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The Relevance of Dividends and Book Value in the Brazilian Stock Market

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Abstract

The purpose of this article is to explore, theoretically and empirically, the relevance of dividends and book value in the Brazilian stock market (BM&FBOVESPA). From this, the following question arises. Which model has greater explanatory power to link accounting figures with stock price, based on the Brazilian stock market: book value and dividends or book value and reported earnings? The basis of this study comprises models by Brief and Zarowin (1999) and Pourheydari *et al* (2008) and the period from 1997 to 2007. It is found that dividends play an important role in the valuation models, although as shown, on average, it is only 0.8% superior to models combining book value and reports earnings. Models combining book value and reported earnings appear to have inferior explanatory power, but are better than the combination of book value and dividends, in Brazil. This is mainly because of (i) an accounting focus on tax regulations and the credit market and (ii) the stock concentration of the Brazilian stock market, evidencing a stock market still in development when compared to more-developed markets with an investment culture focused on the long term, such as the USA.

Keywords: Ohlson model, Accounting disclosures, Share prices, Mathematical Models, Studies linking accounting numbers and share prices.

1. Introduction

The development of positive accounting theory is one of the goals of the approach of normalizing accounting with disclosure theory, introducing economical and finance theories to accounting practices with the purpose of improving the quality of published financial information on security market data.

Fama (1970, p. 383) stated in relation to the efficient market hypothesis (EMH), "on the average, competition will cause the full effects of new information on intrinsic values to be reflected 'instantaneously' in actual prices," leaving accounting information evaluation for the usefulness of transmission of signs or perceptions. The focus of disclosure theory is based on association in an attempt to examine the relationship between popularization and changes in investors' activities and competitors in the stock market, seeking to maximize members' financial wealth.

An example of this approach can be found in Ball and Brown (1968 p. 159), who used a semiannual series of accounting earnings published by the *Wall Street Journal* and data on daily stock returns to determine the impact of such accounting information on stock prices.

Ohlson (1995; 2003; 2005) in his studies attempted to analyze this relevance through a method that Ohlson called *Residual Income Valuation (RIV)*, which basically is the difference in the accounting result verified in one specific period multiplied by the present value of a book value of a previous period by a risk-free rate (Lopes, 2001, p.155). Complementing such reasoning, Lopes (2001, p. 156) *apud* Lopes, Sant'anna, and Costa (2007, p. 499) explained the following:

[...] this concept of abnormal earnings is not the same as Residual Income traditionally used in the accounting literature. The risk-free rate is used in this model instead of the cost of capital used in Residual Income models. (Lopes *et al*, 2007 p. 499)

Ohlson (2003) subsequently developed the model called *Abnormal Earnings Growth (AEG)*, which moves the focus from book value to earnings. Ohlson (2003, p. 4) cited in Lopes *et al* (2007, p. 499) comments that the AEG model would "be one of the formulas based on accounting data used to evaluate companies," but is supportive of it, stating:

The AEG model would be another of those formulas, being the actual book value replaced by the expected earnings of the next period (divided by a risk-free rate) as a starting point, and the future abnormal earnings expected being substituted by the abnormal growths of the expected earnings. (Lopes *et al*, 2007, p. 499)

In the middle of 2005, Ohlson with Juettner-Nauroth updated the AEG model by considering, beyond dividends policy irrelevancies, the possibility of evaluating a company based on future growth expectations, long periods of activities, and sustainable growth (in this paper referred to as the Ohlson-Juettner-Nauroth (OJ) model).

Lopes (2007) also explains that financial practitioners previously did not consider book value before beginning their analyses; Lopes makes the point that the price-to-earnings (P/E) ratio is a key concept explaining earnings growth and also defends the focus on expected earnings, adjusted by dividends paid, as a key factor used by analysts and for the market as well.

In contrast, Brief and Zarowin (1999) undertook a study with a different focus, relating the relevance of book value and dividends rather than book value and reported earnings, which was a model proposed by Ohlson (1995).

The authors explain their choices based on the notion that, once earnings are transitory, "dividends are the better proxy for permanent earnings than reported earnings." Modigliani and Miller (1959) argued that "dividends might have a greater correlation with a true measure of earnings potential (and therefore price) than current earnings itself." Another interesting point is the fact that, in certain situations, the main component of the OJ model, book value, might be contaminated by the presence of non-recognized assets such as trademarks and intangibles.

Along the same lines, Pourheydari *et al* (2008) replicated the studies of Brief and Zarowin (1999) on Iran's stock market and reached a larger R^2, relating the compound dividend and book value variables rather than book value and reported earnings.

In view of the above studies, the goal of the present article is to study, theoretically and empirically, evidence for the relevance of accounting information dividends and book value in the Brazilian security market. In order to achieve this, section 1 discusses the accounting information as influenced by several past studies and theories and the reflex in stock valuation. Section 2 introduces a literature review of models that include the relationship between accounting information and stock price. Section 3 presents the research problem, section 4 the main hypotheses of the work, and section 5 the applied methodology and the respective results. Section 6 concludes.

This study is justified by the fact that, although models relating book value and reported earnings have been studied thoroughly and discussed in the field, studies relating dividends and book value have not been explored with the same intensity in the literature.

