Value Relevance of Ohlson Model with Jordanian Data

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Abstract

This paper examined the value relevance of Ohlson (1995) model with Jordanian data using an unbalanced panel regression analysis for a sample of (365) industrial and commercial public companies listed in the Amman Security Exchange during the period 2003 to 2008. The results showed value relevance for the Jordanian data indicated by the variables of the model and the highly explanatory power.

Keywords: Value Relevance, Ohlson Model, Jordanian Data

1. Inroduction

The value relevance literature represents one of the main groups of the capital market research that examines the ability of accounting numbers to explain the differences in stock prices in capital markets (Kothari, 2001). The objective of value relevance research is to relate annual financial statement figures to a measure of firm value, and to assess the relation of such information to the determination of value. This type of literature was originated from the pioneer work of Ball and Brown (1968) and Beaver (1970) who examined the stock price impact of accounting information relevant to investors. According to Collins, et al. (1997), book values and earnings have been successfully shown significant independent variables in explaining stock prices.

The Ohlson (1995) valuation model made a hit in the market-based research, it motivates the adoption of the historical price model in the value relevance studies. The Ohlson (1995) valuation model underlies the classic belief that the value of the company is consisted of its book value (The net value of investment on it) and earnings (The present value of the period benefits) and that together brings the "clean surplus" concept of the shareholders equity value. (Vazquez, Valdes and Valdes, 2007). It uses book value of assets, abnormal earnings and other information to estimate the value of a firm. The model is based on fundamental analysis principles which are a combination of the discounted cash flow approaches, and the book value of assets methods.

The Ohlson (1995) valuation model framework has been successfully tested the value relevance of book value and the abnormal earnings in a number of studies within different contexts, and has been successfully applied in markets with different attributes. Since 1995, the model has been tested in the United States, Europe, Asia and other different contexts using different methodologies.

Whether these previous conclusions hold in the Jordanian context still untested at present, so this study will be oriented to the use of the Ohlson (1995) valuation model famework and the practical justifications of its empirical application to the Jordanian context data.

This paper is structured as follows. The following section presents a brief background about the development and structure for the Ohlson (1995) valuation model. This is followed by a summary of the previous literature that led to the research question. Then the paper discusses the research method (including data collection), present the results and, finally, outline the study's conclusions.

2. Ohlson (1995) Model some background

Ohlson (1995) developed his model after modifying the residual income valuation model which implies that the value of the firm is equals to its book value of equity and the present value of anticipated abnormal earnings. Ohlson (1995) model, expressed the market value of a firm as a linear function of its book value, the abnormal earnings together with another information dynamics variable. (Vazquez, Valdes and Valdes, 2007)

The Ohlson model was described under the following assumptions:

1- The Present Value Relation: This assumption implies that the market value of the firm's equity is equals to the present value of its expected future dividends discounted at the risk-free interest rate, and this assumption was based on the original classic dividend discount model.

2- The Clean Surplus Relation: This assumption implies that all changes in the book value of equity are reported either as accounting earnings or dividends. According to that the relation between book value of equity, earnings, and dividends can be expressed as follows:

$$b_t = b_{t-1} + \chi_t - d_t, \qquad (1)$$

Where b_t = book value of equity at date t; χ_t = earnings for period t; d_t = dividends paid at date t. According to Ohlson, book value of equity at date t_{-1} multiplied by the risk free rate is considered as the normal earnings of the firm. Then the earnings for the period t minus the normal earnings can be defined as abnormal earnings.

$$\chi^a_t = \chi_t - rb_t, \qquad (2)$$

Where χ^a_t = abnormal earnings for period t, (defined as above)

3- The Linear Information Dynamics: This assumption is the most controversial assumption which imposed a time-series structure on the abnormal earnings (that is, the relation between the current and the next period's abnormal earnings) as linear and stationary. Ohlson defines this abnormal relation as the difference between accounting earnings and normal earnings. Normal earnings are the net book value of equity multiplied by the risk free rate.

The linear information dynamic (models) which assumes a time-series structure on the abnormal earnings are as follows:

$$\chi^{a}_{t+1} = \omega_{11}\,\chi^{a}_{t} + \upsilon_t + \acute{\varepsilon}_{1t+1}, \quad (3)$$

Where:

$$\upsilon_{t+1} = \gamma\,\upsilon_t + \acute{\varepsilon}_{2t+1}, \quad (4)$$

χ^{a}_{t}: Abnormal earnings of year t ($\chi^{a}_{t} = \chi_t - rb_t$)
υ_t : Other information variable at time t
ω_{11} : Persistence of abnormal earnings $(0< \omega_{11} <1)$
$\acute{\varepsilon}_{1t}, \acute{\varepsilon}_{2t}$: Error terms.

