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## FINANCIAL ECONOMICS | RESEARCH ARTICLE

# Perception of negative earnings persistence and value relevance: Evidence from Zimbabwe

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**Abstract:** This paper investigates the impact of negative earnings persistence on the value relevance of earnings before interest and taxes (EBIT) and book values for 27 non-financial firms listed on the **Zimbabwe Stock Exchange (ZSE)**. Negative earnings are perceived to be persistent where firms reported losses in at least 25% of the time over the eight-year study period. Two-step System GMM was used, with the average debt-equity ratio and net asset value per share being additional regression instruments. The regressions were primarily done on the ZSE full sample, and then on a profit-reporting firms' sample. The loss-reporting firms' sample was too small for meaningful regressions. It was found that when loss-firms were removed from the sample, value relevance of EBIT and book value declined. This means that investors are very meticulous with firms they perceive to be persistent loss-makers but tend to be complacent with profit-firms.

**Subjects:** Finance; Corporate Finance; Investment & Securities; Business, Management and Accounting; Accounting

**Keywords:** value relevance; negative earnings persistence; book value; EBIT; Zimbabwe  
**Jel classification:** C23; M49.

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### PUBLIC INTEREST STATEMENT

The objective of this research is to determine how investors' perception of the persistence of negative earnings affect the value relevance of earnings before interest and taxes (EBIT) and book values of non-financial firms listed on the Zimbabwe Stock Exchange. This was accomplished via a dynamic model, where EBIT and book value were regressed on share price using a full sample of 27 firms, and then removing loss-firms from the sample and running the regression again. Loss-firms sample was not analysed on its own due to its small size. Two-step System GMM was used, with average debt-equity ratio and net asset value per share being additional regression instruments. It was found that when loss-firms were removed from the sample, value relevance of EBIT and book value declined. This means that investors are very meticulous with firms they perceive to be persistent loss-makers but tend to be complacent with profit-firms.

## 1. Introduction

Value relevance of financial statements measures the extent to which published financial statements explain the movement of share prices. Francis and Schipper (1999) proffered four interpretations of value relevance, two of which are based on statistical links between accounting numbers and market values of equities. The other interpretation says that financial statements affect share prices by capturing the intrinsic value of shares. Share prices are then deemed to drift towards their intrinsic values. Francis and Schipper (1999) also stated that financial statement information is deemed value relevant if it contains variables used in a valuation model or helps in forecasting those variables. Whatever interpretation one chooses, the underlying question is in determining the existence of a link between share prices and financial statement information: are share prices related to financial statement variables?

Given two firms, a loss-maker and a profitable one, a rational investor is most likely going to buy shares of the profitable company, *ceteris paribus*. As more investors flock to the profitable firm, the price discovery process becomes competitive, causing share prices to be a correct reflection of the value of that company. This is not a guarantee of value relevance of financial statement information, but it certainly increases that probability as compared to the shunned loss-makers. This, coupled with previous research (Collins, Maydew, & Weiss, 1997; Filip & Raffournier, 2010; Venter, Emanuel, & Cahan, 2014; Zulu, De Klerk, & Oberholster, 2017), motivated the researchers to investigate the impact of profit or loss on value relevance of EBIT and book value on the Zimbabwe Stock Exchange (ZSE). The ZSE was chosen because it is one of the alternatives to equity investors in Southern Africa who would want to diversify their equity portfolios across territorial boundaries. The largest and most liquid bourse is the Johannesburg Stock Exchange (JSE), so investors will invest on the JSE plus other markets, and the ZSE is one of such markets. The fact that inflation in Zimbabwe has been tamed, plus the use of the stable US dollar as the currency of trading on the ZSE, makes the ZSE a worthwhile addition to the diversified equity portfolio.

A lot of value relevance research has been done using models adapted from the Ohlson valuation model (Khanna, 2014; Olugbenga & Atanda, 2014; Omokhudu & Ibadin, 2015; Silvestri & Veltri, 2012; Wang, Fu, & Luo, 2013). The major attraction of this model is that it puts together the balance sheet and income statement items into one valuation model. This research uses dynamic models adapted from the Ohlson model.

## 2. Literature review

The research is based on the Ohlson share valuation model. Kwon (2017) says the model, unlike conventional models, has a clear theoretical rationale and it offers a framework within which firms can be valued. According to Bernard (1995) and Penman and Sougiannis (1998), the Ohlson model is a better model in predicting the market value of equity than the dividend discount model. Equation 1 below gives the Ohlson model.

$$P_t = b_t + \alpha_1 x_t^a + \alpha_2 v_t \quad (1)$$

Where:

$$\alpha_1 = \frac{\omega}{R - \omega} \text{ and } \alpha_2 = \frac{R}{(R - \omega)(R - \gamma)}$$

$P_t$  = share price at time  $t$ ;  $b_t$  = book value of equity for period  $t$ ;  $x_t^a$  = abnormal earnings for period  $t$ ;  $v_t$  = other information in period  $t$  that affects future profitability. The discount rate  $R$  is specified as  $1 + r$ . The parameters of persistence,  $\omega$  and  $\gamma$ , are non-negative and less than one.

