysis
Fregnani, Faneco and Famá (2008)	1995 – 2005	Beta, B/M	Portfolio analysis
Saito, Savoia and Sousa (2009)	1997 – 2007	E/P	Portfolio analysis

**Chart 2** – Brazilian research on value versus growth.

**Source:** the authors.

Some of these studies also intend to verify the existence of the so-called “golden opportunity”, suggested by Haugen (1995), within the Brazilian market. There is plenty of international evidence that, although value stocks produce higher profits, they present a lower level of risk than growth stocks. This fact goes completely against what Modern Financial Theory states: that risk and profit are directly related variables. Accordingly, Haugen (1995) proposes that this is a “golden opportunity” available to investors who want to receive high, non-risky profits in the long term.

Although Ramos, Picanço and Costa Jr. (2000), Fregnani, Faneco and Famá (2008)

and Saito, Savoia and Sousa (2009) have found evidence of the “golden opportunity” in Brazil, their results have no statistical significance. Rostagno, Soares and Soares (2005) report that their portfolios made up by E/P ratios seems to confirm the existence of this premium, but their explanation is not risk-based – it is based on the smaller liquidity of stocks. Risk measures used by Rodrigues (2000) prove to be superior for value stock portfolios, contradicting the existence of the “golden opportunity” within the Brazilian market.

Regarding the existence of value versus growth itself, virtually all Brazilian research confirms that value stocks outperform growth



stocks in terms of profit. However, there is some evidence in favor of growth strategies.

Mescolin, Braga and Costa Jr. (1997) analyzed Brazilian stocks between 1986 and 1996. They reveal that, in 1990 and 1991, the performance of growth stocks was better than that of value stocks. From 1992 on, the situation reversed, and value stocks began to present better profits. In the last year of research (1996), however, they once again presented an unfavorable result.

In a study of stocks that make up the IBrX 50 Index, Pedreira (2005) found that, in 2001 and 2002, the portfolio made up of value stocks presented a smaller average annual profit than that obtained by growth stocks. The author suggests that this fact may be connected to the macroeconomic conditions of the sectors of activity of companies in the index during that period.

Ramos, Picanço and Costa Jr. (2000) studied the behavior of stocks traded in BM&FBovespa between 1988 and 1994, and present results that favor growth stocks in 1988, 1989 and 1994. Building on the work of these authors, Fregnani, Faneco and Famá (2008) carried out similar research for the 1995-2005 period. Growth stocks performed better in the years 1999, 2000, 2002 and 2003. This evidence is confirmed by Saito, Savoia and Sousa (2009), whose results favor growth stocks in 1999, 2000, 2002, 2003, 2006 and 2007, considering annual profits, and from 2001 to 2003, regarding cumulative profitability.

All this having been said, this paper intends to confirm the existence of value versus growth in Brazil, considering subtle evidence in favor of growth strategies. Moreover, as shown in the next section, we will use two methodological approaches in order to identify which variables best explain stocks' average profits.

### 3 METHODOLOGY

In this section, we present the methodological procedures used to achieve the

previously established goals, based on the work of Gharghori, Strykowski and Veeraraghavan (2012).

#### 3.1 Research characterization

This research is classified as empirical-analytic. According to Sánchez Gamboa (1987), this approach is based on principles that are valid for natural and physical sciences, and emphasizes causal relationships between variables, systematization of empirical data and control by means of statistical analysis. From this perspective, scientific validity results from testing instruments used for collecting and processing data and from the degree of statistical significance.

#### 3.2 Data

The researched population was made up of all companies with stocks listed in the State of São Paulo Stock Exchange – BM&FBovespa (Bolsa de Valores do Estado de São Paulo – BM&FBovespa), between June 1, 1995 and June 30, 2008. This period was used because it included an economically stable phase, after July 1994 and before the global financial crisis (2008-2009). All data was collected in the Economática database.

We used four filters to ensure the accuracy of accounting data. Thus, financial companies were excluded from the sample, because, according to Fama and French (1992), their high indebtedness can distort the book-to-market ratio, and it does not mean the same as non-financial companies' high indebtedness. We also excluded companies that did not submit monthly rates during 12 consecutive months after portfolio formation, market value on December 31 and June 30 of each year, or Net Worth on December 31 of each year.