After the discussion of the abnormal earnings structure, Ohlson (1995, p.669) shows that with the standard assumptions underlying the dividend discount model together with the above mentioned Equations (1) and (2), his model equation can be written as follows:

$$P_t = bv_t + \alpha_1\chi^{a}_{t} + \alpha_2 V_t \quad (5)$$

Where:

P_t: Is the market value of the firm's share equity for the fiscal year-end t,

bv_t: Is the book value of the firm's share equity at the end the fiscal year-end t,

χ^{a}_{t}: Is the abnormal earning per firm's share during the year t, (defined as above),

V_t Is other non-accounting value relevant information for the fiscal year-end t,

α_1, α_2,: Are coefficients taking values that are a function of the linear information dynamics models and the risk free rate for the firm. [40]

3. Literature review and research propositions

A number of studies have been tested the Ohlson (1995) model, and another studies using the Ohlson (1995) framework valuation model have examined the value relevance of book value and earnings.

Vazquez, Valdes, and Valdes (2007) tested the value relevance of the Mexican accounting variables and its ability to summarize the information underlying stock prices. Using a sample of all the firms traded in the Mexican stock market over the period 1991 to 2003 that fulfill the Ohlson (1995) model criteria following methodology used by Collins, Maydew and Weiss (1997). Their results for the Ohlson
(1995) model showed that the book value and earnings are value relevant. The results of the alternative model which used the operative cash flow as third variable, provided with an extra information and better statistics than the original Ohlson (1995) model.

40 For more information see Olson (1995).

R. G. Graham and Raymond King (2000) have reviewed the relationship between the stock prices, accounting earnings and book values in 6 Asian countries (Indonesia, Korea, Malaysia, Philipines, Taiwan, and Thailand). They used the abnormal earnings model in their analysis which expresses the firm's value within the framework of book value and abnormal earnings. Graham and King main objective was to review the possible effect of various accounting methods on the explaining ability of the abnormal earnings model. They argued that such type of research is useful in respect of settling international accounting standards

Dechow, Hutton, and Sloan (1999) provided an empirical assessment of the residual income valuation model proposed by Ohlson (1995) for a sample of 50133 observations over the period 1976 to 1995. In their results, the researchers suggested that the Ohlson (1995) model provided a useful framework for empirical research for . three reasons. First, it provides a unifying framework highlighting the relationship between current accounting variables and future abnormal earnings. Second, it serves as a basic framework on which subsequent research can build. Third, the focus of the model on the relation between current information variables and future abnormal earnings is heuristically appealing

Finally, Collins, et al. (1997) investigated systematic changes in the relevance of earnings and book values over the period 1953 to 1993. Collins, et al. (1997) used the Ohlson (1995) model using a sample of 119389 firm years. Three primary results were reported. First, the combined book value and earnings appears to have increased over the period of the study. Second, the increasing of the value relevance of book
values replaced the declining of the incremental value relevance of earnings. Third, most of the shift in value relevance from earnings to book value can be justified by the frequency increased in negative values, changes in intangible intensity and firm sizes across time.

Given the prior research findings discussed above, it is reasonable to expect that Ohlson (1995) valuation model framework will be also successfully tested the value relevance of book value and the abnormal earnings within the Jordanian context over the period of this study.

4. Method and Data

This study aimed to provide evidence of the value relevance of accounting information for the Amman Security Exchange market prices under the Ohlson (1995) model framework, in order to identify the significance of book value and abnormal earnings in Jordanian financial statements. This study will try to answer the following research question:

Is there value relevance of Jordanian accounting variables from the Ohlson (1995) model framework?
This study will apply the basic Ohlson (1995) valuation model as it is represented by Equation (5) above in the previous discussion with some minor changes as follows:

$$MVE_t = \alpha_1 BVE_t + \alpha_2 AE_t + \alpha_3 V_t + \acute{\varepsilon} \quad (6)$$

Where:

MVE_t Is the market value of the firm's equity, time t (defined as market capitalization value of the firm);
BVE_t Is the book value of the firm's equity, time t (defined as the book value of the firm shareholders equity);
AE_t Is the abnormal earnings, time t (defined as the difference between earnings time t, and the lagged book value t_{-1} of the firm's equity multiplied by the risk free rate.
V_t Is other non-accounting value relevant information that will have impact in future abnormal earnings, time t;
α_1, α_2 & α_3 Are coefficients taking values that are a function of the linear information dynamics models (discussed below) and the risk free rate for the firm; and
ε: Is the error term

Despite the importance of the non-accounting value relevant information variable (V_t), it is not clear what this "other information" variable might be exactly, and even Ohlson himself didn't clarify exactly what this variable might be. According to this fact many researchers neglected this variable in their studies. However, some other researchers mostly in the US adopted the "Analysts Forecasts" to represent the "other information" variable.