2. Literature Review

It could be said that the most significant studies with the intention of testing how the security market reacts to financial information began with Ball and Brown (1968), followed by Foster (1977), who, using a temporary series of accounting earnings published by the *Wall Street Journal* and daily returns, attempted to measure how the stock price reacted by using a regression calculation. Their studies therefore attempted to determine the impact of the popularization of accounting figures on the stock market and the reflex on stock prices.

Bezerra and Lopes (2008, p. 135) studied the relationship between accounting disclosure and stock price and how the market reacts when financial reports are released, and whether abnormal earnings[1] also generate an abnormal return in the stock price. Kothari (2001, p.105) cited in Cupertino (2003), alleges that accounting research on stock markets has its origins at the end of the 1960s; in fact, the studies by Fame (1965), Ball and Brown (1968), and Beaver (1968) corroborate this.

Ohlson is prominent in the field because of his models (RIV and AEG, and soon afterward the OJ model), which are well-known for their simplicity as well as versatility.

It could be said that the reasons behind the models' attractiveness to researchers include the fact that the models link valuation and accounting figures (Hand and Landsman, 1998). They may also be applied around the world with different Generally Accepted Accounting Principles (GAAP), excluding country-specific factors (Ali and Hwang, 2000). Thus, it could be said that Brazil's accounting procedures, where the models prevailed until 2007, focus on tax proposals and credit than accounting disclosure, which should be the main focus of accounting systems.

Because, apparently, the Ohlson model supplied that fails, his model gained the support of accounting entities such as *Coopers & Lybrand Accounting Advisory Committee*, which stated that the evaluation of empirical research would be better conducted by using as a theoretical foundation the Ohlson model (Hand and Landsman, 1998).

Globally, Ohlson developed in 1995 the model known as *Residual Income Valuation*. Lopes *et al* (2007, pp. 498–499) describes his logic:

The net earnings (or residual) that a company presents after deducting the portion that should be invested by the shareholders of their capital divided by a certain tax of minimum remuneration (Lopes *et al*, 2007, pp. 498–499).

In this case the minimum remuneration rate could be due to the remuneration of a savings deposit account, using the example given by Lopes *et al* (2007), an interbank rate, the basic rate of economy,[2] or even the company's cost of capital as demonstrated by Penman (2007, p. 480).

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[1] Abnormal Earnings, by the authors, is defined by the formula $E = (r_{i,t} \mid r_{m,t}) = \hat{a}_i + \hat{b}_{i,rm,t} + \hat{e}$ where it is possible measure the "expected return to the company *i* in the period *t* with dependency of the market return r_m."

[2] In Brazil this rate is called SELIC.

In a similar study, Lopes and Galdi (2007) investigated the choice of the minimum rate, using in their tests accounting profits and the constant prices of securities. This "avoids subjectivity in the estimated discount rate, which is a well-known problem in the literature" (Ohlson and Lopes, 2007, pp. 96–103).

The model is based on the following equation:

$$Ra_{in} = EPS_{in} - (BV_{in-1} \cdot r_f) \quad [1]$$

where:

Ra_{in} = Residual Income (abnormal) of company *i* in time *n*;

EPS_{in} = Earnings per Share of company *i* in time *n*;

BV_{in-1} = Book Value per Share company *i* in time *n−1*;

r_f = risk-free rate in the time *n.*

In this mathematical methodology, the necessity of a forecast by analysts is avoided, once the researcher chooses the risk-free rate and undertakes simulations of the theoretical abnormal earning for the assets. It is necessary to note that Frank and Lee's (1998) propositions have no application in this valuation model; the authors attest that analysts' forecasts are, in general, a proxy of the market perspective as for future earnings, and in conclusion the authors propose that the model by Ohlson (1995) might be the starting point for valuation studies. However, they also suggest the adoption of more complete valuations models, although the same authors do not mention any in particular.

Lopes *et al* (2007, pp. 497–510) warn that the value of the company (or stocks) is equal to the discounted dividend flow, a concept that is also stated by Damodaran (2005, p. 239). Lopes *et al* also state that "the Book Value (BV) of a period is equal to BV of the immediately previous period added to the accounting earnings and discounted from the liquid dividends distributed in the period" (2007, p. 499).

With this concept the dividends policy becomes irrelevant in calculating the value of the company (or stocks) – according to Modigliani and Miller's (1958) suggestion – and becomes a function of the future abnormal earnings, which are also calculated by the model, as demonstrated below:

$$P_{ij} = BV_{ij} + \sum_{t=1}^{\infty} \frac{E_j \left[Ab_{ij+t} \right]}{\left(1 + r_f\right)^t} \quad [2]$$

where:

P_{ij} is the stocks price of company *i* in time *j:*

BV_{ij} is the Book Value per share of company *i* at the end of time *j:*

Ab_{ij+t} is the accounting abnormal earnings (based on the above explanation) per share of company *i* for the periods *j*+1, *j*+2,... , *j*+*t*;

Ej [ ] is the mathematical operator of expected value based on accounting disclosure in time *j*;

r_f is the risk-free rate.

With the same mathematical and theoretical structure of the RIV model, the AEG model, developed by Ohlson (2005), evaluates the stock's value based on accounting disclosure instead of discounted dividend flow. Subsequently, the focus changed from average book value to expected future earnings, adjusted by a risk-free rate and the growth of their future abnormal earnings.