#### 3.3 Methods

In order to analyze the relationship between fundamental variables and the average profits of stocks, two methods were used, namely:

portfolio analysis, in which portfolios were formed according to each variable of interest and the relationship with average profits was investigated; and panel data regressions based on individual assets.

### 3.3.1 Portfolio analysis

The first phase of analysis aimed at verifying whether value versus growth does exist in the Brazilian stock market. To this end, we used the portfolio analysis method used by Fama and French (1993) in drafting the Three-Factor Model. The use of this procedure is justified by the need to reduce possible “noise” or “measurement errors” pointed out by Blume (1975). According to this author, when using sample data to draw conclusions about a certain population, sample values correspond to the population’s values with added random noise –significant to individual assets, but not to portfolios made up of various assets. Thus, portfolio profits provide a more efficient estimate of expected profits, since they tend to be less affected by fluctuations in individual assets.

Accordingly, five stock portfolios were made up each year, based on each of the five variables selected for the study. Sample stocks were sorted decreasingly, in the month of June of each  $t$  year, beginning in 1995 and ending in 2008. Quintile 1 (Q1) represents companies with the highest value variable (value stocks), whereas Quintile 5 (Q5) is made up of companies with the lowest value variable (growth stocks). Weighted average profit for each quintile was calculated from July of year  $t$  to June of year  $t + 1$ . Portfolios were annually rebalanced. To calculate excess profit, we used the Selic rate as a proxy for risk-free profit (FRALETTI, 2004).

Each year, we analyzed data referring to 149 stocks (25,65% of the population), on average, presenting, in 2003, a minimum 103 analyzed stocks (16,89% of the population) and, in 2006, a maximum 191 (33,81% of the population). Portfolio analysis is capable of

identifying relationships between variables and portfolios’ subsequent profits. We concluded that value versus growth does exist, if premium value can be proven – that is, if there is a significant difference between the profits of value (Q1) and growth (Q5) portfolios.

### 3.3.2 Regression analysis

The second phase of analysis aimed at investigating the explanatory power – individually and as a whole – of the five studied variables when explaining Brazilian stock profits. To this end, we carried out univariate and multivariate regressions using individual assets. Although Gharghori, Strykowski and Veeraraghavan (2012) used pooled regressions, we considered using panel data regressions more appropriate to this research.

Panel data allows for the econometric analysis of basic units arranged in transverse sections, over time (WOOLDRIDGE, 2002). The main advantage of this technique is that it allows dynamic relationships to be observed and heterogeneity to be controlled – neither of which are possible when using only cross-sectional data (ARELLANO; BOVER, 1990). We must emphasize that the basic unit of this research is made up of companies that have stocks listed in BM&FBovespa, observed at different moments. In this way, we consider this estimation method the most appropriate, since it takes the heterogeneity of sample companies’ stocks into account.

The set of variables in this research is made up of stock profits, as the dependent variable, and the following explanatory variables: B/M, CF/P and E/P ratios, as proxies for value versus growth; and financial leverage and firm size as control variables, because of their documented associations with stock profits. Although there is no consensus in previous literature about the choice of companies’ fundamental variables, proxies used in this research to test value versus growth were also successfully used by Chan, Hamao and Lakonishok (1990), Lakonishok,

Shleifer and Vishny (1994), Cai (1997) and Gharghori, Strykowski and Veeraraghavan (2012).

Explanatory variables were measured on an annual basis and are defined as follows:

- *Book-to-market* ratio (B/M): Net Worth book value divided by company market value as of December 31 of year  $t - 1$ ;
- Cashflow/price ratio (CF/P): earnings before interest, taxes, depreciation and amortization (EBITDA) divided by stock price as of December 31 of year  $t - 1$ ;
- Earnings/price ratio (E/P): net income

divided by stock price as of December 31 of year  $t - 1$ ;

- Firm size (VM): Net Worth market value as of June 30 of year  $t$ ;
- Financial Leverage (PO/AT): value of onerous liabilities divided by company's total assets as of December 31 of year  $t - 1$ .

