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**Revenue Investment, Accounting Conservatism
and the Valuation of Loss Making Firms**

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ABSTRACT

The proportion of listed firms reporting accounting losses has increased greatly since the 1970s. The perception that accounting losses always indicate a loss of economic value is no longer widely held. It is now accepted that many loss making firms report losses because of investments that cannot be capitalized under present accounting rules. Charges against income caused by investments are called 'revenue investments' in this study. Two aspects of the valuation of loss making firms are investigated. Firstly, a method of distinguishing firms that have made revenue investments from firms that are suffering 'real' economic losses is developed. The findings show that loss making firms can be categorized, and that the accounting and economic characteristics of firms differ over these categories. Secondly, the impact of revenue investment on the residual income valuation model is examined. The findings show that revenue investment means that book value is not sufficient to specify the stream of normal returns on the firm's investments. The Ohlson (1995) model is used to show that decomposition of residual income leads to a better valuation model and that current and past losses are associated with value creation for firms that practice revenue investment.

Keywords: Losses, Valuation, Conservatism.

Data Availability: The data used in this study are from the public sources identified in the text.

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I. INTRODUCTION

This paper tests whether current and past losses are associated with firm value. The motivation for the inquiry stems from the observation that some firms make losses because of investments which cannot be capitalized, rather than because of a loss of economic value. Investments such as research and development (R&D), marketing, staff training, and knowledge development cannot be capitalized as assets under current accounting rules. For example, Hand (2003a) argues that for internet start-up firms very-large marketing costs are intangible assets - not period expenses. SFAC 6 defines an asset as "Probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events." More detailed accounting rules exclude investments such as R&D from this definition because their 'future economic benefits' are too risky. [Holthausen and Watts \(2001\)](#) point out that the balance sheet is a collection of 'individual, separable assets and liabilities.' They argue that investments such as R&D are excluded because they do not have a value that is separable from the value of the firm. In either case, valuable investments have been excluded from the firm's balance sheet and charged as expenses to the profit and loss account. This is called 'revenue investment' in this paper.

There are a number of different perspectives on the association between stock market value and the accounting numbers of loss making firms. Early research on the earnings response coefficient assumed that the association between stock market price and profits is symmetric to the association between stock market price and losses. This position

states that given a certain level of earnings persistence a \$1 profit will result in the same change in stock price as a \$1 loss. [Hayn \(1995\)](#) specifically considered loss making firms and argued that losses are not expected to perpetuate. This implies that losses are less informative about stock price movements than profits. [Burgstahler and Dichev \(1997\)](#) agree with Hayn's (1995) findings but argue that this is because the abandonment value of the firm is more important for the valuation of loss making firms than earnings. [Chambers \(1996\)](#) argues that the information content of losses is related to the persistence of losses. A loss that is not expected to persist will be less informative than a loss that is going to persist for several periods. [Joos and Plesko \(2003\)](#) follow Hayn's work by examining the probability of loss reversals. They argue that transitory losses are likely to reverse quickly while losses due to revenue investments will persist. They find a negative relation between earnings and returns for the loss making firms with the lowest probability of loss reversal. [Donnelly \(2002\)](#) returns to the persistence arguments by using losses as proxies for the transitory components of earnings.

Researchers have also investigated the circumstances in which losses are more likely to be related to investments than to value destruction. [Amir and Lev \(1996\)](#) find that intangibles can be valued using nonfinancial information in the wireless telecommunications industry. [Hand \(2003b\)](#) shows that the equity values of biotechnology companies are related to their R&D expense, and to their cash and noncash assets. [Joos and Plesko \(2003\)](#) find that investors reward the R&D component of losses with positive returns. [Franzen \(2002\)](#) classifies firms as either transitory loss firms, firms likely to be investing in intangibles or firms likely to abandon their operations. [Franzen](#)

(2002) finds that the R&D expense is positively valued for loss firms likely to be investing in intangibles. Easton and Pae (2002) find that a proxy for conservatism is value relevant for high market-to-book and high R&D expenditure firms.

This paper contributes to this literature in two ways. Firstly, the paper attempts to identify firms whose losses are likely to be informative about stock movements because these losses are really investments. Accumulated losses are used to identify these firms. The firm's technological, accounting and financial characteristics confirm that this division is economically meaningful. Secondly, the residual income valuation model and the [Ohlson \(1995\)](#) models are used to examine the association between firm value and both current and past accounting losses. This is in line with the arguments of Subramanyam and Venkatachalam (1998) and Collins, Pincus and Xie (1999). The [Ohlson \(1995\)](#) framework models firm value as a weighted function of current residual earnings and book value. The intuition behind the model is that the weight on book value represents 'normal returns' on the firm's resources and the weight on residual earnings represents expected 'abnormal returns' on the firm's resources. The effect of revenue investment is to reduce both earnings and book value. The reduction in book value is equal to an investment which will yield normal returns. This means that book value is not a good proxy for normal returns for revenue investment firms. The findings from this paper distinguish between the Hayn (1995) and Burgstahler and Dichev (1997) hypothesis that losses have no information content and other findings that for some firms losses can be associated with value creation.

The paper finds that the occurrence of multiple accounting losses is associated with the age, size and technological opportunities of the firm. It was also noted that the type of firms that make losses have changed over time. Loss making firms at the start of the sample tended to make losses for shorter periods of time and were more similar to profit making firms than firms in the later years of the sample. The life-cycle of some loss making firms was found to differ from other loss making firms. Some firms made losses over long periods of time while for other firms losses tended to reverse quickly.

The paper supports the Hayn (1995) and Joos and Plesko (2003) finding that current losses are associated with increases in stock prices for some loss making firms. Furthermore, the implications of conservatism for book value are incorporated into a valuation model using Ohlson (1995). This paper finds that past losses have a role in valuation that is in addition to the role of current losses. A side effect of separating the components of book value is that the role of book value adjusted for past losses is found to be stable over all types of firms.

II. EMPIRICAL PREDICTIONS AND RESEARCH DESIGN

The Characteristics Of Revenue Investment Firms

Holthausen and Watts (2001) point out that the balance sheet is a collection of 'individual, separable assets and liabilities.' They argue that investments such as R&D are excluded from the balance sheet because they do not have a value that is separable from the value of the firm. Therefore, revenue investment firms can be identified by looking for firms with high levels of investment in such assets. Three approaches are used to identify

revenue investment firms. Firstly, innovative firms are likely to have investments whose assets are not easily separated from the value of the firm. Secondly, firms with high levels of specialised assets are likely to have a different capital structure to that of other firms. Thirdly, the amount of the firm's investments that has been capitalized in the past and the amount of the firm's past losses can also provide information about the firm's revenue investments.

An innovative firm makes investments that are specialised to the firm and that cannot be capitalized by the accounting model. Kelm, Narayanan and Pinches (1995), use R&D intensity and R&D intensity relative to industry peers as measures of a firm's technological opportunities. Tushman and Anderson (1986) argue that most highly innovative firms are smaller, younger and have more potential for growth than their industry peer group. Innovative firms may have a higher level of sales growth than their non-innovative counterparts (Kelm, Narayanan and Pincas, 1995) unless the firm is developing a totally new product for which no market exists. Growth rate in sales relative to the firm's industry peers is also examined in order to control for the industry growth rate.

