VALUE RELEVANCE OF ACCOUNTING INFORMATION USING AN ERROR CORRECTION MODEL

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ABSTRACT

Studies of accounting information value relevance are often based on the scale of R^2 value. However, Insukindro (1998) states that a high R^2 coefficient does not imply that a model is superior. When linear regression estimation produces a high coefficient of R^2 but it is not consistent with the theory or it does not pass the classic linear regression assumption test, the model may be inferior. In this case, the model should not have been chosen as the best empirical model. This study contributes to the accounting information value relevance literature by providing a new econometric analysis in a value relevance model. The research samples consisted of 81 manufacturing companies, including 324 firm years, listed on the Indonesian Stock Exchange from 2003 to 2007. The results of this study indicate that the error correction models play a role in determining the value relevance of accounting information.

JEL: G12; G14; M41

KEYWORDS: Value Relevance, Earnings, Book Value Equity, Cash Flow, Error Correction Model, Error Correction Terms

INTRODUCTION

Value-relevance of accounting information refers to the ability of accounting information to explain the value of the company (Beaver, 1968). Value-relevance of accounting information, especially earnings, has become the focus of several U.S. studies. Studies of the relevance of these values lead to a discussion of the usefulness of accounting information. The topic is important because some individuals argue that financial statements based on historical cost have lost relevance for investors due to the change in value-relevance of accounting information.

This study tests the relevance of accounting data value in order to test the usefulness of accounting information to the investor. The study of value relevance always uses stock price regressions or return against accounting variables to evaluate the usefulness of accounting information for investors. The model widely employed is a simple profit capitalization model. In this model, the stock price is expressed as profit function with the assumption that profit reflects information about future cash flows (Beaver, 1989; Watts and Zimmerman, 1986).

An accounting number is said to have value relevance when that accounting number is significantly associated with equity market value (Beaver, 1998; Holthousen and Watts, 2001; Barth et al., 2001). Ohlson (1995) and Feltham and Ohlson (1995, 1996) develop a valuation theory and valuation models to test the association between accounting numbers and security market value. This model is also meant to improve the misspecification in previous methodologies and provide a theoretical basis for the study of stock price/return association with accounting numbers.

Studies of accounting information value relevance are often based on the scale of $R^{2.}$ Higher R^2 values are generally viewed as having additional value relevance. However, Insukindro (1998) states that a higher R^2 coefficient does not imply a superior model. When linear regression estimation produces a high

coefficient of R^2 but it is not consistent with the theory chosen by the scientist or it does not pass the classic linear regression assumption test, such a model is not a good model. In econometric analysis this situation is known as *spurious regression* (Thomas, 1997). In order to draw conclusions model selection should not only be based on a high R^2 value but also most consider the econometric analysis in linear regression modeling. The purpose of this study is to test the relevance of accounting information value by taking econometric analysis into account in order to avoid *spurious regression*. This study contributes to the accounting information value relevance literature by means of econometric analysis in a value relevance model. This paper is the first known research to complete such an analysis.

The remainder of the paper is organized as follows. Section 2 briefly discusses the relevant literature. Data selection, research methodology, and empirical models are described in Section 3. Section 4 provides analysis and interpretations of the empirical findings and Section 5 concludes the paper.

LITERATUR REVIEW AND HYPOTHESIS DEVELOPMENT

The initial study of financial information value relevance for stock market is attributed to the late 1960s when Ball and Brown (1968) and Beaver (1968) performed empirical studies to reveal the usefulness of accounting numbers for stock market performance. Those two studies prove that accounting profit does have information content and is useful for stock market participants. Easton (1999) and Beaver (2002) state the goal of value relevance studies is to test the association between stock price/return-based dependent variables and fundamental accounting numbers. According to Barth et al. (2001) and Beaver (2002), the study of value relevance has a significant role in providing empirical evidence of whether accounting numbers have value relevance for the stock market.

From a theoretical standpoint, Beaver (2002) states the theoretical foundation on which value relevance study is based is the combination of valuation theory plus contextual accounting arguments. There are three types of valuation models to be employed namely the profit model, balance model and a combination of profit and balance models developed by Ohlson (1995). Ohlson's (1995) model is most commonly employed. This model assumes the market value of a company is a linear function of equity book value and expected future abnormal profits. According to Beaver (2002), although the accounting theoretical basis is weak, scientists can test the linear function of accounting variables with equity market value by combining Ohlson's valuation theory (1995) and contextual accounting arguments.

