

Value-Relevance of Financial Statement Information: A Flexible Application of Modern Theories to the Vietnamese Stock Market

Nguyen Viet Dung, PhD.

*Department of Financial Management
Faculty of Banking and Finance – Foreign Trade University*

Abstract: *Based on the Ohlson's model (1995) and the study of Aboody et al. (2002) allowing to relax the semi-strong form of the Efficient Markets Hypothesis, the paper tests the value-relevance of financial statement information on the Vietnamese stock market. Contrary to prevailing views that financial statement information is not related to stock prices in Vietnam, the results show that this relationship is statistically meaningful, though somewhat weaker than in other developed and emerging markets. In addition, there is sign that earnings and book value are reflected in stock prices with a time lag and the value-relevance of earnings becomes much higher during stock market boom periods. These results provide helpful insights to stock market authority and participants for their respective activities.*

The vital role of information in efficient functioning of markets has long been studied. Akerlof – the 2001 Nobel laureate in economics – showed in his famous article published in 1970 that information asymmetry might cause markets to disappear¹. For financial markets in particular, securities mispricing due to information problems has a negative impact on the resources allocation by this important direct finance channel.

Among factors likely to influence stock prices, financial statement information has an important place. Since this information source is mandatory with high degree of quantification and standardization, investors' interest and sensitivity to its disclosure are considerable. Studying the value-relevance of financial statement information in a given context or market allows to assess its usefulness and contributes to shed light on the issue of market efficiency, providing helpful insights to stock market authority and participants for their respective activities.

In Vietnam, the birth of stock market in 2000 marks a step forward in developing the financial system in order to meet capital needs of the economy in transit to market mechanism. In the first 9 years of operation, the Vietnamese stock market has gradually developed but is still subject to many imperfections. As to the value-relevance of financial statement information, there exist contradictory views. Some hold that in a rather new market like Vietnam where non-compulsory or other alternative information sources are limited (information provided by *financial analysts* for instance), investors mostly turn to financial statement information disclosed by public companies to define their investment strategy. As such, this sort of information plays a major role. By the contrary, many others emphasize its

¹ Akerlof G. (1970), "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism", *Quarterly Journal of Economics*, 84, p. 488-500.

minor contribution for the following reasons: deficiencies remain in the legal framework of information disclosure in general and financial statement information in particular; most of the public firms were privatized from state-owned companies whose financial information system is aimed for state control purpose rather than meeting the need of outside investors; disclosure awareness of public companies in Vietnam is limited; unreliable role of auditing...There are even views that doubt the significant role of financial statement information simply for the very limited knowledge of the majority of investors making irrational investment decisions rather than basing them on skilled analysis of financial information. For the reasons, apart from qualitative analysis, it is deemed necessary to quantify the above-mentioned value-relevance in order to draw implications for the Vietnamese stock market's authority and participants.

I. Theoretical Foundations – Ohlson Model (1995) and Proposition of Aboody et al. (2002)

Since the publication of the first study on this topic by Ball and Brown in 1968 until 1995, there were many attempts, mostly empirical, to measure the value-relevance of financial statement information. However, an important common feature of all these studies is the lack of a solid theoretical basis because they did not give satisfactory answers to the following two questions: what financial statement information to take into account in a direct relationship with stock prices and what is the theoretical model measuring this value-relevance? The impact of financial statement information on stock prices could not be quantified without answering these questions.

In a research article published in 1995, James Ohlson – professor at Stern School of Business, New York University – succeeded in answering these questions with a solid theoretical basis and his results have since strongly influenced studies on the value-relevance of financial statement information. According to Bernard (1995), the Ohlson model stands among the most important developments in capital markets research in early 90s and provides a foundation for redefining the appropriate objective of valuation research².

I.1. The Ohlson Model (1995)

The Ohlson model could be decomposed into two component parts: Residual Income Model (RIM) and information dynamics proposed by Ohlson's (1995). In fact, the first part (RIM) appeared as soon as in 1938, in a research of Preinreich³, nearly 60 years before the proposition of the second. Derived from the dividend discount model and based on the clean surplus relation, RIM has the following form:

² Bernard V. L. (1995), "The Feltham-Ohlson Framework: Implications for Empiricists", *Contemporary Accounting Research*, Vol. 11, p. 733-747.

³ Preinreich G. (1938), "Annual Survey of Economic Theory: The Theory of Depreciation", *Econometrica*, Vol. 6, p. 219-241.

$$\hat{P}_t = b_t + \sum_{\tau=1}^{\infty} \frac{E(x_{t+\tau}^a)}{(1+k_e)^\tau} \quad (1)$$

Where: $x_{t+\tau}^a = x_{t+\tau} - k_e \times b_{t+\tau-1}$

\hat{P}_t : stock intrinsic value at t

$x_{t+\tau}$: (annual) earnings per share at t + τ

$x_{t+\tau}^a$: (annual) residual earnings per share at t + τ

b_t : book value per share at t

k_e : required return (cost of equity capital)

E_t : expectation based on available information at t

Thus, according to the residual income model, the intrinsic value of a stock consists of two components. The first is its book value and the second is formed by the present value of the stock's expected future residual earnings. This valuation model allows to analyze a company's value creation for its shareholders. If its return on equity is greater than its cost of equity capital (i.e. positive residual earnings), the intrinsic value will be more than the book value and the company will be seen as creating value for its shareholders. On the contrary, if residual income is negative, the company will be considered as « shareholder value destroyer ».