Lopes *et al* (2007, p. 499) briefly explain what the model attempts to calculate:

The abnormal growth (or variation) of the earnings is calculated by the difference between the accounting earnings of the period and the immediate accounting earnings of a previous period capitalized by a risk-free rate. In case of dividends paid in the previous period, the dividends are multiplied by the risk-free rate, and the result must be added to the difference calculated previously. (Lopes *et al*, 2007, p. 499)

The mathematical formula of abnormal growth, based on previous theory is:

$$Ag_{t+1} = L_{t+1} + r_f . DIV_t - R.L_t \quad [3]$$

where:

Ag_{t+1} is the earnings abnormal growth per share at the end of t+1;
L_{t+1} is the earnings per share at the end of t+1;
L_t is the accounting earnings per share at the end of t;
Div_t is the dividend paid per share related to time t;
r_f is the risk-free rate;
R is the risk-free rate plus one unit ($R=1+ r_f$).

Once abnormal growth is calculated, the model proposes that the value of the stock is equal to the earnings of the next period, adjusted by a risk-free rate, in which the abnormal earnings are added to the abnormal earnings previously calculated. Visually, the formula is simpler to understand:

$$P_0 = \frac{EPS_1}{r_f} + \sum_{t=1}^{\infty} \frac{\frac{\left(L_{t+1} + r_f . DIV_t - R.L_t\right)}{r_f}}{\left(1+r_f\right)^t} \qquad [4]$$

where:

P_0 is the stock price at the end of period 0;
EPS_1 is the earnings per share at the end of period 1;
L_t is the earnings per share at the end of period t;
L_{t+1} is the earnings per share at the end of period $t+1$;
Div_t is the dividends paid per share in the period t;
r_f is the risk-free rate;
R is the risk-free rate plus one unit ($R=1+ r_f$).

Lopes *et al* (2007, p. 500) stated that in this case the advantage of the AEG model over the RIV model lies in the fact that mistakes foreseen in the AEG would be smaller than that in the RIV:

Errors between the book value and the price of stock (P - Book Value) refer to the goodwill, while the errors between the capitalized earnings and price of stock (P- EPS/r_f) refer to the changes in the goodwill. In other words, while in RIV the abnormal earnings justify the whole goodwill, in AEG the abnormal growth of the earnings justifies only a part (changing of the goodwill) and that implies that, when a finite number of periods is utilized, AEG presents an error in contrast to RIV (and the smaller the period, the larger this error will be), the main practical characteristic of finance. (Lopes *et al*, 2007, p. 500)

In 2005, Ohlson and Juettner-Nauroth updated the AEG model by considering, besides the dividends policy irrelevancies, the possibility of evaluating a company based on "expectations of future growth, taken over the long term, and taking into account stable growth" (Azevedo, 2009, p. 18). Therefore, with this new model, the stock price would be a function term of four variables: (i) earnings per share, (ii) short-term growth, (iii) long-term growth, and (iv) cost of capital.

The mathematical representation of this new model (broadly mentioned in the literature as the Ohlson-Juettner-Nauroth model or simply the OJ model), would be then:

$$\mathrm{P}_0 = \frac{eps_t}{k}\left[\frac{g_s - y}{k - y}\right] \qquad [5]$$

where:

P_0 = Stock Price; eps_t = Earnings per Share; k = Cost of Capital; g_s = Short-term growth = $\frac{eps_t - eps_{t-1}}{eps_{t-1}} - \frac{k.dps_t}{eps_{t-1}}$, where the term dps_t refers to the dividends per share in the period t; y = Long-term growth of earnings = $\frac{eps_t - eps_{t-1}}{eps_{t-1}} \rightarrow considering\ t = \infty$

Because of its practical applicability, this model is studied broadly by analysts and academics in finance. Its ease of calculation and simpler analytical development made possible several studies and articles, for instance, in Brazil, Martins *et al* (2006) studied statistical differences between the expected

values for the cost of capital of Brazilian companies using the Gordon Growth model, CAPM (Capital Asset Pricing Model), the APM (Arbitrage Pricing Method), and the OJ model. Another example is Azevedo (2009), which used the concepts of the OJ model as a tool to measure the correlation between research and development (R&D) and the growth rate of NYSE-listed companies.

A disadvantage of this concept lies in the fact that the model depends, even if theoretically, on the forecasts of analysts (or even of researchers) to project future values, and this approach could create bias in the analysis, because in most cases, analysts (and even academics) tend to project rising profits (Martins *et al*, 2006, p. 145).

To illustrate this, imagine a company that presents the following data, distributed between actual and forecast, according to Table 1 below. Assume 11% for the cost of capital (this value would be considered as the risk-free rate) and the forecast of growth of the economy (GDP) of 4%. The company distributed 50% of earnings per share (EPS) in the form of dividends (DPS), and the analysts forecast a stable growth of 20% per year starting in 2000, even though no expressive growth was reported between 1998 and 1999.