Ohlson (1995) and Feltham and Ohlson (1995, 1996) develop a valuation theory and valuation models to test the association between accounting numbers and security market value. The development is meant to improve the misspecification in previous measurement methodologies and provide a theoretical basis for study of the relation between stock price/return and accounting numbers. The essence of Ohlson's valuation theory (1995) is that security prices are the linear function of accounting numbers (equity book value and profit). By virtue of this prediction of Ohlson's valuation theory, the hypothesis of value relevance is developed. The essence of the value relevance hypothesis is that an accounting number has value relevance when the said figure is statistically and significantly associated with market determined security values (Ohlson, 1995, 2001; Holthausen and Watts, 2001; Barth et al., 2001). By virtue of Ohlson's valuation theory and model (1995), studies of value relevance test the claim that financial information value relevance for the stock market decreases from time to time.

According to Barth et al. (2001), an accounting number has value relevance when the accounting figure reflects information that is relevant to the investor during the evaluation of company. It is quite reliably measured by its impact on stock prices or return. Barth et al. (2001) thinks that the motivation value relevance study is encouraged by such a wide potential interest of non-academic constituents including standard making boards (FASB and IASB), policy makers, regulators (SEC and *Federal Reserve Board*), company managers, and other financial information users. According to Barth et al. (2001), the study of

value relevance provides a benefit to the standard establishment, accommodation of accounting conservatism, and it can also be used to learn about the implication of conservatism to the relation between accounting numbers and equity market value. Holthausen and Watts (2001) state that the study of value relevance helps determine whether an accounting number is useful for evaluating a company by conducting a test of whether the accounting number is associated with the stock price. Holthausen and Watts (2001) conclude the literature of value relevance reports that relation between accounting numbers and ordinary stock prices has a limited implication and inference for the making of standards.

Holthausen and Watts (2001) classify the study of value relevance into three categories. First, the study of relative relation compares the association between stock market value, or value alteration, and bottom-line alternative measures. One such study is to test whether the association of profit figures, calculated by virtue of the suggested standard, has a higher association with the value or market return than the profit calculated by means of the prevailing GAAP (Dhaliwal et al., 1999). Another example is to compare the association of foreign GAAP-based profit to that of US GAAP-based profit (Harris et al., 1994). This study usually tests the difference of R^2 by means of bottom line accounting number differences. Those accounting numbers with larger R^2 indicate the presence of value relevance. Second, the study of incremental relation tests whether an accounting number is useful in the description of value or return with another specific variable. Third, the study of marginal information content tests whether a certain accounting number provides more information than is already available for the investor. This type of study usually employs a study of event methodology to decide if the published accounting number is associated with value alteration.

The study of value relevance that employs equity book value accounting, profit component and cash flow component information produces varied result. Some studies show that cash flow is incrementally useful compared to profit in deciding the value of company (Cheng, Liu & Schaefer, 1996; Subramanyam, 1996) as well as more persistent than accrual (Sloan, 1996). LaGore and McCombs (2009) provide evidence that cash flow and accruals have higher value relevance than other accounting information. This differs from the results of study by Abuzayed et al. (2009) who provide evidence that profit and profit component have value relevance compared to other accounting information. Moreover, they are able to explain the gap between book value and equity market value.

Wang et al. (2005) indicates that profit component has higher value relevance than aggregate earnings in the explanation of value relevance and it is more relevant to evaluate the capability of company to earn future profits. Kumar and Khrisnan (2008) indicate that operational and accrual cash flow accounting information has higher value relevance than other accounting information. Papadaki and Siougle (2007) also indicate the negative relation between price and profit for a company that reports a loss and positive relation between price and profit for a company that reports a profit.

To date, there is no study that takes econometric analysis into account in order to avoid *spurious regressions* in the model of accounting information value relevance. The testing of value relevance models that indicates result variation can be due to ignoring of econometric analysis. A regression model that is only based on a higher value of R^2 but does not meet diagnostic testing renders the R^2 value produced by such model invalid. The accounting information tested in this study is the information provided in equity book value, profit components, and cash flow components. By virtue of the above argumentation, the hypothesis proposed in this study is as follows:

H1: Book value equity has value relevance or is able to explain the firm stock price using Error Correction Model - ECM.

