

FREE CASH FLOW AND VALUE RELEVANCE OF EARNINGS AND BOOK VALUE IN UK

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Abstract

The main objective of this study is to examine the interactive effect of free cash flow and value relevance of earnings and book value with share price of 100 listed construction companies in UK between 2010 and 2018 (a period of 900 firm-years). Using Myers and Majluf (1984), Ohlson's (1995) methodology, significant findings of the study are as follows: 1) findings indicates that earning per share has a stronger significant and positive interaction with book value on share price; 2) free cash flow attributable to shareholders has a adverse significant and negative interaction on earnings and book value on share price; and 3) book value is positively correlated with market price when the effects of aggregate earnings are not offset by the effects of aggregate dividend. This means that managers of these enterprises tend to increase free cash flows and ultimately the value of the enterprise by the use of earning management tools.

Keywords: Cash flow, earnings, shareholders, value

1. Introduction

Recently, what a researcher chooses to study in the field of capital market is largely a function of his interaction in the efficiency of these markets. In my opinion, a retrospective view of an effective and efficiency market in which price is centered to equal intrinsic value is an inadequate conceptual starting point for market based research. This is because, the above illustration is an abstract from reality thereby failing to elucidate the richness of market pricing dynamics and the complex formation of prices in the market. However, Malkiel (2003) illustrated that whenever new information arrives in market, it is immediately reflected in the stock price thus the tomorrow's price change will reflect tomorrow's news and will be independent of the price changes today, hence should be considered as under-lay basement for market efficiency.

1.1 The Purpose of the study

In this research, the primary aim is to investigate whether there a predictive interaction of the free cash flow on the relevance value of the book value per share and earnings per share on the market price. If significant, which of these factors elucidate more power explanatory for UK listed companies? The relevance value literature in the financial market research is generally consistent with the simple view that, when in equilibrium, free cash flow and earnings are equal to or have some strong interaction with the market prices, and that market returns are related in a systematic fashion to the book value. Therefore, in the financial market research, earnings have remained constant over time. Cross-sectional econometric models typically produce weak R^2 test statistics and have yet to describe convincingly any underlying pattern in the interaction between free cash flow and share price in the time series context.

1.2 Summary of prior research

Fama (1970) presented the efficient market theory in term of a fair game model, contended that investors can be confident that a current market price fully reflect all available information about a security and expected return based upon this price is consistent with its risk. Earlier studies have also revealed the fact that investors can take advantage of the pricing information that is specified in the financial statements to earn superfluous earning. In this view, Jensen (1986) breaks the obscurity that erupt the theory of market valuation. Since the fundamental objective of a business is to increase real shareholder value, this means increasing the net present value (NPV) of the future stream of cash flows. Financial statements must, therefore, put much more emphasis on the free

cash flows that a business generates. He believed that free cash flow is the cash flow available to the company's suppliers of equity capital after all operating expenses (including interest and taxes) and principal repayment have been paid, and necessary investments into short-term assets (working capital) and long-term assets (net capital expenditures) have been made. It is called 'free' cash flow to equity to indicate it is the amount of money free to distribute to equity investors without negatively affecting the continuation of the business. Furthermore, a firm's market price presents the interaction of its free cash flow on the relevant value of its book value and earnings per share which is later reflected by the collective judgment of the shareholders' expectations of its future cash flows. If the firm produces expected cash flows, the market price should remain constant. If cash flows turn out better, market price should rise; if cash flow turns down, market price should erode.

Recasting financial statements into a much more explicit and clear free cash flow format permits one to at least relate the current period's free cash flows to the current market price per share and reach some reasonable conclusion. Mehrani (2009) shows that the desirability of high free cash flow is acceptable only when the firm has passed the stage of growth and no longer has any highly profitable investment opportunities. However, the basic goal of free cash flow is to provide a better approach to assess the power of real benefits from the use of assets, which at the same time provides a more credible image for creditors and investors. Koerniadi and TouraniRad (2005) enlightened in their study that when the high cash flow accompanied the current earnings then there is high possibility of persistence of high current earnings that in return causes a higher expected future price. As a result, this becomes a source of commotion among investors because they react positively towards earnings per share. Thus the market is inclined to overprice high cash flow stocks and underprice the low cash flow stocks. Accordingly, the market obsession of investors with earnings provides the opportunity to arbitrageurs to take advantage of this arbitrage opportunity.

The treatment of free cash flow has been a topic of debate for the best part of a century. Houge and Loughran (2000) argue that investors can obtain significant surplus returns by using the trading strategy based on flow. Also, they demonstrated that cash flows reveal information about the underlying quality of earnings and showed that the firms with high cash flows outperform the firms with low cash flows but the investors in the market show an opposite behavior. Investors consistently underestimate the long term persistence of cash flow and the market undervalues high cash flow firms and overvalues low cash flow firms. Easterbook (1984) and Rozeff (1982) suggest that the payout of cash to shareholders creates a major conflict that has received little attention. As payouts to shareholders reduce the resources under manager's control, thereby reducing manager's power and making it more likely they will incur the monitoring of the capital market which occurs when the firm must obtain new capital. A financial project internally avoids this monitoring and the possibility the funds will be unavailable or available only at high explicit prices. On the other hand, managers have incentives to cause their firms to grow beyond the optimal size. Cheng, et al., (2005) concludes that, growth increases managers' power by increasing the resource under their control. It is also associated with increases in managers' compensation, because changes in compensation are positively related to growth in sales. Moreover, competition in the product and factor markets tends to drive prices towards minimum average cost in an activity. Hence, managers must therefore motivate their organizations to increase efficiency to enhance the problem of survival. Contrary to product and factor market disciplinary forces are often weaker in new

activities and activities that involve substantial economic rents or quasi. In such scenario, monitoring by the firm's internal control system and the market for corporate control is more important since such activities generates substantial amount of free cash flow. Lastly, a related approach to discounted free cash flow valuation is the use of FCFF instead of FCFE. Using this method, the value of the firm is obtained by discounting expected cash flows to the firm, i.e. the cash flows after covering all operating expenses and taxes, but prior to debt payments, at the weighted average cost of capital (WACC). Problematic in discounting FCFF is that it introduces circularity into the valuation model. The FCLOFF must be discounted at the WACC to calculate firm value, but in order to calculate the WACC the value of the firm is needed in the first place. Consequently, valuation becomes an iterative process. The discounted free cash flow models were most popular after the 1980's until recently when Ohlson (Ohlson, 1995) proposed a new DCF approach that had a considerable impact on the academic valuation literature.