The information dynamics proposed by Ohlson (1995) was based on two features that could be combined in assumed times series of residual earnings: i/ earnings are persistent and this had been evidenced in prior empirical studies; ii/ financial statement information is only a subset of all information likely to influence expectation about future earnings of a company:

$$x_{t+1}^a = \omega x_t^a + v_t + \varepsilon_{t+1} \quad (2)$$

ω : persistence coefficient of residual earnings, $0 \leq \omega \leq 1$

ε : mean zero disturbance terms

v_t : value relevant information not or not yet captured by financial statements at t

This relation could be interpreted differently: expectation of future earnings is not only affected by current financial statement information but also by other value relevant information not or not yet captured by accounting system. The coefficient ω is assumed to be in the range (0, 1), reflecting the results of most empirical studies on time series of earnings.

Other value relevant information is also assumed to have a time-series behaviour:

$$v_{t+1} = \gamma v_t + \eta_{t+1} \quad (3)$$

γ : persistence coefficient of other value relevant information, $0 \leq \gamma \leq 1$

η : mean zero disturbance terms

Two equations (2) and (3) formulate the Ohlson information dynamics that are combined with RIM to form the Ohlson model expressing stock value in relation with financial statement information:

$$\hat{P}_t = b_t + \alpha_1 x_t^a + \alpha_2 v_t \quad (4)$$

$$\text{Where: } \alpha_1 = \frac{\omega}{1+k_e-\omega}; \alpha_2 = \frac{1+k_e}{(1+k_e-\omega)(1+k_e-\gamma)}$$

Thus, in an efficient stock market, stock price is a function of financial statement information and other value relevant information not or not yet captured by accounting system. The relation between stock price and book value as well as earnings is positive, consistent with the results of most prior empirical studies. Equation (4) can be easily tested to examine the value-relevance of financial statement information. This feature of the Ohlson model is highly appreciated by empiricists.

Based on the Ohlson model, many empirical studies have been conducted to test the value-relevance of financial statement information in different markets: from the U.S. (Collins et al., 1997) to other developed countries such as UK, Germany, Norway (King and Langli, 1998), France (Dumontier and Labelle, 1998)... Results were often prone to a very tight relationship between stock prices and financial statement information. For instance, Collins et al. (1998) show that financial statement information according to the Ohlson model explains 54% of stock prices variations in the U.S. This study also indicates that the role of earnings decreases over time. King and Langli (1998) use a regression model of earnings and book value on stock prices and report an explanatory power of 70%, 60% and 40% respectively for the UK, Norway and Germany. More recently, other research have been conducted on emerging markets such as Southeast Asia (Graham and King, 2000) and China (Chen et al., 2001). Results show significant differences in the relationship between financial statement information and stock prices across countries and across time.

In Vietnam, some studies have analyzed the role of information disclosure for the development of financial markets and proposed solutions to improve their transparency (Tran Quoc Tuan, 2001; Tran Dac Sinh, 2002; Nguyen Dinh Hung, 2005; Do Thanh Phuong, 2006; Nguyen The Tho, 2006; Mai Hoang Minh, 2007). However, these studies only addressed qualitative aspects related to the impact of disclosure in general without a deep analysis of financial statement information and its value-relevance.

1.2. Market Inefficiency and Value-Relevance of Financial Statement Information

The Ohlson model itself and most empirical studies on the value-relevance of financial statement information are based on the implicit hypothesis of capital market efficiency. In other words, the model can be used as theoretical basis to measure value-relevance only when stock prices reflect intrinsic values. However, market efficiency is a strong hypothesis and in a growing volume of research on this topic, more and more results tend to contradict it.

Over 40 years have passed since Fama (1965) first introduced the concept of capital market efficiency, it still causes much debate. First empirical studies tended to confirm this hypothesis. Two pioneer articles of Ball and Brown (1968) and by Fama et al. (1969) showed

that stock prices reflected new information quickly, making it difficult to beat the market by simply using public information. After these works, a large number of other research have refined their empirical methodology and also found that the market reacted nearly instantaneously to new information⁴. The success of the efficient markets hypothesis at that time could be summarized by Jensen's statement: « *there is no other proposition in economics which has more solid empirical evidence supporting it than the Efficient Markets Hypothesis* »⁵.

