

Prices Lead Earnings in Brazil?

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ABSTRACT

This article aims to identify the timing of the return-earnings relationship in Brazil, that is, the degree of time lag between the occurrences of the variables. This research was developed based on assumptions from the prices lead earnings hypothesis, the fundamental premise of which is that the stock price is informationally richer than the current and past accounting earnings in terms of future earnings, which invalidates the establishment of a contemporaneous relationship (timing zero) between these variables. This research was conducted by means of pooled regression using panel data (fixed effects and random effects). Four models were employed in total. A total of 205 firms were analyzed over 53 quarters (1999 to 2012), resulting in 8,440 firm-quarters. The results indicated that accounting earnings alone are not informationally contemporaneous to stock price. However, when the effects of future earnings on this relationship were eliminated, it was found that there are signs of timeliness. Furthermore, it was found that the returns anticipated information about future earnings. The identified associations suggest that this anticipation occurs over at least eight quarters. However, it was not possible to determine the timing of the quarterly return-earnings relationship in Brazil because, on the one hand, past returns are associated with current earnings and, on the other, the significance of future earnings in explaining current returns depends on the arrangement of the independent variables in the model. Nevertheless, it is clear that the results converge with a timing equal to 1, in which the return anticipates earnings in the following period, a result that was independent of the addition of the other variables in the model.

Keywords: Return-earnings relationship. Prices lead earnings. Informational timeliness. Untimeliness.

1 INTRODUCTION

Stock prices follow the expectations of investors and are conditioned on the information available at any given time. It may be assumed that this relationship occurs rationally but without obeying specific rules. Each investor has his/her own decision model that is influenced by his/her indifference to the various risk and return configurations established for the assets. Accounting earnings, meanwhile, also capture much of this information; however, they do so subject to the limitations imposed by objectivity, by conservatism and by the rules for the recognition of revenue within the accounting model itself, which render them informationally untimely.

To some extent, prices and earnings can be considered to be signs of the same state of reality, although they are not contemporaneous. This situation appears more clearly in light of market efficiency. Accounting earnings tend to have a delayed response to the relevant events considered by the market when valuing stock (Beaver, Lambert & Morse, 1980). The primary implication of this delay is that only part of the contemporaneous variation in earnings is a surprise to the market with respect to the expectations regarding future earnings (Collins, Kothari, Shanken & Sloan, 1994; Kothari & Zimmerman, 1995).

The portion of information about future earnings that is not expressed by current earnings is an important variable that is omitted in the traditional model of the return-earnings relationship contributes, alongside the competing effect of information obtained from other sources, to obtaining low and biased response coefficients for earnings and a low explanatory power for the models¹ (Kothari & Zimmerman, 1995; Kothari, 2001).

The prices lead earnings hypothesis addresses part of this problem. Under this concept, it is assumed that prices contain more information about future earnings than the series of current and past earnings, i.e., prices have informational content regarding future earnings (Beaver et al., 1980; Kothari & Zimmerman, 1995). One implication of this phenomenon is that market expectations for earnings are different from expectations based on the earnings time series. This time series is described as a random walk in much of the literature, meaning that past earnings cannot anticipate the subsequent variations (Kothari & Sloan, 1992).

Important studies have explored, directly or indirectly, or recognized the lack of informational timeliness between prices and earnings, for example, Beaver, Lambert and Morse (1980), Kothari and Sloan (1992), Kothari (1992), Collins, Kothari, Shanken and Sloan (1994), Ayers and Freeman (2000) and Truong (2012). However, despite the relevance of the topic to accounting research in the capital markets, with a few exceptions such as Galdi and Lopes (2008), Pimentel and Lima (2010), Santos and Lustosa (2010), Sales (2011) and Paulo, Sarlo Neto and Santos (2012), it has been little explored for the Brazilian stock

market. This study of the temporal aspects of the return-earnings relationship therefore aims to bridge this gap in the national literature and to provide theoretical and methodological contributions to advance the understanding of this relationship on the national scene.

The study therefore aims to identify the timing of the return-earnings relationship in Brazil, which ultimately is the primary indicator of the prices lead earnings hypothesis. To that end, the following research questions will be studied:

- Is there informational timeliness between the quarterly stock returns and quarterly accounting earnings of publicly traded Brazilian firms?
- Do the quarterly stock returns of publicly traded Brazilian companies anticipate information regarding future quarterly earnings?
- What is the timing of the return-earnings relationship?

Informational timeliness is understood here to be a significant relationship between two variables, in this case accounting earnings and stock returns, when considered at the same moment in time. The timing is used to indicate the degree of the time lag between the occurrences of the variables when a significant relationship between them is verified. For example, in a contemporaneous relationship, the timing is zero; however, where there is 1 lag between the variables, the timing is -1, and so on.

In general, the results obtained showed a lack of informational timeliness between returns and earnings with a timing equal to 1, where returns anticipate earnings in the subsequent period, i.e., prices can anticipate earnings. However, the study shows that current earnings are contemporaneous when future earnings are introduced into the analyzed relationship. These findings, among others obtained in the study, offer an important contribution to the improvement of the operational and analytical models employed by Brazilian studies investigating the return-earnings relationship, given that many of them do not commonly consider or only partly consider these time lag effects when defining such models.

Furthermore, these findings provide additional support for the forecasting of future earnings for investors or investment analysts in that they indicate that the current stock return has informational content in relation to future earnings, notably for the subsequent period.

The remainder of the paper is organized as follows. Section 2 presents the empirical evidence obtained in previous studies, discusses the theoretical aspects underlying the price leads earnings hypothesis and states the research hypotheses. Section 3 addresses the methodological aspects of the study. Section 4 presents and analyzes the results obtained and Section 5 presents our final considerations.

¹ The problems presented by the traditional model of the return-earnings relationship have been discussed in the accounting literature for many years. An example of this discussion is Lev's (1989) study.

2 DEVELOPMENT OF THE RESEARCH HYPOTHESES

2.1 Theoretical Framework.

The traditional model for the price-earnings ratio assumes the following: (i) the earnings of a period contemporaneously reflects all of the information contained in that period's return, (ii) only the information contained in earnings (expected future cash flows) affects the price of stock, (iii) earnings follow a random walk and (iv) the rate of dividend payout is 100% (Kothari, 1992).

Kothari (1992) emphasizes that the purpose of premise "iv" is to simplify the econometric analysis of the price-earnings ratio and that it does not sacrifice the economic intuition associated with a more realistic payout rate. Regarding premise "iii", despite the existence of divergences, for some time, much of the literature has been assembling a substantial body of evidence indicating that the time series of annual earnings follow a random walk or a random walk with a trend (Kothari, 2001).