Variables' capacity to explain stock profits is measured by coefficient significance. To this end, different variations were estimated from the regression model, according to Gharghori, Strykowski and Veeraraghavan (2012):

$$R_i = \gamma_0 + \gamma_1 \ln\left(\frac{B}{M}\right) + \gamma_2 \ln\left(\frac{L}{P}\right) + \gamma_3 \ln\left(\frac{FC}{P}\right) + \gamma_4 \ln(VM) + \gamma_5 \ln\left(\frac{PO}{AT}\right) + \varepsilon_i \quad (1)$$

The work of Gharghori, Strykowski and Veeraraghavan (2012) included many (approximately 50%) Australian companies with negative earnings or cashflows. Thus, they treated the positive and negative values of E/P and CF/P variables separately. According to the authors, the value-growth concept applied to companies with positive ratios can also be applied to companies with negative ratios. In this context, companies with the most negative E/P or CF/P values are undervalued and present greater risk; they are also the most valuable. On the other hand, companies whose ratios are less negative are also less valuable.

In this paper there are not many companies with negative results for these two variables. Considering the annual observations of the E/P ratio, 1,217 were positive and 274 were negative. For the CF/P ratio, we found 109 positive observations and 952 negative ones. Virtually all Brazilian studies disregard companies with negative results, except for Costa Jr. and Neves' (2000). Given Chan, Hamao and Lakonishok's (1991) and Gharghori, Strykowski and Veeraraghavan's (2012) arguments that companies with negative earnings produce higher

profits, we created a dummy variable in this research to capture this effect.

Taking into account the estimation of regression models using panel data, we prepared a balanced panel, so that each studied company faced the same number of time observations. Thus, we included in the sample stocks that presented all the valid observations of variables focused on by this research (profit, B/M, E/P, CF/P, firm size and leverage), during the entire period of analysis (13 years). Thus, the final sample was made up of 52 shares (9,3% of the population, on average). The next section presents the results reached following empirical analysis.

#### 4 RESULTS

This section presents empirical results from the two phases of research: portfolio analysis and regression analysis. In order to provide exploratory data analysis, we first of all present variables' descriptive statistics and correlation matrix.

#### 4.1 Descriptive statistics

Table 1 presents descriptive statistics of the five fundamental variables studied. All firm size variable observations were valid, thus representing the total number of annual observations in this

research. Other variables also presented high rates of valid observations, contributing to a reasonable amount of data. Next, we present the average and standard deviation of variables as well as their maximum and minimum values.

**Table 1** – Descriptive statistics of fundamental variables

	<b>B/M</b>	<b>E/P</b>	<b>CF/P</b>	<b>VM</b>	<b>PO/AT</b>
Annual	1488	1491	1061	1493	1209
valid observations					
Average deviation	1.810	-0.050	0.270	5895943.877	62.530
Standard deviation	2.464	0.943	0.725	24196080.308	91.990
Minimum	0.000	-10.000	-9.000	705.000	0.000
Maximum	42.000	3.000	10.000	429922948.000	920.000

**Source:** the authors.

The average book-to-market ratio was relatively low when compared to its maximum value. According to Fama and French (1993), low B/M rates indicate growth opportunities. The same trend can be observed in the average values of E/P and CF/P ratios, revealing the predominance of growth companies in the Brazilian market. Cupertino and Coelho (2006) observed a decreasing B/M ratio trend in Brazil in the

1998-2004 period – which, according to them, proves greater coherence with what is predicted by the theory of accounting conservatism. Additionally, the sample varied widely in terms of firm size, as well as of financial leverage.

In order to investigate the relationship between the five variables in this research, we created a correlation matrix which is presented in Table 2.

**Table 2** – Correlation matrix for transformed variables.

	<b>B/M</b>	<b>E/P</b>	<b>CF/P</b>	<b>VM</b>	<b>PO/AT</b>
B/M	1.000				
E/P	-0.290	1.000			
CF/P	0.0542	0.292	1.000		
VM	-0.108	0.042	-0.031	1.000	
PO/AT	-0.036493	-0.221343	-0.009	-0.046	1.000

**Source:** the authors.

As shown in Table 2, research variables reveal no significant correlations between each other. This result confirms the findings of Cupertino and Coelho (2006), who registered low correlation levels between B/M and variables leverage, liquidity, firm size, risk, and intangible

assets. Complementing what these authors stated, here there is a slight negative 0,29 correlation between E/P and B/M and an insignificant correlation between B/M and CF/P. This having been said, we believe that regression analysis will not present multicollinearity problems.