The issue of how much of the firm's investments have been capitalized in the past can be tackled directly by looking at the firm's holding of property, plant and equipment. The net level of property, plant and equipment to book value is used as a proxy for the specialisation of the firm's assets. Firms with non-specialised assets will have been able to capitalize those assets in the past and will have increased the level of property, plant

and equipment. This variable is also compared to the industry median in order to control for industry levels of asset specialisation.

The nature of a firm's assets will partly determine the firm's capital structure. Assets that can be traded in their own markets provide good collateral and reduce the risk of holding the asset. Therefore, firms with more specialized assets have less scope for borrowing than those with more marketable assets. The characteristics of a firm's assets will also influence its willingness to risk financial distress. High levels of business risk will lead to the firm taking on relatively low levels of financial risk (Kale, Noe and Ramirez, 1991.) This implies that firms with high levels of innovation and therefore high levels of specialised assets will have low levels of borrowing. This variable is also calculated relative to industry levels in order to control for industry effects.

For some firms revenue investments exceed profits from the firm's other operations pushing the firm into accounting losses. Retained earnings accumulate past profits and losses. They are a significant variable in the accounting system and a component of book value. When retained earnings are negative this means that the firm has had more losses and dividend payouts in the past than profits. Many firms that have practiced revenue investment will have negative retained earnings. This is because the accounting system does not recognize the value that is being created by these firm's investments. Because of retained earnings links to revenue investment a link between retained earnings and the specialization of the firm's assets is likely.

The population of firms was divided into four parts in order to identify revenue investment firms. These parts are (Case I) Profit firms with positive retained earnings; (Case II) Profit firms with negative retained earnings; (Case III) Loss firms with positive retained earnings and (Case IV) Loss firms with negative retained earnings².

Case I - Profit Firms

These firms have positive earnings and positive retained earnings. These firms are expected to be older, bigger and have higher levels of debt and fixed assets than other firms in the study. They are also expected to have lower level of technological opportunities and lower sales growth than other firms. Their earnings are expected to be more stable than the earnings of other firms in the sample.

Case II - Profit firms with retained earnings < 0

These firms are currently profitable but must have made losses at some point in the past. They are likely to be less mature than Case I firms and therefore be smaller and younger and have less debt. They may also have higher levels of technological opportunities than Case I firms.

Case III - Loss firms with retained earnings ≥ 0

² Use of retained earnings as a proxy for past losses is dependent on dividends. Past losses can be higher or lower depending on the path of past dividends. This has not been taken into account in this paper for two reasons. Firstly, any adjustment for dividends would have to be arbitrary as we cannot trace back the entire history of the firm. Secondly, for loss making firms dividends tend to be zero.

These firms are currently making a loss but have positive retained earnings. It is assumed that these firms have been profitable in the past but are now making a loss. Furthermore, it is assumed that these losses are indicative of value having been destroyed. These losses indicate that the economic value of the firm is lower at the end of the accounting period than at the beginning. These firms are making a loss because of poor economic conditions rather than making investments. They are expected to be older and larger than other loss making firms. They are also expected to have less specialised assets and more debt than other loss making firms. These features should make these firms similar to Case I firms. Their losses will not be as large as those for Case IV firms. It is likely that these firms will return to profitability within a reasonably short period of time.

Case IV - Loss firms with retained earnings < 0

These firms are currently making a loss and have negative retained earnings. We assume that these firms are practicing an extreme form of conservatism. They incur expenditure that has to be expensed but that will yield benefits in the future. This expenditure has more in common with investment in assets than with reduction in value caused by trading losses. These past losses will be accumulated in the retained earnings figure. It is expected that these negative retained earnings reflect past investments in specialised assets.

Loss firms with negative retained earnings are expected to be firms that practice revenue investment. These firms are expected to be significantly different in their operating characteristics from other loss making firms. They are expected to make a higher level of

losses than other loss making firms. This is because their losses represent both changes in the economic value of the firm and some of their investments. The negative retained earnings loss firms are expected to be firms that are making high levels of investments - both revenue investments and investments that can be capitalized. Therefore, both research and development expenditure should be higher and fixed asset intensity should be lower for these firms. These firms are likely to have very low levels of debt and a low book-to-market ratio. They are also likely to be smaller and younger than other loss making firms.

The earnings of loss firms with negative retained earnings are expected to remain negative for longer periods of time than for loss firms with positive retained earnings. Firms that practice revenue investment in one period are likely to practice it in the future. This is because particular businesses and industry groupings have to invest in assets specific to that industry grouping or business. If these investments cannot be capitalized because of the nature of the assets then this will lead to long period of loss making for some firms.

Identifying Revenue Investment Firms

Data was acquired from the Compustat (North America) CD-ROM product with annual and quarterly backdata. Each observation used for the test represents a firm-year. Outliers were not deleted for the statistics in this section of the paper. Data is for all firms listed on a US stock exchange from 1980-1997. Backdata is used to calculate firm age. Distressed firms were identified as firms that were not in the sample three years after the

observation date because of bankruptcy or liquidation. Non-distressed firms are all other firms. This is similar to the definition of distress used by Barth, Beaver and Landsman (1998). Distressed firms are deleted from all of the samples used, except for the results reported in Table 2. Industries are as defined by Fama and French (1997).

INSERT TABLE 2 HERE

Table 2 shows the medians of firm characteristics for loss making (Panel A) and profitable (Panel B) firms. The panels contain medians for each year and for the full sample. The results in this table are interesting in three ways. Firstly, the number of loss making firms (Panel A) has increased significantly from 1980 to 1997 both in absolute terms and as a proportion of the total sample. This could be because of a shift in the type of firms that are listed on stock exchanges. It is possible that there are more firms in early stages of their life cycles listed on the US stock exchanges than there were in 1980. This is illustrated by the young age of loss-making firms and their small sales. Secondly, the amount of specialized assets used by these loss making firms (Panel A) seems to have increased dramatically over this time. This can be seen in the decreased level of the book to market ratio, the debt to equity ratio and fixed asset intensity. In 1997, loss making firms had very low levels of borrowing, low investments in fixed assets and only a small part of their market value was represented by book value. Thirdly, loss making firms in 1997 seem to have better technological opportunities than loss making firms in 1980. Their level of investment in R&D, and their sales growth have increased significantly. These results provide some evidence that loss making firms may be engaging in revenue investment due to their high levels of specialized assets and technological investment.

Table 2, also examines the sub sample of profitable firms (Panel B). These firms are older, bigger and have larger borrowings than loss-making firms. They also have lower levels of research and development expenditure and less investment in specialized assets. Although, the book-to-market ratio and fixed asset intensity ratio have both fallen over time. The number of firms in distress is much smaller for profitable firms (1%) than for loss making firms (4%). These results show that there are important differences in operating and financing characteristics between profitable and loss making firms. These differences are not solely related to profitability but concern the firm's size, age, leverage, technological opportunities and asset specialisation.

INSERT TABLE 3 HERE

Table 3 subdivides the sample in order to identify firms that are practicing revenue investment. It examines the medians of firm characteristics in order to establish whether proposed subdivisions are capturing the expected effects of revenue investment. Panels A and B subdivide the sample by sign of earnings and sign of retained earnings. This procedure isolates firms that are making losses and that have negative retained earnings. It is expected that these firms practice revenue investment. If this is the case then they should have high levels of specialized assets that cannot be capitalized and must be expensed. This will be indicated by low levels of fixed asset intensity, low levels of leverage and high levels of losses. Panel A shows that such firms have a median level of leverage of 5% as opposed to 44% for other loss making firms. Their book value is composed of 35% of fixed assets as opposed to 66% for other loss making firms. Their losses are 21% of share price as opposed to 9% for other loss making firms. These firms also have higher levels of technological opportunities than other loss making firms or

profit making firms. They have a much higher level of R&D spend and are younger and smaller.