Premises "i" and "ii" are unrealistic and contrary to the implications of market efficiency, an underlying hypothesis assumed in the accounting research on capital markets. In an efficient market, the stock price (P_t) instantly reflects the expectations of its participants regarding future cash flows. In addition, earnings (X_t), due to limitations imposed by the accounting model, especially the criteria for the recognition of revenues and expenses, tend to incorporate the information already reflected in P_t systematically with a delay. It therefore follows that P_t is informationally richer about future earnings than the series of current and past earnings. In other words, the market expectations and the expectations based on the time series of X_t become different, a phenomenon (hypothesis) known as prices lead earnings (Beaver et al., 1980; Lev, 1989; Kothari, 1992, 2001).

The first study that addressed this phenomenon was that of Beaver et al. (1980). The results obtained confirmed that P_t is informationally richer than X_t . Other important studies were those of Kothari (1992), Kothari and Sloan (1992) and Kothari and Zimmerman (1995), who discussed and demonstrated the effects of this phenomenon on econometric models that addressed the price-earnings ratio - traditionally used up until then in the international literature - and offered alternatives to mitigate them.

This informational superiority of P_t , according to Beaver et al. (1980), may occur for various reasons. For example, (i) X_t can be considered to be an aggregation of earnings of smaller intervals, thus P_t can be used to obtain information about pre-aggregated series that is lost in the temporal aggregation process, (ii) there are events that affect future earnings and that are not reflected in X_t and (iii) X_t can be represented by a process comprising more than one stochastic variable.

If X_t follows a random walk, all information expressed in P_t is already contained in the past series of X_t . However, if P_t contains information about future earnings, it must therefore have violated the random walk premise because

the future variations of X_t can be anticipated by market participants. It is for this reason that Beaver et al. (1980) assumed that X_t is formed by a compound process as expressed in equation (1):

$$X_t = x_t + \varepsilon_t \quad 1$$

where x_t is the portion of X_t that reflects the events that also affect P_t , called undistorted earnings; ε_t is white noise, known as distorted earnings, which represents the impact of X_t on adjustments or events that do not affect P_t .

Kothari (1992) and Kothari and Zimmerman (1995) argue that when P_t is informationally richer, the variation of X_t is composed of a portion ($a_{t,t-1}, \dots, a_{t,t-n}$) that was previously incorporated by P_{t-1}, \dots, P_{t-n} and by a random portion that represents a market surprise (s_t). It is with this random portion that a contemporaneous relationship could be found.

Extending this idea to the compound process shown in equation (1), it is possible to assume that

$$x_t = s_t + \sum_{n=1}^N \alpha_{t,t-n} \quad 2a$$

$$X_t = s_t + \sum_{n=1}^N \alpha_{t,t-n} + \varepsilon_t \quad 2b$$

where $a_{t,t-n}$ is the portion of X_t (first subscript t =year to which X refers) anticipated by the market in period $t-n$ (second subscript).

The portion x_t is not observable, therefore, s_t and $\sum_{n=1}^N \alpha_{t,t-n}$ cannot be isolated or measured. However, according to Beaver et al. (1980), X_t offers a distorted measure of x_t due to the existence of ε_t , and therefore, X_t measures variations of P_t with error.

It is noteworthy, however, that apart from the effects of this distortion, the informational dynamic between X_t and P_t imposes problems on the contemporary relationship between these variables. As only the portion s_t correlates with variations in P_t , because $\sum_{n=1}^N \alpha_{t,t-n}$ is irrelevant to the explanation of these variations, and as P_t anticipates information that will only be expressed in future earnings ($\sum_{n=1}^N \alpha_{t,t+n}$) — variables omitted in the traditional model and uncorrelated with s_t — the econometric consequences noted by Beaver et al. (1980) are exacerbated. This result is demonstrated by the low explanatory power offered by the traditional model of the price-earnings ratio and the low magnitude and bias of the response coefficient of X_t (Lev, 1989; Kothari & Zimmerman, 1995; Kothari, 2001).

Collins et al. (1994) found that the relationship between P_t and X_t has poor timeliness and identified that the informational untimeliness of X_t is the main determinant of this phenomenon. The authors found that future variations of X_t were able to explain the current variations of P_t , i.e., P_t anticipated the portion $\sum_{n=1}^N \alpha_{t,t+n}$.

Basu (1997) found that X_t is asymmetrically timely in relation to bad news signaled by negative changes in P_t , a finding that introduces additional aspects to the subject be-

cause it shows the effect of accounting conservatism on the informational portion s_t . This fact tends to exacerbate the problems of the poor timeliness between X_t and P_t because it indicates that as well as being reduced, timeliness is apparently also incomplete and skewed.

Another line of research has been exploring the influence of other aspects on the prices lead earnings phenomenon, such as ownership structure, investor characteristics, analyst coverage, governance structure, level of long-term investments, goods produced and size, which have increased the understanding of the topic. In general, studies have shown that these factors affect the informational non-synchronization of X_t and P_t (Ayers & Freeman, 2000, 2003; Jiambalvo, Rajgopal, & Venkatachalam, 2002; Lee, 2007).

Along the same line, Ayers and Freeman (2000) studied the association between firm size and the timing of returns relative to the average variation in sectoral annual earnings and the variation in firm-specific annual earnings. A positive association was found between size and the degree of anticipation of future earnings for both analyzed variations. Moreover, the results also suggested that the stock prices of large firms anticipate information that affects the entire industry, so their returns can anticipate a portion of the small firms' returns.

Jiambalvo, Rajgopal and Venkatachalam (2002) and Ayers and Freeman (2003) found a positive association between the institutional ownership percentage in firms' ownership structures and the prices lead earnings phenomenon. For Jiambalvo, Rajgopal and Venkatachalam (2002), this association occurs because institutional investors are more sophisticated and have advantages in acquiring and processing information that are only reflected in future earnings, which would impose lower informational synchronization as these investors' ownership increases.

Ayers and Freeman (2003) also evaluated the influence of analyst coverage on the degree of anticipation of future earnings displayed in stock prices. As observed for institutional investors, the results for analyst coverage showed a positive association. In addition, Ayers and Freeman (2003) found that such factors are incremental to each other in this association and their influence on the degree of anticipation is independent of firm size.

Lee (2007), in turn, presented evidence to suggest that operational (durability of products produced) and market (product power in the market) characteristics are positively associated with the anticipated recognition of future earnings, while the level of investment in long-term assets is negatively associated with this anticipation.

Another interesting study is that of Truong (2012), which explores the relationship between options trading and the extent to which prices anticipate future earnings. Truong (2012) found that the stock prices of firms with listed options anticipate more information about future earnings. In addition, a positive relationship was identified between the options trading

volume and this anticipation. Another result reported was that among firms with listed options, stock prices in the post-listing period reflected better and faster information about future earnings than those in the pre-listing period.