Such strong statements portend reversals and the efficient markets hypothesis is no exception. In the last thirty years, both the theoretical foundations of this hypothesis and the empirical evidence purporting to support it have been challenged by a growing body of research. Numerous anomalies that could not be explained under the efficient market hypothesis have been reported: underreaction, overreaction, excessive volatility, seasonal effects, ability of non-CAPM factors to explain returns⁶... According to Ball (1994), if anomalies exist, it is because the efficiency theory does not take into account practical problems of capital markets: information and transactions costs, investors heterogeneous expectations, issues related to market microstructure... However, he did not rule out the possibility that results supporting the existence of anomalies were due to errors in research methodologies. Lee (2001) asserts that a naïve view of market efficiency is an inadequate conceptual starting point and an over simplification that fails to capture the richness of market pricing dynamics. One believes markets are efficient because one believes arbitrage forces are constantly at work. If a particular piece of value-relevant information is not incorporated in price, there will be powerful economic incentives to uncover it, and to trade on it. As a result of these arbitrage forces, price will adjust until it fully reflects the information. Individual agents within the economy may behave irrationally, but one expects arbitrage forces to keep prices in line. Faith in the efficacy of this mechanism is a cornerstone of modern financial economics. However, there are limits to arbitrage in reality. Firstly, short selling is restricted in many markets. Secondly, the existence of noise traders is also a source of risk because their behaviour is unpredictable for arbitrageurs. Thirdly, information and transaction costs could make arbitrage expensive and even eliminate profits. Lee (2001) submits that moving from the mechanics of arbitrage to the efficient markets hypothesis involves an enormous leap of faith. It is akin to believing that the ocean is flat, simply because we have observed the forces of gravity at work on a glass of water. No one questions the effect of gravity, or the fact that water is always seeking its own level. But it is a stretch to infer from this observation that oceans should look like millponds on a still summer night. If oceans were flat, how do we explain predictable patterns, such as tides and currents? How can we account for the existence of waves? In reality, oceans are in a constant state of restlessness and trying to become flat. Similarly, financial markets are in a continuous state of adjustment and trying to become efficient.

The academic debate on market efficiency continues. Rainelli (2003) described “*if it was a time when theorists were quite unanimous to reply in the affirmative, those days seem*

⁴ See Fama (1970, 1991) for details on methodologies and specific results of these studies.

⁵ Jensen M. C. (1978), "Some anomalous evidence regarding market efficiency", *Journal of Financial Economics*, 6, p. 95-101 - p. 95.

⁶ See Ball (1994), Shleifer (2000), Kothari (2001), Lee (2001) and Schwert (2001) for details.

over. However, the moment where they would all agree to give a negative answer does not seem to come yet. We are in a kind of rather uncomfortable theoretical vacancy where innovative hypotheses are put forward without proof⁷. A more detailed analysis of the subject is beyond the scope of this study. The above arguments have the only aim to emphasize that market efficiency is a hard-to-prove hypothesis. When stock price does not really reflect its intrinsic value, the Ohlson model could not be used as such to measure the value-relevance of financial statement information. The approach by Aboody et al. (2002) allows to account for this possibility.

Aboody et al. (2002) characterize an inefficient market by assuming that price measures intrinsic value with a measurement error. They consider a case where the semi-strong form of market efficiency is violated in that the measurement error and financial statement information are correlated. This correlation causes the conventional regressions of prices on financial statement variables to produce biased estimates of value relevance coefficients due to the standard omitted correlated-variables problem. In order to deal with this problem, they show how information about the measurement error can be extracted from future price changes under the weak assumption that all inefficiencies resolve over time. The present value of future price changes unrelated to systematic risk factors⁷ is then added to the current price to obtain unbiased coefficients for the mapping from financial statement information to intrinsic value.

$$E(V_{it}|X_{it}) = E\left(\frac{P_{it+1} + D_{it+1}}{1 + \bar{R}_{it+1}^V} \middle| X_{it}\right) = B_t' X_{it} \quad (5)$$

V_{it} : intrinsic value of stock i at t

X_{it} : financial statement information of firm i at t

P_{it+1} : price of stock i at $t + 1$

\bar{R}_{it+1}^V : return based on intrinsic value from t to $t + 1$

D_{it+1} : dividend per share at $t + 1$

B_t' : vector of regression coefficients

Equation (5) is a simple solution to measure the value-relevance of financial statement information when the semi-strong form of market efficiency is violated. Value-relevance relations can be estimated free of bias due to market inefficiencies by changing the dependent variable from the contemporaneous stock price to the future cum-dividend price deflated by conditional expected returns. In other words, the adjustment to the contemporaneous stock price needed to pick up expected future price effects in measuring value relevance is the expected present value of future price changes unrelated to systematic risk factors.

Thus, because market efficiency is a strong hypothesis, especially for emerging markets with many imperfections like Vietnam, the combination of the Ohlson model (1995) and the proposition of Aboody et al. (2002) offers an appropriate theoretical basis to measure the

⁷ Idiosyncratic risk does not play a role since it is assumed to be pure white noise

value-relevance of financial statement information on the Vietnamese stock market. The section II's objective is to test this relation.