With this information, it is possible to calculate the following scenario:

Table 1: Actual and Forecasting Growth; Calc Memo for AEG Model

	Actual 1998	Actual 1999	Forecast 2000	Forecast 2001	Forecast 2002
LPA	2.740	2.750	3.300	3.960	4.750
DPS	1.370	1.380	1.650	1.980	2.380
AEG	0	(0.141)	0.399	0.478	0.574

Source: Adapted from Penman (2007)

Considering as an example the necessity of determining the value of the company in 2001, the expectation of abnormal earnings growth is defined as:

$$Ag_{t+1} = L_{t+1} + r_f .DIV_t - R.L_t \rightarrow Ag_{t+1} = 3.96 + (1.65 \times 0.11) - 3.30 \times (1 + 0.11) = 0.478$$

Based on the presupposition of an average growth of the economy of 4%, and the expectation of short-term growth of earnings, we now calculate by the expression:

$$gs = \frac{3.96 + (1.65 \times 0.11)}{3.30} - 1 = 0.255$$

,

taking *y* to be the expected long-term growth, this example is a spread between the company's cost of capital and how much the analysts expected as GDP growth (4%), it is possible to calculate the stock value as follows:

$$P_0 = \left(\frac{3.30 \times \left(1 + \left(\frac{0.255 - 0.11}{0.11 - 0.04} \right) \right)}{0.11} \right) \therefore P_0 = 92.143$$

2.1. A Different Focus

With a different focus, Brief and Zarowin (1999) developed an alternative model that demonstrates the relevance of book value with dividends, in contrast to book value and reported earnings. In deriving their dividends discount model (DDM) from the RIV model, the authors demonstrated that the two models are algebraically equivalent, once a price model regarding book value and dividends could be derived from the RIV model.

Brief and Zarowin (1999, p. 4) made this selection for two reasons. First, using the studies of Modigliani and Miller (1959), dividends may have a greater correlation with a true measure of earnings

potential (and therefore price) than current earnings itself. Second, the model derives price in terms of book value and dividends by using a simple mathematical relationship.

In fact, while most research in this area has concentrated almost exclusively on explaining share price by book value and reported earnings, studies addressing explanations of share price by book value and dividends have been overlooked, an argument supported by Brief and Zarowin (1999).

If the book value, in certain cases, has less-relevant information (due, for instance, the presence of non-recognized assets), and the earnings are transitory, the dividends may have more-relevant information.

The model to determine the informational relevance of the variables described previously is based on a group of five regression models, whose results are analyzed in panel form, as the following formulas respectively show:

1. $MVit = a_0 + a_1 BVit + u_{it}$
2. $MVit = b_0 + b_1 Eit + v_{it}$
3. $MVit = c_0 + c_1 BVit + c_2 Eit + w_{it}$
4. $MVit = d_0 + d_1 Dit + x_{it}$
5. $MVit = e_0 + e_1 BVit + e_2 Dit + y_{it}$

where:

MV is the Market Value at the end of the fiscal year;

BV is the Book Value at the end of the fiscal year;

E is the Annual net earnings;

D is the Dividends paid in the year.

The values are per share, considering in the sample only dividend-paying companies.

The development of the derivation of the DDM with the RIV model and the proposed alternative model will be developed next, according to Brief and Zarowin's (1999) proposal, considering:

MV_t as the market value of common equity at the end of period *t*;

BV_t as the accounting book value at the end of period *t*;

DPS_t as the net dividends paid at the end of period *t*;

r_f as a risk-free rate;

k as cost of capital.

Brief and Zarowin (1999, pp. 7–9) algebraically demonstrated how the derivation of DDM from RIV can be expressed. Thus, the model DDM that defines the market value of a stock can be expressed by the following expression[3]:

$$MV_t = \sum_{t=1}^{T} \frac{DPS_t}{(1+k)^t} + \frac{MV_T}{(1+k)^T} \qquad [6]$$

Over the finite time horizon (*t*,*T*), RIV defines market value in terms of discounted residual earnings:

$$MV_t = BV_t + \sum_{t=1}^{T} \frac{(r_{f_t} - k)BV_{t-1}}{(1+k)^t} + \frac{MV_t - BV_t}{(1+k)^T} \qquad [7]$$

Brief and Zarowin (1999, p. 8, cited in Bernard, 1995) specified cross-section regression models based on DDM in equation [6] and RIV in equation [7] for four-year forecasts of dividends and residual earnings as:

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[3] Recall that RIV is formulated by $P_{ij} = BV_{ij} + \sum_{t=1}^{\infty} \frac{E_j\left[Ab_{ij} + t\right]}{(1+r_f)^t}$, and DDM by $P_0 = \sum_{t=1}^{\infty} \frac{DPS_t}{(1+r_f)^t}$.

$$\text{Model 1}: MV_t = \beta_0 + \sum_{t=1}^{4} \beta_{t+1} \frac{DPS_t}{(1+k)^t} + e_t$$

$$\text{Model 2}: MV_t = \beta'_0 + \beta_1 BV_t + \sum_{t=1}^{4} \beta'_{T+1} \frac{(r_{ft} - k)BV_{t-1}}{(1+k)^t} + e'_t$$

Brief and Zarowin (1999, p. 8) caution that in both cases the terminal values are ignored in the model specification. The authors compared the RIV model with the DDM model to demonstrate how RIV contains more information than DDM, as follows:

$$\sum_{t=1}^{T} \frac{(r_{f_t} - k)BV_{t-1}}{(1+k)^t} = \sum_{T=1}^{T} \frac{DPS_t}{(1+k)^T} + \frac{BV_T}{(1+k)^t} - BV_t \quad [8]$$