## 4.2 Portfolio analysis

Portfolio analysis results are presented in Table 3, which contains average monthly profits in the June/1995 to June/2008 period for the five portfolios, based on book-to-market (B/M), earnings/price (E/P), cashflow/price (CF/P), firm size (VM) and financial leverage (PO/AT) variables.

The first part of Table 3 presents portfolios' classification results for variable B/M. A strong

negative relationship between B/M and profits can be observed. Average profits decrease almost monotonically from 3,78% in the lowest Quintile (Q5) to 1,10% in the highest Quintile (Q1), producing a 2,68% premium (Q1-Q5). This result contradicts theory, which predicts that stocks that have higher B/M ratios (value) produce greater profits than stocks that have lower B/M ratios (growth).

**Table 3** – Profits from portfolios based on fundamental values.

Variables/Portfolio	1 (Value)	2	3	4	5 (Growth)	5-1
Profits (%)						
<b>B/M</b>						
Average profit	1.10%	2.26%	2.24%	3.00%	3.78%	2.68%
Standard deviation	18.03%	17.12%	16.17%	16.13%	15.43%	11.42%
Test <i>t</i>	0.7310	1.5858	1.6599	2.2288	2.9387	2.8166
<i>p value</i>	0.4648	0.1128	0.0969	0.0258	0.0033	0.0049*
<b>Earnings/Price</b>						
Average profit	4.79%	5.29%	5.62%	4.25%	3.98%	-0.81%
Standard deviation	9.43%	9.75%	8.47%	8.53%	8.89%	7.07%
Test <i>t</i>	6.0923	6.5023	7.9520	5.9854	5.3814	-1.3625
<i>p value</i>	0.0000	0.0000	0.0000	0.0000	0.0000	0.1730
<b>Cashflow/Price</b>						
Average profit	3.33%	5.05%	5.35%	5.39%	4.28%	0.94%
Standard deviation	9.80%	9.49%	10.16%	8.79%	7.79%	6.79%
Test <i>t</i>	4.0840	6.3895	6.3226	7.3645	6.5859	1.6674
<i>p value</i>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0954***
<b>Firm size</b>						
Average profit	3.04%	3.14%	3.00%	3.44%	3.07%	0.03%
Standard deviation	15.44%	15.86%	16.10%	16.34%	16.21%	8.26%
Test <i>t</i>	2.360	2.376	2.237	2.525	2.270	0.044
<i>p value</i>	0.018	0.018	0.025	0.012	0.023	0.965
<b>Leverage</b>						
Average profit	5.08%	4.68%	4.96%	5.14%	4.49%	-0.59%
Standard deviation	8.74%	10.61%	8.82%	9.12%	9.21%	7.27%
Test <i>t</i>	6.9738	5.2995	6.7489	6.7664	5.8509	-0.9698
<i>p value</i>	0.0000	0.0000	0.0000	0.0000	0.0000	0.3321

**Source:** the authors.

\* Significant at 1%, \*\*\* Significant at 10%.

As for the E/P variable, we observe that, although average profits increase slightly between the lowest quintile (Q5) and the highest quintile (Q1) – resulting in a positive difference of 0,81% –, the result is statistically insignificant. Thus, we cannot conclude that value versus growth exists for portfolios based on the E/P index.

The third part of Table 3 presents results for the CF/P variable. Similarly to what was found for the B/M index, profits of portfolios based on the CF/P index decrease almost monotonically between the top quintile and the bottom quintile, producing a 0.94% premium (Q1-Q5), significant at 10 %. This result contradicts what theory usually proposes, since, according to former evidence, high CF/P ratio stocks presented better results than those with a low CF/P ratio.

Regarding the firm size variable, no significant difference between the profits of value stocks (Q1) and growth stocks (Q5) was observed. Thus, the results of this phase of research do not indicate, *a priori*, the existence of the firm size effect documented by Banz (1981), in which stocks from smaller companies produce greater profits.

Finally, we observe that, although the leverage variable presents a small value premium, this result is insignificant. Thus, considering this first stage of analysis, we cannot confirm the existence of the leverage effect, proposed by Bhandari (1988), revealing a positive relationship between a company's capital structure and profits.