The stochastic process that defines the behaviour of  $x_t^a$  is known as the dynamics of linear information (DIL) and it is given by the following equations:

$$\tilde{x}_{t+1}^a = \omega x_t^a + v_t + \tilde{\varepsilon}_{1,t+1} \quad (2)$$

$$\tilde{V}_{t+1} = \gamma V_t + \tilde{\varepsilon}_{2,t+1} \quad (3)$$

The disturbance terms  $\tilde{\varepsilon}_1$  and  $\tilde{\varepsilon}_2$  are unpredictable, zero-mean variables.

### 2.1. Value relevance of negative earnings

Franzen and Radhakrishnan (2009) investigated the value relevance of earnings and book value across loss and profit firms. The study used the Ohlson model, incorporating research and development expenditure (R&D) as a proxy for “other information” in the model. R&D was found to be positively related to share prices for loss firms while for profit firms, it was found to be negatively related to share prices. These findings are in line with what Xu and Cai (2016) found out. They investigated the value relevance of earnings, book value, revenue, and R&D for loss-making high-tech firms in the USA. They found what they termed “an anomalous negative price-earnings relation” for the loss-making high-tech firms. R&D was found to be more value relevant for loss-making firms. It was argued that the main reason for this is that R&D represents the major contributor to accounting losses for the high-tech firms (because R&D is expensed). While they show the effect of accounting losses on value relevance, they do not delve into the effect of loss persistence on value relevance. Similar findings were put forward by Hayn (1995); Jan and Ou (1995); Collins, Pincus, and Xie (1999)..

The decline in value relevance of earnings over the years was attributed to the presence of more loss firms (Collins et al., 1997). Barth, Li, and McClure (2018), citing Lev and Zarowin (1999); Brunnermeier and Nagel (2004); Dontoh, Radhakrishnan, and Ronen (2004), proffer three possible reasons for the decline in value relevance of earnings. The presence of more loss firms as given by Collins et al. (1999) is one of the factors. Another factor put forward is the growing influence of investments in intangible assets on future earnings. These investments are expensed, thus leading to losses. Barth et al. (2018) also argued that the increased noise in share prices is another contributing factor to the decline in value relevance of earnings. Of the three reasons suggested, what is clear on the ZSE is the increase in loss of firms due to the challenging economic environment in Zimbabwe and the effect of this has not been documented yet. Beisland (2011) posits that value relevance of earnings is linked to earnings persistence, arguing that losses are not expected to persist. This purported lack of persistence then causes losses not to be value relevant. However, Beisland (2011) goes further to hypothesise and prove that disaggregated negative earnings’ level of value relevance is not in any way different from that of positive earnings. Similar results were found by Jahmani, Choi, Park, and Wu (2017) who studied the value relevance of components of other comprehensive income, concluding that losses, among other components, were value relevant. This runs contrary to other researchers who found that losses have very low levels of value relevance. Losses were viewed to be persistent by Joos and Plesko (2005), arguing that larger persistent losses in some cases are linked to higher stock returns. Darrrough and Ye (2007) ventilate this argument by saying that firms suffer from “chronic losses” but remain in business. All this points to the fact that losses can persist, and analysts have to find out the causes of the losses in their valuations. There is no consensus with regards to the value relevance of losses and this presents an opportunity for further research in this area. If losses can persist but the firms still remain in business, it means that the losses can provide relevant information for firm valuation. The proposition by Collins et al. (1999) that simple earnings capitalisation models are mis-specified due to the omission of book value of equity, a correlated omitted variable in the models, and informs this study to include book value of equity in all the models.

Kwon (2017) investigated the value relevance of accounting information to profit and loss firms in South Korea. Using a residual income valuation model based on Ohlson’s model, Kwon (2017) found that book value and cash flows are positively related to market value of firms while net income, operating income and operating cash flows have a negative relationship with enterprise value for loss firms. For-profit firms, all the named variables are positively related to market value of equity. Ahmadi (2017) studied value relevance of earnings per share and book value on a sample of firms listed on the Tunisian Stock Exchange. The sample was drawn from non-financial firms (28) covering the period 2010 to 2015. The models used were based on the Ohlson model as well as the Feltham and Ohlson model. Book value was found to be more value

relevant than earnings per share. The combined value relevance declined when firms had negative earnings. The challenge with negative earnings according to Jenkins (2003) “is the diminished relationship between current earnings and future earnings and the resulting negative implications for earnings prediction and equity valuation”. This is the reason this research does not exclusively focus on the value relevance of losses alone but, rather, extend attention to the perception of loss persistence measured by having losses in at least 25% of the period under study.

### 3. Research sample profile

The study sample comprises of 27 non-financial firms listed on the Zimbabwe Stock Exchange. There were around 63 counters listed on the ZSE as at 30 April 2018 and from this list, financial firms were discarded. Financial firms were discarded because their balance sheets are structurally different from non-financial firms, thus combining them in one model is not ideal. Next to be discarded were firms with annual reports missing from the firms’ websites and their transfer secretaries for the period 2010 to 2017. Ultimately, only 27 firms were left. Considering that this is almost half of the listed firms on the ZSE, the sample is representative for the results to be generalised.