1.4 Research Question

To achieve this aim, the study has the following propositions:

1) There exist strong interactive effects of earning per share on market price than book value ***if and only if*** the coefficients are difference.

1.1) The coefficient of Book Value and Earning per Share are equal ***if and only if*** \hat{R}^2 of the un-constrained equation is significantly larger than the R^2 for the constraint equation.

2) There exist weak or adverse interactive effects of FCF on the relevance value on BV and EPS on the market price ***if and only if*** the coefficients are difference.

2.1) The coefficient of $FCF_{i,t} * BV_{i,t}$ and $FCF_{i,t} * EPS_{i,t}$ are equal ***if and only if*** \hat{R}^2 of the unconstrained equation is significantly larger than the R^2 for the constraint equation.

3) Book Value is positively correlated with market price ***if and only if*** the effects of aggregate earnings are not offset by the effects of aggregate dividend

On the basis of findings in Collin et al. (1997), he predicted that significant relationship between book value and valuable profits of U.S. Firms over a period of forty year (1954-1993) did not change significantly. However, Ou and Sepe (2002) predicted that when forecasting the profitability of the following year was closer to current year, the profits of that year had higher explanatory power than the book value.

1.5 Significance of the study

Earnings figures are commonly used as the basis for models that are used to value companies. For example, a popular approach is to obtain an average price-to-earnings ratio for the industry in which a company operates, and to multiply that ratio by the company's expected earnings in order to arrive at an estimate of share price for the company. The results of the study indicate to UK investors and analysts that excluding FCF attributable to equity from continuing operations from the computation of earnings do reduce the usefulness of earnings as an indicator of value, and therefore its usefulness as an input to valuation models is wasteful. Although, it has a very small significant such an articulation is better assume on the price-to-book ratio. Since exclusion of the FCF attributable to equity from computation of Net Book Value, hence it does not under value the important of NBV as an indicator of company valuation. Finally, this study may

provide some insight into whether financial markets are efficient and provide relevance on free cash flow attributable to shareholders.

The remainder of this research is organized as follows. Section 2 presents a literature review of previous research in the area of value relevance, and in particular the value relevance of earnings, book value and free cash flow attributable to equity. Section 3 outlines how the data was collected for the project, and the methodology used in the analysis of the data. Section 4 presents the results from the analysis of the data. The study's key findings, examines the implications of those findings, discusses the study's limitations, and identifies questions for further research will be illustrated in section 5.

2. Literature Review

In recent years research has attempted to provide empirical evidence on the relative performance of free cash flow on earnings per share and book on market price. It then focuses on three branches of this literature that are of particular significance for the present research report: book value; earnings per share; and free cash flow attributable to shareholders.

2.1 Free Cash Flow

Kaplan and Ruback (1995) examine the performance of discounted free cash flow techniques in the valuation of management buyouts and leveraged recapitalizations. They report results indicating that free cash flow techniques perform at least as well as valuation techniques using comparable firms and transactions. However, they do not compare free cash flow techniques to earnings techniques. Penman and Sougiannis (P&S) (1998) are the first to make this comparison. Their valuations are based on average *ex post* free cash flows and earnings. They find that earnings techniques consistently outperform cash flow techniques over alternative forecast horizons. Their analysis concludes that the primary superiority of earnings techniques occurs for two reasons. First, the free cash flow technique expenses the anticipated investment, while the earnings approach capitalizes it. Second, the earnings technique recognizes non-cash (accrual) value changes. These two features of the earnings technique "bring the future forward in time". Thus in estimating the value of a firm the earnings forecasts requires a shorter horizon vis-a-vis free cash flows. The *ex-post* based results of Penman and Sougiannis (P&S) appear to be robust. Francis et al. (2000) confirm the P&S results by using *ex ante* Value Line forecasts for earnings and cash flows. Given the results of these two studies, research attention has recently concentrated on the specification of terminal value calculations for each technique. Thus Penman (1997) derives theoretically "ideal" terminal value expressions that make the earnings and free cash flow techniques equivalent over a given forecast horizon. Using Value Line forecasts Claude et al. (2000) present additional empirical support on the ability of these terminal values to make the two techniques equivalent. Hackel and Livnat (HL)(1992, p. 6) believe that free cash flows are superior to the earning approach for several reasons. For example, they indicate that earnings are subject to managerial discretion, such as having some latitude in applying accounting standards to their specific situation. That is, firms may have different approaches to revenue recognition, expense recognition and the allocation of costs across periods. Additionally, HL state that free cash flows are not affected by choice of accounting methods and are unaffected by managerial discretion with respect to real cash expenditures. Also Hackel and Livnat (1992, pp. 138-149) discuss the limitations in

earnings reports in general and develop specific shortcomings of the earning approach for investment purposes. For example, accrual accounting requires estimation of depreciation expense for a period. Firms estimate the depreciation expense by predicting the useful lives of depreciable assets and their salvage values. These estimates can contain errors and furthermore, when firms update their estimates of useful lives of fixed assets the result can be an increase or decrease in earnings. Throughout the book, HL makes the case that for the purposes of investment analysis and management, free cash flows are preferable to earnings. Jensen (1986) support the view of Hackel and Livnat (1992, pp. 138-149) that managers, in their own self-interest, seek to accumulate perquisites and as a firm becomes larger, more opportunities exist for managers to indulge their needs for pecuniary and non-pecuniary (power and prestige) benefits. Unless properly controlled, such behavior can lead to managers making inefficient expenditures by taking on less than optimal (i.e. below cost of capital) investments as they attempt to “grow” the firm.