It is known that many contexts included Jordan and the Arab world countries do not provide an analysts forecasts data like the US and other western countries, and this is included Jordan, so this study will apply the Ohlson (1995) valuation model without the "other information" variable for the following reasons:

(1) Many previous studies applied the model without this variable,
(2) The Jordanian data do not provide an "Analysts Forecasts" data like many western countries in order to use this data as a representative for the "other information" variable,
(3) This study basically concentrated on the value relevance of the accounting variables and not any other non-accounting variables,
(4) The results of applying the Ohlson (1995) valuation model for this study shown a high explanation power (R-Square) which means that there is a little room for the "other information" variable.
The issue of what is the appropriate risk free rate is not constant between researchers, some researchers used the Capital Asset Pricing Model (CAPM) for this issue, other researchers used the T-Bills Yield or annual return on saving. (Cheng, 2005) mentioned that studies applied the (CAPM) as the cost of capital didn't deliver a significantly different results from those applied a risk free interest rate like the
Treasury-Bills yield. Based on these facts, this study will follow other previous studies, and will apply the interest rate for the certificate of deposits calculated as a yearly average interest rate as a proxy for the risk free rate, and this data was collected from the published monthly bulletins of the Center Bank of Jordan.
Financial data incorporates all the industrial and services Jordanian public companies listed on Amman Security Exchange during the six-year period 2003 to 2008. All the book values were collected yearly as it is at the end of December from the published annual financial reports of these public companies and from the published information of the Amman Security Exchange web site.

All market values were collected from the Amman Security Exchange published monthly bulletins, and from the published information of the Amman Security Exchange web site.
We used the market capitalization and share prices data as it is at the end of March every year.

The final sample of 365 observations is derived from a potential sample of 1218 observations following a filtering process summarized in Table 1.

Table (1)
Sample selection

Years	2003-2008
Starting number of public companies years	1218
Less:	
Financial public companies	444
Public companies with missing market and book values	402
Top and bottom 1% of observations	7
Final number of public companies years	365

We exclude 444 observations related to financial firms because of its unique operations, and the different nature of their assets and liabilities, and their additional regularity requirements. We also exclude 402 observations with missing book and / or market value data. Finally, and following other researchers like (Lev and Nissim, 2004) we deleted the top and bottom 1 percent of observations in order to reduce any outliers effect.

Table (2)
Summary statistics

	MVE	**BV**	**AE**
Panel A: Pooled sample years (2003-2008)			
N= 365			
Mean	70	29	1
Std. Dev.	181	54	8
Min	16	1	-34
Max	1500	417	60
Panel B: 1st sub-sample years (2003-2005)			
N= 148			
Mean	66	26	2
Std. Dev.	165	5	7
Min	2	1	-6
Max	1290	400	55
Panel C: 2nd sub-sample years (2006-2008)			
N= 217			
Mean	72	31	0
Std. Dev.	191	58	8
Min	3	1	-34
Max	1500	417	60

This table reports summary statistics for variables used in the regression analysis reported in Table 3. MVE is the market value of equity of the company on the last day of March in the year following the company's 31 December financial year end. BV is the book value of equity of the company at 31 December year end. AE is the company's abnormal earnings calculated as the difference between earnings and the lagged book value of equity multiplied by the risk free rate. All variables are reported in millions of Jordanian currency.

5. Results

Table (2) presented the summary statistics of the variables. The data covers a wide of industrial and commercial public companies; the market capitalization of the pooled sample ranges from a minimum of 16 million Jordanian dinars to a maximum 1.5 billion Jordanian dinars and a mean equal to 70 million Jordanian dinars. The book value of equity for the pooled sample also ranges from a minimum of 1 million Jordanian dinars to a maximum 417 million Jordanian dinars and a mean equal to 29 million Jordanian dinars.

Table (3) presents the estimated regression for the Equation (5) using unbalanced panel analysis corrected for potential heteroscedasticity without altering the values of the coefficients by using heteroscedasticity-consistent estimators (following White, 1980).

Table 3
Assessing value relevance of Jordanian financial statements using Ohlson (1995) valuation model framework

$MVE_t = \alpha_1 BVE_t + \alpha_2 AE_t + \acute{\varepsilon}$ (5)

Regression analysis is calculated using an unbalanced panel procedure and standards errors are corrected for heteroscedasticity.