H2: Earnings component (operating profit, net income and accrual) has value relevance or is able to explain the firm stock price using Error Correction Model - ECM.

H3: Cash flow component (operating cash flow, investment cash flow, and financing cash flow) has value relevance or is able to explain the firm stock price using Error Correction Model - ECM.

RESEARCH METHOD

The population in this study is firms registered with the Indonesian Stock Market. The procedure employed to determine study sample is purposive sampling method. The technique involves sample determination by means of specific considerations. The sample selection technique is performed by the following criteria: 1) The company provides financial statements for December 31 that are complete and successively registered with the Indonesian Stock Market from 2003 to 2007, 2) The company's stock is registered with and actively traded at the Indonesian Stock Market from 2003 to 2007, and 3) those sample companies with increment (decrement) level of profit component and cash flow that are considered outliers are removed from the sample. This refers to the empirical evidence presented by Cheng and Yang (2003) which proves that extreme profit and cash flow have less information content or are less-informative compared to those with moderate profit and cash flow. The final results of the study sample consisted of 81 manufacturing companies listed on the Indonesia Stock Exchange from 2003 to 2007. The data includes 324 firm year observations.

Type of data employed by this study is Secondary Data. Secondary data has previously been collected and processed by a third party, usually in the form of publication of variable data. For company data, the annual financial statement, company market data and the date of publication as well as other data are obtained from the following sources: Data of financial statement obtained from the annual statement published by the company in 2003 - 2008 and data of company stock market price obtained from the Indonesian Capital Market Directory (ICMD).

The dependent variable in this study includes: Market Value/Stock Market Price per sheet of stock derived from the closing price of stock per sheet at the end of year. The independent variables in this study include: Equity Book Value derived from total IDR values of equity at the end of year divided by total share of stock at the end of year; Operating profit derived from total IDR values of company operating profit at the end of year divided by total share of stock at the end of year; Net Income derived from total IDR values of company net income at the end of year divided by total share of stock at the end of year; Accrual derived from total IDR values of company net income minus total IDR values of cash flow from operation at the end of year divided by total share of stock at the end of year; Operating Cash Flow derived from total IDR values of operating cash flow at the end of year divided by total share of stock at the end of year; Investment Cash Flow derived from total IDR values of investment cash flow at the end of year divided by total share of stock at the end of year; Financing Cash Flow derived from total IDR values of financing cash flow at the end of year divided by total share of stock at the end of year;
And Cash flows derived from total IDR values of cash flow that comes from the operational, investment and funding activities of company at year end divided by total sheets of stock at year end.

Data Analysis Technique

This study employs *pooled data*, Baltagi (2005) states that when a study employs panel data then it is necessary to conduct a data probability test in order to determine whether the sample of companies has the same characteristic. One method to test the probability of data is the chow test (Baltagi, 2005). The initial analysis performed in this study is to test the poolability of data for the value relevance model by means of *chow test.* The data are classified into two samples based on total assets. There are 3 similarities for 3 samples: large sized company, small sized company, and all companies. The stages of testing are as follows: 1) Regression using all observations to obtain the restricted residual sum of square or RSSr value. 2) Regression on the small sized company observations to obtain RSS1 value. 3) Regression on the large sized company observations to obtain RSS2 value. 4) Add the RSS1 value and RSS2 value in

order to obtain the *unrestricted residual sum of square* (RSSur). 5) Calculate F test value = [(RSSr - RSSur)] / k] / [RSSur / (n1 + n2 - 2k)] 6) If F test value < F table then the regression model for the large sized company and small sized company is not different.

The diagnosis test in this study includes the autocorrelation test, linearity test, normality and heterogeneous tests for each model of accounting information value relevance. This is done to avoid spurious regression (Insukindro, 1998), thereby producing a valid R^2. 1) The autocorrelation test determines whether there is a correlation between the error of period t and the error of period t-1 (previous) in the linear regression model. The autocorrelation test employed in this study is the Breusch Godfrey. If the probability value is above 0.05 then the correlation assumption is met. 2) The linearity test is employed to see whether model specification is correct, namely whether the function employed in the empirical study should better be linear, quadrate or cubical. By means of a linearity test, the information of whether the empirical model is best specified linear, quadrate or cubical can be obtained. The linearity test in this study employs the Ramsey Reset Test. If the probability value is above 0.05 then the linearity assumption is met. 3) The normality test determines whether the residual variable has a normal distribution in the regression model. The normality test in this study employs Jarque-Bera (JB) Test. If the probability value is above 0.05 then the normality assumption is met. 4) The Heterogeneous test determines whether there is a variant difference of residuals from one observation to the other in the regression model. This test employs White Hetero (Cross) Test. If the probability value is above 0.05 then the heterogeneous assumption is met.