In Jensen's world, "good" managers are those who commit to dispose of excess cash flows by increasing dividends and instituting share repurchase programs. Bad managers, interested in increasing their perquisites, will retain cash in order to "grow" the firm by engaging in (unprofitable) takeover and/or expansion behavior. Myers and Majluf (1984), on the other hand, suggest a more benign reason for management's reluctance to distribute excess free cash flows. They argue that management is motivated by their desire to "protect" current shareholders' interests relative to new shareholders. Due to in-formation asymmetries, management possesses superior information relative to investors and/or creditors as to the desirability of (new) investment projects. As such, they are reluctant to finance these projects with the use of external funding for fear that any new securities issued would be underpriced. Therefore, in order to have internal funds available for investment use and avoid issuing under-priced securities (and cutting future dividends), managers build up “financial slack” by storing excess funds until they are needed. Unlike the Jensen scenario, in the Myers Majluf world, firms have future (positive NPV) investment projects. Thus, cash flows will be retained in a form where they are readily accessible; i.e. as cash or short-term financial assets². Management would be willing to store the excess cash in these as-sets despite their low returns because of their ease of recover ability. From an empirical perspective, both the Jensen and Myers and Majluf approaches suggest a similar behavior pattern; i.e. managers do not distribute free cash flows but rather invest/hoard them in alternative venues. Given the identical outcome, distinguishing the underlying motivation from the behavior pattern itself is not always feasible³. However, although managers of both Jensen-type and Myers and Majluf firms engage in the hoarding of future cash flows.

2.2 Earnings per share

The present research report focuses on the information value of two variations of the earnings figure, namely earnings including goodwill amortization and earnings excluding goodwill amortization. Consequently it is important to examine the subset of the value-relevance literature that relates to earnings, and in particular to determine whether the literature does in fact indicate that earnings are of relevance to investors and analysts when valuing companies. The literature again begins with Ball and Brown (1968) and Beaver (1968), discussed above, since both those studies investigated the information value of earnings. Numerous articles on the subject have since been published. A theme running through much of the recent literature is how various earnings measures compare with each other, and with non-earnings measures, as indicators of value. Thus Dechow (1994) investigated the value relevance of accounting earnings and cash flows, and found

that accounting accruals result in earnings being a better predictor of short-term firm performance than realized cash flows. Biddle et al (1997) found that earnings have more information value than Economic Value Added®, residual income, and cash flow from operations.

Jennings et al (2001) found that earnings excluding goodwill amortization are more useful as an indicator of share value, than earnings including goodwill amortization. Moehrle et al (2001) examined how informative earnings excluding goodwill amortization are compared to the traditional measures of earnings before extraordinary items and cash flow from operations. Their conclusion was that both earnings measures are equally informative, and have more information value than cash flow from operations. The latter two articles will be discussed in depth in the last section of the literature review. Perhaps the most important issue that has arisen from the literature is the question of how strong the relationship between earnings and market value actually is. There is evidence that the association between the two is not strong and has been declining in recent decades. Lev (1989) evaluated a representative sample of 19 studies on the usefulness of earnings, from the 1980's. He found that the R²'s of the regression equations derived in his sample of representative 1980's studies were very low, ranging in size from 2 to 10 percent. This indicated a weak association between earnings and market value.

Lev and Zarowin (1997) and Lev and Zarowin (1999) presented evidence that the information value of earnings had been declining over the previous 20 years. Collins, Maydew and Weiss (1997) and Francis and Schipper (1999) found that, while the information value of earnings may be decreasing, the information value of book values has risen. However Brown, Lo and Lys (1999) reexamined the latter two studies and found that the information value of book values has in fact declined after allowing for scale effects. A number of reasons have been suggested for this apparent decline in the value relevance of earnings. Lev (1989) believes the most likely explanation for the weak association between earnings and market value is that earnings have low information content. Possible reasons for this include the arbitrary nature of the accounting techniques used to measure earnings, and manipulation of earnings figures by management. However, two other reasons suggested by Lev for earnings' apparent lack of explanatory power, are weaknesses in the methodologies used in the studies he examined, and the inability of investors to properly interpret the information contained in earnings. Lev and Zarowin (1997), Lev and Zarowin (1999) and Goodwin (2003) note the increasing investment in intangible assets by firms, and argue that this phenomenon has resulted in performance measures such as earnings being less value-relevant. These three studies and the value relevance of intangibles in general, will be discussed in more detail in the next section of the literature review. Collins et al (1997) believe other possible explanations for the declining value relevance of earnings include the increasing importance of nonrecurring items and the increasing occurrence of negative earnings. Francis and Schipper (1999) point to the increase in market volatility as the possible cause. The studies cited above provide a note of caution on using earnings as a measure of market value. However despite the evidence presented in these studies, other researchers are still actively investigating the relationship between earnings measures and market value, and moreover are finding evidence that a significant relationship does exist. For example, Jennings et al (2001) found that the R²'s of regression equations derived for earnings including goodwill amortization and earnings excluding goodwill amortization ranged in size from 44.7 to 69.4 percent. They concluded that regardless of the measure used, accounting earnings explain a substantial portion of the cross-sectional distribution of prices

(p.23). Hoegh-Krohn and Knivsfla (2000) take into account research published up to 1999, believe that the evidence for the declining value relevance of earnings is still not conclusive. Because the results from the research do not appear to have provided definitive answers with respect to the strength of the relationship between earnings and value, we believe further research in this area can be justified, including the present research on the relevance of earnings excluding free cash flow.