### 4. Research subgroups

The study sample was broken down into the following subgroups for analysis:

- (1) A full sample of ZSE-listed firms.
- (2) A sub-sample of ZSE-listed firms that reported profits in at least seven of the eight periods.

### 5. Hypothesis development

The rationale for separating firms based on whether they reported losses in two or more periods is to test the researchers’ proposition that investors may punish firms that report losses quite often (at least 25% of the time) by under-pricing such stocks. This will manifest itself as a lack of value relevance of financial statement information. The implicit assumption made is that by reporting losses at least 25% of the time, investors will perceive a firm as a persistent loss-maker. This is the definition of “persistence” adopted in this study, contrary to other scholars who defined loss persistence as those losses that will lead to firm liquidation (Hayn, 1995; Joos & Plesko, 2005). Firms have been observed to make chronic losses but continue in business (Darrough & Ye, 2007). These chronic losses are what is termed persistent losses in this study. Literature documents that value relevance is heavily linked to the persistence of earnings, i.e. persistent earnings provide information for future firm performance (Beisland, 2011). This research focuses on the perception of loss persistence by dividing the sample into profit firms and firms that report losses “quite often”. Regardless of good performance in other years, if investors perceive a company as a loss-maker, this may affect their objectivity in analysing its true value, hence lack of value relevance. We, therefore, test the hypothesis that the perception of loss persistence affects the value relevance of accounting information.

### 6. Data issues

Financial statements for the firms studied were downloaded from the firms’ websites. Where the websites had some missing financial statements, these were sought from transfer secretaries. EBIT, book values, total liabilities, and a number of shares outstanding were taken from firms’ financial statements. All financial statements for companies in Zimbabwe are prepared based on IFRS. Share prices and market capitalisation figures were collected from the Zimbabwe Stock Exchange reports. To avoid look-ahead bias, the study uses share prices recorded three months after each firm’s financial year-end. Variables used in this study were calculated as stated in Table 1.

EBIT and book values were taken as they were in the firms’ financial statements. Equity reported in the financial statements was overlooked in favour of market capitalisation. This was done in order to get a measure of equity that is as close as possible to market consensus. This is also justified considering that debt was measured as total liabilities, and not just long-term debt. This is

**Table 1. Formulae for variables calculated**

Variable	Formula
Debt/equity ratio	$\frac{\text{total liabilities}}{\text{market capitalisation}}$
Average debt/equity ratio	$\frac{\text{debt/equity ratio}}{\text{number of years}}$
Net asset value per share	$\frac{\text{market capitalisation} - \text{total liabilities}}{\text{total shares in issue}}$

because some companies deliberately avoid long-term debt in favour of short-term borrowing to keep a fictitiously low debt ratio. Considering all liabilities ensures that this motive is defeated. The research sought to measure the influence of any form of firm indebtedness, and that is given by total liabilities.

### 7. Scope of the study

The study covers the period 2010 to 2017. This period was chosen because of its relative stability after demonetising the Zimbabwean dollar and adopting a basket of multi-currencies dominated by the United States dollar as legal tender in March 2009. The period prior to 2009 was marked by hyperinflation. Furthermore, a different currency was in use, meaning that financial statements for the two periods cannot be combined. A lot of financial statements for this period are also missing. For this reason, this research focused on the 2010–2017 period.

### 8. The model

This research uses modified Ohlson valuation models. The Ohlson share valuation model was chosen based on its theoretical appeal (Kothari, 2001; Kwon, 2017) as well as empirical evidence by several scholars that have tested its validity (Bernard, 1995; Silvestri & Veltri, 2012; Lee, Chen, & Tsa, 2014). The modifications were done in order to capture the autoregressive nature of stock prices as argued by Onali and Ginesti (2015). The variable “other information” is undefined in the Ohlson model, hence it was left out. The resultant modified models are as follows:

$$\ln P_{it} = \beta_0 + \phi \ln P_{it-1} + \beta_1 \ln b_{it} + \beta_2 \ln b_{it-1} + \beta_3 \ln EBIT_{it} + \beta_4 \ln EBIT_{it-1} + \varepsilon_{it} \quad (4)$$

$$\ln P_{it} = \gamma_0 + \phi \ln P_{it-1} + \gamma_1 \ln b_{it} + \gamma_2 \ln b_{it-1} + \varepsilon_{it} \quad (5)$$

$$\ln P_{it} = \gamma_0 + \phi \ln P_{it-1} + \gamma_1 \ln EBIT_{it} + \gamma_2 \ln EBIT_{it-1} + \varepsilon_{it} \quad (6)$$

Where:

$\ln P_{it}$  = natural logarithm of share price for firm  $i$  in period  $t$ .

$\ln P_{i,t-1}$  = natural logarithm of the first lag of share price for firm  $i$

$\ln b_{it}$  = natural logarithm of firm  $i$ 's book value in period  $t$ .