When any of the four aforementioned diagnosis test are not met the regression is *spurious* and the stationary concept in regression modeling is not met. In this case the R^2 value produced by the regression is not valid. Other consequences that result from a spurious regression are: inefficient regression coefficients, the prediction based on such regression will be biased, and the general standard test for regression coefficient significance will be invalid. A linear regression in econometric models is spurious when it does not pass stationery and/or co-integration tests. When there is a spurious regression in the value relevance model, this study solves the problem by using a co-integration and developing an error correction model in the testing of value relevance model.

Co-Integration Test and Error Correction Model

The issue of dynamic model statistics, especially the co-integration approach should not be ignored. The technique is principally used when the researcher wants to avoid spurious regression while estimating the selected model. The co-integration approach is meant to analyze the long-term relationship as suggested by the theory and can be used as a bridge to connect the statistical model with the assessable model.

The co-integration test is meant to observe whether those economic variables with similar integration demonstrate a long-term equilibrium as suggested by the theory or have a stationary residual. The co-integration test employed in this study is the Johansen Test. If the Trace Test value is larger than the critical value at the certainty level of 5% or 1% then it can be said that the variables are co-integrated with each thereby indicating a long-term inter-variable relation.

The usual way to avoid the possibility of spurious regression is to include more indolence variables (lag). We make a dynamic model such as Error Correction Model = ECM or other models of indolence. Insukindro (1999) states that error correction models can be used to explain the imbalance in the context of a preferable phenomenon. This step is taken especially when we ignore the stationery test or when the data is not stationary.

If the data being analyzed is not stationary but co-integrated with each other, the implication is that there is a long-term relationship (equilibrium) between the two variables. In the short term there is the possibility of disequilibrium. The existence of this disequilibrium will require a correction to the error correction model (Error Correction Model = ECM). The error correction model (ECM) in this study uses the approach of Engle and Granger, with two stages. The first stage is to calculate the residual value of the initial regression equation. The second stage is to run the regression analysis including the residuals from the first step. If the residual of the previous year was significant the error correction model (ECM) that is used is valid. Table 1 presents a comparison between the model without error correction and error correction models with (ECM) for the eight accounting numbers: book value of equity, operating profit, net income, accruals, operating cash flow, investment cash flow, financing cash flow and cash flow total.