All this having been said, portfolio analysis offers evidence that value versus growth is not described in the Brazilian stock market, given that growth strategies are superior to value strategies. This result, however, is coherent with evidence presented by Mescolin, Braga and Costa Jr. (1997), Ramos, Picanço and Costa Jr. (2000), Pedreira (2005), Fregnani, Faneco and Famá (2008) and Saito, Savoia and Sousa (2009), in

which growth stocks present greater profits than value stocks in some of the analyzed periods. It is important to note that this research uses a longer period than those hitherto carried out in Brazil, suggesting that value strategies can only achieve better results in the short term.

### 4.3 Regression analysis

This section presents results from univariate and multivariate regressions, whose goal is to identify the variables that best explain Brazilian stock profits in the period surveyed. All regressions were estimated using panel data.

For each specified model, we calculated the “t” – for Student – test, in order to verify individual significance; and the “F” test, to analyze the joint significance of variables investigated. Tests were also made to verify the model's assumptions, such as the modified Wald test, so as to test homoscedasticity, and the Wooldridge test of Lagrange Multipliers, for autocorrelation in panel data. In cases where heteroscedasticity and/or autocorrelation were detected, we used the Huber-White robust variance-covariance matrix. After estimating with fixed and random effects, the Hausman test (1978) was carried out, in order to ascertain which model was most appropriate in each case.

#### 4.3.1 Univariate regressions

Univariate regressions aim at analyzing the individual explanatory power of research variables. Their results are presented in Table 4. All variables, except the E/P ratio, are significant at 1%.

The B/M ratio presents a -0,216 negative, significant coefficient. This result contradicts what is usually found in theory, which predicts that B/M is positively connected to profits. This finding, however, is coherent with results from portfolio analysis (Table 3), which favor investment strategies for growth stocks.

Confirming what was presented in Table 2, the **E/P** index is statistically insignificant to explaining profits. The dummy variable was also analyzed, in which “0” represents the negative values and “1” the positive values of the E/P

index. According to Table 4, the coefficient for this variable was positive and significant, suggesting that there is a difference when considering positive and negative earnings separately, confirming Gharghori, Strykowski and Veeraraghavan (2012).

**Table 4** – Univariate regressions from profits for fundamental variables.

	Constant	Coefficient	Adjusted R <sup>2</sup>	F Test	Wald	LM	
B/M	0.564*	-0.216*	0.1432	78.01*	590.50*	6.407*	55.55*
E/P	0.258*	0.0002	0.0004	0.23	500.48*	1.154	0.30
DUMMY	-0.026	0.319*	0.0378	13.36*	455.16*	1.065	0.03
CF/P	0.317*	-0.410**	0.0177	4.84**	318.28*	0.003	3.91**
VM	-2.082*	0.163	0.0274	68.13*	449.90*	4.845**	50.44*
PO/AT	0.237*	0.0004	0.0006	0.18	670.66*	1.345	0.10

**Source:** the authors.

\* Significant at 1%, \*\* Significant at 5%, \*\*\* Significant at 10%.

Standard errors estimated with correction for heteroscedasticity and serial correlation, using the Huber-White robust matrix.

The **CF/P** variable presents a -0,410 negative, significant coefficient. This result also contradicts what is commonly found in theory, which states that the CF/P index is positively connected to profits. This finding, however, is coherent with results from portfolio analysis (Table 3), which reveal that investment strategies for growth stocks achieve greater profits than those for value stocks.

With respect to variable **VM**, a 0,163 positive, significant coefficient can be observed. This result is inconsistent with the firm size effect documented by Banz (1981), in which the lower the company’s market value, the greater the profits. This finding, however, is coherent with previous research carried out in the Brazilian market, such as Rodrigues (2000), Braga and Leal (2002) and Machado and Medeiros (2011), whose results indicate a favorable firm size effect for companies with high market values.

The **PO/AT** variable achieved a 0.0004 positive coefficient. Although the result is consistent with Bhandari’s leverage effect (1988),

it has no statistical significance. Mellone Jr. (1999) observed that leverage has no relevance to explaining Brazilian stock profits.