2.3 Book Value per Share

Book value is the theoretical value of what a company's net assets are worth. It is also referred to as equity. In theory, book value is equivalent to the amount of cash shareholders would receive if all of the company's debts, both short-term and long-term, were paid off and all remaining assets were sold. Its compelling use as a measure of valuation can be explained in one statement. No quality company should sell for a price equivalent to or less than its theoretical liquidation value. Benjamin Graham (1934) encourages investors to look for companies trading near or below their book values. His result shows that more than 75 years later, buying stocks trading at low price-to-book multiple (share price divided by book value per share) continues to work. The reason behind such accession was that book value is what company's net assets are worth. A price-to-book multiple of 1.0 means the company is worth the same as its net assets. This multiple means the market is indifferent as to whether the company opens its doors tomorrow. If the business is shut down, the debts paid off and the assets liquidated, shareholders' wealth will, theoretically, be unchanged. If the company stays open, shareholders' wealth may increase or decrease—not liquidating the company essentially becomes a roll of the dice.

Ohlson (1995) develops a valuation framework wherein book value plays an integral role in valuation. Using the clean surplus relation, Ohlson reformulates the dividend discount model by expressing price as the sum of book value and the present value of expected future abnormal earnings. In this framework, the role for book value is mechanically determined and does not depend upon the stochastic (or informational) properties of accounting data. Rather, book value plays an “anchor” role in valuation by representing the stock of resources that generates future “normal” earnings that are expected to persist forever into future. Another explanation for the value relevance of book value is that it reflects the liquidation value of a firm especially when a firm is in financial distress (see Barth, Beaver and Landsman, 1997 and Berger, Ofek and Swary, 1996). The origins of this idea comes from the “liquidation option” proposed by Hayn (1994) wherein shareholders are expected to liquidate a firm if the liquidation value of its assets exceeds the value-in-use. Under this framework, book value which reflects (albeit imperfectly) the net realizable value of a firm's assets will become value relevant when a firm's liquidation probability is high. Barth, Beaver and Landsman (1997) provide evidence that is consistent with this claim. Finally, Burgstahler and Dichev (1997) argue that book value may be relevant for valuation when the firms' net assets are likely to be adapted to superior alternative use (including that of liquidating the firm). While in Ohlson's model, book value measures the expected “value in use” of the firm's assets, in the liquidation option hypothesis, it measures the “liquidation value” of the firm's net assets. However, in both explanations, the value relevance of book value arises because it represents the firm's net *assets in place* (stock). In contrast, we show that book value's role in valuation may arise independent of its role in representing the firm's net assets-in-place, by aggregating past earnings which are independently value relevant

3 Data and Methodology

3.1 Data

I began with a preliminary sample of 100 UK listed firms (900 firm-years) of data obtained from Annual Report of listed companies in the UK Stock Exchange database, for the years from 2010 to 2018. The UK Stock Exchange database only provides coverage of financial data for company under the construction industries for the years 2010. Amongst these companies, majority have better financial situation which reduce my sample 900 firm-years. To extend the sample, 100 firm-years of data on Real Estate with negative free cash flows were included. We pay no attention if the free cash flow was positive or negative. However, almost 85% of the annual report did state the amount allocated for free cash flow. In some case, it was difficult to have the prices of previous years implying that 25% of the share prices were estimated base on the report increase in prices.

3.2 Theoretical Framework

As was stated in the introduction, the study has the following proposition:

- 1) There exist strong interactive effects of earning per share on market price than book value **if and only if** the coefficients are difference.
 - 1.1) The coefficient of Book Value and Earning per Share are equal **if and only if** R^2 of the un-constrained equation is significantly larger than the R^2 for the constraint equation.
 - 2) There exist weak or adverse interactive effects of FCF on the relevance value on BV and EPS on the market price **if and only if** the coefficients are difference.
 - 2.1) The coefficient of $FCF_{i,t} * BV_{i,t}$ and $FCF_{i,t} * EPS_{i,t}$ are equal **if and only if** R^2 the of the unconstrained equation is significantly larger than the R^2 for the constraint equation.
 - 3) Book Value is positively correlated with market price **if and only if** the effects of aggregate earnings are not offset by the effects of aggregate dividend

The following analyses are carried out on the data in order to achieve three study proposition listed above. Using Myers and Majluf (1984), Ohlson's (1995) and Mehrani (2009) methodology shows (1) market price, earning per share and book value per share with difference in coefficients and (2) market price, earning per share and book value per share with equal coefficients. Specifically, we correlation method to test the assumptions of **Multivariable regression** for the pooled company data:

$$P_{i,t} = \alpha_0 + \alpha_1 BV_{i,t} + \alpha_2 EPS_{i,t} + e_{i,t} \quad (1)$$

$$P_{it} = \alpha_0 + \alpha_1(\dot{E}) + e_{it} \quad (2)$$

Where:

$$\dot{E} = (BV_{it} + EPS_{it})$$

Thus $P_{it} = \alpha_0 + \alpha_1(BV_{it} + EPS_{it}) + e_{it}$

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_1 EPS_{it} + e_{it}$$

$P_{i,t}$	= Price per share of firmi in year t
P_{it}	= Price per share of firmi in year t with equal coefficient
$BV_{i,t}$	= Book Value per share of firmi in the year t
$EPS_{i,t}$	= Earnings per share of firmi in the year t
$e_{i,t}$	= Error term at time t

Share prices on the last day of the third month after the balance date were very important in the studies. However, in order to obtain evidence for the share prices of the year, average-base-method was applied (the market prices for every quarter of the year was sum up and divided by the 12, which gave me an average market price). To determine the usefulness of earnings per share to shareholders compared the R^2 's of the regression equation derived above. If the R^2 of equation (1) is greater than the R^2 of equation (2), we conclude that EPS have a strong interaction on the market prices when their coefficients are difference than when they are equal. Hence, to test whether the difference between the R^2 's of the two regression equations is statistically significant, a t-test based on Ohlson's (1995) price model. Share price is regressed on (3) FCF attributable to shareholders on EPS and BV with equal coefficients and (4) FCF attributable to shareholders on EPS and BV with difference in coefficients as shown below. In addition, the dummy variable of the regression equation becomes Free Cash Flow. The assumed dummy variable will enable us to cover the entire model, helps to reduce the average population characteristic from being bias, enabling the regression coefficient to be unbiased.