Table 1: Research Model

No.	Model 1 (Theoretic Model/ Long Run Model)	Model 2 (*Error Corection Model*)
1.	Book value equity $P = \alpha_1 + \alpha_2 BVE_{it} + e_{it}$	Book value equity $\Delta P = \alpha_1 + \alpha_2 \Delta BVE_{it} + e_{it-1}$ $\Delta P = \alpha_1 + \alpha_2 \Delta BVE_{it} + \alpha_3 (P - \beta_1 + \beta_2 BVE)_{it-1}$
2.	Operating Profit $P = \alpha_1 + \alpha_2 OP_{it} + e_{it}$	Operating Profit $\Delta P = \alpha_1 + \alpha_2 \Delta OP_{it} + e_{it-1}$ $\Delta P = \alpha_1 + \alpha_2 \Delta OP_{it} + \alpha_3 (P - \beta_1 + \beta_2 OP)_{it-1}$
3.	Net Income $P = \alpha_1 + \alpha_2 E_{it} + e_{it}$	Net Income $\Delta P = \alpha_1 + \alpha_2 \Delta E_{it} + e_{it-1}$ $\Delta P = \alpha_1 + \alpha_2 \Delta E_{it} + \alpha_3 (P - \beta_1 + \beta_2 E)_{it-1}$
4.	Accruals $P = \alpha_1 + \alpha_2 ACC_{it} + e_{it}$	Accruals $\Delta P = \alpha_1 + \alpha_2 \Delta ACC_{it} + e_{it-1}$ $\Delta P = \alpha_1 + \alpha_2 \Delta ACC_{it} + \alpha_3 (P - \beta_1 + \beta_2 ACC)_{it-1}$
5.	Operating Cash flow $P = \alpha_1 + \alpha_2 OCF_{it} + e_{it}$	Operating Cash flow $\Delta P = \alpha_1 + \alpha_2 \Delta OCF_{it} + e_{it-1}$ $\Delta P = \alpha_1 + \alpha_2 \Delta OCF_{it} + \alpha_3 (P - \beta_1 + \beta_2 OCF)_{it-1}$
6.	Investment Cash flow $P = \alpha_1 + \alpha_2 ICF_{it} + e_{it}$	Investment Cash flow $\Delta P = \alpha_1 + \alpha_2 \Delta ICF_{it} + e_{it-1}$ $\Delta P = \alpha_1 + \alpha_2 \Delta ICF_{it} + \alpha_3 (P - \beta_1 + \beta_2 ICF)_{it-1}$
7.	Financing Cash flow $P = \alpha_1 + \alpha_2 FCF_{it} + e_{it}$	Financing Cash flow $\Delta P = \alpha_1 + \alpha_2 \Delta FCF_{it} + e_{it-1}$ $\Delta P = \alpha_1 + \alpha_2 \Delta FCF_{it} + \alpha_3 (P - \beta_1 + \beta_2 FCF)_{it-1}$
8.	Cash flow total $P = \alpha_1 + \alpha_2 CF_{it} + e_{it}$	Cash flow total $\Delta P = \alpha_1 + \alpha_2 \Delta CF_{it} + e_{it-1}$ $\Delta P = \alpha_1 + \alpha_2 \Delta CF_{it} + \alpha_3 (P - \beta_1 + \beta_2 CF)_{it-1}$

Note: P = Price per share, BVE = Book value equity per share, OP = Operating profit per share, E = Net income per share, ACC = Accruals per share, OCF = Operating cash flow per share, ICF = Investment cash flow per share, FCF = Financing cash flow per share, and CF = Cash flow total per share

RESULTS

The probability test used in this research is the chow test method. The Probability tests require classifying the sample by size. In this research the sample is grouped based on company size as measured by total assets. The probability test results are presented in Table 2. The F test value is smaller than F table for all variables. The results indicate no differences in regression model for firms with small and large size. Thus the firms included in these samples have the same characteristics.

Diagnostic tests are performed for the eight models for the value relevance models of earnings components, book value equity and cash flow components. Diagnostic test results are shown in Table 3. The results of diagnostic tests for book value equity model shows no requirement for normality, linearity and heteroscedasticity are indicated by probability values below 0.05. Diagnostic test results for earnings components are divided in to three components: operating profit, net income and accruals. In each case the results of diagnostic tests show no requirement for normality and heteroscedasticity as indicated by probability values below 0.05. Diagnostic test results for earnings components divided in to three

components: operating profit, net income and accruals. The results of diagnostic tests for each component show there is no requirement for normality and heteroscedasticity are indicated by probability values below 0.05. Diagnostic test results for cash flow components divided in to four components: operating cash flow, investment cash flow, financing cash flow and total of cash flow. The test results on each component show no requirement for normality, autocorrelation and heteroscedasticity are indicated by probability values below 0.05.

Table 2: The Results of Probability Test

Independent Variables	F Test	F Table	Conclusion
Book Value Equity	2.7168	3.0144	There are no differences in regression model for firm with small and large size
Operating Profit	2.0630	3.0144	There are no differences in regression model for firm with small and large size
Net Income	1.5028	3.0144	There are no differences in regression model for firm with small and large size
Accruals	0.7480	3.0144	There are no differences in regression model for firm with small and large size
Operating Cash Flow	2.2332	3.0144	There are no differences in regression model for firm with small and large size
Investment Cash Flow	1.8462	3.0144	There are no differences in regression model for firm with small and large size
Financing Cash Flow	1.1052	3.0144	There are no differences in regression model for firm with small and large size
Cash Flow Total	0.6064	3.0144	There are no differences in regression model for firm with small and large size

This table shows the results of the probability test based on firm size.