In Brazil, the studies are still preliminary. For example, Galdi and Lopes (2008) and Pimentel and Lima (2010) obtained evidence of a long-term relationship between accounting earnings and stock prices. In addition, among the firms analyzed, they observed a greater number of occurrences where stock price anticipated information contained in the accounting earnings, at least at a timing equal to -1. According to Galdi and Lopes (2008), the latter finding is somewhat expected considering the informational untimeliness of accounting earnings.

Sales (2011) obtained results indicating that the market anticipates information contained in X_t , pricing stock during the period to which it relates and after the closure of the same. This result is consistent with the findings of Santos and Lustosa (2010). Sales (2011) also found evidence of the existence of a lead-lag type structure between the variations in P_t and X_t , which according to the author suggested that future earnings can explain part of the variation in P_t that is not explained by X_t . However, notwithstanding the functional relationship employed, from a time perspective, what is observed is that P_t may explain part of future earnings $\left(\sum_{i=1}^N \alpha_{t,t+i}\right)$ and not the reverse.

Paulo, Sarlo Neto and Santos (2012), assuming the prices lead earnings hypothesis and the asymmetric timeliness evidenced by Basu (1997) as an underlying idea, studied within the context of the Brazilian stock market the informational content expressed by X_t when disclosed. The results indicated that P_t only showed abnormally significant variations in response to bad news; this result is aligned with the perception of information asymmetry for s_t .

2.2 Hypotheses.

Based on the theoretical assumptions and empirical evidence presented and discussed in the previous section, it is possible to conclude that the primary effect of the informational superiority of P_t due to its ability to quickly incorporate the relevant events that will only be reflected in future variations of X_t , the essence of the prices lead earnings hypothesis is poor or even a lack of timeliness between these variables. Thus, finding the existence of timings above zero may confirm this hypothesis in the Brazilian market. The following research hypotheses were therefore formalized:

H_{0a} : The relationship between the quarterly stock returns and the quarterly accounting earnings of publicly traded Brazilian firms is not contemporaneous.

H_{0b} : The quarterly stock returns of publicly traded Brazilian firms anticipate information regarding future quarterly earnings.

H_{0c} : The timing of the return-earnings relationship of publicly traded Brazilian firms is greater than or equal to 1.

3 METHODOLOGY

3.1 Data.

The empirical analysis included the quarterly data of non-financial firms listed on the São Paulo Stock Exchange (Bolsa de Valores de São Paulo - Bovespa) for the period between 03/1999 and 03/2012. Only those firms presenting financial statements for that period, for the quarters ended 03/31, 06/30, 09/30 and 12/31 and for which the stock price was available on these dates or the day immediately after were included in the study sample. The final sample consisted of 205 firms and resulted in panel data consisting of 8,440 firm-quarters. All data were obtained from the Economática database.

The accounting variables earnings per share (*EPS*) and book value of equity per share (*BVPS*) were used, which served as a control for the effect of firm size. Both variables were deflated by the stock price at the beginning of the period (end of the previous period). The *EPS* growth rate, referred to here as *EPSGR*, was determined by the natural logarithm of the difference between the *EPS* in two consecutive periods [$\ln(EPS_{it}/EPS_{it-1})$].

The stock price return was also calculated logarithmically. The stock price was adjusted by earnings according to criteria adopted by Economática. When possible, preferred stocks were selected because of their greater liquidity.

As detailed below, the study was conducted in two stages, with the use of four econometric models, which required the use of two sets of variables. Observations located in the first and last percentiles of each variable series were excluded to minimize the econometric effect of outliers on the model results. This process resulted in a final sample of 4,177 firm quarters for the first group of variables and 3,321 for the second.

3.2 The Model.

Basically, the three functional relationships represented below were explored:

$$\text{Accounting Earnings} = f(\text{Stock Return}) \quad \mathbf{3}$$

$$\text{Stock Return} = f(\text{Accounting Earnings}) \quad \mathbf{4}$$

$$\text{Stock Return} = f(\text{Accounting Earnings}, \text{Stock Ret}_{t+1}, \text{Stock Ret}_{t+2}, \text{Stock Ret}_{t+3}) \quad \mathbf{5}$$

For all of these relationships, the respective econometric models were estimated using pooled regressions and panel data. To evaluate the suitability of pooled regression, the indication of a structural break in the model was considered at a significance level of at least 10% using the Chow test. Where a break exists (the alternative hypothesis of the test), the use of panel data is recommended. The choice of the appropriate modeling type for the panel, i.e., fixed effects or random effects models, was based on the Hausman test, the null hypothesis of which indicates the exist-

tence of random effect components in the estimated multivariate relationship.

The econometric models employed were based on Beaver et al. (1980) — model (6) — and Collins et al. (1994) — models (7), (8) and (9). In these studies, variations of *EPS* were used; therefore, the *EPSGR* variable was used herein. However, EPS_{it}/p_{it-1} was used because of its superiority in the presence of prices lead earnings, as highlighted by Kothari (1992). Furthermore, the model estimates using these two variables offer additional opportunities to evaluate the adequacy of these proxies for accounting earnings on the return-earnings (earnings-return) relationship in Brazil.

The functional relationship (3) was estimated using econometric model (6), below, which is based on Beaver et al. (1980). This model is also known as the inverted or reverse regression model, so called because it reverses the traditional relationship in which stock returns (change in price *p*) are a function of the variation in earnings per share (ΔEPS). Two estimations were performed where the dependent variables were EPS_{it}/p_{it-1} and $EPSGR_{it}$.

$$X_{it} = \beta_0 + \sum_{k=0}^4 \beta_{k+1} R_{it-k} + \beta_6 R_{it-6} + \beta_7 R_{it-8} + \beta_8 \frac{BVPS_{it}}{p_{t-1}} + \varepsilon_{it} \quad \mathbf{6}$$

where

$$X_{it} = EPS_{it}/p_{it-1} \text{ or } EPSGR_{it}$$

$$EPS_{it} = \text{earnings per share of firm } i \text{ in quarter } t$$

$$p_{it-1} = \text{stock price of firm } i \text{ at the end of quarter } t-1$$

$$EPSGR_{it} = EPS_{it} \text{ growth rate, obtained by the natural logarithm of the difference between } EPSs \text{ in } t \text{ and } t-1$$

$$R_{it} = \text{logarithmic return of the stock of firm } i \text{ in quarter } t \text{ (} t-1 \dots t-8 \text{)}$$

$$BVPS_{it} = \text{book value of equity per share of firm } i \text{ in quarter } t; \text{ used as a proxy for size for control purposes}$$

If the variations in the stock price express information that only reflects future earnings, it is likely that past returns are linked to current accounting earnings. To evaluate this aspect, quarterly returns were used that were both contemporaneous to earnings and lagged by 1 to 4, 6 and 8 quarters, aiming to analyze the informational relationship of the immediately preceding quarter up to a two-year lag. It is assumed, therefore, that investor expectations about future earnings are evaluated in response to the new information brought by quarterly earnings and revised and incorporated into prices in the short and medium terms. If, therefore, the prices lead earnings hypothesis is true in Brazil, it may be expected that β_1 is not significant or else has low magnitude, depending on the representativeness of s_t . The relationships of the other coefficients to the lagged returns are expected to prove to be positive and significant. These results will specifically allow hypothesis H_{ob} to be operationally tested and will provide input that together with the other models will allow hypothesis H_{oc} to be tested.