$\ln b_{it-1}$  = natural logarithm of the first lag of firm  $i$ 's book value.

$\ln EBIT_{it}$  = natural logarithm of firm  $i$ 's earnings before interest and taxes in period  $t$

$\ln EBIT_{it-1}$  = natural logarithm of the first lag of firm  $i$ 's earnings before interest and taxes.

A dynamic panel was used in this study because:

- (1) Being time series cross-sectional, panel data provides a large number of data points. This increases the degrees of freedom and reduces the collinearity among explanatory variables, thus improving the efficiency of the estimates.
- (2) The presence of omitted variables that are correlated with explanatory variables is the reason why researchers find (or do not find) certain effects. Panel data allows for control over variables that cannot be observed or measured in this study, e.g. differences in business practices among the different companies.

### 9. Descriptive statistics

Table 2 below shows the descriptive statistics for the ZSE full sample.

Table 2 above shows that there is normal variation as indicated by the low standard deviations and a relatively acceptable distance between the minimum and maximum values. There are a lot of loss reporting firms on the ZSE as evidenced by the loss of observations on the EBIT variable.

Table 3 below shows descriptive statistics for a sub-sample of ZSE firms that reported profits for at least seven of the eight years under study. This sample includes a very small number of negative earnings, hence the small number of lost observations on EBIT. The variation as measured by standard deviation and the distance between the minimum and maximum values is not too big. The statistics in Table 3 do not indicate potential scale effects on the models used.

Loss-reporting companies sample statistics are left out for the reasons explained earlier in Section 4.

Table 2. ZSE full sample descriptive statistics						
Variables	(1) N	(2) Sum	(3) Mean	(4) SD	(5) Min	(6) Max
Average debt/equity	216	713.6	3.304	5.586	0.170	23.82
NAVPS	216	78.91	0.365	2.691	-15.62	27.04
Log Share price	216	-471.7	-2.184	2.069	-9.210	3.584
Log Book value	213	3,725	17.49	1.513	13.61	22.73
Log EBIT	161	2,550	15.84	1.914	11.44	21.47

Table 3. Descriptive statistics for profit reporting firms						
Variables	(1) N	(2) Sum	(3) Mean	(4) SD	(5) Min	(6) Max
Average debt/equity	136	144.5	1.062	1.900	0.170	8.410
NAVPS	136	99.42	0.731	3.323	-15.62	27.04
Log Share price	136	-227.2	-1.671	2.127	-6.215	3.584
Log Book value	136	2,429	17.86	1.502	15.16	22.73
Log EBIT	127	2,041	16.07	2.034	12.35	21.47

### 10. Correlation analysis

Table 4 below shows the correlation matrix for the ZSE full sample.

EBIT has a high positive correlation with share price (0.7759). Average debt/equity ratio has a negative correlation with share price and all the other variables. This means that as the debt/equity ratio increases, share prices decrease as investors perceive higher risk levels. The negative correlation is however very weak, with a coefficient of  $-0.1402$  with share price. The two independent variables (book value and EBIT) have reasonably high correlations (above 0.5) with the dependent variable share price. EBIT and book value, however, have a very high correlation between themselves (0.8329), which is above the often-cited cut-off point (0.8) to avoid collinearity. In normal circumstances, one of them could have been dropped. These are the two variables in the Ohlson model (plus an undefined variable termed other information) and the Ohlson model forms the foundation of this study. Resultantly, it is not possible to drop either variable. A model that is robust to collinearity was thus chosen for the analysis.

The ZSE sample was further divided into profit- and loss-reporting firms and Table 5 below shows the correlation matrix for the ZSE profit reporting sample.

There is a positive correlation between share price and all the variables except average debt/equity ratio. The correlation coefficient for EBIT is now higher while that for book value is lower than that in the ZSE full sample. This may imply that for profit-reporting firms, investors consider EBIT much more than with loss-reporting firms. The coefficient between share price and average debt/equity ratio has dramatically increased to  $-0.4095$ . Worth noting again is the correlation between book value and EBIT which is now higher at 0.8686.

**Table 4. ZSE full sample correlation matrix**

	Share price	EBIT	Book value	NAVPS	Average debt/equity
Share price	1				
EBIT	0.7759	1			
Book value	0.6088	0.8329	1		
NAVPS	0.3862	0.387	0.2502	1	
Average debt/equity	$-0.1402$	$-0.147$	$-0.1884$	$-0.1158$	1

**Table 5. Correlation matrix for-profit reporting firms**

	Share price	EBIT	Book value	NAVPS	Average debt/equity
Share price	1				
EBIT	0.7885	1			
Book value	0.5935	0.8686	1		
NAVPS	0.3978	0.3844	0.2488	1	
Average debt/equity	$-0.4096$	$-0.206$	$-0.3038$	$-0.0389$	1

## 11. Model assumptions

The models assume the following:

- (1) Errors are correlated within individuals but not across them. For this to hold, time dummies must be incorporated in System GMM using *xtabond2* (Roodman, 2009). Consequently, time dummies were used in the study.
- (2) The first lag of the natural logarithm of share prices is endogenous and thus instrumented GMM style in *xtabond2*.
- (3) The natural logs of book value and EBIT are exogenous, thus instrumented IV style in the models. Net asset value per share and the average debt/equity ratio were incorporated in the model as additional IV-style instruments. The reason for including average debt/equity ratio stems from an assumption that shareholders are concerned about a firm's capital structure because equity ranks lower than debt in case of liquidation. If the average debt ratio is higher than 1, shareholders view this negatively. This means that there is a link between share price and the level of a firm's indebtedness. Net asset value per share represents the undistributed value to a shareholder. This should thus influence share prices.
- (4) Share prices follow a random walk. Where the dependent variable is close to a random walk, Blundell and Bond (1998) showed that the Difference GMM performs poorly. The reason is that "past levels convey little information about future changes, so untransformed lags are weak instruments for transformed lags". For this reason, System GMM is preferred over Difference GMM.

## 12. Regression results for the ZSE full sample

Table 6 below presents regression and diagnostic test results for the ZSE full sample.

We chose to use orthogonal differences over first difference transformation because the later has an unwanted feature of magnifying gaps in unbalanced panels (Roodman, 2009). Since log transformations of negative earnings will create gaps, orthogonal deviations maximise the sample size. The lag limit is changed in models 4, 5 and 6 as a way of checking the robustness of models 1, 2 and 3.

Models 1 and 4 are comparable in that they have the same independent variables, the only difference being that they have different lag limits. Model 2 is comparable to model 5 while model 3 is comparable to model 6. The analysis thus follows this pattern.

## 13. Analysis of results for models 1 and 4

The results of the *F*-test show that both models are significant at 1% level. This means that the variables used in the model jointly explain the share price movements on the ZSE. Model 1 used 26 instruments while model 4 had 31 instruments. The year 2013 was dropped from the regression in both models due to collinearity.

The results show that EBIT and book value have a positive relationship with share price, i.e. as the book value and EBIT of a company listed on the ZSE increase, that company's share price also increases. This is in line with theory. The models' *t*-test results reveal that the log of EBIT is statistically significant at 1% significance level in both models. Book value is not statistically significant in both models. Despite the change in the lag limits, the coefficient of EBIT only changed slightly from 0.367 to 0.300 while that of book value remained static at 0.087. The Windmeijer corrected standard errors are low and increased from 0.089 to 0.095 due to a change in the lag limits. The changes registered in the coefficients and the corrected standard errors when lag limits were changed are quite low, implying that the model used is robust. The Arellano-Bond test shows that there is no autocorrelation in the models. The Hansen test also shows that the over-identifying restrictions are valid.

**Table 6. ZSE full sample regression model results**

Variables	Model 1 Lag(1 1)	Model 2 Lag(1 1)	Model 3 Lag(1 1)	Model 4 Lag(2 4)	Model 5 Lag(2 4)	Model 6 Lag(2 4)
Lag share price	0.740*** (0.151)	0.770*** (0.133)	0.765*** (0.147)	0.844*** (0.138)	0.830*** (0.114)	0.861*** (0.073)
Log EBIT	0.367*** (0.089)	0.276** (0.104)		0.300*** (0.095)	0.255*** (0.077)	
Log of Lag EBIT	-0.066 (0.159)	-0.104 (0.153)		-0.120 (0.143)	-0.157* (0.082)	
Log book value	0.087 (0.181)		0.331** (0.130)	0.087 (0.210)		0.223 (0.177)
Log of Lag book value	-0.271 (0.172)		-0.195 (0.138)	-0.250 (0.176)		-0.100 (0.180)
Constant	-2.073 (1.869)	-3.118 (2.244)	-2.820 (2.203)	-0.345 (1.756)	-1.928 (1.956)	-2.303 (2.219)
Number of instruments	31	24	24	31	29	29
Observations	127	127	186	127	127	186
Number of firms	25	25	27	25	25	27
Arellano-Bond test for AR(1)	-2.55	-2.51	-1.86	-2.75	-2.69	-1.89
P-value AR(1)	0.011	0.012	0.063	0.006	0.007	0.058
Arellano-Bond test for AR(2)	-0.44	-0.62	1.00	-0.61	-0.68	0.91
P-value AR(2)	0.661	0.536	0.318	0.544	0.499	0.362
Hansen test statistic	11.26	14.06	14.86	11.02	10.01	17.37
P-value Hansen test	0.665	0.445	0.388	0.923	0.953	0.565

**Notes:** Standard errors are in parentheses; AR(k) is the test for the *k*-th order autocorrelation  
 \*\*\* \*\* and \* represent statistical significance at the 1%, 5% and 10% levels

The research found that EBIT is value relevant while book value is not valued relevant. To an investor on the ZSE, this means that they should not pay much attention to companies' book values in their share valuation process. They should rather focus more on analysing EBIT and use models that incorporate EBIT in share valuation. The implication of these findings to executives of ZSE-listed firms is that they should expend their energy on strategies that maximise EBIT for their firms to be highly valued. This ensures that future rights issues are correctly priced.