In summary, there are significant accounting, economic and technological differences between profit making firms and loss making firms and between loss making firms with a history of losses and loss making firms that were previously profitable.

Valuation And Revenue Investment

The relationship between price and book value will be more complex for firms that practice revenue investment than for firms that capitalize their investments. The residual income model allows the analysis of this relationship. This model assumes that price is equal to discounted risk-adjusted dividends, and that the clean-surplus relation holds. Using [Ohlson \(1995\)](#) notation the value relation is:

$$P_t = y_t + \sum_{\tau=1}^{\infty} R_f^{-\tau} E_t[\tilde{x}_{t+\tau}^a] \quad (1)$$

The residual income model, given by equation (1), states that firm value is equal to book value plus the discounted sum of expected residual income. If the firms resources are measured correctly in book value then the firm's expected earnings will be equal to book value times the firm's cost of capital. In this case, book value represents the 'normal' returns on the firm's resources. This is because an asset that earns exactly the firm's cost of capital is worth its acquisition cost. Any returns on book value in excess of cost of

capital is captured by the expected value of residual income. These returns are called 'abnormal returns.' However, if the firm's assets are not measured well by book value then it will not represent the full value of the firm's resources and future expected residual income will include some of the firm's normal returns. If the firm reduces book value because of an investment in a zero NPV project, then the sum of discounted future residual earnings goes up by exactly the amount of the investment. This is caused by two effects. Firstly, future expected earnings will increase due to the inflows from the project. Secondly, the nominal charge against earnings will be smaller due to the reduction in book value.

Feltham and Ohlson (1995,1996) explicitly model accounting conservatism. Feltham and Ohlson (1995) model the stochastic process for abnormal operating income in terms of lagged operating income and lagged operating assets. Feltham and Ohlson (1996) model the depreciation of investments. The model predicts that “if the depreciation policy expenses the investment cost more quickly than is implied by the expected cost in future cash receipts (i.e., conservative accounting), then the valuation function includes a constant times the start-of-period book value.” Easton and Pae (2002) use Feltham and Ohlson (1995) to develop a model that predicts that stock returns are a function of earnings levels, earnings changes, lagged dividends and the change in operating assets. These models are very theoretically attractive as they model conservatism directly. The Ohlson (1995) model was used in this paper because of the ability to use retained earnings, the specific variable of interest, in the valuation function.

A regression equation is needed to test whether book value is a good guide to normal returns for firms that practice revenue investment. Ohlson (1995) provides a framework within which the development of such a model is possible. [Ohlson \(1995\)](#) develops the following value equation after making an assumption about the time series properties of residual income:

$$P_t = y_t + \alpha_1 x_t^a + \alpha_2 v_t \quad (2)$$

where

$$\alpha_1 = \frac{\omega}{(R_f - \omega)} \geq 0$$

$$\alpha_2 = \frac{R_f}{(R_f - \omega)(R_f - \gamma)} > 0$$

Equation (2) gives the value of the firm as a linear function of book value, residual income and other value relevant information. The coefficients (α_1 , α_2) represent the capitalization factors necessary to turn current residual income and current 'other information' into the future value of the firm. The value of α_1 assumes that residual income grows at the rate of ω . When ω is less than 1 this implies residual income is mean reverting. This assumption makes sense where current residual income represents future abnormal returns on the firm's resources. Ohlson (1995) then substitutes the definition of residual income back into the expression for price to yield:

$$P_t = y_t + \alpha_1 x_t - \alpha_1 (R_f - 1) y_{t-1} + \alpha_2 v_t \quad (3)$$

The equation now provides capitalization factors for book value, earnings, lagged book value and other information. In order to build a useable model the other information term is dropped.

$$P_t = y_t + \alpha_1 x_t - \alpha_1 (R_f - 1) y_{t-1} \quad (4)$$

Revenue investment means that the observed values of book value, earnings and lagged book value differ from the theoretical values inherent in this model³. The observed values are defined as y_t^* and x_t^* for book value and earnings respectively. The amount of revenue investment is defined as z_t . Equation 4 can now be written including revenue investment.

$$P_t = (y_t^* + z_t) + \alpha_1 (x_t^* + \Delta z) - \alpha_1 (R_f - 1) (y_{t-1}^* + z_{t-1}) \quad (5)$$

Substituting $y_{t-1}^* = y_{t-1} - z_{t-1}$ and $z_t = z_{t-1} + \Delta z$ into equation 5 and re-arranging gives:

$$P_t = y_t^* + \alpha_1 x_t^* - \alpha_1 (R_f - 1) y_{t-1} + z_{t-1} + (1 + \alpha_1) \Delta z_{t-1} \quad (6)$$

Assume that negative retained earnings are a proxy for revenue investment $z_{t-1} \approx RE_{t-1}$.

Furthermore, assume that for revenue investment firms the current period net loss is approximately equal to the current period revenue investment i.e. $\Delta z_t = -x_t^*$. This give the following valuation equation for revenue investment firms.

³ The assistance of Colin Clubb in rewriting the model in this way is acknowledged.

$$P_t = y_t^* - x_t^* - \alpha_1(R_f - 1)(y_t^* - RE_{t-1}) - RE_{t-1} \quad (7)$$

Equation 7 has an intuitive interpretation. For revenue investment firms each dollar of losses adds to market value so current period losses are added back to book value. The Ohlson framework relies on capitalized book value being a proxy for future earnings. In equation 7 the same capitalization factor (α_1) is used to capitalize observed book value minus the value of retained earnings. Remember that retained earnings will be negative for these revenue investment firms so retained earnings will increase observed book value. This term represents the returns on both the investments that have been included in book value and those investments that have been expensed in the past. The last term in equation 7 represents the cost of investments that have been capitalized in the past. Retained earnings must be included here as it accumulates past investments that have been excluded from book value.

Harris and Kemsley (1999), Collins and Kemsley (2000) and Harris, Hubbard and Kemsley (2001) use a similar model to test the hypothesis that dividend taxes are capitalised into share prices. However, Dhaliwal, Erickson, Frank and Banyai (2003) and Hanlon, Myers and Shevlin (2003) argue that this model is not suitable for testing this hypothesis.

This framework provides a way to test the impact of revenue investment on valuation models. It provides predictions for the signs and magnitude of coefficients on observable

accounting variables. It also provides a way of comparing the coefficients in a valuation model between revenue investment and non-revenue investment firms.

Specification Of The Valuation Empirical Tests

We delete the term for other information from equations 2, 3 and 7 in the empirical tests and divide across by P_{t-1} to control for scale:

$$\text{Model 1 } \frac{P_t}{P_{t-1}} = \alpha_0 + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_1 \frac{RI_t}{P_{t-1}} + \varepsilon_t$$

$$\text{Model 2 } \frac{P_t}{P_{t-1}} = \alpha_0 + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_2 \frac{X_t}{P_{t-1}} + \beta_3 \frac{BV_{t-1}}{P_{t-1}} + \varepsilon_t$$

$$\text{Model 3 } \frac{P_t}{P_{t-1}} = \alpha_0 + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_2 \frac{X_t}{P_{t-1}} + \beta_4 \frac{(BV_{t-1} - RE_{t-1})}{P_{t-1}} + \beta_5 \frac{RE_{t-1}}{P_{t-1}} + \varepsilon_t$$

Where:

P_t = market price of equity per share 3 months after the fiscal year end

P_{t-1} = market price of equity per share at the end of the preceding fiscal year

X_t = earnings per share before extraordinary items

BV_{t-1} = book value per share at the end of the preceding fiscal year

RE_{t-1} = retained earnings per share at the end of the preceding fiscal year

BV_t = book value per share at the end of the fiscal year

RI_t = residual income for the fiscal year.