Establishing the same reasoning above, although from

the perspective of accounting earnings, it is possible to assume that current earnings respond in an untimely fashion to the current returns. Thus, assuming a traditional functional relationship between returns and earnings, adding earnings for subsequent periods would offer a better level of explanation of this relationship. Based on this notion, the functional relationship (4) was explored by means of the econometric models below:

$$R_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 \frac{BVPS_{it}}{P_{it-1}} + \varepsilon_{it} \tag{7}$$

$$R_{it} = \beta_0 + \sum_{k=0}^3 \beta_{k+1} X_{it+k} + \beta_5 \frac{BVPS_{it}}{P_{it-1}} + \varepsilon_{it} \tag{8}$$

where X_{it} assumes EPS_{it}/p_{it-1} or $EPSGR_{it}$ in the respective estimations. Model (7) is the traditionally studied relationship (Kothari, 2001) and model (8) is based on Collins et al. (1994).

However, as the informational portions of X_t and X_{t+k} that are already anticipated by past prices $\sum_{n=1}^N \alpha_{t,t-n}$ and $\sum_{n=1}^N \alpha_{t+k,t+n}$ would not be correlated with R_t , there are measurement errors in the model for the coefficients of X_t and X_{t+k} , the extent of which depends on the deviation

of price variations associated with the expectations in t . In the specific case of X_{t+k} , there is an additional source of error arising from the informational portion not anticipated by R_t , which will only be reflected in future returns, $\sum_{n=1}^N \alpha_{t+k,t+n}$ (Collins et al. 1994; Kothari, 2001). To mitigate some of the effects of these measurement errors related to X_{t+k} , future stock returns were used (R_{t+1} , R_{t+2} and R_{t+3}), as proposed by Collins et al. (1994).

The following model was therefore used, operationalizing the functional relationship (5):

$$R_{it} = \beta_0 + \sum_{k=0}^3 \beta_{k+1} X_{it+k} + \sum_{k=1}^3 \beta_{k+4} R_{it+k} + \beta_8 \frac{BVPS_{it}}{P_{it-1}} + \varepsilon_{it} \tag{9}$$

It should be stressed that the significance test of the coefficient β_1 , especially in model (7), represents the primary operational test of hypothesis H_{0a} because if β_1 is significantly different from zero, signs of timeliness will be obtained and therefore this hypothesis would be rejected. Furthermore, it should be noted that the results obtained with models (7), (8) and (9) will also be required for the proper evaluation of the propositions contained in hypotheses H_{0b} and H_{0c} .

4 ANALYSIS OF RESULTS

The descriptive statistics of the group of variables used in the first step of the analysis and their correlation matrix are shown in Tables 1 and 2, respectively. After excluding the outliers that were included in the first and last percentiles of the series of each variable, with the exception of the control variable, the initial sample was reduced to 4,177 observations.

Table 1 Descriptive statistics

Variable	Mean	Median	Minimum	Maximum	Standard Dev.
$\frac{EPS_{it}}{P_{it-1}}$	-0.0460	0.0255	-8.8334	0.5318	0.5092
$EPSGR_{it}$	0.0059	0.0358	-3.2736	3.2991	0.9253
$\frac{BVPS_{it}}{P_{it-1}}$	0.4964	0.8294	-244.3480	107.5110	12.1136
R_t	0.0452	0.0356	-0.6124	0.8755	0.2104
R_{t-1}	0.0426	0.0333	-0.6251	0.8097	0.2111
R_{t-2}	0.0423	0.0319	-0.6668	0.8214	0.2141
R_{t-3}	0.0466	0.0383	-0.6931	0.8396	0.2202
R_{t-4}	0.0470	0.0382	-0.6729	0.8206	0.2217
R_{t-6}	0.0522	0.0414	-0.6931	0.8745	0.2325
R_{t-8}	0.0556	0.0458	-0.7418	0.9676	0.2407

EPS_{it} is earnings per share of firm i in quarter t .

p_{it-1} is the stock price of firm i at the end of quarter $t-1$.

$EPSGR_{it}$ is the EPS_{it} growth rate, obtained by the natural logarithm of the difference between EPS_{it} in t and $t-1$.

R_{it} is the logarithmic return of the stock of firm i in quarter t ($t-1...t-8$).

$BVPS_{it}$ is the book value of equity per share of firm i in quarter t and is used as a proxy for size for control purposes.

In the first subset of data, the variables representing accounting earnings have very different characteristics, which is to be expected given the means by which each variable was calculated. It can be observed that the series EPS_{it}/p_{it-1} , despite having greater amplitude, has a lower standard deviation and a lower coefficient of variation (11.07 versus 156.83) than $EPSGR_{it}$. That difference indicates a certain superiority for this variable because its series exhibits less variability. With regard to returns, there is an apparent similarity in the statistics for these two variables. However, it is interesting to note that there is an almost monotonic increase for all variables as their lags increase, in particular in periods $t-6$ and, especially, $t-8$. This possibly shows the influence of the returns of previous periods that were not attained by other series ($t, \dots, t-4$).

The correlation matrix presented in Table 2 shows the existence of a similar linear behavior between accounting earnings and returns for the current and prior periods. There are few correlations observed for the variable $EPSGR_{it}$; these correlations, although significant, do not exceed 0.047. Among these correlations, there is a negative correlation with respect to R_{t-6} , which is intriguing given the remaining correlations observed for other periods. However, the reason for this result may be linked to the series of R_{t-6} , given that other negative correlations are observed for that series in relation to the returns of other periods, specifically from quarter $t-3$. The variable EPS_{it}/p_{it-1} exhibits a uniform sequence of highly significant correlations of the same sign and, although the oldest return series have slightly different descriptive characteristics, no correlation pattern was observed that revealed an important influence for the returns from much older periods. This preliminary analysis also suggests the superiority of EPS_{it}/p_{it-1} in the studied relationship.