Years	Pooled sample 2003-2008	1st sub-sample 2003-2005	2nd sub-sample 2006-2008
Variable			
Constant (Millions)	**-9.106**	**-14.326**	**-8.601**
t-staistic (Ho:0)	-2.318	-2.211	-1.195
p-value	0.021	0.030	0.234
BV	**2.515**	**2.723**	**2.520**
t-staistic (Ho:0)	13.194	8.370	9.777
p-value	0.000	0.000	0.000
AE	**5.843**	**5.225**	**5.525**
t-staistic (Ho:0)	4.815	3.416	3.291
p-value	0.000	0.001	0.001
Number of observations	**365**	**148**	**217**
Adjusted R-Square	**0.904**	**0.860**	**0.923**
F-staistic	40.655	16.099	32.106
p-value	0.000	0.000	0.000

The regression results for the pooled sample (presented in the first column of Table (3) confirm previous studies applied Ohlson (1995) valuation model (Vazquez, Valdes, and Valdes, 2007: R. G. Graham and Raymond King, 2000: Dechow, Hutton, and Sloan, 1999: Collins, et al., 1997) indicating that the coefficients of the book value of equity (BV) variable, and the abnormal earnings (AE) variable are value relevant; that is, there coefficients are significantly greater than zero.

It is noted that the abnormal earnings (AE) variable is more value relevant than the book value of equity (BV) variable. The coefficient for the book value of equity (BV) variable is 2.515 and the coefficient for the abnormal earnings (AE) variable is 5.843, which is higher by 3.328 than the coefficient of the book value of equity (BV) variable. The higher coefficient value of the abnormal earnings (AE) variable might be an indication for unrecorded internally generated intangible assets.

It should be noted that, consistent with previous studies using Ohlson (1995) model (Vazquez, Valdes, and Valdes, 2007: R. G. Graham and Raymond King, 2000: Dechow, Hutton, and Sloan, 1999: Collins, et al., 1997), the regression result for the pooled sample has high explanatory power (Adjusted R-Square of 90%); indicated that the adoption of Ohlson (1995) model in this study is highly relevant.

As a further robustness, another unbalanced panel analysis was done for the first and second sub-samples, and it can be seen from the second and the third columns in Table (3) that the regression results are consistent with the regression results of pooled sample, and that's included the values of the coefficients of the variables which are the (BV) variable and the (AE) variable, in addition to the (Adjusted R-Square) values.

Finally we made a sector (industrial) analysis to compare between the results of the industrial sector with the results of the commercial sector for the sample of the study.

It can be seen from the first column (industrial companies) and second column (commercial companies) in Table (4) that the regression results are consistent with the regression results of the primary pooled sample in Table (3), and it is value relevant. The coefficients of the (BV) variable for the two samples (industrial and commercial companies) are approximately the same. However, the coefficients of the (AE) variable for the two samples (industrial and commercial companies) are a little different. The coefficient of the (AE) variable for the industrial companies is 7.493 comparing to the value of 3.208 for the commercial companies, which means a difference higher for the industrial companies equal to 4.285. As for the explanatory power (Adjusted R-Square), it can be seen that the Adjusted R-Square value for the industrial companies is equal to 80%, and this value is lower than the high Adjusted R-Square value of the commercial companies by 17.6%.

Table 4
Assessing value relevance of Jordanian industrial and commercial public companies using Ohlson (1995) valuation model framework

$MVE_t = \alpha_1 BVE_t + \alpha_2 AE_t + \acute{\varepsilon}$ (5)

Regression analysis is calculated using an unbalanced panel procedure and standards errors are corrected for heteroscedasticity.

Sector Companies	**Industrial Companies**	**Commercial Companies**
	Pooled sample	Pooled sample
Years	2003-2008	2003-2008
Variable		
Constant (Millions)	**-6.694**	**-17.272**
t-staistic (Ho:0)	-1.051	-4.944
p-value	0.295	0.000
BV	**2.488**	**2.765**
t-staistic (Ho:0)	7.732	20.003
p-value	0.000	0.000
AE	**7.394**	**3.208**
t-staistic (Ho:0)	4.208	3.470
p-value	0.000	0.001
Number of observations	**229**	**136**
Adjusted R-Square	**0.800**	**0.976**
F-staistic	19.572	129.689
p-value	0.000	0.000

6. Conclusions

This study examined the value relevance of the Ohlson (1995) model for the Jordanian industrial and commercial public companies listed in Amman Security Exchange during the period 2003 to 2008. Unbalanced panel analysis regression corrected for potential heteroscedasticity was used to examine the validity of the model. Based on the results of the study, the following conclusions can be made:

First, The Ohlson (1995) valuation model shown a highly value relevant for the Jordanian industrial, and commercial public companies listed in Amman Security Exchange in capturing share prices.

Second, the results showed that both the variables of book value of equity and abnormal earnings are value relevant for the pooled sample and the two sub-samples, and the results are consistent.

Third, the coefficient value of the abnormal earnings is higher than the coefficient value of the book value variable, and it was more related to the industrial public companies, and this result might be an indication for unreported internally generated intangibles in these companies.

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