II. Value-Relevance of Financial Statement Information on the Vietnamese Stock Market

II.1. Econometric Modeling

The Ohlson model (1995) shows that stock value is a function of two financial statement variables (book value and earnings) and other value relevant information not or not yet captured by accounting system. To test this relationship, linear regressions with stock prices as dependant variable and book value as well as earnings per share as independent variables will be estimated. Since panel data is used for the estimation, in addition to the OLS method, the Fixed Effects Model and the Random Effects Model will also be used⁸.

If the OLS method is used, for firm i , the model to estimate has the following form:

$$Y_i = \bar{\beta}_1 \mathbf{j}_T + \mathbf{X}_i \boldsymbol{\beta} + \mathbf{e}_i$$

Where $\mathbf{Y}_i = (Y_{i1}, Y_{i2}, \dots, Y_{iT})'$, $\mathbf{e}_i = (e_{i1}, e_{i2}, \dots, e_{iT})'$, $\mathbf{j}_i = (1, 1, \dots, 1)'$ all have dimension $(T \times 1)$, T being the number of observations for firm i . $\bar{\beta}_1$ is the intercept and $\boldsymbol{\beta} = (\beta_2, \beta_3, \dots, \beta_K)'$ is the vector of regression coefficients. The matrix of independent variables \mathbf{X}_i has dimension $(T \times (K - 1))$, K being the number of independent variables.

The Fixed Effects Model has the following form:

$$Y_i = (\bar{\beta}_1 + \mu_i) \mathbf{j}_T + \mathbf{X}_i \boldsymbol{\beta} + \mathbf{e}_i$$

Where μ_i represents company i 's specific elements (beyond financial statement information) having (fixed) impact on its stock prices.

The Random Effects Model has the following form:

$$Y_i = \mathbf{X}_i \boldsymbol{\beta} + \mu_i \mathbf{j}_T + \mathbf{e}_i$$

Where \mathbf{X}_i is the matrix of regression coefficients (including the intercept) having dimension $(T \times K)$ and $\boldsymbol{\beta} = (\beta_1, \beta_2, \dots, \beta_K)'$. μ_i is a random variable satisfying the following conditions: $E(\mu_i) = 0$, $E(\mu_i^2) = \sigma_\mu^2$, $E(\mu_i \mu_j) = 0$ for all $i \neq j$ and $E(\mu_i e_{it}) = 0$.

⁸ Fixed and random specific effects in these two models are likely to reflect "other value relevant information not or not yet captured by accounting system" according to the Ohlson model (1995), which the OLS method fails to deal with. This feature of the model might make OLS estimates biased because of omitted correlated variables.

Statistical tests are conducted to find the appropriate model. The fixed effects model is compared with the OLS method using the Fischer test. The latter allows to verify the existence of heterogeneous specific effects across units. The null hypothesis is expressed as follows:

$$H_0: \mu_1 = \mu_2 = \dots = \mu_N = 0$$

The random effects model is compared with the OLS method using the Breusch-Pagan (chi-squared) test for the existence of random effects. The null hypothesis has the following form:

$$H_0: \sigma_\mu^2 = 0$$

When the fixed and the random effects model already pass the above tests, they are compared with each other using the Hausman test for independence of random effects and regressors. In the case of independence, the random effects model is more powerful than the fixed effects model and is therefore selected. In the opposite case when random effects correlate with explicative variables, estimates are biased and the fixed effects model is selected.

Since panel data in this study is unbalanced, Least Squares Dummy Variable (LSDV) regression with group and time effects is used to estimate the fixed effects model and Feasible Generalized Least Squares (FGLS) regression for the random effects model⁹. For the OLS and LSDV methods, Breusch-Pagan/Cook-Weisberg test is conducted to detect heteroscedasticity. When there are signs of it, standard errors are adjusted using White's (1980) correction.

To account for the impact of possible market inefficiency on the value-relevance of financial statement information according to Aboody et al. (2002), the dependant variable (stock prices) is adjusted in different cases. In the first case where stock market is assumed to be efficient, stock price is taken at the end of financial year¹⁰. In other cases, it is assumed that semi-strong form of market efficiency is violated and that inefficiency is resolved after a time length. Since there is no theoretical basis for determining this duration, time lengths of 3, 6, 9 and 12 months after the end of financial year are chosen in this study¹¹. In these cases, current stock prices are adjusted for errors implied by unsystematic variations of future stock prices as follows (a variant of formula (5) proposed by Aboody et al. (2002)):

⁹ See Greene (2003) for more details

¹⁰ Financial statements are published some time after the end of financial year. Taking stock prices at the date of financial statements disclosure with a time lag compared with the end of financial year has the advantage that prices could reflect more fully financial statement information. However, prices taken in such way might also reflect information of the next financial year. In this study, for the first case where stock market is assumed to be efficient, prices are taken at the end of financial year. In reality, main financial statement information of a financial year is often anticipated to a great extent at the end of this financial year before the information is officially disclosed. Moreover, taking stock prices at the end of financial year increases the number of observations in case of assuming market inefficiency with different time lengths necessary for inefficiency resolution (stock prices in this study were taken up to July 31st 2008).