Table 2 Correlation matrix

	$\frac{EPS_{it}}{P_{it-1}}$	$EPSGR_{it}$	R_t	R_{t-1}	R_{t-2}	R_{t-3}	R_{t-4}	R_{t-6}	R_{t-8}	$\frac{BVPS_{it}}{P_{it-1}}$
$\frac{EPS_{it}}{P_{it-1}}$	1	-0.0283 *	0.0640 ***	0.0917 ***	0.0574 ***	0.0718 ***	0.0554 ***	0.0647 ***	0.0327 **	0.7056 ***
$EPSGR_{it}$		1	-0.0184	-0.0234	0.0159	0.0461 ***	0.0069	-0.0352 **	0.0352 **	-0.0029
R_t			1	0.1263 ***	0.0111	-0.0349 **	0.0116	-0.0691 ***	-0.0803 ***	0.0329 **
R_{t-1}				1	0.0937 ***	0.0300 *	-0.0245	-0.0473 ***	-0.0908 ***	0.0018
R_{t-2}					1	0.1045 ***	0.0265 *	-0.0011	-0.0780 ***	-0.0049
R_{t-3}						1	0.0998 ***	-0.0445 ***	-0.0509 ***	0.0138
R_{t-4}							1	0.0107	0.0000	0.0093
R_{t-6}								1	0.0271 *	0.0156
R_{t-8}									1	0.0193
$\frac{BVPS_{it}}{P_{it-1}}$										1

*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

The first relationship examined was that proposed by model (6), where the variable representing accounting earnings is estimated as a function of contemporaneous and lagged stock returns. Table 3 shows the results obtained.

Table 3 Model (6) results
$$X_{it} = \beta_0 + \sum_{k=1}^4 \beta_{k+1} R_{it-k} + \beta_6 R_{it-6} + \beta_7 R_{it-8} + \beta_8 \frac{BVPS_{it}}{P_{t-1}} + \varepsilon_{it}$$

Coefficients	X_{it}	
	$\frac{EPS_{it}}{P_{it-1}}$	$EPSGR_{it}$
β_0	-0.0785 (-15.7777)***	0.0006 (0.0364)
β_1	0.0369 (1.7850)*	-0.0596 (-0.8658)
β_2	0.1499 (7.2805)***	-0.1003 (-1.4568)
β_3	0.0614 (3.0427)***	0.0702 (1.0391)
β_4	0.0818 (4.1406)***	0.1877 (2.8528)***
β_5	0.0651 (3.3707)***	0.0083 (0.1281)
β_6	0.0601 (3.2354)***	-0.1441 (-2.3344)**
β_7	0.0346 (1.9238)*	0.1409 (2.3483)**
β_8	0.0200 (18.4664)***	-0.0002 (-0.2039)
Panel modeling	Fixed Effects	Random Effects
Chow Test	18.6574***	2.2795*
Hausman Test	47.4286***	5.27543
Breusch-Pagan Test		24.0171***
Adjusted R ²	73.47%	0.38%
F	52.57603***	-

Number of observations: 4,177. Outliers corresponding to the first and last percentiles of each variable series were excluded, with the exception of the control variable. X_{it} is the dependent variable of the model. Two estimations were performed, one in which X_{it} was assumed to be EPS_{it}/P_{it-1} and another where X_{it} was $EPSGR_{it}$. The t-statistic is shown in parentheses below the relevant coefficient.

*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

In both models, the results reveal a weak or nonexistent relationship between the contemporaneous returns and accounting earnings, indicating the low informational representativeness of the portion s_t . However, the results indicate that there is a significant level of association if the returns from previous periods are considered.

The estimation involving $EPSGR_{it}$ indicates that the returns for quarters -3 (β_4), -6 (β_6) and -8 (β_8) exhibit a significant relationship with this variable. An apparent response pattern was not, however, observed as expected. The intermittency in the quarters and the different signs of the coefficients cannot be explained in general terms, with the exception of the hypothesis that the variable $EPSGR_{it}$ is unrepresentative of the relationship studied here. This lack of representativeness is suggested by the low or nonexistent correlation with returns (Table 2), and it contributes to the low explanatory power of the model (Adjusted R^2 equal to 0.38%).

Conversely, in the estimation with the dependent variable EPS_{it}/p_{it-1} , there is explanatory power of over 70%, and a response pattern consistent with the theory can be observed. The returns for periods -1 to -6 have positive and highly significant coefficients, the values of which

show an increasing trend as the lags decrease. This result suggests that the information expressed in current accounting earnings was already being anticipated by the stock price at least six months previously, which is consistent with the prices lead earnings hypothesis. In light of the results, it can be assumed that approximately 6% of the variations in the return of period -6, for example, are related to variations in current accounting earnings and likewise for the following periods until period -1, where there would be an approximately 15% association between the variables in question. This perception is reinforced by the linear movements of returns and accounting earnings, signaled by the significant level of correlation observed (Table 2). These results, in general, are consistent with those obtained by Galdi and Lopes (2008) and Sales (2011).

In the second stage of the study, the returns contemporaneous with stock price were estimated on the basis of accounting earnings and the future returns of that price, so a new subset of variables was employed. The exclusion of outliers resulted in a total of 3,321 observations. Table 4 shows the descriptive statistics of these variables.

Table 4 Descriptive statistics

Variable	Mean	Median	Minimum	Maximum	Standard Deviation
R_t	0.0658	0.0568	-0.6668	0.8881	0.2155
$\frac{EPS_{it}}{P_{it-1}}$	-0.0767	0.0316	-11.4879	0.5131	0.7829
$\frac{EPS_{it+1}}{P_{it}}$	-0.0807	0.0306	-11.5601	0.4714	0.7851
$\frac{EPS_{it+2}}{P_{it+1}}$	-0.0909	0.0298	-16.7955	0.4116	0.8518
$\frac{EPS_{it+3}}{P_{it+2}}$	-0.09101	0.0285	-16.7955	0.3612	0.8704
$EPSGR_{it}$	0.0464	0.0565	-2.7939	2.9545	0.7429
$EPSGR_{t+1}$	0.0360	0.0503	-2.7324	2.8491	0.7113
$EPSGR_{t+2}$	0.0363	0.0537	-2.7657	2.6974	0.7007
$EPSGR_{t+3}$	0.0014	0.0382	-2.9108	2.7131	0.7312
R_{t+1}	0.0563	0.0455	-0.6497	0.8214	0.2065
R_{t+2}	0.0460	0.0375	-0.6497	0.8097	0.2030
R_{t+3}	0.0394	0.0356	-0.6493	0.7691	0.1988
$\frac{BVPS_{it}}{P_{it-1}}$	-0.6774	0.7887	-490.6530	92.4912	21.4974

EPS_{it} is earnings per share of firm i in quarter t ($t+1$, $t+2$, $t+3$).

p_{it} is the stock price of firm i at the end of quarter t ($t-1$, $t+2$, $t+3$).

$EPSGR_{it}$ is the EPS_{it} growth rate, obtained by the natural logarithm of the difference between EPS s in t and $t-1$.

R_{it} is the logarithmic return of the stock of firm i in quarter t ($t-8$... $t-1$, ..., $t+1$... $t+3$).

$BVPS_{it}$ is the book value of equity per share of firm i in quarter t and is used as a proxy for size for control purposes.