$$P_{i,t} = \alpha_0 + \alpha_1 BV_{i,t} + \alpha_2 EPS_{i,t} + \alpha_3 FCF_{i,t} + \alpha_4 FCF_{i,t} * BV_{i,t} + \alpha_5 FCF_{i,t} * EPS_{i,t} + e_{i,t} \quad (3)$$

$$P_{it} = \alpha_1 + \alpha_2 (\hat{E}p) \quad (4)$$

$$\text{where } \hat{E}p = FCF_{i,t} * BV_{i,t} + FCF_{i,t} * EPS_{i,t}$$

It becomes,

$$P_{it} = \alpha_1 + \alpha_2 (FCF_{i,t} * BV_{i,t} + FCF_{i,t} * EPS_{i,t})$$

$$= \alpha_1 + \alpha_2 FCF_{i,t} * BV_{i,t} + \alpha_2 FCF_{i,t} * EPS_{i,t}$$

And FCF is equal to 1 if companies have \uparrow FCF but \downarrow P/B ratio or 0 otherwise $FCF_{i,t} * BV_{i,t}$
:captures the interaction between $FCF_{i,t}$ and $BV_{i,t}$

$FCF_{i,t} * EPS_{i,t}$: captures the interaction between $FCF_{i,t}$ and $EPS_{i,t}$

α_1 and α_2 descpt the gradient of $BV_{i,t}$ and $EPS_{i,t}$

α_3 captures the gradient of $FCF_{i,t}$

α_4 and α_5 capture the interactive impact of $FCF_{i,t}$ on $BV_{i,t}$ and $EPS_{i,t}$

To determine the usefulness of FCF on relevance value on EPS and BV on share price, com-pared the R^2 's of the regression equation derived above. If the R^2 of equation (1) is

greater than the \hat{R}^2 of equation (2), we conclude that FCF attributable to shareholder have a strong interaction on the market prices when their coefficients are difference than when they are equal. Finally, it is obvious from equation (1), (2), (3) and (4) that book value has no direct interaction on market price. However, note that price is a function of only the earnings variable, although price is not a function of current earnings alone. Past flows are relevant because of the presence of transitory components. The stock (book value) does not have a direct role in this interaction framework. However, as we show below, book value may correlate with price because it is aggregates past earnings. Book value can be express as follows:

$$BV_{it} = EPS_{it} - D_{it} \quad (5)$$

Where

BV_{it} = Book Value per share of firm_i in the year t

EPS_{it} = Earnings per share of firm_i in the year t

D_{it} = Dividend per share of firm_i in year t

I = 0, 1, ..., t

It is obvious from expression (5) that book value is positively related to the earning history. However, note that past dividends and past earnings are likely to be related because of dividend payout. Therefore, it is possible that book value may not correlate with past earnings because of the offsetting effect of dividends in the extreme; book value will be uncorrelated with past earnings for a firm that has a full payout policy. The extent to which book value correlates with past earnings is essentially an empirical issue, and is investigated later. Next, to demonstrate the indirect interaction of book value, consider a simple correlation between market price and book value:

Applying correlation on price, (5) becomes:

$$\text{Corr}(P_{it}, BV_{it}) \propto \text{Cov}(P_{it}, EPS_{it}) - \text{Cov}(P_{it}, D_{it}) \quad (6)$$

From (1), it is obvious that $\text{Cov}(P_{it}, EPS_{it}) > 0$. Therefore, book value will correlate positively with price as long as the effects of aggregate EPS from 2007 to 2010 are not offset by the effect of the aggregate dividend from 2007 to 2010. This implies that $\text{Corr}(P_{it}, BV_{it}) > 0$ **if and only if** $\text{Cov}(P_{it}, EPS_{it}) > \text{Cov}(P_{it}, D_{it})$. The correlation between stock prices and book value will be zero only under the restrictive condition that the covariance between price and aggregate dividends perfectly offsets the covariance between price and aggregate earnings. In sum, an interaction between price and book value can be established even under a multivariable regression because of a positive interaction of book value and past earnings. Nevertheless, it is pertinent to note again that the purpose of the preceding analysis is neither to advocate the direct interaction of earning on market price nor to compare the relative superiority of earning per share to book value on share price. We adopt the approach because it does not accord a direct role for book value in the interaction and thus helps us to illustrate our alternative reasoning for the value relevance of the book value on the market price.

3.3 Variables and Measurement

The independent variables in this study are free cash flow per share, book value per share and earnings per share and the dependent variable is the price per share. They can be measure as follows:

Free Cash Flow (FCF): $(\text{INC}_{i,t} - \text{TAX}_{i,t} - \text{INTEXP}_{i,t} - \text{PSDIV}_{i,t} - \text{CSDIV}_{i,t}) / \text{A}_{i,t-1}$

Where: $\text{INC}_{i,t}$: Operating income before depreciation

$\text{TAX}_{i,t}$: Total taxes

$\text{INTEXP}_{i,t}$: Interest expense

$\text{PSDIV}_{i,t}$: Preferred stock dividends

$\text{CSDIV}_{i,t}$: Common stock dividends

$\text{A}_{i,t-1}$: Total assets at the beginning of the fiscal year

Book value per share: Book value of equity/number of common share issued at year end

Earnings per share: Earnings after interest and taxes /number of common shares issued at year end

Price per share: market value of equity/ number of common shares issued at year end.

4 Data Analysis

4.1 Descriptive Statistics

Table 1 presents descriptive statistics relating to the size of the companies in the final sample, and to the important interaction of earning per share and book value on the market price with difference in coefficients as well as different in coefficients as reported in the Annual Report of those companies.