Considering results from univariate regressions, we can conclude, *a priori*, that the variables that best explain average profits are the B/M and CF/P ratios, although they presented a contrary relationship to what was expected. The fact that B/M and CF/P ratios presented reverse relationships seems to be, however, a specific feature of the Brazilian market, coherent with the results of Machado and Medeiros (2011), who observed a firm size effect that favored large companies, as well as that the B/M ratio of portfolios made up of high market value stocks was smaller than the B/M ratio of portfolios made up of low market value stocks – thus concluding that, in Brazil, growth opportunities were concentrated in high market value companies, similar results to this paper’s.

High market value companies’ greater profits, coupled with the fact that these companies have lower B/M ratios, may lead, therefore, to the

predominance of the growth strategy in Brazil. Additionally, we highlight the long period of research, which may signal the predominance of growth strategies in the long term. Periods over 12 months are considered long-term (CPC, 2011). Moreover, this research highlights the high volatility of capital markets in emerging countries, as revealed by Fama and French (1998).

Additional empirical evidence supports the findings of this research. Fama and French (1998) argue that value versus growth is a global phenomenon, but there are some exceptions. In Italy, growth stocks outperformed value stocks for portfolios based on book-to-market, earnings/price and dividend/price variables. Considering this last variable only, there are two more exceptions: Germany and Singapore.

#### 4.3.2 Multivariate regressions

Multivariate regressions aim at analyzing which fundamental variables best identify value and growth companies, following control for firm size and leverage. Their results are presented in Table 5.

Model A in Table 5 reveals that, when B/M and E/P ratios are simultaneously regressed, the B/M ratio presents a negative and significant coefficient and the E/P ratio a positive – but insignificant – coefficient. The B/M ratio continues to present significant and negative coefficients in all other combinations of explanatory variables (models B, D, E, H, I and K), confirming results from Portfolio Analysis (Table 3) and univariate regression (Table 4).

**Table 5** – Multivariate regressions from profits for fundamental variables.

Models	Constant	B/M	E/P	CF/P	VM	PO/AT	Adjusted R <sup>2</sup>	F Test	Wald	LM	Hausman
(A) B/M, E/P	0.562*	-0.215*	0.0001				0.1432	39.99*	595.18*	6.48**	56.41*
(B) B/M, CF/P	0.581*	-0.236*		-0.185			0.1830	27.11*	1.8e+28*	4.09**	28.68*
(C) E/P, CF/P	0.311*		0.0004	-0.407**			0.0175	4.68**	328.32*	0.17	5.19***
(D) B/M, E/P, CF/P	0.579*	-0.236*	0.0002	-0.184			0.1828	18.13*	359.01*	4.36**	30.76*
(E) B/M, VM, PO/AT	1.047***	-0.249*			-0.031	0.00007	0.1498	17.09*	628.86*	4.94**	33.95*
(F) L/P, VM, PO/AT	-2.086*		0.0001		0.159*	0.00006	0.0266	18.39*	694.08*	2.37	35.21*
(G) CF/P, VM, PO/AT	-2.312*			-0.294***	0.173*	0.0013	0.0617	25.39*	389.14*	2.08	29.93*
(H) B/M, E/P, VM, PO/AT	1.048***	-0.249*	0.0002		-0.031	0.00007	0.1497	12.98*	637.89*	5.02**	34.64*
(I) B/M, CF/P, VM, PO/AT	0.867	-0.259*		-0.192	-0.019	0.00005	0.1783	16.96*	304.12*	3.08***	34.03*
(J) E/P, CF/P, VM, PO/AT	-2.311*		0.0003	-0.291	0.173*	0.0015	0.0618	19.10*	399.57*	2.38	31.46*
(K) B/M, E/P, CF/P, VM, PO/AT	0.866	-0.259*	0.0003	-0.189	-0.019	0.0005	0.1781	14.26*	313.33*	4.73**	36.06*

**Source:** the authors.

\* Significant at 1%, \*\* Significant at 5%, \*\*\* Significant at 10%.

Standard errors estimated with correction for heteroscedasticity and serial correlation, using the Huber-White robust matrix. Absence of multicollinearity, with tolerance values varying between 0,732 and 0,936 and FIV varying between 1,068 and 1,367.