Table 3: Value Relevance Model of Book Value Equity, Earnings and Cash Flow

	BVE_{it} - P_{it}	OP_{it} - P_{it}	E_{it} - P_{it}	ACC_{it} - P_{it}	OCF_{it} - P_{it}	ICF_{it} - P_{it}	FCF_{it} - P_{it}	CF_{it} - P_{it}
Intercept	-1278.07	-199.344	274.011	4452.111	773.02	85.577	3232.61	1995.23
	(-2.3736)	(-0.2743)	(0.4256)	(3.2761)	(6.8011)	(0.1530)	(2.9929)	(1.6969)
BVE_{it}	2.4349	-	-	-	-	-	-	-
	(23.042)							
OP_{it}	-	6.9165	-	-	-	-	-	-
		(15.467)						
E_{it}	-	-	9.7101	-	-	-	-	-
			(17.62)					
ACC_{it}	-	-	-	-1.3854	-	-	-	-
				(-0.706)				
OCF_{it}	-	-	-	-	6.8011	-	-	-
					(16.26)			
ICF_{it}	-	-	-	-	-	-14.477	-	-
						(-20.97)		
FCF_{it}	-	-	-	-	-	-	-9.188	-
							(-6.695)	
CF_{it}	-	-	-	-	-	-	-	20.2705
								(5.952)
N	81	81	81	81	81	81	81	81
R^2	0.8704	0.7518	0.7972	0.0063	0.7700	0.8477	0.3620	0.3096
Adj R^2	0.8688	0.7486	0.7947	-0.0063	0.7671	0.8458	0.3539	0.3009
F	530.95	239.23	310.57	0.4991	264.526	439.819	44.823	35.426
Diagnostic Test								
Normality	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Linearity	0.0006	0.6558	0.0018	0.0004	0.7773	0.0019	0.0036	0.0841
Autocorrelation	0.5781	0.9886	0.9666	0.0106	0.0074	0.2564	0.9185	0.5235
Heteroscedasticity	0.0000	0.0000	0.0000	0.1645	0.0000	0.0024	0.6266	0.5091

Note: P = Price per share, BVE = Book value equity per share, OP = Operating profit per share, E = Net income per share, ACC = Accruals per share, OCF = Operating cash flow per share, ICF = Investment cash flow per share, FCF = Financing cash flow per share, and CF = Cash flow total per share

Diagnostic test result showed that value relevance models of book value equity, earnings components and cash flow components have spurious regression models and the stationery concept in regression model is not met. This implies the R^2 value produced in such value relevance models is not valid. Other

consequences that can be incurred by a spurious regression are: inefficient assessing regression coefficient, the prediction based on such regression will miss, and the general standard test for regression coefficient will be invalid. A linear regression in econometric model can be considered as spurious when it does not pass the stationery and/or co-integration test.

Co-integration Test

The co-integration test employed in this study is the Johansen Test. If the Trace Test value is larger than t*he critical value a*t the certainty level of 5% or 1% then the variables are co-integrated with each other which indicates a long-term relationship. The result of co-integration tests are presented in Table 4. Co-integration test results show that book value of equity and prices; earnings components and price; and cash flow components and price indicates that the two variables are co-integrated, so that the classical assumption of linearity, residuals equal to zero, homoscedasticity, and no autocorrelation hold (Thomas, 1997). Then it can be said that the variables are co-integrated to each other which indicates a long-term inter-variable relation.

Table 4: The Results of Co-integration Test

Independent Variables	Trace Test Value	5% Critical Value	1% Critical Value	Conclusion
Book Value Equity	42.6152	15.41	20.04	The two variables are co-integrated
	13.9331	3.76	6.65	
Operating Profit	50.6229	15.41	20.04	The two variables are co-integrated
	18.1187	3.76	6.65	
Net Income	51.2101	15.41	20.04	The two variables are co-integrated
	17.8176	3.76	6.65	
Accruals	40.5288	15.41	20.04	The two variables are co-integrated
	13.7511	3.76	6.65	
Operating Cash Flow	62.6004	15.41	20.04	The two variables are co-integrated
	17.3315	3.76	6.65	
Investment Cash Flow	36.5154	15.41	20.04	The two variables are co-integrated
	16.8089	3.76	6.65	
Financing Cash Flow	47.0513	15.41	20.04	The two variables are co-integrated
	15.7715	3.76	6.65	
Cash Flow Total	42.9042	15.41	20.04	The two variables are co-integrated
	15.9415	3.76	6.65	

Note: Dependent variable = stock price.