Table 1: Descriptive Statistics

Panel A: Difference in coefficients	Mean	Std Deviation	N
Market Price	86,074	100,092	120
Earnings per Share	9,091	25,819	120
Book Value	72,655	90,308	120

Source: Developed particularly for this study

Panel B: Equal coefficients	Mean	Std Deviation	N
Market Price	86,074	100,092	120
Book Value plus Earning per Share	81,147	93,505	120

Source: Developed particularly for this study

From Panel A, it is possible to see that the mean and standard of book value (72,655 and 90,308) is larger than the mean and standard deviation of earnings per share of (9,098 and 2,819). This could be due to the sample variability. Hence, it shows that firms with high book value can do indirect influence on the price. Panel B on the other hand shows a situation when both earnings per share and book value are treated as whole. Result shows that the standard deviation of market price (100,092) is the same both Panel A and Panel B while the standard deviation of both book value and earnings per share is (93,505) which is less than the combine standard deviation after the test $(25,819 + 90,308 = 116,128)$ in Panel. This phenomenon highlights that market may interpret larger earnings

gained by firms may contain some effect from earnings management (Whelan and Mcnamara, 2004)

4.2 There exist strong interactive effects of Earnings per share than Book Value on market price if and only if the coefficients are difference.

Before proceeding with the regression analysis of the pooled sample, the data was analyzed to determine whether it satisfied the assumption of Multi variable regression, which according to assumption the following model will be presents and tested. The preference for price model is based on Kothari and Zimmerman's (1995) argument that the slope or earnings response coefficients were substantially less biased in price model than in return model. This model has been widely used in the literature (e.g., Landosman, 1986; Barth, 1991; Eccher et al., 1996; Burgstahler & Dichev, 1997; Collins et al., 1997).

Table 2: Results from First Group Assumptions Test with Default Method in SPSS

Panel A: Difference in Coefficients

Model	Unstandardized Coefficients		standardized Coefficients		t	Sig.	Confidence interval of 95,0% for B		Correlation			Collearity statistic	
	B	Std Error	Beta				Lower limit	Upper limit	Zero order	Partial	part	Tolerance	FIV
1 (Constant)	73,712	11,697			6,302	,000	50,547	96,877					
Earning per Share	1,485	,041	,306		3,471	,001	,509	1,860	,305	,306	,306	1,000	,000
Book Value	,522	,098	,520		,225	,822	-,171	,215	,514	,521	,002	1,000	,000

a. Variable dependent: Market Price

Panel B: Equality in Coefficients

Modelo	Unstandardized Coefficients		standardized Coefficients		t	Sig.	Confident interval of 95,0% for B		Correlation			Statistical collinearity	
	B	Std Error	Beta				Lower limit	Upper limit	Zero order	Partial	part	Tolerance	FIV
1 (Constant)	96,485	12,084			7,985	,000	72,556	120,414					
Book Value	-,128	,098	-,120		-1,311	,192	-,322	,065	-,120	-,120	-,120	1,000	1,000
Earning													

a. Variable dependent: Market Price

Source: Developed particularly for this study

Coefficients determination in Panel A indicates that earnings per share and book value per share explain the variation in market price. From the unstandardized coefficients, the beta for the earnings per share (1,485) is larger than the beta weight of the book value (0,522). The significant level of the coefficients of each variable of and its comparison with the coefficients significant level of error (0.05) will be approved at the 95 percent of confidence level.

The coefficient of earnings per share ($\alpha_1 = 1,485$) and are positive and significant (0.041) while the coefficient of book value per share ($\alpha_2 = 0.522$) but it significance level is 0.098 which is above the required level of significant of 0.05. Thus, the results support

proposition 1 that there exist a strong interaction of the earning per share on share prices with difference in coefficients while book value remains insignificant. This result is consistent to the previous studies of Anandarajan et al. (2006)

In Panel A, it is possible to conclude that, the unstandardized coefficients reduce as more independence variables are added in the regression. Also, the unstandardized coefficient of the earning per share is difference from those of the standardized coefficient where as the unstandardized coefficients and standardized coefficients of book value are almost the same. The reason for the difference in the unstandardized coefficient and standardized coefficient ($1,185 - 0,306 = 0,878$) is explain by their standard deviation. This imply that the standard deviations for earning per share are not similar for both unstandardized coefficients and the standardized coefficient while those of book value remain the same (i.e. std deviation is 1). Hence, earnings per share contribute more on the market price relatively to book value. Further evidence can be analysis from their t-value and the significant values of the T- Statistics which is associated with beta weight which also correspond to the part and partial correlation of the another part of the table. Only earnings per share is significant (0,001) because it is less than the threshold of 95% confidence interval or $p=0,05$ while book value is insignificant (0,098) greater than the threshold of 95% confidence interval or $p=0.05$. This result shows that earnings per share contribute stronger to the interaction on market price. Lastly, the confident interval associate with the unstandardized beta weight. Notice that there is a big gap between the lower limit and the upper limit for both earning per share (0,509 to 1,860) and book value (-1,171 to 0,215) although the limit of earning per share are positive. The part correlation is the correlation between the independent variable and the dependent variable. Also, in Panel A notice that earnings per share has a part correlation of 0,306 which means depending on the variance share between the earnings and book value, the correlation between earnings per share and share price is 0,306 while book value part correlation with market price is 0,002.