With respect to the E/P index, positive coefficients – but insignificant for all other models – can still be observed. Thus, when regressed along with B/M, FC/P and control variables VM and

PO/AT, the E/P index then presents a similar result to that obtained by univariate regression (Table 4) – that is, no relevance to explaining analyzed stock profits.



Model B shows joint regression results for B/M and CF/P indexes. Both variables present negative coefficients, confirming results from univariate regressions (Table 4). Only the B/M index was statistically relevant, however. The CF/P index presented negative coefficients for all the other regressions, but was only significant when combined with the E/P index and with control variables (models C and G). In all models in which it was combined with B/M, FC/P was insignificant, which may indicate that its explanatory power of stock profits is incorporated by the B/M index.

According to Table 5, amongst proxies used to measure growth-value strategies, therefore, the book-to-market index proved to be consistent, since, in all models, it presented the same sign (negative, confirming findings from Table 4) and statistical significance. The E/P variable was not significant for any model, confirming results from univariate regression and proving irrelevant to explaining profits. The CF/P index, although it was statistically significant in univariate regression, was no longer significant when combined with the B/M index. This result may indicate that its explanatory power is incorporated by the B/M index.

With regard to control variables, for the VM variable results of multivariate regressions are inconclusive, since it presented a significant and positive coefficient in models only (F, G and J). Although this result confirms what portfolio analysis found, when combined with the B/M index the firm size variable presented a negative, insignificant coefficient. Thus, the existence of the firm size effect documented by Banz (1981) is not proven in the Brazilian market. For the PO/AT variable, coefficients were positive in all models, but were statistically insignificant. Thus, in this research, it is not possible to confirm the existence of Bhandari's leverage effect (1988) in the Brazilian market.

All this having been said, we can conclude that the B/M index is the best proxy for identifying value and growth companies in Brazil. This result

is coherent with the findings of Gharghori, Strykowski and Veeraraghavan (2012) and contradicts the results of Barbee, Mukherji and Raines (1996). Moreover, it confirms the results of almost all Brazilian research that included this variable.

## 5 CONCLUSION

This research aimed at analyzing the existence of value versus growth in the Brazilian stock market in the 1995-2008 period, and at identifying the variable that best explains its impact on stock profits. Results from portfolio analysis favor growth strategies, given that growth stocks achieved greater profits than value stocks in portfolios based on book-to-market and cashflow/price variables. Results were not statistically significant for the other variables. Results from regression analysis confirm what was found in portfolio analysis, confirming the importance of B/M to explaining Brazilian stock profits.

Although most Brazilian studies consider value strategies to be superior to growth strategies, many of them also present results that favor growth strategies in certain periods. It is important to note that this research covers a period of thirteen years of analysis, longer than other studies carried out in Brazil. Thus, we believe that, to date, value strategies performed better because they are concentrated in the short term. In the long term, there is evidence that results favor growth strategies. According to the Accounting Pronouncements Committee - CPC (2011) (Comitê de Pronunciamentos Contábeis - CPC), in this paper a period shorter than 12 months is considered short-term, and a period over 12 months is considered long-term. Additionally, we emphasize the high volatility of the Brazilian capital market. Results in this paper are similar to those obtained by Fama and French (1998) in Italy, Germany and Singapore.

In this research, we used firm size and leverage as control variables, considering its

documented connections with profits. However, results do not confirm that these effects do in fact exist in the Brazilian market. Contrary to expectations, we found a negative relationship between the leverage variable and stock profits in portfolio analysis. In univariate and multivariate regressions, although the variable presented a positive relationship with profits, as predicted by theory, there was no statistical significance. Regarding the firm size effect, portfolio analysis observed the firm size effect in favor of large companies, similarly to results from Rodrigues (2000), Braga and Leal (2002) and Machado and Medeiros (2011). In regressions, results were inconclusive.

This particular Brazilian market trend justifies the fact that the book-to-market and the cashflow/price ratios are reversed in this research and, in turn, supports the absence of a premium in favor of value stocks and the presence of investment strategies with growth stocks. Moreover, we conclude that, to obtain greater profits with this type of strategy, the variable that best identifies growth stocks is the book-to-market index.

Finally, we suggested that further research carry out analysis in short periods, in order to verify whether value and growth strategies are indeed short or long-term phenomena. Furthermore, we suggest other proxies are tested, such as the price/sales index and the dividend yield.

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