Error Correction Model

If the data being analyzed is not stationary but co-integrated with each other, there is a long-term relationship between the two variables. In the short term there is the possibility of disequilibrium. The existence of this disequilibrium requires a correction to the error correction model (ECM). The ECM in this study uses the approach of Engle and Granger, with two stages. The first stage is to calculate the residual value of the initial regression equation. The second stage is to run the regression analysis by including the residuals from the first step. If the residual of the previous year is significant, the error correction model (ECM) is valid.

Insukindro (1999) states that the error correction model can be used to explain disequilibrium in the context of the desired phenomenon. The next step is to develop the value relevance of the three accounting numbers (book value equity, earnings and cash flow) using the error correction model. The OLS estimation results for the value relevance of book value equity with an error correction model approach is as follows:

$$\Delta P = 88.328 + 2.241\Delta BVE_{it} - 0.376ECT_{t-1} \quad (1)$$

$R^2 = 0.2897$, Adjusted $R^2 = 0.2821$

Based on the above equation, the short-term impact of book value of equity on the stock price is 2.241. Co-integrated test results show that book value of equity and prices are co-integrated, so that the classical assumption of linear as a residual equal to zero, homoscedasticity, and no autocorrelation (Thomas, 1997) holds. The result of the regression coefficient estimates ECT_{t-1} is significant, so the result above is chosen as the appropriate empirical model. The adjusted R^2 value of this model is 28.208% which shows that the stock price variations are influenced by corporate book value equity.

The OLS estimation results for the value relevance of operating profit with an error correction model approach is as follows:

$$\Delta P = 116.690 + 3.195\Delta OP_{it} - 0.044ECT_{t-1} \quad (2)$$
$R^2 = 0.1918$, Adjusted $R^2 = 0.1878$

Based on the above equation, the short-term impact of operating profit on the stock price is 3.195. Co-integrated test results show that operating profit and prices are co-integrated, so that the classical assumption of linear as a residual equal to zero, homoscedasticity, and no autocorrelation (Thomas, 1997) hold. The results of the regression coefficient estimates ECT_{t-1} is not significant, so the results above are rejected as the appropriate empirical model. The lack of significance for ECT_{t-1} indicates we cannot interpret the value of adjusted R^2, because the model is not appropriate. These results indicate that we must explore other econometric models to find the appropriate model.

The results of OLS estimation for the value relevance of net income with an error correction model approach is as follows:

$$\Delta P = 342.753 + 1.815\Delta E_{it} - 0.081ECT_{t-1} \quad (3)$$
$R^2 = 0.0617$, Adjusted $R^2 = 0.0570$

Based on the above equation, the short-term impact of net income on the stock price is 1.815. Co-integrated test results show that net income and prices are co-integrated, so that the classical assumption of linear as a residual equal to zero, homoscedasticity, and no autocorrelation (Thomas, 1997) hold. The result of the regression coefficient estimates for ECT_{t-1} is significant, so the result above is chosen as the appropriate empirical model. Adjusted R^2 value of this model is 5.704% which shows that the stock price variations are influenced by corporate net income.

The results of OLS estimation for the value relevance of accruals with an error correction model approach is as follows:

$$\Delta P = 460.487 - 0.185\Delta ACC_{it} + 0.038ECT_{t-1} \quad (4)$$
$R^2 = 0.0094$, Adjusted $R^2 = 0.0045$

Based on the above equation, the short-term impact of accruals on the stock price is -0.185. Co-integrated test results show that accruals and prices are co-integrated, so the classical assumption of linear as a residual equal to zero, homoscedasticity, and no autocorrelation (Thomas, 1997). The regression coefficient estimates for ECT_{t-1} is not significant, so the result is rejected as the appropriate empirical model. The insignificance of ECT_{t-1} indicate that we can't interpret the value of the adjusted R^2, because the model is not appropriate. This results indicate that we must explore the others econometric models to find the appropriate model.

The results of OLS estimation for the value relevance of operating cash flow with an error correction model approach is as follows:

$$\Delta P = 384.884 + 1.011\Delta OCF_{it} - 0.053ECT_{t-1} \quad (5)$$
$R^2 = 0.0715$, Adjusted $R^2 = 0.0668$

Based on the above equation, the short-term impact of operating cash flow on the stock price is 1.011. Co-integrated test results show that operating cash flow and prices are co-integrated, so that the classical assumption of linear as a residual equal to zero, homoscedasticity, and no autocorrelation (Thomas, 1997) holds. The regression coefficient estimates for ECT_{t-1} is not significant, so the result is rejected as the appropriate empirical model. The insignificance of ECT_{t-1} indicate that we can't interpret the adjusted R^2 value because the model is not appropriate. This results indicate that we must explore the others econometric models to find the appropriate model.