#### 14. Analysis of results for models 2 and 5

To validate models 1 and 4, book value was dropped from the models, yielding models 2 and 5. These two models have different lag limits, again as a way of checking their sensitivity to a change in lag limits. Just like with models 1 and 4, *xtabond2* omitted the year 2013 in these two models due to collinearity. Model 2 has 24 instruments while model 5 has 29 instruments. The number of instruments is less than the number of observations in both cases, meaning there is no instrument proliferation problem.

Both models are significant at the 1% level according to the *F*-test. Dropping book value does not greatly affect the coefficient for the lag of share price in model 2, changing from 0.740 to 0.770. It also remained significant at 1% level. In model 5, the coefficient changed from 0.844 (model 4) to 0.830. The standard errors are within the same range and relatively low.

When book value is dropped in model 2, EBIT is now significant at 5% level as opposed to the 1% level in model 1. This change in the level of significance may be attributed to the very high correlation coefficient between EBIT and book value (0.8329). This argument is supported by model 3, where book value on its own becomes significant while in model 1 it is not significant. While this argument holds, the fact that EBIT remains statistically significant at 1% level in model 5 means that there is an element of lag limit sensitivity: models 2 and 5 respond differently to dropping the same variable from the original models.

The Windmeijer corrected standard errors changed from 0.089 (model 1) to 0.104 (model 2) as well as from 0.095 (model 4) to 0.077 (model 5). Comparison within and across lag limits shows the values are within the same range and did not change substantially as a result of changing lag limits and dropping book value from the model. The models are thus relatively robust despite exhibiting some sensitivity to lag structure changes. The Hansen test supports this point and the Arellano-Bond test indicates there is no autocorrelation in the models.

### **15. Analysis of results for models 3 and 6**

Both models are significant at 1% level of significance. Model 3 has 24 instruments while model 6 has 29 instruments, with 186 observations in both models. The number of observations is higher than the number of instruments, meaning there is no instrument proliferation problem.

In both models, the lag of share price remained significant at 1% level and the coefficients did not change much from the original models. The coefficient for model 3 is 0.765 while that for model 6 is 0.861, showing that despite using different lags the coefficients for the lag of share price are not very different.

Book value is still not statistically significant in model 6 but in model 3 it is now significant at 5% level. The change in the level of significance was also witnessed on EBIT in model 2 from model 1. Corrected standard errors are stable, decreasing from 0.181 in model 1 to 0.130 in model 3 and also to 0.177 in model 6, from 0.210 in model 4. This shows model stability. The Hansen test in both models shows that the over-identifying restrictions are valid and the models are robust. The Arellano-Bond test shows that there is no autocorrelation in the models.

The analysis now focuses on the profit-reporting firms' sample. The results will then be compared to the results for the full sample to determine the impact of loss-reporting firms on the value relevance of EBIT and book values.

### **16. Results for the ZSE profit reporting firms sample**

Regression and diagnostic test results for profit-reporting firms are presented in Table 7.

The analysis will compare model 7 with model 10, model 8 with model 11 and lastly model 9 with model 12.

### **17. Analysis of results for models 7 and 10**

Model 7 has 26 instruments while model 10 has 21 instruments, with 17 firms and 107 observations in the two models. The *F*-test shows that both models are statistically significant at 1% level. This means that the variables in these models jointly explain the movement in share prices of profit-reporting firms listed on the ZSE.

There is a positive and statistically significant (5%) relationship between EBIT and share price in both models. The coefficient of EBIT in model 7 is 0.301 while that in model 10 is 0.399. The corrected standard errors are 0.128 (model 7) and 0.164 (model 10). These figures show that despite the change in the lag structure of the model, there is no significant change in the model results. This implies model stability. A comparison of these results with those in model 1, however, shows that the statistical significance of EBIT for the profit-reporting firms' sample is lower than

**Table 7. Regression and diagnostic test results for profit reporting firms**

Variables	Model 7 Lag(1 1)	Model 8 Lag(1 1)	Model 9 Lag(1 1)	Model 10 Lag Collapsed	Model 11 Lag Collapsed	Model 12 Lag Collapsed
Lag share price	0.868*** (0.166)	0.863*** (0.130)	0.830*** (0.098)	0.781*** (0.182)	0.894*** (0.144)	0.897*** (0.066)
Log EBIT	0.301** (0.128)	0.256 (0.172)		0.399** (0.164)	0.208 (0.141)	
Log of lag EBIT	-0.134 (0.145)	-0.175 (0.156)		-0.148 (0.130)	-0.170 (0.131)	
Log Book value	0.075 (0.290)		0.284 (0.195)	0.097 (0.224)		0.366 (0.229)
Log of Lag Book value	-0.207 (0.274)		-0.115 (0.252)	-0.195 (0.186)		-0.303 (0.250)
Constant	-0.532 (4.461)	-1.344 (3.048)	-2.935 (3.174)	-2.516 (3.400)	-0.635 (2.769)	-1.025 (2.201)
Number of instruments	26	24	24	21	19	19
Observations	107	107	119	107	107	119
Number of firms	17	17	17	17	17	17
Arellano-Bond test for AR(1)	-2.55	-2.45	-1.95	-2.49	-2.42	-2.08
P-value AR(1)	0.011	0.014	0.051	0.013	0.016	0.038
Arellano-Bond test for AR(2)	-0.61	-0.55	-1.70	0.16	-0.63	-1.6
P-value AR(2)	0.543	0.582	0.089	0.872	0.527	0.109
Hansen test statistic	9.24	9.02	6.34	4.05	7.03	5.73
P-value Hansen test	0.816	0.83	0.957	0.908	0.634	0.767