The results from Panel B, show that when the coefficients of earnings and book value are equal as assumed, both variables turn to have a negative and insignificant effects on the inter-action on market price. From the data, both the standardized and unstandardized coefficients represent a negative number (ie, -1,28 and -120) with significant level of 0,098 above the required level of 0,05. Analysis from the t-value and the significant values of the T- Statistics which is associated with beta weight which also correspond to the part and partial correlation of the table is -1,311 for the t-value and 0,192 for the level of insignificant. Therefore, the result of our t-statistics favor the constrained model with difference in coefficients which prove proposition 1.1 to be false hence, add reasonable evident to proposition1 that, earning per share has stronger interaction on market price than book value per share. First, it was necessary to test for the difference and the equality in coefficients as shown in Panel A and Panel B using the t-test before comparing the significance increment in the R^2

Table 3: Results from First Group Assumptions Test with Default Method in SPSS comparing the R^2

Panel C: Model Summary^b with Difference in Coefficients $P_{i,t} = \alpha_0 + \alpha_1 BV_{i,t} + \alpha_2 EPS_{i,t} + e_{i,t}$

Model	R	R^2	Adjusted R^2	Std error associated with R^2	Durbin-Watson
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1	0.806	0,743	0,717	0.1902	2,102
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- a. Variables predictor: (Constante), Book Value, Earning per Share
b. Variable dependiente: Market Price

Panel D: Model Summary^b with Equality in Coefficients $\beta_{it} = \alpha_0 + \alpha_1(\dot{E}) + e_{it}$ where $\dot{E} = (BV_{it} + EPS_{it})$

Model	R	R ²	Adjusted R ²	Std error associated with R ²	Durbin-Watson
2	0.723	0,659	0,626	19.876	2,281

- a. Variables predictor: (Constant), Book Value plus Earning per Share
b. Variable dependent: Market Price

The result from Panel C appears to support the claim that earnings per share has a stronger inter-active effect on market price than book value with difference in coefficients. While Panel D prove that the coefficient of Book Value and Earning per Share are equal **if and only if** \dot{R}^2 of the unconstrained equation is significantly larger than the R^2 for the constraint equation i.e. ($\dot{R}^2 > R^2$) is false, resulting from the fact that, $R^2 = 0,806$ in Panel C of the constrained equation is significantly larger than the $\dot{R}^2 = 0,723$ in Panel D of the unconstrained equation. Hence, adding evident that earnings per share has a stronger interactive effect on market price than book value with difference in coefficients

Model specification tests

From the table, Durbin-Watson shows that testing hypothesis, there must be serious correlation with the data. In order to test this correlation, I use the rule that says the Durbin-Watson value should be lesser than 1,5 to 2,5. So any Durbin-Watson value within this range does not show any correlation. But in this case, we have 2,102 for Panel C and 2.281 for Panel D which show that there is no autocorrelation in the residuals from the regression analysis. Furthermore, to determine whether there are model specification problems, tests are run on the full model for this study to detect problems with multicollinearity, and heteroscedasticity. An assessment of the Durbin-Watson statistics for the full models indicates that the residuals are not auto-correlated. There do not appear any major problem with multicollinearity because there is no high R-squared with few significant t-statistics, and there are no correlations greater than 0.8. Because the variance inflation factors (VIFs) are less than 1.248 in all cases, it appears that there is not a multicollinearity problem.

Table 4: Results from First Group Assumptions Test with Stepwise Method in SPSS

Panel E: Application of stepwise method

Model	Unstandardized Coefficients		standardized Coefficients	t	Sig.	Confident interval of 95,0% for B		Correlaciones		
	B	Std Errors	Beta			Lower limit	Upper limit	Orden cero	Parcial	Semiparcial
1 (Constant	75,309	9,269		8,125	0	56,954	93,664			

Earnings per share	1,183	0,34	0,305	3,482	0,001	0,51	1,856	0,305	0,305	0,305
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a. Variable dependent: Market Price

Furthermore, applying stepwise method in the regression automatically eliminate the non statistical significant predictor (Book value) in the equation. That is, it looks in the correlation matrix and chooses the independent variables that have the larger Pearson correlation with the de-pendent variable. This process is done sequentially the until non statistical significant variable is eliminated (see panel E above: application of stepwise methods).

Solution to Heteroscedastic,

Sort the data set by Earnings and perform a Goldfeld-Quandt test for heteroscedasticity running regression using the subsamples of 15 companies with the smallest and the greatest earning per share. Dividing through by earnings equation (1) becomes

$$P_{i,t}/EPS_{i,t} = \alpha_0/EPS_{i,t} + \alpha_1 BV_{i,t}/EPS_{i,t} + \alpha_2 + \epsilon_{i,t}/EPS_{i,t} \quad (7)$$

With price-earnings ratio denote P/E, hypothesized to be a sample function of the reciprocal of earning with no intercept

4.3 There exists a weak or adverse interactive effect of FCF on the relevance value on BV and EPS on the market price if and only if the coefficients are difference.

Table 5: Results from First Group Assumptions Test with Default Method in SPSS

Model	Unstandardized Coefficients		standardized Coefficients	T	Sig.	Confidence interval of 95% for B		Correlation			Collearity statistic	
	B		Beta			Lower Limit	Upper Limit	Zero order	Partial	part	Tolerance	FIV

		Std Error										
1 (Constant)	72,205	12,96		5,969	0	50,547	96,877					
Earnings per share	1,217	0,021	0,314	3,474	0,001	0,506	1,845	0,312	0,306	0,306	1	1
Book Value per share	0,193	0,057	0,021	0,234	0,822	-0,171	0,217	0,114	0,021	0,021	1	1
FCF attributable to equity	0,042	0,035	0,185	0,044	0,082	0,324	2,971	0,123	0,011	0,011	1	1
EPS*FCF	-4,652	0,087	-5,056	0,678	0,039	0,185	3,001	0,896	0,034	0,034	1	1
BV * FCF	-7,74	0,092	-9,321	0,943	0,975	0,023	2,034	1,321	0,562	0,562	1	1