¹¹ The rationale for using these time lengths is that main financial statement information is also disclosed quarterly, strengthening the process of updating and adjusting expectations by investors. Time lengths are taken up to 12 months due to limited sample size.

$$P_{t/\tau} = \frac{P_{t+\tau}}{1 + R_M^\tau}$$

Where:

$P_{t/\tau}$: stock price at t (end of financial year) adjusted for error implied by stock price τ months later.

$P_{t+\tau}$: stock price at t + τ .

R_M^τ : market return (based on market index) from t to t + τ .

$\tau = 3, 6, 9$ and 12 months.

II.2. Sample and Descriptive Statistics

The initial sample consists of all non-financial firms listed on the Hochiminh Stock Exchange. Necessary data including earnings per share, book value per share, stock prices and VN Index are extracted from EzSearch database of FPT Securities Company. Since this database only records financial statements from 2003 and stock prices from the first trading day of 2004, the value-relevance is tested for the period 2003-2007¹². A firm-year observation is eliminated from the final sample if any of the following data for this observation is missing: book value per share, earnings per share for the corresponding financial year, stock prices and VN Index at the following dates: 0, 3, 6, 9 and 12 months after the corresponding financial year's end.

It is noticeable that series of stock prices in EzSearch database (as well as in most other stock market databases in Vietnam) had not been adjusted for all events changing stock prices but not changing market capitalization at the same rate (stock dividends, bonus issues, seasoned equity offerings...). In this study, such adjustments are performed¹³ based on information about this kind of events from the Hochiminh Stock Exchange and from concerned listed companies.

After initial data processing, the final sample consists of 306 firm-year observations belonging to 135 listed companies (representing nearly 90 % of all firms listed on Hochiminh Stock Exchange by the end of 2007). Figure 1 reports the number of observations per year. Because of rapid growth in the number of listed firms in late 2006, the sample's observations are concentrated in the period 2006-2007.

¹² The limited number of listed companies up to the end of 2002 does not have a great impact on the sample size.

¹³ See Ton Tich Quy (2005) and Nguyen Viet Dung (2007b) for details

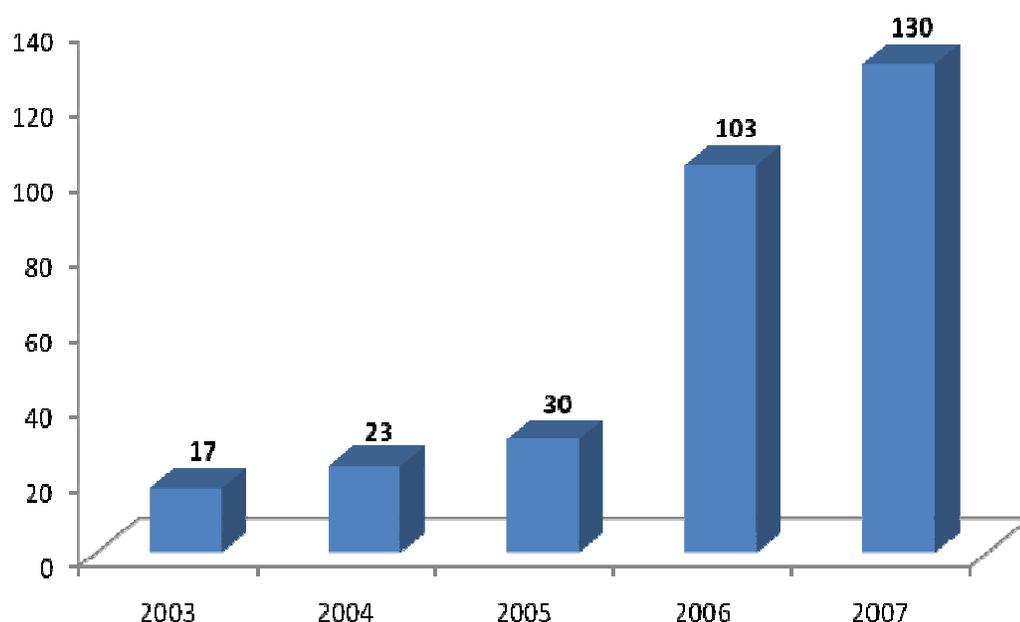
Figure 1: Number of firm-year observations

Table 1 reports the sample's descriptive statistics. The mean earnings per share of firms listed on the Hochiminh Stock Exchange is approximately 3,500 VND for the period 2003-2007. The minimum value shows that there are loss firms, however they only represent a very small proportion (1.6 %). The mean book value per share is approximately 18,000 VND. The mean price-earnings ratio (computed by dividing the mean stock price at t by the mean earnings per share) is quite high (more than 18) as the result of the bullish period in early 2007. The number of firm-year observations for $P_{t/9}$ and $P_{t/12}$ is only 173 compared with 306 for other variables because stock prices are taken up to July 31st 2007 in this study.