Model 1 has been tested by Dechow, Hutton and Sloan (1999) and Myers (1999).

Concerns about scale lead to consideration of another specification for the regression equation. Following Easton and Sommers (2000) the intercept from the equation is dropped and the inverse of lagged price is included.

$$\text{Model 4 } \frac{P_t}{P_{t-1}} = \alpha_0 \left(\frac{1}{P_{t-1}} \right) + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_1 \frac{RI_t}{P_{t-1}} + \varepsilon_t$$

$$\text{Model 5 } \frac{P_t}{P_{t-1}} = \alpha_0 \left(\frac{1}{P_{t-1}} \right) + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_2 \frac{X_t}{P_{t-1}} + \beta_3 \frac{BV_{t-1}}{P_{t-1}} + \varepsilon_t$$

$$\text{Model 6 } \frac{P_t}{P_{t-1}} = \alpha_0 \left(\frac{1}{P_{t-1}} \right) + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_2 \frac{X_t}{P_{t-1}} + \beta_4 \frac{(BV_{t-1} - RE_{t-1})}{P_{t-1}} + \beta_5 \frac{RE_{t-1}}{P_{t-1}} + \varepsilon_t$$

Equation 4 predicts that the coefficients, in Models 3 and 6, on earnings and book value will be positive, and the coefficients on lagged retained earnings and ordinary share capital will be negative. This is because book value appears twice in equation (4). Price depends on book value directly, but lagged book value also determines the nominal charge that is part of the residual income calculation. Lagged retained earnings and ordinary share capital will have negative coefficients because they are negatively related to abnormal returns.

For profitable firms, book value serves as a good guide to the firm's normal return on its resources. If book value has been reduced because of a loss in economic value then the firm's economic resources must also have declined by this amount. Consider a fall in book value that is caused by a decline in the economic value of the firm. This could be the discovery of a future liability, say the settlement amount of a court case. Assume that accounting rules force the firm to reduce its book value by the amount of the decline in economic value. Then book value will have fallen by the same amount as the firm's price. This is similar, in principle, to the argument of Basu (1997). In this case book value will

have reflected the fall in economic value and the value associated with normal returns will remain unchanged. This is because under the residual income valuation model expected earnings will decline to reflect the firm's lower resource base. The nominal charge against earnings in the residual income calculation will also decline to reflect the lower resource base of the firm. In the case of profitable firms we expect the coefficients of models 3 and 6 to be:

$$\beta_0, \beta_2 > 0$$

$$\beta_4, \beta_5 < 0$$

As shown by equation (7) residual income model can explain firm value in the presence of revenue investment by letting retained earnings proxy for revenue investments. The predictions of equation (7), for Models 3 and 6 are as follows:

$$\beta_2 < 0$$

Equation (7) predicts that the coefficient on current earnings should be minus one on the assumption that all current losses are revenue investments. Being that it is unlikely that all of a firm's losses are related to revenue investment the prediction is weakened to the coefficient on current earnings being less than zero. A negative coefficient on current earnings implies that losses create rather than destroy value for revenue investment firms.

This leads to hypothesis one:

H1 Current period losses are associated with value creation for firms that practice revenue investment.

It is expected that for loss making firms negative retained earnings reflect past revenue investments. The mechanics of the Ohlson equations determine that as book value is

reduced by the expensing of an investment the value of the firm's expected abnormal earnings should increase. Equation (7) predicts that the coefficient on retained earnings should be negative. Where retained earnings are negative this gives a positive impact on returns. If β_5 is negative, this means that negative retained earnings do have a positive impact on future value, for negative retained earnings firms, and are more like investments that losses. This means that:

$$\beta_5 < 0$$

for loss making firms with negative retained earnings. It is also expected that the coefficient on retained earnings will differ from the coefficient on lagged book value minus lagged retained earnings (α_1 in equation (7)). Equation (7) predicts that the coefficient on lagged retained earnings should be one while the coefficient on shareholder's contributed funds (lagged book value minus lagged retained earnings) should be less than one. This is because the weight on ordinary share capital represents abnormal returns on that capital while the weigh on retained earnings represents normal returns on those past investments.

H2 The coefficient on retained earnings will be negative and less than the coefficient on ordinary share capital for revenue investment firms.

This means that separating out the coefficients on lagged book value (shareholder's contributed funds and retained earnings) should lead to improved explanatory power for the model if revenue investment is modelled by equation (7). This leads to hypothesis 3.

H3 Breaking residual income into its components will increase its explanatory power only for firms that practice revenue investment.

Revenue investment means that the firm's book value has decreased but price has gone up or at least not changed. In the case of a zero NPV project price will remain the same and book value will decrease by the amount of the investment. This means that future value must increase by the amount of the investment in the project. This is caused by both an increase in expected earnings and a decrease in the nominal charge against earnings. Some of the firm's normal return on its resources is now included in future value (through the sum of discounted expected residual income) rather than being included in book value. Therefore, book value is, in this situation, an unreliable guide to normal returns on the firm's resources. Splitting residual income into its component parts provides extra information about the firm's normal returns. One of the component parts of residual income is retained earnings. Retained earnings represent past losses for these firms and negative retained earnings reduce the nominal charge against earnings.

The fourth hypothesis suggested by the model outlined above deals with the relationship between price and book value. Revenue investment is a major reason why book value is not linearly related to price. Breaking out retained earnings from book value takes this factor into account. When this adjustment is made to the specification of the regression equation, the relationship between price and book value should be uniform over profit and loss making firms.

H4 The relationship between price and book value should be uniform over profit and loss making firms.

This hypothesis will be tested by observing the coefficient on book value in the regression equations. Burgstahler and Dichev (1997) argue that book value has a greater

weight in valuation when earnings are low or negative. H4 tries to establish that book value has a relatively stable role in valuation even for loss making firms.

This paper aims to investigate four hypotheses. Firstly, is book value a good guide to normal returns for firms that practice revenue investment. Secondly, whether current losses could create value for some firms. Thirdly, is the role of book value the same for loss firms as it is for profit firms. Fourthly, are past losses value relevant for revenue investment firms.

Valuation Results

The data was acquired from the Compustat (North America) CD-ROM product with annual and quarterly backdata. Data was transformed as follows. Data was downloaded from the compustat CD-ROM product into SAS. Each observation used for the test represents a firm-year. Data is for all firms listed on a US stock exchange from 1980-1997. Backdata from 1962 is used to calculate firm age. Distressed firms were identified as firms that were not in the sample three years after the observation date because of bankruptcy or liquidation. Non-distressed firms are all other firms. This is similar to the definition of distress used by Barth, Beaver and Landsman (1998). Distressed firms have been deleted from the samples used in all of the tables except Table 2. Observations in the top or bottom one percent of observations ranked on deflated price, earnings, residual income, book value, lagged book value, book value less retained earnings and retained

earnings have been deleted as outliers. The definitions of the variables used in this study appear in Table 1.