**Notes:** Standard errors are in parentheses; AR(k) is the test for the *k*-th order autocorrelation  
 \*\*\*, \*\* and \* represent statistical significance at the 1%, 5% and 10% levels

that for the full sample. The expectation was to have the level of significance remaining the same at the very least. Analysis of the loss-reporting firms' sample would have helped to explain this, but the analysis cannot be done meaningfully because the observations are very few. The results here thus do not give evidence to support the hypothesis that value relevance is higher in profit-making than in loss-making firms. Inclusion of a dummy variable (profit = 1 and 0 otherwise) in the regression models shows that the categorisation is statistically significant (output not shown).

Book value has a positive relationship with share price but in both cases, it is not statistically significant, implying the relationship may be due to chance. Coefficients and standard errors for book value in both models are reasonably within the same range. Book value was also found not to be value relevant in the ZSE full sample (model 1). This means that regardless of whether a company reports profits or losses, book value is not value relevant. The lag of share price is statistically significant at the 1% level in both models and the coefficients and standard errors in the models are comparable. Diagnostic tests show that the models are robust, thus the results are reliable.

### 18. Analysis of results for models 8 and 11

Model 8 has 24 instruments while model 11 which has 19 instruments. The difference between these two models only lies in the different lag limits that were used. The year 2013 was dropped due to collinearity in both models. The models are significant at 1% level according to the *F*-test.

EBIT, while still having a positive relationship with share price, is now not statistically significant in both models. This pattern was observed between models 1 and 2. In model 1, EBIT is significant at 1% level while in model 2 it is now at 5% level. In this case, EBIT is significant at 5% level in model 7 while in model 8 it is now not statistically significant. A closer inspection of the correlation coefficients between the independent variables (EBIT and book value) for the two samples provides some useful insights into the possible reason for this: the correlation coefficient in the full sample is 0.8329 while that for the profit-reporting firms is 0.8686. The correlation coefficient is even higher after taking out loss-making firms. Following the pattern described above, one would have expected EBIT in model 8 to be significant at 10% level. This, however, is not the case. The higher correlation coefficient might have played a part in this anomaly. The coefficient of EBIT and the standard errors in model 8 are close to those obtained in model 11 despite the use of different lag limits.

The lag of share price is however still significant at 1% level in both models, the same level as in the full sample. In model 8, its coefficient is 0.863 while in model 11 it is 0.894. The constants in both models are negative and insignificant. These models show that removing loss firms affects value relevance.

### 19. Analysis of results for models 9 and 12

EBIT was dropped from the regression and this helped increase the observations from 107 to 119. The year 2011 was dropped by *xtabond2* in both models due to collinearity. Different lag structures were used in the two models, with model 9 having 24 instruments while model 12 has 19 instruments. Both models are statistically significant at 1% level of significance according to the *F*-test.

In both models, there is still a positive relationship between book value and share price, but the relationship is not statistically significant. In previous models, book value was also found to be statistically insignificant. While the coefficients of book value in model 9 and model 12 are not very different from one another, there is a moderately large difference from the original models. In model 7 it is 0.075 while in model 9 it is 0.284 and in model 12 it is 0.366 as compared to 0.097 in model 10. There is some sensitivity to the removal of EBIT from the model but there is little sensitivity to a change in the lag structure. The observed sensitivity may still go back to the very high EBIT-book value correlation coefficient that may have distorted the true levels of the coefficient in the models that contain both variables (7 and 10). The corrected standard errors are stable. The lag of share price is still significant at 1% level in both models. These results do not give much information as to the influence of negative earnings on value relevance of book value on the ZSE.

### 20. Discussion of findings

A section of literature documents that negative earnings barely have an association with share price movements (Joos & Plesko, 2005; Darrrough & Ye, 2007; Venter et al., 2014; Zulu et al., 2017). Zulu et al. (2017) tested the value relevance of losses and found that negative earnings affect value relevance of financial statements on the Johannesburg Stock Exchange (JSE). Further evidence to this was provided by Collins et al. (1997), Filip and Raffournier (2010) as well as Venter et al. (2014). In these particular studies, the explanatory power of the models used as measured by  $R^2$  and Adjusted  $R^2$  increased significantly when loss-making companies were removed from the study samples. Ahmadi (2017) also found that value relevance declined when firms had negative earnings. Contrary to these researchers' findings, Beisland (2011) found that disaggregated negative earnings are equally value relevant, arguing that losses provide information relevant to firm valuation. Lack of persistence of negative earnings is cited in literature as the main reason why losses are deemed not value relevant (Barth et al., 2005; Carnes, 2006). This research tested the hypothesis that persistent losses are value relevant as long as the going concern status of the firms is not in doubt. This research found that EBIT is value relevant while book value is not valued relevant in both the full sample and the profit-firms sample. However, the