Substituting equation [7] into equation [6] and simplifying,

$$\mathrm{MV_t} = \mathrm{BV_t}\left(\frac{1+g}{1+k}\right)^T + \sum_{t=1}^{T} \frac{DPS_t}{(1+k)^t} + \frac{MV_T - BV_T}{(1+k)^T} \quad [9]$$

$$Where: g = \left(\frac{BV_T}{BV_t}\right)^{\frac{1}{T}} - 1$$

Brief and Zarowin (1999, p. 9, *apud* Bernard, 1995) explain that Bernard (1995) based his regression models on equations [6] and [7], but in specifying the two regression models, Bernard (1995) left out the last term, $\frac{\mathrm{MV_t}}{(1+\mathrm{k})^T}$, in equation [6] and the last term, $\frac{\mathrm{MV_t}}{(1+\mathrm{k})^T} - \frac{BV_t}{(1+\mathrm{k})^T}$, in equation [7]. However, the term that is left out of equation [6] is generally much larger (and, therefore, will have a greater influence on R^2) than the term left out of equation [7]. This will create a bias in favor of Model 2 since the variables in Model 2 will account for more of the variation in market value than the variables in Model 1. Therefore, since the last terms in equations [7] and [9] are the same, it is possible to specify a regression model based on equation [9] instead of equation [6] and consequently to leave the same term out of both regression models (Brief and Zarowin, 1999, pp. 7–8):

$$\text{Model 3}: MV_t = \beta''_0 + \beta''_1 BV_{t-1} + \sum_{t=1}^{4} \beta''_{t+1} \frac{DPS_t}{(1+k)^t} + e''_t$$

Brief and Zarowin (1999) observe that β''_1 depends partly on $\left(\frac{1+g}{1+k}\right)^T$. The authors also point out that both Models 2 and 3 are based on RIV, not DDM, and both models exclude the same terminal value, i.e., $\frac{\mathrm{MV_t}}{(1+\mathrm{k})^T}$.

Brief and Zarowin conclude that the equivalent form of RIV in Model 3 provides the motivation to substitute dividends for earnings to determine which of these two variables has a greater association with stock price. If there is a high likelihood that the book value, in certain cases, has less explanatory power (due, for instance, to the presence of non-recognized assets such as intangibles), and as earnings are transitory, dividends may have larger informational relevance.

To illustrate this, imagine now the same company studied in the OJ model before, but with some additional information, such as the stock market value in the period and the cost of capital of 11%, which in this example will be considered at the same risk-free rate of 4% used previously as a projection of GDP growth in the period.

In this scenario, it is possible to compile Table 2, below, where all values are in per-share units.

Table 1: Actual and Forecasted Growth; Calc Memo for Dividends and Book Value Model

	Actual 1998	Actual 1999	Forecast 2000	Forecast 2001	Forecast 2002
MV	90.748	97.579	104.923	112.821	120.718
BV	10.415	10.420	10.695	11.025	11.421
Eps	2.740	2.750	3.300	3.960	4.752
Dps	1.370	1.375	1.650	1.980	2.376

Source: Adapted from Penman (2007)

Based on the need to calculate the stock value in 2001, with the data described in Table 2 it is possible to infer the value of the stock as the following function:

$$P_0 = 10.695 + \left(\frac{1.980}{(1+0.11)}\right) - \left(\frac{1.980}{(1+0.04)}\right) + \left(\frac{113.010}{(1+0.11)^2}\right) - \left(\frac{11.025}{(1+0.04)^2}\right) \therefore$$

$$P_0 = 92.103$$

It can be observed that the value diverges slightly from that in the OJ model calculated previously ($92.143) because of rounding problems.

On this subject, it can be observed that the model forecast the value of stock as being smaller than was negotiated, and therefore, it is possible to conclude that the rational investor could sell such title and realize "abnormal gain" (the positive variance between the market and the estimated value calculated by the model).

A similar study in Iran (Pourheydari *et al*, 2008) concluded that dividends are a better proxy of information and play an important role in valuation studies in Iran.

In this particular case, it is important to highlight that the Iranian stock market when compared to other western stock markets such as America's, or even Brazil's, is irrelevant. The main point of this study is not to measure the relevance of the stock market itself on the global scene but to verify whether a model that attempts to link accounting figures with stock values, using dividends and book value variables that have informational relevance.

Therefore, the observations found in work by Pourheydari *et al* (1999) could be scientifically considered and analyzed by adapting the model developed by Brief and Zarowin (1999) using different stock markets and accounting regulations.

3. Research Problem

Through a bibliographical study, it is possible to find several studies that tested the Ohlson models. One example that stands out are the studies of Frankel and Lee (1998) that use analysts' forecasts as a proxy of the market perspective with regard to future earnings; Frankel and Lee suggest that the Ohlson model can be a starting point, but do not rule out the use of other more complete techniques of stock valuation.

Dechow, Hutton, and Sloan (1999) took the perspective of "the dimension in which the accounting measures can explain future residual earnings, actual value and future stock price" (Beaver, 1999), where the abnormal earnings are a function of the return rate and the book value growth rate, considering in this system that the earnings and return rates will revert to the average.