INSERT TABLE 4 HERE

Table 4 presents descriptive statistics for the sample used in this chapter. Panels A, B and C give descriptive statistics for the full sample, the sample divided by sign of earnings and the sample divided by sign of earnings and sign of retained earnings respectively.

INSERT TABLE 5 HERE

Table 5 shows the results of the regression analysis for Models 1-3. Model 1 is based on equation (2). It regresses deflated price on deflated book value and deflated residual income. Model 2 (based on equation (4)) replaces residual income with earnings and lagged book value. Model 3 (based on equation (7)) replaces lagged book value with ordinary share capital and retained earnings. Panels A and B show the results for profit making firms with positive and negative retained earnings. Panel C shows the results for loss making firms with positive retained earnings and Panel D shows the results for loss making firms with negative retained earnings. In general, the coefficients on residual earnings (β_1) and earnings (β_2) are positive and significant for profit making firms. The coefficient on earnings (β_2) is negative and significant for loss making firms with negative retained earnings (Panel D).

Hypothesis 3 can be tested by examining the change in explanatory power from model 1 to model 3 in Table 5 Panel A. All of the firms in this table are profitable so it is expected that breaking residual income into its components will not provide extra explanatory

power. The results support this hypothesis as the increase in explanatory power between model 1 and model 2 is .89% and between model 2 and model 3 is .14%. In the context of R^2 's of about 18% these increases are small. Table 5 Panel C provides evidence that is in accordance with hypothesis 3. These loss making firms with positive retained earnings are assumed to be firms whose losses indicate a loss in economic value. Hypothesis 3 states that a de-composition of residual income should not provide extra explanatory power for such firms. This is because book value is a good guide to the firm's reduced earning power. The results support this hypothesis. The increase in explanatory power from model 1 to model 2 is .6%. There is no increase in explanatory power from model 2 to model 3. Table 5 Panel D shows the results of the regression equations for firms that make losses but have negative retained earnings. Panel D also provides evidence on hypothesis 3. Breaking residual income into its component parts increases the explanatory power of the model. The R^2 of model 2 is 3.5% higher than the R^2 of model 1. Model 3 increases explanatory power by .87% over model 2. That is a 4.22% increase in R^2 from model 1 to model 3. This is because book value does not constitute a complete information set for normal returns for firms that practice revenue investment. Splitting residual income into its component parts provides extra explanatory power by modelling the relationship between retained earnings and future residual income.

The coefficients on retained earnings (β_5) and on ordinary share capital (β_4) are negative and significant in all the panels of Table 5. The test that $\beta_4 = \beta_5$ is rejected for Panels A, B and D. It was expected that this test would only be rejected for panel D.

INSERT TABLE 6 HERE

Table 6 shows the results for regression models 4-6. These regressions are the same as models 1-3 but replace the intercept with one over lagged price. According to Easton and Sommers (2000) this specification should help control for scale.

The coefficients on residual earnings (β_1) and earnings (β_2) are negative and significant for both loss making firms with positive retained earnings (Panel C) and loss making firms with negative retained earnings (Panel D). However the coefficients are much lower for loss making firms with negative retained earnings. This provides evidence that current losses can create value for some firm, especially firms with high levels of revenue investment. These findings support hypothesis 1.

It is predicted that retained earnings should be negatively related to returns. From the mechanics of equation (7) it is expected that reductions in book value now would reduce the nominal charge against earnings in the future, and would increase 'future value'. The coefficient on retained earnings (β_5) is significant and negative in Panel D. This means that negative retained earnings multiplied by a negative coefficient gives a positive impact on returns and value. Hypothesis 2 also predicts that the coefficient on retained earnings (β_5) will be less (more negative) than the coefficient on ordinary share capital (β_4). The restriction $\beta_4 = \beta_5$ on model 6 is tested. This test is rejected for all of the Panels in Table 6 but it is most strongly rejected for Panel D. Panel D covers firms that are

making losses and have negative retained earnings. This finding provides weak support for hypothesis 2

Hypothesis 3 proposes that breaking residual income into its components will only provide extra explanatory power for firms that practice revenue investment. This hypothesis is tested by examining the change the explanatory power from model 4 to model 6 in Table 6 Panel A. All of the firms in this panel are profitable so it is expected that breaking residual income into its components will not provide extra explanatory power. The model selection test developed by Vuong (1989) and used in Dechow (1994) is used to determine whether the decomposition of residual income adds to the model's ability to explain value. In Panel A Model 5 is not significantly better at explaining value than Model 4 but Model 6 is significantly better than Model 5. Only in Panel D does the decomposition of residual income lead to monotonic improvements in the models ability to explain value.

Hypothesis 4 predicts that the relationship between price and book value should be uniform over profit and loss making firms when revenue investment is taken into account. The coefficient on book value (β_0) in model 6 is of the same magnitude for profitable firms (1.225) as for loss making firms with negative retained earnings (1.178). Without the adjustment for retained earnings developed in equation (7) this coefficient went from 1.243 for profit making firms to 0.647 for loss making firms with negative retained earnings. This finding provides support for hypothesis 4.

INSERT TABLE 7 HERE

Table 7 performs sensitivity analysis by changing the definition of revenue investment firms used. This table looks at Model 6 for loss making firms only. The first regression looks at loss making firms that are younger than their industry peers. The results are in keeping with expectations as there is a significant negative coefficient on earnings (β_2) and the hypothesis that $\beta_4 = \beta_5$ is rejected for all of the models. The second model is run for loss making firms that have a higher level of R&D spend than their industry peers and the third model is run for firms that are smaller than their industry peers.

The findings in this paper show that a decomposition of residual income containing retained earnings provides incremental information over residual income in valuation. The expected role of book value and retained earnings in valuation using the Ohlson (1995) model is confirmed.

III. CONCLUSION

I investigate the effects of revenue investment on the valuation of loss making firms. Revenue investment occurs when a firm invests in an asset that cannot be capitalized by the accounting system. I aim to show that there are two sub-populations of loss making firms. Firms that make losses because of loss of economic value are distinguished from firms that make losses because of making investments that cannot be capitalized by the accounting system. I show that dividing loss making firms into sub-populations based on retained earnings draws out differences in the firms' ages, size, technological opportunities and accounting characteristics. Secondly, I work through the implications

of revenue investment for a valuation model widely used in accounting research. The residual income model and the Ohlson (1995) valuation model use book value as a proxy for normal returns on the firm's resources. I argue that because revenue investment means that investments have been excluded from book value, it is not a good proxy for normal returns. I modify the Ohlson (1995) model to take account of revenue investment. I test this modified model and find that revenue investment means that the weight on earnings is negative. This implies that losses can be associated with value for some loss making firms. I also find that splitting book value into its components in the valuation model leads to better explanatory power for loss making firms. This is because book value is not a good proxy for normal returns for some firms. Splitting book value into its components improves its performance as a proxy for normal returns.