degree of value relevance is lower in the profit-firms sample (5% significance level) than for the full sample that contains loss-firms (1% significance level). These findings suggest that negative earnings are value relevant. This is deduced from the fact that the full sample (which includes loss-reporting firms) has a higher level of value relevance than the resultant sample when loss-reporting firms are left out. This is true across the two different lag structures in both samples used in this study. The assertion that losses are value relevant is supported by the Wald test results as well as the results of dummy variable regression models. In the dummy variables regression models, the dummy variable is significant at 1% level and all robustness checks show that the models are quite robust. The findings both confirm and contradict what other scholars found out: they are contrary to scholars like Kwon (2017) and Venter et al. (2014) but are consistent with Beisland (2011) and Jahmani et al. (2017). This research rejects the hypothesis that the market punishes loss firms, resulting in lack of value relevance of negative earnings. Negative earnings were found to be value relevant.

The most plausible explanation for the value relevance of perceived chronic losses is that investors and analysts are very careful and meticulous when dealing with persistent loss-making firms. To avoid losses, one has to be really sure about the sources of the losses before committing to buy a loss-making firm's shares. This does not mean loss-making firms are fervently followed by investors but, rather, their financial statements are scrutinised by the investors that buy these shares. This creates a link between share prices and financial statement information for the loss-making firms, hence value relevance. Shareholders are unlikely to exercise their abandonment option hypothesised by Hayn (1995) on the shares of loss-firms because the firms are still solvent. With the exception of two loss-firms in the study sample, the other loss-firms reported profits in at least half of the period under study. This shows that regardless of the "chronic losses", the firms will remain in business for the foreseeable future and are not candidates for abandonment, a point also highlighted by Darrough and Ye (2007). The profits in the other years and the hopes of a turnaround cause shareholders not to exercise their abandonment option. The turnaround may, however, take long to materialise. Theoretical explanations on why losses are value relevant are multi-faceted: the market views the losses as temporary setbacks from which the firms will recover; the market upholds the going concern assumption regardless of losses; and the causes of the losses may be cyclical due to movements in commodity prices or deterioration of the overall economy (Damodaran, 2012, pp. 611–614). These theoretical explanations can also be used in this particular case. The results show that investors pay attention to the causes of losses, most of which are not fatal, meaning that the firms will recover. Depreciation expense, write-offs, and research and development are cited in literature as some of the causes of losses that are not fatal (Cheng & Liu, 2016; Joos & Plesko, 2005). The first two points apply in this case.

The results also show that renowned profit-making firms are not heavily scrutinised, and investors may be complacent, taking for granted these firms' good performance. In most cases this may turn out to be wrong, hence the lack, or lower level, of value relevance for profit-making firms observed in this study. There is also another dimension to this: share prices are a reflection of demand and supply factors. If demand increases relative to supply, then share prices will increase. This increase may not be a reflection of performance as reported in financial statements but rather a reflection of general market sentiment. In most cases, demand outstrips supply for known profit-making or blue-chip companies because these are safe havens. When demand pushes share prices beyond their intrinsic values as espoused by financial statements, this results in low level of value relevance. This helps explain the observed phenomenon. Analysis of a purely loss-making firms' sample should have given us some insights but this is not feasible due to its relatively small size.

## 21. Conclusion

The research failed to find evidence to support the hypothesis that perceived loss-firms have lower levels of value relevance. The influence of negative earnings on value relevance of financial statements is supported by research but the nature of the influence is not unanimously agreed. The influence of losses on value relevance can manifest as mispricing (mostly under-pricing) of

shares. The mispricing of these firms' shares may be an indicator that the market views the losses as a sign that such firms may actually end up in liquidation, causing a loss to stockholders. A lack of interest in these shares may also help to explain why such shares remain mispriced, leading to lack of value relevance. It is very difficult to find an equity buyer for a loss maker at a fair market value, so if there is going to be any trade, sales are done at fire-sale prices. All this helps explain why financial statement information for loss-making entities is expected to have little, if any, value relevance. This, however, runs contrary to the ZSE scenario as well as to other researchers' findings outlined in this study. The observed phenomenon on the ZSE is all the same tractable.

The limitation to this study is that it did not analyse the loss-making firms on their own due to a very small sample size. However, other studies have also analysed value relevance of loss-firms by removing loss-firms from the sample and running regressions, the same way we did it here. Further studies can thus be done with two samples, the profit-firms and the loss-firms. Results from the two samples will then be compared and conclusions drawn. Policy makers and accounting standard setters are advised to ensure that firms fully report the nature and sources of their losses and the expected turnaround times. This helps investors in determining whether or not the losses will affect the infinity life assumption made in firm valuation. This is critical when investors decide whether or not to exercise their liquidation option on the firm.

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