The series of returns comprising this second data subset show behavior similar to that shown in Table 1, i.e., the descriptive statistics increase as the lags increase. Here it can be observed, for example, that R_{t+3} has a mean and a standard deviation lower than those exhibited by R_t . This behavior is also observed for the mean values of the series of variables representing accounting earnings but is not observed for the respec-

tive standard deviations; there is a reverse trend for EPS_{it+k}/p_{it+1} , and it is not possible to determine a pattern for $EPSGR_{it+k}$.

As observed in Table 5, the variable $EPSGR_{it+k}$ is smaller than the variable $EPS_{it+k}/p_{it-(1-k)}$ in terms of the correlation with current and future returns. Considering also the correlations listed in Table 2, it can be inferred that the linear behavior of $EPSGR$ has little association with the behavior

² Although inappropriate, the estimation was performed using the fixed effects model, and the adjusted R^2 was found to be equal to -1.83%. This result indicates that the low explanatory power was not caused by the estimation technique used, which corroborates the finding of the low explanatory power offered by $EPSGR$.

of past, current and future returns. In fact, it appears that $EPS_{it+k}/P_{it-(1-k)}$ displays a reverse behavior. Moreover, it can be observed that the correlations between this variable and past returns appear to be higher than those for the current and future periods. For example, the correlation of earnings in $t+1$ with returns in t is greater than those with returns in

$t+1$, $t+2$ and $t+3$. Likewise, this relationship occurs for the earnings in $t+2$ because the correlations with the returns in t and $t+1$ are higher than those observed for periods $t+2$ and $t+3$ and higher than earnings in $t+3$. This finding suggests that some of the movements for earnings have been "anticipated" by price variations at least a quarter in advance.

Table 5 Correlation matrix

	R_t	$\frac{EPS_{it}}{P_{it-1}}$	$\frac{EPS_{it+1}}{P_{it}}$	$\frac{EPS_{it+2}}{P_{it+1}}$	$\frac{EPS_{it+3}}{P_{it+2}}$	$EPSGR_{it}$	$EPSGR_{it+1}$	$EPSGR_{it+2}$	$EPSGR_{it+3}$	R_{t+1}	R_{t+2}	R_{t+3}	$\frac{BVPS_{it}}{P_{it-1}}$
R_t	1	0.0303*	0.0865***	0.0803***	0.0887***	0.0221	-0.0327*	0.0015	0.019	0.0986***	0.0389**	-0.0127	0.0092
$\frac{EPS_{it}}{P_{it-1}}$		1	0.859***	0.8353***	0.7831***	-0.0272	0.0309*	-0.0012	0.0248	0.0308*	0.0171	0.0397**	0.7824***
$\frac{EPS_{it+1}}{P_{it}}$			1	0.8787***	0.8768***	0.009***	-0.0192	0.0196	0.0086	0.0403**	0.0341**	0.0247	0.7608***
$\frac{EPS_{it+2}}{P_{it+1}}$				1	0.8951***	0.0038	-0.0048	-0.027	0.0378**	0.0833***	0.0411**	0.0503***	0.7411***
$\frac{EPS_{it+3}}{P_{it+2}}$					1	0.0109	-0.007	-0.0001	-0.0124	0.0714***	0.0830***	0.0482***	0.7376***
$EPSGR_{it}$						1	-0.3888***	-0.0482***	-0.1229***	0.0734***	0.0300*	-0.0123	0
$EPSGR_{it+1}$							1	-0.3876***	-0.055***	0.004	0.0627***	0.0276*	0.0025
$EPSGR_{it+2}$								1	-0.3694***	-0.0281*	-0.0141	0.0507***	-0.0062
$EPSGR_{it+3}$									1	0.0072	0.0037	0.0215	0.0007
R_{t+1}										1	0.1000***	0.0109	0.0081
R_{t+2}											1	0.1075***	0.0087
R_{t+3}												1	0.0216
$\frac{BVPS_{it}}{P_{it-1}}$													1

*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

For model (7), satisfactory adjustments (highly significant F statistics) and acceptable explanatory power for the

association studied can be observed in both estimations as shown in Table 6.

Table 6 Model (7) results

$R_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 \frac{BVPS_{it}}{P_{it-1}} + \epsilon_{it}$		
Coefficients	X_{it}	
	$\frac{EPS_{it}}{P_{it-1}}$	$EPSGR_{it}$
β_0	0.0640 (17.0800)***	0.0649 (17.5682)***
β_1	-0.0183 (-1.6860)*	0.0050 (0.9860)
β_2	-0.0006 (-1.2180)	-0.0010 (-2.3093)**
Panel modeling	Fixed Effects	Fixed Effects
Chow Test	3.0406**	5.4102**
Hausman Test	14.8883***	7.2134***
Adjusted R^2	3.33%	3.27%
F	1.5862***	1.5757***

Number of observations: 3,321. Outliers corresponding to the first and last percentiles of each variable series were excluded with the exception of the control variable. X_{it} is one of the independent variables of the model. Two estimations were performed, one in which X_{it} was assumed to be EPS_{it}/P_{it-1} and another in which X_{it} was $EPSGR_{it}$. The t statistic is shown in parentheses below the relevant coefficient.

*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

Current accounting earnings were not significant, which is consistent with the results obtained with model (6) and is thus consistent with the prices lead earnings hypothesis. Moreover, these results are consistent with Collins et al.'s (1994) findings, which were achieved using a similar model estimated based on pooled data.

The inclusion of earnings from future periods in the relationship above generated random effects in the

established multivariate relationship, as verified using the Hausman test (not significant), which required the estimation of the regressions using the random effects model. This result may indicate that the fixed effects identified in model (5) were generated by the omission of these variables because these are significantly correlated with current earnings and equity, as shown in Table 5.

Table 7 Model (8) results

$$R_{it} = \beta_0 + \sum_{k=0}^3 \beta_{k+1} X_{it+k} + \beta_5 \frac{BVPS_{it}}{P_{it-1}} + \varepsilon_{it}$$

Coefficients	X_{it+k}	
	$\frac{EPS_{it+k}}{P_{it-(1+k)}}$	$EPSGR_{it+k}$
β_0	0.0676 (9.1450)***	0.0625 (8.2171)***
β_1	-0.0384 (-3.5800)***	0.0033 (0.5731)
β_2	0.0440 (3.5542)***	-0.0008 (-1.1930)**
β_3	0.0159 (1.4078)	-0.0006 (0.0872)
β_4	0.0192 (1.7903)*	0.0050 (0.8595)
β_5	-0.0010 (-2.8126)***	-0.0002 (-0.6780)
Panel modeling	Random Effects	Random Effects
Chow Test	2.8115***	4.5867***
Hausman Test	4.2871	7.2763
Breusch-Pagan Test	0.0521	0.7722
Adjusted R^2	1.99%	0.01%

Number of observations: 3,321. Outliers corresponding to the first and last percentiles of each variable series were excluded with the exception of the control variable. X_{it} is one of the independent variables of the model. Two estimations were performed, one in which X_{it} was assumed to be $EPS_{it+k}/P_{it-(1+k)}$ and another in which X_{it} was $EPSGR_{it+k}$. The t statistic is shown in parentheses below the relevant coefficient.