REFERENCES

- Amir, E. and B. Lev 1996. Value-relevance of nonfinancial information: The wireless communications industry. *Journal of Accounting and Economics* 22: 3-30
- Barth, M.E., W.H. Beaver and W.R. Landsman 1998. Relative valuation roles of equity book value and net income as a function of financial health. *Journal of Accounting and Economics* 25: 1-34
- Basu, S. 1997. The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting and Economics* 24: 3-38
- Burgstahler, D., and I. Dichev 1997. Earnings, adaptation, and equity value. *The Accounting Review* 72: 187-215
- Chambers, D. 1996. The information content of negative earnings and its relation with initial-loss persistence. Working Paper, The University of Illinois at Urbana-Champaign.
- Collins, D.W., M. Pincus, and H. Xie 1999. Equity valuation and negative earnings: the role of book value of equity. *The Accounting Review* 74: 29-61
- Collins, J.H., and D. Kemsley 2000. Capital gains and dividend taxes in firm valuation: evidence of triple taxation. *The Accounting Review* 75: 405-427
- Dechow, P.M. 1994. Accounting earnings and cash flows as measures of firm performance the role of accounting accruals. *Journal of Accounting and Economics* 18: 3-42
- _____, A.P. Hutton and R.G. Sloan. An empirical assessment of the residual income valuation model. *Journal of Accounting and Economics* 26:1-34
- Donnelly, R. 2002. Earnings persistence, losses and the estimation of earnings response coefficients. *Abacus* 38: 121-133
- Dhaliwal, D., M. Erickson, M.M. Frank and M. Banyai 2003. Are shareholder dividend taxes on corporate retained earnings impounded in equity prices? Additional evidence and analysis. *Journal of Accounting and Economics* 35: 179-200
- Easton, P.D., and G.A. Sommers 2000. Scale and scale effects in market-based accounting research. Working Paper, Ohio State University.
- _____, and J. Pae 2002. Accounting conservatism and the regression of returns on earnings and earnings changes. Working Paper Ohio State University and Queens University.

Fama, E.F., and K.R. French. 1992. The cross-section of expected stock returns. *Journal of Finance* 47: 427-466

_____, and _____ 1995. Size and book-to-market factors in earnings and returns. *Journal of Finance* 50: 131-156

_____, and _____ 1997. Industry costs of equity. *Journal of Financial Economics* 43: 153-194

Feltham, G.A. and J. Ohlson 1995. Valuation and clean surplus accounting for operating and financial activities. *Contemporary Accounting Research* (Spring): 689-731

Feltham, G.A. and J. Ohlson 1996. Uncertainty resolution and the theory of depreciation measurement. *Journal of Accounting Research* 34 (Autumn): 209-234

Franzen, L. 2002. The nature of losses and the value relevance of earnings. Working paper, University of Texas, Dallas

Hand, J.R. 2003a. Profits, losses and the non-linear pricing of internet stocks. In Hand, J.R.M. and B. Lev (Eds.) *Intangible Assets: Values, Measures and Risks*. Oxford: Oxford University Press

Hand, J.R. 2003b. The value relevance of financial statements within and across private and public equity markets. Working Paper, UNC Chapel Hill.

Hanlon, M., J.M. Myers and T. Shevlin 2003. Dividend taxes and firm valuation a re-examination. *Journal of Accounting and Economics* 35:199-153

Harris, T.S. and D. Kemsley 1999. Dividend taxation in firm valuation: new evidence. *Journal of Accounting Research* 37: 276-291

_____, R.G. Hubbard and D. Kemsley 2001. The share price effects of dividend taxes and tax imputation credits. *Journal of Public Economics* 79:569-596

Hayn, C. 1995. The information content of losses. *Journal of Accounting and Economics* 20: 125-153

Holthausen, R.W., and R.L. Watts 2001. The relevance of the value relevance literature for financial accounting standard setting. *Journal of Accounting and Economics* 31: 3-75

Joos, P., and G. Plesko 2003. Loss reversals and Earnings Based Valuation. Working Paper, Sloan School of Management, MIT.

Kale, J., T.H. Noe and G.G. Ramirez 1991. The effect of business risk on corporate capital structure: theory and evidence. *Journal of Finance* 46: 1693-1715

Kelm, K., V. Narayanan and G. Pinches 1995. Shareholder value creation during R&D innovation and commercialization stages. *Academy of Management Journal* 38: 770-786

Myers, J.N. 1999. Implementing residual income valuation with linear information dynamics. *The Accounting Review* 74:1-28

Ohlson, J.A. 1995. Earnings, book values and dividends in equity valuation. *Contemporary Accounting Research* 11: 661-687

Subramanyam, K.R., and M. Venkatachalam 1998. The role of book value in equity valuation: does the stock variable merely proxy for relevant past flows. Working Paper, University of Southern California.

Tushman, M., and P. Anderson 1986. technological discontinuities and organizational environments. *Administrative Science Quarterly* 31: 439-465

Vuong, Quang 1989. Likelihood ratio tests for model selection and non-nested hypothesis. *Econometrica* 57: 307-333.

White, H. 1980. Heteroskedasticity consistent covariance matrix estimator and a direct test of heteroskedasticity. *Econometrica* 48: 817-838

Table 1 List of variables

Variable	Description	Compustat Code
P_t	Price, per share, at the firm's fiscal year end	PRCCM
P_{t-1}	Price, per share, at the end of the financial year preceding year t	PRCCM
X_t	Earnings per share, excluding extraordinary items and discontinued operation, for the fiscal year t.	EPSPX
RD_t	Research and development expenditure for fiscal year t.	XRD
BV_t	Book value per share of common shareholder's equity at the end of fiscal year t.	CEQ
TBV_t	Total Book value of common shareholder's equity at the end of fiscal year t.	CEQ
RE_t	Retained earnings at the end of fiscal year t	RE
OI_t	Operating income after depreciation for fiscal year t	OIADP
FA_t	Net property, plant and equipment at the end of year t	PPT
LTD_t	Long term debt included in long term liabilities at the end of fiscal year t	DLTT
MV_t	Market value of the firm at the end of fiscal year t	
AGE	AGE is the number of years that compustat has recorded a figure for earnings for the firm since 1962.	
RAGE	Firm age relative to median age for firms in the same industry. (AGE/Median Age for the industry ^a)	
RMV	Firm market value relative to median market value for firms in the same industry. (MV/Median MV for the industry ^a)	
RSALE	Firm sales relative to median sales for firms in the same industry. (SALE/Median SALE for the industry ^a)	
RSALEG	Firm sales growth relative to median sales growth for firms in the same industry. (SALEG/Median SALEG for the industry ^a)	
RRD	Firm R&D spend relative to median R&D spend for firms in the same industry. ((RD/SALE)/Median (RD/SALE) for the industry ^a)	
RFA	Firm fixed asset intensity relative to median fixed asset intensity for firms in the same industry. ((FA/BV)/Median (FA/BV) for the industry ^a)	
RI_t	Residual income for fiscal year t. Residual income is defined as $X_t - (BV_{t-1} \times .12)$. This assumes a cost of capital of 12%. Residual income is calculated for firms with negative book value.	