Table 1: Descriptive Statistics

	Mean	Median	Standard Deviation	Minimum	Maximum	Number of Observations
EPS	3.44	2.75	2.64	-3.64	20.61	306
BPS	18.37	16.11	8.07	4.99	52.20	306
	62.71	47.10	55.58	8.10	460.00	306
	61.47	44.38	53.68	7.26	379.63	306
	63.33	41.43	79.47	6.91	1049.68	306
	58.76	35.19	90.45	6.82	1031.55	173
	62.17	37.87	99.07	5.24	1132.58	173

Table 2 presents the correlation matrix. It shows that price variables are highly correlated but this correlation decreases when current stock prices are adjusted for errors implied by stock prices in further future. Earnings and book values per share correlate the most with stock prices adjusted for errors implied by prices 3 months later. This initial result

might be a sign of the fact that financial statement information is reflected in prices with a time lag on the Vietnamese stock market. It will be further examined in regression analysis. The correlation between two independent variables is quite high and significant at the highest level, suggesting that collinearity might exist and influence the models' statistical significance. The Variance Inflation Factor's procedure is then used to detect collinearity and shows no sign of it. Using stepwise regressions also reveals that it is fair to include these two independent variables in a same model.

Table 2: Correlation Matrix

	<i>EPS</i>	<i>BPS</i>	P_t	$P_{t/3}$	$P_{t/6}$	$P_{t/9}$	$P_{t/12}$
<i>EPS</i>							
- Pearson	---						
- Spearman	---						
<i>BPS</i>							
- Pearson	0.53**	---					
- Spearman	0.60**						
P_t							
- Pearson	0.60**	0.50**	---				
- Spearman	0.55**	0.56**					
$P_{t/3}$							
- Pearson	0.63**	0.53**	0.87**	---			
- Spearman	0.56**	0.59**	0.92**				
$P_{t/6}$							
- Pearson	0.52**	0.39**	0.54**	0.82**	---		
- Spearman	0.56**	0.57**	0.86**	0.95**			
$P_{t/9}$							
- Pearson	0.60**	0.49**	0.47**	0.81**	0.99**	---	
- Spearman	0.57**	0.62**	0.89**	0.94**	0.98**		
$P_{t/12}$							
- Pearson	0.58**	0.46**	0.46**	0.79**	0.99**	0.99**	---
- Spearman	0.45**	0.51**	0.85**	0.91**	0.92**	0.95**	

** : statistically significant at 1%

II.3. Empirical Results

Estimation and test results are reported in Table 3. All models are estimated and tested with 5 different dependant variables: P_t , $P_{t/3}$, $P_{t/6}$, $P_{t/9}$ and $P_{t/12}$. For the OLS and LSDV methods, Breusch-Pagan/Cook-Weisberg test is performed and shows that there are signs of heteroscedasticity in all models with different dependant variables. Therefore, the White's (1980) correction is used to adjust standard errors of regression coefficients and corresponding t-statistics.

Table 3: Estimation and Test Results

	Dependant Variable: P_t			Dependant Variable: $P_{t/3}$		
	OLS	LSDV	FGLS	OLS	LSDV	FGLS
<i>Intercept</i>	-2.50 (-0.35)	20.41* (2.43)	3.61 (0.55)	-5.39 (-0.69)	13.03 (1.51)	-3.52 (-0.58)
<i>EPS</i>	9.86** (4.08)	10.38** (4.45)	8.25** (7.42)	9.79** (4.49)	10.18** (4.84)	8.08** (7.98)
<i>BPS</i>	1.71** (4.81)	1.03** (2.72)	1.91** (5.76)	1.81** (4.83)	1.24** (3.33)	2.24** (7.63)
R^2	0.40	0.48	0.40	0.44	0.51	0.44
<i>Number of observations</i>	306	306	306	306	306	306
<i>Breusch-Pagan / Cook-Weisberg Test (Heteroscedasticity)</i>	$\chi^2(1)$ 378.01**	$\chi^2(1)$ 365.44**		$\chi^2(1)$ 301.36**	$\chi^2(1)$ 295.28**	
<i>Fischer Test (Fixed Effects)</i>		F 24.38**			F 22.87**	
<i>Breusch-Pagan Test (Random Effects)</i>			$\chi^2(1)$ 23.33*			$\chi^2(1)$ 34.40**
<i>Hausman Test (Comparing effects)</i>		$\chi^2(2)$ 24.14**			$\chi^2(2)$ 12.57**	

** and *: statistically significant at 1 % and 5 % respectively

When the dependant variable is stock price at the end of financial year (P_t), the Fischer and Breusch-Pagan tests reveal that it is impossible to reject the hypothesis of the existence of specific effects. However, according to the Hausman test, random effects are correlated with regressors. This renders coefficient estimates biased and therefore the LSDV method is selected. Estimation results under this method show that stock prices are positively related to earnings and book value per share at the highest level of statistical significance. These two financial statement variables together with fixed specific effects explain 48 % of stock prices variations on the Vietnamese stock market (40 % attributable to BPS and EPS under the OLS method).