*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

A premise underlying this study is that the current variations in stock price capture information that will only be reflected in future earnings, so the inclusion of these would increase the explanatory power already verified by model (7). However, as shown in Table 7, the explanatory power did not increase. Instead, the adjusted R^2 of the estimates decreased. However, it is true that the included variables correlate with those already used, which tends to reduce their effect on the explanatory power. Moreover, the difference between the techniques used to estimate the models must be considered in this comparison.

One interesting aspect is the significance of coefficient β_1 relative to variable EPS_{it}/P_{it-1} . Alone, this variable was not significant in relation to R_t ; however, the inclusion of future variations allowed for the establishment of such significance. This result suggests that variations in current earnings are only associated with variations in R_t when combined with the variations from the following periods, i.e., when

the econometric effects of these variations are eliminated from the current earnings. One possible explanation for this finding may be the linear behavior of these variables. According to Table 5, the current earnings show a correlation of 0.0303 with R_t (significant only at 10%), while they are correlated with the earnings of the following periods ($t+1$, $t+2$ and $t+3$) at highly significant levels and with coefficients above 0.78. The earnings of the following periods, in turn, also have a highly significant correlation with R_t , the coefficients of which are greater than 0.08. However, it is intriguing that the earnings in $t+2$ and $t+3$ have also not been shown to be significant.

Regarding the estimation involving $EPSGR_{it+k}$, there is a lack of explanatory power, although the earnings in $t+1$ exhibit a significant coefficient. It is difficult to interpret these results beyond the observations made for the correlation coefficient: there is a weak correlation between the current return and the variation in

earnings in $t+1$. This result is in keeping with the prices lead earnings notion, but does not represent robust empirical evidence.

These findings can be attributed to measurement errors for these variables. As mentioned in the previous section, these variables have informational portions that do not correlate with the current return, but do with the past

returns and, in the case of future earnings, also with the contemporaneous returns (future). These errors cause biases in the estimators and affect the explanatory power of the models because these informational portions represent omitted variables. The inclusion of future returns tends to mitigate some of these problems. Model (9) contemplates that alternative.

Table 8 Model (9) results

$$R_{it} = \beta_0 + \sum_{k=0}^3 \beta_{k+1} X_{it+k} + \sum_{k=1}^3 \beta_{k+4} R_{it+k} + \beta_8 \frac{BVPS_{it}}{P_{it-1}} + \varepsilon_{it}$$

Coefficients	X_{it+k}	
	$\frac{EPS_{it+k}}{P_{it-(1-k)}}$	$EPSGR_{it+k}$
β_0	0.0681 (16.5422)***	0.0642 (16.0316)***
β_1	-0.0379 (3.2902)***	0.0018 (0.3102)
β_2	0.0407 (3.1436)***	-0.0072 (-1.0394)
β_3	0.0132 (1.1388)	0.0008 (0.1134)
β_4	0.0220 (1.8280)*	0.0050 (0.8325)***
β_5	0.0435 (2.3450)**	0.0083 (0.1281)
β_6	-0.0070 (-0.3701)	-0.1441 (-2.3344)**
β_7	-0.0329 (-1.6989)*	0.1409 (2.3483)**
β_8	-0.0007 (1.3881)	-0.0002 (-0.2039)
Panel modeling	Fixed Effects	Fixed Effects
Chow Test	4.9077***	5.7257***
Hausman Test	47.9602***	55.5329***
Adjusted R^2	4.53%	3.51%
F	1.7845***	1.6006***

Number of observations: 3,321. Outliers corresponding to the first and last percentiles of each variable series were excluded, with the exception of the control variable. X_{it} is one of the independent variables of the model. Two estimations were performed, one in which X_{it} was assumed to be EPS_{it}/P_{it-1} and another in which X_{it} was $EPSGR_{it}$. The t statistic is shown in parentheses below the relevant coefficient.

*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

The results suggest that the inclusion of future returns reduced some of the problems displayed by model (8). It is clear, first, that there is no longer an indication of the presence of random effects in the model. The explanatory power of the estimates was significantly improved, from 1.99% to 4.53% and from 0.01% to 3.51%. The significance of the coefficients was virtually unchanged. It is important to note that of the returns included, R_{t+1} exhibited a significant coefficient in relation to $EPS_{it+k}/P_{it-(1-k)}$ and R_{t+2} and R_{t+3} in the estimation involving the variable $EPSGR$. Still regarding this estimation, the variable $EPSGR_{t+3}$ also began to show a significant coefficient.

These results suggest that it is not possible to rule out a contemporary relationship, but it would only be incremental relative to the earnings of future periods. In addition, future returns may enhance the explanatory power of the model, a finding in keeping with the assumptions made in this study.

To explore this last observation, model (7) was estimated using a stepwise forward analysis for future earnings in an isolated and incremental manner. In this task, only the variable $EPS_{it+k}/P_{it-(1-k)}$ was considered because it had shown better results in the estimates as a whole. The variable R_{t+1} was included in every step, given its significance in the estimation of model (9).

Table 9 Model results (7) - Further analysis

Variables	Estimations					
	(a)	(b)	(c)	(d)	(e)	(f)
	Coefficients					
Constant	0.0613 (15.7900)***	0.0646 (16.4900)***	0.0642 (16.2700)***	0.0653 (16.4800)***	0.0657 (16.6200)***	0.0666 (16.7300)***
$\frac{EPS_{it}}{P_{it-1}}$	-0.0181 (-1.6700)*	-0.0354 (-3.1410)***	-0.0306 (-2.7090)***	-0.0246 (-2.2610)**	-0.0400 (-3.4810)***	-0.0379 (-3.2860)***
$\frac{EPS_{it+1}}{P_{it}}$		0.0595 (5.2530)***			0.0503 (4.1440)***	0.0423 (3.2740)***
$\frac{EPS_{it+2}}{P_{it+1}}$			0.0378 (3.8270)***		0.0219 (2.0680)**	0.0131 (1.1290)
$\frac{EPS_{it+3}}{P_{it+2}}$				0.0447 (4.6380)***		0.0216 (1.8200)*
R_{t+1}	0.0491 (2.6520)***	0.0489 (2.6550)***	0.0423 (2.2800)***	0.0440 (2.3810)**	0.0450 (2.4320)**	0.0442 (2.3850)**
$\frac{BVPS_{it}}{P_{it-1}}$	-0.0005 (-1.1080)	-0.0009 (-1.8380)*	-0.0005 (-0.9982)	-0.0003 (-0.5711)	-0.0008 (-1.6550)*	-0.0006 (-1.3040)
Hausman Test	50.6856***	42.8122***	43.0311***	38.8427***	41.7925***	42.2857***
Adjusted R^2	3.52%	4.33%	3.93%	4.14%	4.43%	4.50%
F	1.6171***	1.7626***	1.6903***	1.7287***	1.7772***	1.7862***

Number of observations: 3,321. Outliers corresponding to the first and last percentiles of each variable series were excluded with the exception of the control variable. The estimations were performed using the fixed effects model. The *t* statistic is shown in parentheses below the relevant coefficient.