The results of OLS estimation for the value relevance of investment cash flow with an error correction model approach is as follows:

$$\Delta P = 422.200 - 0.842\Delta ICF_{it} - 0.135ECT_{t-1} \quad (6)$$
$R^2 = 0.0271$, Adjusted $R^2 = 0.0223$

Based on the above equation, the short-term impact of investment cash flow on the stock price is -0.842. Co-integrated test results show that investment cash flow and prices are co-integrated, so that the classical assumption of linear as a residual equal to zero, homoscedasticity, and no autocorrelation (Thomas, 1997) holds. The result of the regression coefficient estimates for ECT_{t-1} is significant, so the result is chosen as the appropriate empirical model. The adjusted R^2 for this model is 2.227% which shows that the stock price variations are influenced investment cash flow.

The results of OLS estimation for the value relevance of financing cash flow with an error correction model approach is as follows:

$$\Delta P = 451.651 - 0.049\Delta FCF_{it} + 0.018ECT_{t-1} \quad (7)$$
$R^2 = 0.0017$, Adjusted $R^2 = -0.0033$

Based on the above equation, the short-term impact of financing cash flow on the stock price is -0.049. Co-integrated test results show that financing cash flow and prices are co-integrated, so that the classical assumption of linear as a residual equal to zero, homoscedasticity, and no autocorrelation (Thomas, 1997) holds. The regression coefficient estimates for ECT_{t-1} is not significant, so the result is rejected as the appropriate empirical model. The insignificance of ECT_{t-1} indicates that we can't interpret the value of adjusted R^2, because the model is not appropriate. This results indicate that we must explore the others econometric models to find the appropriate model.

The results of OLS estimation for the value relevance of total cash flow with an error correction model approach is as follows:

$$\Delta P = 351.539 + 1.579\Delta CF_{it} + 0.034ECT_{t-1} \quad (8)$$
$R^2 = 0.1128$, Adjusted $R^2 = 0.1084$

Based on the above equation, the short-term impact of total cash flow on the stock price is -1.579. Co-integrated test results show that total cash flow and prices are co-integrated, so that the classical assumption of linear as a residual equal to zero, homoscedasticity, and no autocorrelation (Thomas, 1997) holds. The regression coefficient estimates ECT_{t-1} is not significant, so the result above is rejected as the appropriate empirical model. The insignificance of ECT_{t-1} indicates that we can't interpret the value of adjusted R^2, because the model is not appropriate. This results indicate that we must explore the others econometric models to find the appropriate model. If the eight error correction models (book value equity, operating profit, net income, accruals, operating cash flow, investment cash flow, financing cash flow and

total cash flow) are compared, then the book value of equity with an error correction model is the best model compared to the other seven error correction models. This is indicated by the estimated value of regression coefficient ECT_{t-1} significance and the highest adjusted R^2 value (28.62%).

CONCLUSION

Studies of accounting information value relevance are often based on the magnitude of the R^2 value to determine whether accounting information has value relevance. Insukindro (1998) states that high R^2 coefficients does not necessarily indicate a superior model. When linear regression estimation produce a high coefficient of R^2 but it is inconsistent with the theory or it does not pass the classic linear regression assumption test, the model is not appropriate. In econometric analysis this phenomenon is known as spurious regression (Thomas, 1997). The sample used in this study includes 81 manufacturing companies listed on the Indonesia Stock Exchange from 2003 to 2007 including 324 firm year observations.

The purpose of this study is to test the relevance of accounting information value by taking econometric analysis into account in order to avoid spurious regression. This study contributes to the accounting information value relevance literature by considering econometric analysis in a value relevance model. This is the first known paper to undertake this endeavor.

The results of this study indicate error correction models play a role in determining the value relevance of accounting information for selecting good empirical models. The study also shows the regression of the past error correction coefficient/error correction terms (ECT) can be used as one of the quantities of statistics, which can easily be used to select the best empirical model. The result of this study also show the error correction model for book value equity is the best model.

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