When stock prices are adjusted for errors implied by prices 3 months later ($P_{t/3}$), the tests still lead to choose the LSDV as appropriate method. The coefficients for two financial statement variables are still significantly positive at the highest level. Furthermore, when $P_{t/3}$ is the dependant variable, the models' explanatory power is greater than with P_t (51 % compared to 48 %). With $P_{t/6}$, $P_{t/9}$ and $P_{t/12}$ as dependant variables, the explanatory power tends to decrease and the coefficient for book value becomes statistically insignificant when the dependant variable is $P_{t/9}$ and $P_{t/12}$. Thus, contrary to prevailing views that financial statement information is not related to stock prices on the Vietnamese stock market, the test results show that this relationship is statistically meaningful. There is also sign that financial statement information is reflected in prices with a time lag (financial statement variables correlate the most with $P_{t/3}$).

Table 3: Estimation and Test Results (continued)

	Dependant Variable: $P_{t/6}$			Dependant Variable: $P_{t/9}$		
	OLS	LSDV	FGLS	OLS	LSDV	FGLS
<i>Intercept</i>	-10.56 (-0.72)	-0.32 (-0.02)	-9.38** (-0.91)	-32.50 (-1.28)	3.03 (0.13)	-20.50 (-1.52)
<i>EPS</i>	13.03* (2.53)	13.17** (2.66)	11.28** (6.38)	18.52* (2.37)	19.94* (2.57)	5.99** (3.38)
<i>BPS</i>	1.59** (3.60)	1.19** (2.82)	2.02** (3.78)	1.86* (2.14)	0.42 (0.55)	4.35** (6.18)
R^2	0.29	0.32	0.28	0.37	0.42	0.32
<i>Number of observations</i>	306	306	306	173	173	173
<i>Breusch-Pagan / Cook-Weisberg Test (Heteroscedasticity)</i>	$\chi^2(1)$ 1071.58**	$\chi^2(1)$ 1050.17**			$\chi^2(1)$ 767.41**	
<i>Fischer Test (Fixed Effects)</i>		F 14.72**			F 11.69**	
<i>Breusch-Pagan Test (Random Effects)</i>			$\chi^2(1)$ 8.92**			$\chi^2(1)$ 3.81
<i>Hausman Test (Comparing effects)</i>			$\chi^2(2)$ 5.64			---

** and *: statistically significant at 1 % and 5 % respectively

Table 3: Estimation and Test Results (continued)

Dependant Variable: $P_{t/12}$	OLS	LSDV	FGLS
<i>Intercept</i>	-30.24 (-1.06)	13.36 (0.49)	-9.90 (-0.68)
<i>EPS</i>	20.10* (2.26)	21.77* (2.48)	3.79* (2.06)
<i>BPS</i>	1.61 (1.48)	-0.12 (-0.12)	4.54** (6.24)
R^2	0.34	0.40	0.27
<i>Number of observations</i>	173	173	173
<i>Breusch-Pagan / Cook-Weisberg Test (Heteroscedasticity)</i>	$\chi^2(1)$ 794.85**	$\chi^2(1)$ 767.51**	
<i>Fischer Test (Fixed Effects)</i>		F 14.34**	
<i>Breusch-Pagan Test (Random Effects)</i>			$\chi^2(1)$ 3.76
<i>Hausman Test (Comparing effects)</i>			---

** and *: statistically significant at 1 % and 5 % respectively

Since early 2007 was marked by a sharp rise of the Vietnamese stock market, the relationship between stock prices in early 2007 and financial statement information for 2006 is compared to that for other years using the following regression with interactive terms:

$$P_{it/3} = \alpha + \beta_1 EPS_{it} + \beta_2 BPS_{it} + \beta_3 (YD \times EPS_{it}) + \beta_4 (YD \times BPS_{it}) + \beta_5 YD + \varepsilon_{it}$$

Where:

$P_{it/3}$: stock prices at the end of financial year adjusted for errors implied by prices 3 months later.

EPS_{it} : firm i 's earnings per share for financial year t .

BPS_{it} : firm i 's book value per share at the end of financial year t .

YD (*Year Dummy*): dummy variable taking the value of 1 if the financial year in consideration is 2006 and 0 otherwise.

Table 4: Estimation and Test Results for Interactive Terms

Dependant Variable: $P_{t/3}$	OLS	LSDV	FGLS
<i>Intercept</i>	-3.37 (-0.41)	22.41* (2.47)	-0.18 (-0.03)
<i>EPS</i>	6.38** (2.76)	6.88** (3.19)	5.58** (5.05)
<i>BPS</i>	2.14** (4.97)	1.36** (3.12)	2.39** (8.10)
<i>YD×EPS</i>	10.44** (3.08)	9.94** (3.02)	6.59** (3.62)
<i>YD×BPS</i>	-1.53 (-1.94)	-0.75 (-0.94)	-0.05 (-0.07)
<i>YD</i>	0.71 (0.05)	-25.10 (-1.70)	-14.31 (-1.35)
R^2	0.49	0.55	0.48
<i>Number of observations</i>	306	306	306
<i>Breusch-Pagan / Cook-Weisberg Test (Heteroscedasticity)</i>	$\chi^2(1)$ 167.84**	$\chi^2(1)$ 190.86**	
<i>Fischer Test (Fixed Effects)</i>		F 29.41**	
<i>Breusch-Pagan Test (Random Effects)</i>			$\chi^2(1)$ 25.75**
<i>Hausman Test (Comparing effects)</i>		$\chi^2(2)$ 24.11**	