*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

The results confirm that the contemporary relationship between earnings and returns is only revealed when future earnings are considered in the estimation. The relationship was clear with the inclusion of earnings in $t+1$, $t+2$ and $t+3$, alone or pooled. It also appears that the explanatory power of the model increased almost monotonically with the gradual inclusion of these variables, increasing from 3.52% to 4.50%. R_{t+1} proved to be significant in all estimations and played an important role because its inclusion generated fixed cross-components, thus requiring estimation by the fixed effects model. The control level of the firms' idiosyncrasy also contributed to the improvement of the explanatory power of the estimates, as was observed in simulations without this variable.

Despite the significance of current earnings observed in models (6) and (7) and in the final estimates, the dependency on earnings in the following periods apparently weakens the evidence of their timeliness with R_t . However, it can be observed that there is an informational portion contained in current earnings that is contemporaneous to R_t but that can only be obtained after eliminating the effects of the earnings from the following periods on this portion. This finding is consistent with Kothari (1992) and Kothari and Zimmerman (1995) because it demonstrates the s_t portion, which represents the portion of current earnings that is a surprise to the market and therefore correlated with R_t .

It is interesting to note that in addition to the significance of the current earnings coefficient, its increase in magnitude (in absolute terms) can also be observed in all estima-

tions, suggesting that the effects of s_t on R_t are representative but obscured by the omission of the $\sum_{n=1}^N \alpha_{t+k, t+n}$ portion. The indication of a negative relationship contradicts the theory; however, it is possible that the relationship could be explained by the effects of conservatism, which impose a bias with respect to bad news about s_t . This explanation is in keeping with the results obtained by Paulo, Sarlo Neto and Santos (2012).

Another aspect that should be considered in the present analysis is the possible effect on the return-earnings relationship of the recent adoption of international accounting standards in Brazil. The evidence gathered in this regard indicates that the associative capacity of accounting earnings should have improved (Lima, 2010; Rodrigues, 2012). However, dimensions such as informational content, conservatism, timeliness and persistence should not have been impacted by the adoption of a new set of accounting standards (Lima, 2010; Rodrigues, 2012; Santos, Lima, Freitas, & Lima, 2011).

These results suggest that the adoption of international standards has generated residual effects on the timing of the return-earnings relationship, especially in light of the findings related to timeliness and conservatism. Moreover, despite the improvement of the associative capacity of accounting earnings, the findings obtained with models (7) and (8) show that an improvement in that capacity was not sufficient to eliminate non-timeliness. However, it should be noted that the time window analyzed here considers the periods pre and post adoption of those standards, which may obscure observation of their effects.

5 FINAL CONSIDERATIONS

The present study aimed to identify the timing of the return-earnings relationship in Brazil because it was assumed that this level is an indicator of the prices lead earnings hypothesis. The study was developed using four econometric models based on the proposals of Beaver et al. (1980) and Collins et al. (1994).

The results, in general, are consistent with the theoretical assumptions explored herein because there is evidence that returns anticipate information about future earnings and that the representativeness of current earnings is residual. The findings suggest that prices have informational content regarding future earnings, thereby indicating that the prices lead earnings phenomenon occurs in Brazil.

Specifically with regard to the research hypotheses, hypothesis H_{0a} must be rejected because the results obtained with models (6) and (7) do not provide evidence for the contemporaneity of the return-earnings relationship, although the inclusion jointly or alone of future quarterly earnings in the estimation did reveal such timing. It is thus found that the elimination of the effects of future earnings on current earnings in measuring the association between the latter and the current returns elicited the informational representativeness of portion s_t .

The results obtained with the reverse regression, model (6), indicate that quarterly returns anticipate the information contained in future quarterly earnings, thus leading to the rejection of hypothesis H_{0b} . It is worth noting that this anticipation would have occurred at least 8 quarters ago, a process that lasted until the quarter immediately preceding the current one. These results were consistent with those obtained with models (7) and (9) with respect to the associative capacity of future quarter earnings with the current return.

However, despite the empirical evidence mentioned above, it was not possible to determine the timing of the quarterly return-earnings relationship in Brazil because if on one hand, past returns are associated with current earnings, on the other, the significance of future earnings in explaining current returns depends on the arrangement of the independent variables considered in the model. The evidence of timeliness between the returns and current earnings, even if dependent on the inclusion of future earnings, does not dispel the indication of a timing equal to zero, thus leading to the rejection of hypothesis H_{0c} .

Furthermore, an additional finding refers to the superiority of variable EPS_{it}/p_{it-1} compared to $EPSGR_{it}$ in terms of its representation of accounting earnings in the relationships analyzed, which is consistent with the results presented by Kothari (1992).

The findings in this study contribute to the national literature because they provide a greater understanding of the temporal aspects of the return-earnings relationship in Brazil, which was hitherto relatively unexplored from the perspective employed here. Furthermore, the results indicate that it is possible to improve the models aimed at studying the associative capacity of current earnings using a methodological refinement, the inclusion of future earnings for at least one period, thus contributing to the advancement of research in the area. In a practical sense, the indication of the anticipative capacity of stock returns of Brazilian firms in relation to their future earnings suggests for investors, financial analysts, firms and creditors that the stock return may represent a useful informational source in their assessment of a firm's capacity to generate earnings. In addition, as the results presented here demonstrate to some extent the untimeliness of accounting earnings, they may be an indication, at least for investors, of a qualitative deficiency in accounting information. The results can also provide support for standard setters and regulators when assessing the usefulness of the financial-accounting information that is disseminated in Brazil for those users and, ultimately, of the adequacy of the accounting standards observed.

This study presents a number of methodological limitations, among them being a lack of the following: (i) a specific analysis of the properties of accounting earnings time series and their components, (ii) an effective assessment of the effects of the adoption of international standards; and (iii) a direct analysis of the influence of market factors, such as investor characteristics, the governance structure of firms, and analyst coverage, among others. However, each of these limitations, given the breadth of the empirical studies they would require and the complexity of the topic, offers interesting research avenues that should be explored to advance the understanding of the return-earnings relationship, a fundamental pillar of accounting research in capital markets.

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