^a Industries are as defined by Fama and French (1997)

Table 2
Median of firm characteristics for 1980-1997^a divided into loss making and profitable firms

Panel A: Loss making firms^c

Year	N	Earnings to price X_t/P_t	Book to market BV_t/P_t	Price to Earnings P_t/X_t	Debt to Equity LTD_t/BV_t	Age AGE	Sales $SALE_t$	Market Value MV_t	Operating Income to Sales $OI_t/SALE_t$	Net Income to Sales $NI_t/SALE_t$	Sales growth over last 2 years SALEG	Research and development spend over sales ^d $RD_t/SALE_t$	Fixed asset intensity FA_t/BV_t	Retained earnings over book value RE_t/BV_t	% of firms in distress ^f
80	576	-0.15	0.76	-6.68	0.49	6	17.81	7.99	-0.03	-0.07	0.00	0.02	0.73	0.28	0.05
81	809	-0.18	0.78	-5.66	0.41	7	14.41	6.51	-0.04	-0.07	0.00	0.02	0.77	0.19	0.04
82	1,333	-0.19	0.72	-5.32	0.32	8	12.06	7.20	-0.08	-0.11	-0.03	0.02	0.73	0.17	0.03
83	1,300	-0.13	0.53	-7.50	0.25	9	9.92	10.74	-0.11	-0.15	-0.07	0.03	0.68	0.03	0.04
84	1,383	-0.20	0.58	-5.00	0.20	6	8.38	7.87	-0.13	-0.18	0.02	0.05	0.61	-0.20	0.05
85	1,687	-0.18	0.56	-5.52	0.20	6	10.92	9.18	-0.11	-0.16	0.03	0.05	0.59	-0.08	0.04
86	1,790	-0.17	0.53	-5.81	0.18	6	10.52	11.00	-0.12	-0.16	-0.04	0.05	0.57	-0.09	0.04
87	1,836	-0.17	0.56	-6.03	0.15	5	9.75	10.16	-0.10	-0.14	0.01	0.05	0.47	-0.17	0.06
88	1,832	-0.19	0.54	-5.17	0.11	6	10.29	9.65	-0.10	-0.16	0.04	0.06	0.44	-0.27	0.07
89	1,856	-0.19	0.53	-5.20	0.16	6	12.79	10.20	-0.08	-0.14	0.04	0.05	0.49	-0.25	0.08
90	1,920	-0.30	0.73	-3.35	0.14	7	16.47	7.49	-0.07	-0.13	0.01	0.05	0.42	-0.27	0.07
91	1,932	-0.21	0.61	-4.74	0.13	7	17.35	11.35	-0.07	-0.13	-0.03	0.04	0.44	-0.24	0.04
92	1,837	-0.15	0.52	-6.48	0.10	7	16.35	17.18	-0.08	-0.15	-0.03	0.05	0.41	-0.33	0.04
93	1,864	-0.14	0.45	-7.07	0.09	7	18.90	26.60	-0.07	-0.16	0.01	0.07	0.38	-0.39	0.04
94	1,877	-0.17	0.48	-5.73	0.08	7	16.19	21.90	-0.09	-0.17	0.05	0.08	0.40	-0.65	0.03
95	2,056	-0.15	0.41	-6.87	0.12	6	19.32	28.03	-0.08	-0.15	0.07	0.07	0.38	-0.51	
96	2,406	-0.15	0.37	-6.61	0.07	6	18.59	29.69	-0.11	-0.18	0.08	0.10	0.30	-0.56	
97	2,738	-0.17	0.33	-5.76	0.04	6	18.70	29.17	-0.14	-0.22	0.07	0.13	0.28	-0.59	
Pooled ^e	31,032	-0.17	0.50	-5.75	0.13	7	14.58	13.93	-0.09	-0.15	0.01	0.05	0.46	-0.26	0.04

Table 2 (continued)
Panel B: Profitable firms

Year	N	Earnings to price X_t/P_t	Book to market BV_t/P_t	Price to Earnings P_t/X_t	Debt to Equity LTD_t/TBV_t	Age AGE	Sales $SALE_t$	Market Value MV_t	Operating Income to Sales $OIt/SALE_t$	Net Income to Sales $NI_t/SALE_t$	Sales growth over last 2 years SALEG	Research and development spend over sales ^d $RD_t/SALE_t$	Fixed asset intensity FA_t/BV_t	Retained earnings over book value RE_t/BV_t	% of firms in distress ^f
80	3,639	0.11	0.92	8.67	0.39	13	125.24	54.35	0.10	0.05	0.17	0.01	0.63	0.67	0.01
81	3,601	0.12	0.94	8.45	0.35	13	129.81	53.15	0.09	0.05	0.14	0.01	0.62	0.66	0.01
82	3,618	0.09	0.86	11.04	0.31	12	101.14	55.07	0.09	0.05	0.09	0.01	0.60	0.65	0.01
83	3,598	0.08	0.70	12.85	0.28	13	107.93	76.82	0.09	0.05	0.07	0.02	0.56	0.62	0.01
84	3,748	0.09	0.75	11.28	0.29	12	115.61	72.30	0.09	0.06	0.12	0.02	0.58	0.59	0.01
85	3,460	0.07	0.64	14.42	0.31	12	121.57	90.98	0.09	0.05	0.12	0.02	0.57	0.59	0.01
86	3,328	0.06	0.60	15.58	0.33	12	120.90	96.65	0.09	0.05	0.09	0.02	0.55	0.57	0.01
87	3,516	0.07	0.68	13.54	0.34	13	122.53	81.70	0.09	0.05	0.11	0.02	0.54	0.54	0.01
88	3,563	0.08	0.65	12.86	0.33	13	138.10	95.37	0.09	0.06	0.14	0.02	0.53	0.52	0.02
89	3,412	0.07	0.62	13.64	0.32	13	150.29	108.69	0.09	0.06	0.13	0.02	0.52	0.53	0.01
90	3,307	0.08	0.73	12.56	0.30	11	156.71	94.04	0.09	0.05	0.10	0.02	0.54	0.55	0.01
91	3,274	0.06	0.60	16.82	0.26	11	151.29	128.19	0.09	0.05	0.08	0.02	0.49	0.53	0.01
92	3,516	0.06	0.57	17.18	0.24	11	160.78	143.46	0.09	0.05	0.07	0.02	0.46	0.48	0.01
93	4,206	0.06	0.55	16.86	0.25	9	132.63	137.57	0.10	0.06	0.09	0.02	0.39	0.46	0.01
94	4,696	0.07	0.61	14.77	0.29	9	144.68	138.58	0.11	0.07	0.12	0.02	0.38	0.44	0.01
95	4,856	0.06	0.56	16.11	0.28	9	145.07	162.53	0.12	0.07	0.14	0.02	0.36	0.44	
96	5,292	0.06	0.53	17.05	0.28	9	150.96	176.33	0.12	0.07	0.14	0.02	0.36	0.43	
97	5,350	0.05	0.46	18.78	0.31	9	163.04	232.12	0.12	0.07	0.13	0.02	0.35	0.42	
Pooled ^c	69,980	0.07	0.63	14.38	0.30	11	136.73	107.33	0.10	0.06	0.12	0.02	0.50	0.53	0.01

^a The observations in this table are those with valid compustat data for price, book value and retained earnings in the relevant year. No outliers have been deleted.

Table 2 (continued)

^b X_t is the firm's earnings per share before extraordinary items and P_t is the firm's price at the end of year t . BV_t is book value per share at the end of year t . LTD_t is long term debt at the end of year t and TBV_t is total book value at the end of year t . AGE is the number of years that compustat has recorded a figure for earnings for the firm since 1962. $SALE_t$ is the firm's sales revenue for year t . MV_t is the firm's market value at the end of year t . That is end of year t price multiplied by compustat number of shares outstanding. OI_t is operating income for year t and NI_t is net income for year t . $SALEG$ is the compound sales growth over the last 2 years. FA_t is the amount of net property, plant and equipment at the end of year t . RE_t is retained earnings at the end of year t .

^c Firms are classified as profitable or loss making for each individual firm-year observation.

^d RD_t is the research and development spend for year t . This is only reported on compustat for a sub sample of the firms in the table. It is treated as missing and omitted from the calculation of the median where not available.

^e The pooled results represent the medians of the variables for the whole sample from 1980 to 1997.