Lo and Lys (2000) attempted to identify the level of agreement of the Ohlson model with AEG and DDM used by Brief and Zarowin (1999), and focused on the qualities and the limitations of the Ohlson model as well as describing empirical tests based on the Ohlson model.

As mentioned by Modigliani and Miller (1959), dividends may have a high correlation with present and future earnings (and by consequence the stock price) instead of only actual results and abnormal earnings. In fact, if the DDM and the model proposed by Ohlson (RIV) are made algebraically equivalent, this shows that the model in which the price is a function of the book value

and dividends can be derived from RIV, and the accounting figures which initially define book value as the present value of future dividends can also be derived from RIV and from the accounting figures.

Corroborating the studies of Hand and Landsman (1999), it will be demonstrated, in certain circumstances, that dividends have greater explanatory power than the reported earnings and book value (Brief and Zarowin, 1999).

In light of this, the following question may arise. **What model has larger explanatory power to connect accounting figures with stock prices, based on listed companies in the Brazilian stock market (BM&FBOVESPA): Book Value and Dividends or Book Value and Reported Earnings?** This study is therefore justified by the fact that, apart from several articles and reports, most have not considered the potential relationship of dividends with accounting figures.

In studies by Brief and Zarowin (1999) a model was established that combined book value and dividends as variables to explain stock value in the stock market, and the model was based on Bernard's (1995) studies that supplied the motivation for the substitution of dividends for earnings in relative evaluation models in relation to the price for book value and dividends. Brief and Zarowin verify that Bernard's calculations were "unfair" when the RIV model contains information on book value and dividends, while DDM contains only information related to dividends.

The exchange of earnings for dividends is basically for two reasons:

a) It has been argued that dividends have greater informational power over companies that pay permanent dividends. Consequently, dividends can be seen as a substitute for permanent earnings.
b) Algebraically the "clean surplus"[4] variables in valuation models can be derived in terms of book value and dividends.

In Brazil, Lopes (2001) described studies where accounting information is as important as the dividends for company valuations, and the largest relevance arises from the book value when the AEG model uses the same information.

4. Hypothesis of Study

Using Brief and Zarowin's (1999) model, US companies were studied and compared with the smaller Brazilian stock market, with the focus on the relationship between reported earnings and dividends with the stock market value.[5] However, since there are economical, social, cultural, and regulatory differences between Brazil and the USA, there are likely to be discrepancies in the results.

Pourheydari *et al* (2008) replicated the studies of Brief and Zarowin (1999) with Iran's stock market and found that, combined with dividends, book value plays an important role in the stock valuation process of Iran.

The hypotheses of this work, synthetically, are based on the studies of Pourheydari *et al* (2008) and will serve as the basis for comparison of the models described in this study:

H_0*: The model that takes into account the variables of book value and dividends has the same informational power as the model that takes into account the variables of book value and reported earnings.*

H_1*: The model that takes into account the variables of book value and dividends has larger informational power than the model that takes into account the variables of book value and reported earnings.*

[4] Ohlson (1995) explains that the concept of *clean surplus relationship* is based on all financial transactions, with the exception of shareholders transactions, where changes in the company equity must be registered in the profit & loss report.

[5] See Bernard (1995), Hand and Landsman (1999), and Ohlson (1995).

5. Methodology and Findings

5.1. Methodology

Using as a basis the studies by Brief and Zarowin (1999) and Pourheydari *et al* (2008) and as a database the stocks negotiated in BM&FBOVESPA from 1997 to 2007, we have the following criteria:

a) Companies, excluding banks, listed in BM&FBOVESPA in the period 1997–2007. Companies joining after 1997 or leaving in the period 1997–2007 are excluded in order to guarantee a whole and stationary temporal series.
b) Every year (during the previous month) their stocks (at minimum one order) were negotiated on the stock market (identified by the average stock value).
c) The end of the fiscal year is established as December 31st of each year.

The software used for the data analyses and regressions was SPSS® Version 15.0 for Windows Vista (using method enter for simple regressions and stepwise for multivariate), and for tables and complementary calculations Microsoft Excel® 2007 was used.

All the variables are per share, and the number of observations were 660 company-years, that is, the number of companies (60) multiplied by the number of years (11).

An prominent problem when working with regressions (simple or multivariate) is "always related to the situation of their residuals" (Corrar *et al*, 2007, p. 151); a good indicator of the predictive power (or in this case, the explanatory power of the variables), is correct treatment of the residuals. Thus, the residuals must be in agreement with the main presupposition of the analysis regression described in the following points:

a) Normality of residuals. The groups of the residuals produced in the regression processes should present a normal distribution, according to Corrar *et al* (2007). This rule is an indicator of the normality of the whole extension of the population. One test whereby the residuals (and therefore possible diagnosis of the outliers) obtained can be verified is the statistical Kolmogorov–Smirnov test.
b) Homoscedasticity of residuals. According to Naghettini and Pinto (2007), homoscedasticity is "the result of an independent random variable and normally distributed" and leads to the variance of the residuals becoming constant. If not attended to, this regression presupposition may result in a problem known as heteroscedasticity.
c) Absence of serial autocorrelation. Every model with its basis in simple or multivariable regression assumes that the residuals possess a null autocorrelation or reduce to zero. That means in practice that "the residuals are independent among themselves and only the effect of X is observed on Y, in other words, residual autocorrelations does not exist" (Corrar *et al*, 2007, p. 154). One test that can be used to measure the absence of autocorrelation is the Durbin–Watson, which was used in this work. As a result, all of the population samples go on to show the absence of serial autocorrelation.
d) Multicollinearity among the independent variables. This presupposition is nothing else than the presence of correlation among the independent variables, or in other words, "two or more independent variables of the model explaining the same fact contain similar information" (Corrar *et al*, 2007, p. 156). The presence of multicollinearity, according to Corrar *et al* (2007), can harm the predictive quality of the model (or in the case of this study, the explanatory quality of the model). Corrar *et al* state: "The problem of multicollinearity is usually related to regressions that present high R^2 and no significant coefficients." In the case of this study, the *t* test was used with $\alpha = 5\%$.

5.2. Results

Table 3: Descriptive Statistics

Descriptive Statistics– Variables of Study							
Variable	BVps	Dps	Eps	MVps	BV/MV(%)	E/MV(%)	D/MV(%)
Mean	19.61	0.83	3.36	14.30	137.1%	23.5%	5.8%
Standard deviation	51.00	3.22	8.92	33.52	152.2%	26.6%	9.6%
Minimum	0.00	-	-	0.00	0.0%	0.0%	0.0%
Medium	6.74	0.18	0.83	6.51	103.5%	12.7%	2.8%
Maximum	360.86	24.28	52.69	241.33	149.5%	21.8%	10.1%
Observation (companies-year): 660				Note: all variable are in per share.			
Bvps – Book Value per share				BV/MV – Ratio Book Value per Market Value(%)			
Mvps – Market Value per share				E/MV – Ratio Earnings per Market Value (%)			
Eps – Earnings per share				D/MV – Ratio Dividends per Market Value (%)			
Dps – Dividends per share				BV/MV – Ratio Book Value per Market Value (%)			

Source: Adapted from Pourheydari et al (2008)

Table 3 presents descriptive statistics from 2007. Analyzing the Standard Deviation and medium of the item MVps, it can be verified that their values are 33.52% and 6.51%, respectively.

These values basically demonstrate the fluctuations of the Brazilian stock market, and we can assume that the risk of the Brazilian stock market, in the period of the sample, based on the selected population and in agreement with the established criteria described at the start of this chapter, equals the value of the standard deviation (33.52%), and the Variance (VAR) will be 11.24% ($VAR=0.3352^2$). This is basically demonstrated in relative terms of the degree of absolute dispersion of the values around the general average population sample.

When, even synthetically, the meaning of these two statistical values is explained, it is possible to make inferences from Table 3. For instance, when the dividends standard deviation (Dps) is 3.22% and the book value standard deviation (BVps) is 51%, it is clear that the variable has a larger dispersion than the dividends, which, in theory, could jeopardize analysis of the relevance of the accounting information on the stock price.

As shown in the following table (Table 4), we can analyze a comparative summary by year of R^2 calculated in agreement with the sample and the criteria defined at the start of this chapter.

Table 4: Statistical Analysis of R^2

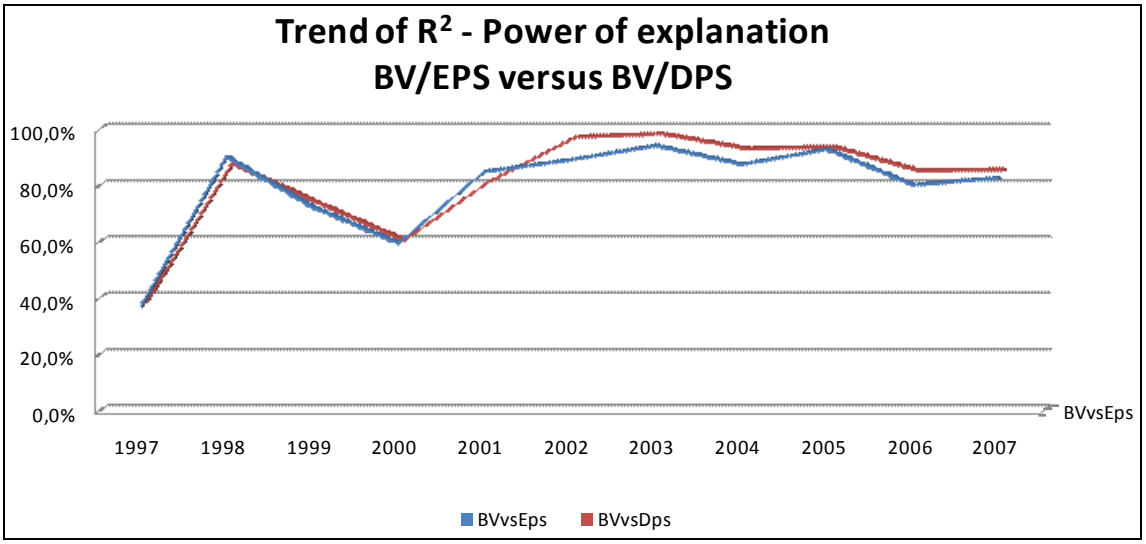
Statistical Analysis of R^2					
Year	**BVps**	**Dps**	**Eps**	**BV vs Eps**	**BV vs Dps**
1997	37.4%	19.2%	12.4%	37.4%	37.4%
1998	83.9%	59.3%	53.3%	90.6%	86.7%
1999	72.8%	0.3%	67.0%	72.8%	72.8%
2000	59.4%	0.7%	59.9%	59.9%	59.4%
2001	77.7%	74.2%	58.5%	85.3%	80.4%
2002	86.3%	94.1%	51.4%	89.5%	96.1%
2003	92.9%	96.6%	37.1%	94.6%	97.3%
2004	87.9%	88.8%	44.2%	87.9%	92.0%
2005	92.2%	56.9%	5.3%	93.2%	92.7%
2006	80.6%	82.3%	24.8%	80.6%	84.2%
2007	81.9%	82.6%	56.2%	83.1%	84.6%
Medium R^2 =	77.5%	59.6%	42.7%	79.5%	80.3%