** and *: statistically significant at 1 % and 5 % respectively

The results are reported in Table 4. The Breusch-Pagan and Hausman tests lead to choose the LSDV method. The estimation using this method shows that in addition to BPS and EPS, the first interactive term $YD \times EPS$ also has significantly positive coefficient at the highest level of statistical significance, while it is impossible to reject the null hypothesis for the second interactive term $YD \times BPS$ at 5 % (even 10 %). As the dummy variable takes the

value of 1 if the financial year in consideration is 2006 and 0 otherwise, this result shows that the relationship between stock prices in early 2007 and financial statement information for 2006 is much stronger than that for other periods and this incremental value-relevance comes mostly from earnings, not from book value. The regression coefficients of EPS and $YD \times EPS$ reveal that each change of 1 % in earnings for 2006 moves stock prices in early 2007 by 17 % in the same direction while this number for other years is only 7 %. Thus, during stock market boom, the value relevance of earnings increases sharply in comparison with other periods.

Table 5 compares the explanatory power of financial statement information in Vietnam with that in other countries. This power is proxied by the coefficient of determination (R^2) or the adjusted coefficient of determination (Adjusted R^2)¹⁴. Table 5 shows that the value relevance of earnings and book value in Vietnam is weaker than that on Western stock markets (this has been anticipated). Nevertheless, the relationship between financial statement information and stock prices on the Vietnamese stock market is stronger than in China in 90s which is also the period just after the Chinese stock market's birth. For Southeast Asia, as Graham and King (2000) use residual earnings instead of net earnings as an independent variable, a direct comparison is impossible. However, the authors did analyze the correlation between stock prices and net earnings and based on this criterion, among six countries and territories (Taiwan, South Korea, Indonesia, Malaysia, Philippines and Thailand – research period: 1987-1996), Vietnam is only ranked ahead of Taiwan.

Table 5: Comparison across countries

Country	Research period	Author(s)	R^2	Adjusted R^2
UK	1982 - 1996	King and Langli (1998)	66 %	
Norway	1982 - 1996	King and Langli (1998)	65 %	
US	1953 - 1993	Collins et al. (1997)	54 %	
Germany	1982 - 1996	King and Langli (1998)	40 %	
Vietnam	2003 - 2007	Nguyen Viet Dung (2009)	40 %	39 %
China	1991 - 1998	Chen et al. (2001)		25 %

As such, the value relevance of financial statement information in Vietnam is somewhat still weak in comparison to not only developed countries but also other emerging markets in the region. This can be explained by numerous existing problems in the legal framework of information disclosure, accounting regime, auditing activities, actual situation of disclosure by public firms and use of financial statement information by investors¹⁵. However, this does not

¹⁴ For a more homogeneous comparison, R^2 and adjusted R^2 in the case of Vietnam are derived from the OLS method with stock prices at the end of financial year as dependant variable.

¹⁵ See Nguyen Viet Dung (2009) for more details

mean that financial statement information is not reflected in stock prices in Vietnam. For professional investors having no inside information or other advantages, information as disclosed in financial statements is still a useful basis for making investment decisions. Moreover, as long as there exists a non-negligible number of uninformed investors following the above-mentioned professionals voluntarily, as it is the case on the Vietnamese stock market, financial statement information is still reflected in stock prices.

III. Summary and Concluding Remarks

Because market efficiency is a strong hypothesis, especially for emerging markets with numerous imperfections like Vietnam, the combination of the Ohlson model (1995) and the proposition of Aboody et al. (2002) offers an appropriate theoretical basis to measure the value-relevance of financial statement information in Vietnam. Contrary to prevailing views that financial statement information is not related to stock prices on the Vietnamese stock market, the results show that this relationship is statistically meaningful. Earnings and book value are found to correlate the most with stock prices at the end of financial year adjusted for errors implied by prices 3 months later. This is a sign that financial statement information is reflected in prices with a time lag¹⁶. The relationship between stock prices in early 2007 and financial statement information for 2006 is much stronger than that for other periods and this incremental value-relevance comes mostly from earnings, not from book value. Thus, during stock market boom in Vietnam, the value relevance of earnings increases sharply in comparison with other periods.

In conclusion, investors on the Vietnamese stock market can quite base their investment strategies on financial statement information, particularly earnings in market boom period. With a skilled analysis of this kind of information, investors will be able to take advantage of the time lag with which earnings and book value are reflected in stock prices. For market authority and public companies, this study provides evidence for the need to reinforce information disclosure in particular and financial markets transparency in general in Vietnam.

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¹⁶ This result might also be due to price limits. Further empirical investigation is needed.

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