a. Variable dependent: Market Price

Table 5 simply shows the interaction of the entire model. Result shows that the coefficient determination indicates the significant on the variability in market price and compares them with the level of error (0.05), will be approved at the 95% of confidence level. The coefficients of earnings ($\alpha_1 = 1,217$) is significant and positive with 0,021. This demonstrates that earnings are able to influence share prices despite the presence of free cash flow in the model. Similarly, the coefficient relevant value of the book value ($\alpha_2 = 0,183$) is positively insignificant with 0,099. Hence, the value of α_1 and α_2 add support to proposition 1. Clearly, FCF * EPS and FCF * BV reflex a negative interaction on market price as it is revealed in their coefficients (as $\alpha_4 = -4,652$ and $\alpha_5 = -7,740$) with insignificance level of 0,087 for α_4 and 0,092 for α_5 . However, the coefficient of earnings and book value decreases when free cash flow was introduced in the model. A good look of this decreased is explained in figure 4 below. Using the step-wise method will automatically eliminate the dominated variables which result will be similar with the result obtained in Proposition 1. Hence, this result supports Proposition 2 which illustrates that there exist a weak or adverse interactive effects of Free cash flow on the relevance value of the book value and earnings per share on the market price. Also, proposition 2.1 is just a repeat of 1.1. Results from proposition 2.1 will have similar characteristics of 1.1. Lastly, it is possible to see that as more independence variables are added in the model, the coefficients reduce and the contribution of each independent variable reduces on the market price. To see this, notice from Panel A of table 2, the coefficients of earnings per share ($\alpha_1 = 1,485$) and book value ($\alpha_2 = 0,522$) decreased by 0,268 and 0,329 respectively when free cash flow was introduced in model 3 above.

Table 6: Correlation between book value, earnings per share and market price

	Earning per share	Adjusted book value	Market Price
BV it = EPSit - Dit			

Earning per Share	Pearson correlation	1	1,000**	,305**
	Sig. (bilateral)		0	0,001
	N	120	120	120
Adjusted Book value	Pearson correlation	1,000**	1	,305**
	Sig. (bilateral)	0		0,001
	N	120	120	120
Market Price	Pearson correlation	,305**	,305**	1
	Sig. (bilateral)	0,001	0,001	
	N	120	120	120
**. The correlation significant level is 0,01 (bilateral).				

Source: Developed particularly for this study.

It is important to note that table 6 shows, the correlation of book value, historical earning per share and the market price. The findings show that all the variables are highly statistical significant and less than 0.01. They are highly associated with each other, i.e., book value is perfectly correlated with the historical earnings per share (representing a Pearson correlation of 1). Therefore, book value is positively correlate with price (representing a Pearson correlation of 0.305) as long as the effects of aggregate EPS are not offset by the effect of the aggregate dividend.

5. Conclusions

The results from the first model of assumptions indicated that there is a positive and significant relationship between earning per share with market price than book value. This means that an in-crease in earnings per share will result in an increase in stock price and vice versa. This means that changes in earnings will result in paralleled changes in stock price of the firm. So we can say that earning per share plays a big role in the evaluation of the firm. It is worth noting that earning per share in comparison to book value per share has higher explanatory power. Shamy and Kayed (2005) have stated that earning accounting is considered as a source of information and is used by many investors and analysts in financial markets, be-cause it allows them to gain a true picture of the firm's performance and helps them in their evaluations. According to accrual accounting, the value of companies is a function of their future performance which has a close relationship with earning (Shamy and Kayed , 2005). Secondly, model 2 indicated that free cash flow reduce the effect of interaction on the relevance value of earning per share and book value on market price. This means that free cash flow re-duce the explanatory power or the relevancy of earning per share for forecasting the price per share. According to the results in Table 2, earning per share variable has entered in the model with a positive

coefficient, which reflects the market's reaction to earning per share in the absence of free cash flow. The free cash flow of earning per share reduces when the free cash flow was introduced. In other words, the explanation power of earning per share reduces as long as additional independent variables are added. Whelman (2004) has expressed that when the managers manipulate earnings by accrual items, the earning figure cannot be considered as a reliable indicator for evaluating the performance of the firm. Also, Ralman and Saleh, (2009), illustrated that when manager of firms with low free cash flow manipulate earnings, this figure cannot reflect the firm's performance correctly and so its credibility will be reduced. In sum, the free cash flow will result in the reduction of the explanatory power of earning per share. Although book value is insignificant in the model, based on the reasoning of Ralman and Saleh, (2009), free cash flow reduce the value relevance of book value per share on the market price. Thus, its explanatory power or relevancy of book value per share for forecasting stock price reduces. According to the results shown in Table 2 the book value per share is positive when introduced into the model although the level of significant was above the required 0.05, which reflexes the market's reaction to book value per share in the absence of free cash flow.

In proposition 2, the introduction of the free cash flow of book value result into a negative and insignificant coefficient. This shows that the market's reaction to book value per share is ad-verse when free cash flow is available. The negative effect of low FCF supports the free cash flow hypothesis that argues managers of firms with high FCF but low growth opportunity tend to make non-wealth-maximizing investment. To cover this activity, managers use accounting accruals to manage earnings (Rahman and Saleh, 2009). As a consequence, the value relevance of earnings and book value is lower in with low FCF compared to other firms. The decline in value relevance may be as result of market perception that firms with low FCF manage their earnings to increase its reported earnings and book value. Therefore, regulators must be aware that low growth may exist in companies with low FCF and should take appropriate measures to reduce the impact such problem. One of the ways is through corporate governance mechanisms. Good corporate governance practices would be able to monitor the management more effectively, particularly in situations when there is a conflict of interest between the managers and the owners (shareholders). In contrast to the analysis above, we try to show that book value can be associated with stock prices because of it it parsimoniously captures value relevant past earnings stream (flows). This result can be seen in Table 4, where book value is positively correlated with the market price.

2. Limitations of the study

The study has a number of limitations which should be borne in mind when considering the findings summarized above. The total sample size (900 firm-years) of the London Stock Exchange data was relatively small when compared to samples analyzed in Jennings et al (2001), for example, used a sample of 2918 company-years of data. As a result, the yearly subsample was as small as 100 company-years and thus insufficient for a separate analysis of each year, once control variables were introduced. Nevertheless there is no reason to believe that annual results would have been different, since no evidence was found of significant intercept or slope differentials on an annual basis. Also, the residual error from the regression equation showed no pattern, which tends to suggest that there are no missing explanatory variables. Lastly, our study focus on free cash flow, and introducing it resulted to a reduction in earnings. However, if free cash flow was prohibited in the model, information would also be lost about the free cash flow periods chosen by listed UK companies.

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