In Table 4 and Graph 1 it can be observed that the model based on the combination of book value and dividends has larger (80.3%) explanatory power than the combination of book value and earnings per share (79.5%), as confirmed by Brief and Zarowin (1999). The information includes

smaller earnings per share (Eps) than book value, as confirmed by Burgstahler and Dichev (1997) and Barth *et al* (1998).

Bernard (1995) affirms that dividends have larger explanatory power, as verified in the present study, than models based only on book value and reported earnings.

Graph 1: R^2 Tendency – Explanatory power



Corroborating the studies of Brief and Zarowin (1999) and Pourheydari *et al* (2008), dividends play an important role in the studies of stock valuation based on accounting figures, as can be seen by the larger average R^2 in the sample.

In light of the results, it can be inferred that such a model can be applied to different markets with different accounting regulations, as well as the Ohlson models (1995; 2003; 2005). The fact that the medium difference between the models is small in Brazil (79.5% for the models combining book value and reported earnings in contrast to 80.3% for the model combining dividend and book value) is likely to be due to the following factors:

1. In the period of the analysis, the accounting practices in Brazil focused on tax regulations and the credit market instead of the stock market and information on financial agents' performance.
2. There is a high share concentration, where a small group, in most cases, controls the totality of ordinary stock types and therefore the capital vote.
3. The security market is still in development, when compared to markets with a long-term investment culture such as the USA.
4. There is a compulsory 25% minimum distribution over net profit according to Law 10303/01 and Law 9249/95 called Interests Over Equity Contribution (Juros Sobre Capital Próprio - JSCP) limited by the Long-Term Interest Rate (Taxa de Juros a Longo Prazo - TJLP). The JSCP are treated as a financial expense for the purposes of income tax returns, whereas dividends are free of tax in Brazil.

It should be recalled that JSCP can be incorporated with dividends only with net of withholding tax.

6. Conclusion

This article has attempted to demonstrate that models combining book value and dividends per share show a greater relationship with accounting figures than models that attempt to relate book value and reported earnings.

This was shown in the key studies on this theme, starting with those of Ball and Brown (1968) and followed by those on accounting information supported by Beaver (1995), for the models closely studied in several nations, such as the RIV and AEG models developed by James Ohlson (1995; 2003; 2005), and finishing with an alternative, firmer, model, developed by Brief and Zarowin (1999) and from the studies of Pourheydari *et al* (2008).

Returning to the original affirmation to resolve the hypotheses of these works, and starting with the fact that the null hypothesis (H_0) is rejected, the following can be understood: ***The sample supports the affirmation that, on average over the period, the model combining Book Value and Dividends has greater informational relevance than the combination of Book Value and Reported Earnings.*** Despite this, on average over the period, the relevance is only 0.8%. The factors possibly preventing larger variation are described at the end of the previous section above in items 1 to 4.

It can be concluded through this study that dividends play an important role in share-price valuation models. However, an important point is that the model proposed by Brief and Zarowin (1999) and tested by Pourheydari *et al* (2008) can serve as a complementary tool for the valuation of share prices, in contrast to the model proposed by Ohlson (1995; 2003; 2005).

Concerning theory, this article attempted to contribute to the study of valuation by proposing an alternative tool for researchers in the field and suggesting further studies, although with the restrictions of using only companies paying dividends.

For financial practitioners and market analysts, the secondary objective of this article was to serve as a tool to support their evaluations, with theoretical and empirical grounds, filling a probable gap in the valuation process, which, in some cases, does not possess such a theoretical approach. Financial practitioners, in certain cases, tend to focus on the growth of projected earnings, influenced by P/E, without a theoretical outline based on, for instance, (i) Dividends Discounts Method, (ii) Free Cash Flow, and (iii) Residual Earnings (Ohlson and Lopes, 2007, p. 97).

On December 31st, 2007, Law 11.638 was approved. This introduced modifications to accounting GAAP in Brazil and brought Brazilian accounting system into line with international accounting standards (IFRS) by requiring the primacy of the information to the shareholders and investors. This may result in easier access to cheap foreign investment, therefore potential further development of the Brazilian stock market, and consequently, probable changes to the studied ratios.

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