^f A distressed firm is defined as a firm that is not in the sample 3 years later because of bankruptcy or liquidation. This variable cannot be calculated from 1995 onwards because the data is not available in the sample.

Table 3

Panel A: Medians of firm characteristics in the pooled sample^a (1980-1997) by sign of earnings and by sign of retained earnings

Variable ^b	N	Earnings to price X_t/P_t	Book to market BV_t/P_t	Price to Earnings P_t/X_t	Debt to Equity LTD_t/TBV_t	Age AGE	Sales $SALE_t$	Market Value MV_t	Operating Income to Sales $OIt/SALE_t$	Net Income to Sales $NI_t/SALE_t$	Sales growth over last 2 years $SALEG_{t-2,t}$	Research and development spend over sales ^d $RD_t/SALE_t$	Fixed asset intensity FA_t/BV_t	Retained earnings over book value RE_t/BV_t
Profitable firms														
$RE_t \geq 0$	59,764	0.07	0.65	14.00	0.31	12	176.78	135.34	0.10	0.06	0.12	0.02	0.52	0.60
$RE_t < 0$	9,684	0.05	0.49	18.74	0.23	8	23.12	24.89	0.07	0.05	0.12	0.01	0.34	-0.36
Loss-making firms														
$RE_t \geq 0$	8,274	-0.09	1.06	-10.89	0.44	12	75.08	27.35	-0.01	-0.04	0.00	0.02	0.66	0.43
$RE_t < 0$	21,614	-0.21	0.30	-4.68	0.05	5	7.39	11.33	-0.19	-0.28	0.03	0.09	0.35	-0.90

Panel B: Medians of firm characteristics relative to median of industry firm characteristics in the pooled sample (1980-1997) by sign of earnings and by sign of retained earnings

Variable ^c	N	Age relative to industry peers RAGE	Market value relative to industry peers RMV _t	Sales relative to industry peers RSALE _t	Sales growth relative to industry peers RSALEG	Research and development relative to industry peers ^d RRD _t	Fixed asset intensity relative to industry peers RFA _t
Profitable firms							
$RE_t \geq 0$	59,764	1.14	2.01	1.83	1.21	0.86	1.03
$RE_t < 0$	9,684	0.86	0.56	0.53	1.17	0.84	0.76
Loss-making firms							
$RE_t \geq 0$	8,274	1.14	0.56	1.01	0.01	0.98	1.25
$RE_t < 0$	21,614	0.67	0.26	0.18	0.29	2.05	0.79

Table 3 (continued)

^a The firm-year observations in this table are those with valid compustat data for price, book value and retained earnings in the relevant year. No outliers have been deleted but distressed firms have been deleted from the sample. A distressed firm is defined as a firm that is not in the sample 3 years later because of bankruptcy or liquidation. This variable cannot be calculated from 1995 onwards because the data is not available.

^b X_t is the firm's earnings per share before extraordinary items and P_t is the firm's price at the end of year t . BV_t is book value per share at the end of year t . LTD_t is long term debt at the end of year t and TBV_t is total book value at the end of year t . AGE is the number of years that compustat has recorded a figure for earnings for the firm since 1962. $SALE_t$ is the firm's sales revenue for year t . MV_t is the firm's market value at the end of year t . That is end of year t price multiplied by compustat number of shares outstanding. OI_t is operating income for year t and NI_t is net income for year t . Sales growth is the compound sales growth over the last 2 years. FA_t is the amount of net property plant and equipment at the end of year t . RE_t is retained earnings at the end of year t .

^c Each variable is divided by the median of that variable for all the firms in the same industry.

^d RD_t is the research and development spend for year t . This is only reported on compustat for a sub sample of the firms in the table. It is treated as missing and omitted from the calculation of the median where not available.

Table 4
Descriptive statistics for firm-year observations for the years 1980-1997^a
Panel A: Full sample

Variable	N	Mean	Standard deviation	Lower quartile	Median	Upper quartile
P_t/P_{t-1}	86,553	1.19	0.62	0.80	1.09	1.44
X_t/P_{t-1}		0.02	0.15	-0.01	0.06	0.10
RI_t/P_{t-1}		-0.06	0.16	-0.09	-0.01	0.03
BV_t/P_{t-1}		0.75	0.53	0.37	0.64	1.00
BV_{t-1}/P_{t-1}		0.70	0.53	0.32	0.59	0.95
$(BV_{t-1}-RE_{t-1})/P_{t-1}$		0.52	0.63	0.15	0.32	0.63
RE_{t-1}/P_{t-1}		0.18	0.63	-0.01	0.20	0.48

Panel B: Sample divided by sign of earnings
Profit making firms

Variable	N	Mean	Standard deviation	Lower quartile	Median	Upper quartile
P_t/P_{t-1}	63,811	1.28	0.59	0.92	1.17	1.50
X_t/P_{t-1}		0.09	0.06	0.05	0.08	0.12
RI_t/P_{t-1}		0.00	0.06	-0.02	0.01	0.04
BV_t/P_{t-1}		0.80	0.51	0.44	0.70	1.05
BV_{t-1}/P_{t-1}		0.71	0.49	0.36	0.61	0.94
$(BV_{t-1}-RE_{t-1})/P_{t-1}$		0.42	0.51	0.12	0.27	0.52
RE_{t-1}/P_{t-1}		0.29	0.52	0.07	0.26	0.52

Loss making firms

Variable	N	Mean	Standard deviation	Lower quartile	Median	Upper quartile
P_t/P_{t-1}	22,742	0.94	0.64	0.50	0.79	1.15
X_t/P_{t-1}		-0.16	0.17	-0.21	-0.10	-0.04
RI_t/P_{t-1}		-0.24	0.20	-0.32	-0.18	-0.10
BV_t/P_{t-1}		0.58	0.57	0.17	0.43	0.84
BV_{t-1}/P_{t-1}		0.68	0.62	0.21	0.50	0.98
$(BV_{t-1}-RE_{t-1})/P_{t-1}$		0.80	0.83	0.29	0.54	1.00
RE_{t-1}/P_{t-1}		-0.13	0.78	-0.36	-0.06	0.23

Panel C: Sample divided by sign of earnings and sign of retained earnings
Profit making firms with positive retained earnings

Variable	N	Mean	Standard deviation	Lower quartile	Median	Upper quartile
P_t/P_{t-1}	55,727	1.28	0.57	0.93	1.17	1.50
X_t/P_{t-1}		0.09	0.06	0.05	0.08	0.12
RI_t/P_{t-1}		0.01	0.06	-0.02	0.01	0.04
BV_t/P_{t-1}		0.82	0.49	0.47	0.71	1.06
BV_{t-1}/P_{t-1}		0.73	0.47	0.38	0.63	0.95
$(BV_{t-1}-RE_{t-1})/P_{t-1}$		0.32	0.31	0.11	0.23	0.43
RE_{t-1}/P_{t-1}		0.40	0.36	0.14	0.32	0.57

Table 4 (continued)

Panel C: Sample divided by sign of earnings and sign of retained earnings (continued)

Profit making firms with negative retained earnings

Variable	N	Mean	Standard deviation	Lower quartile	Median	Upper quartile
P_t/P_{t-1}	8,084	1.30	0.73	0.82	1.14	1.58
X_t/P_{t-1}		0.07	0.07	0.02	0.05	0.09
RI_t/P_{t-1}		0.00	0.08	-0.04	0.00	0.04
BV_t/P_{t-1}		0.69	0.56	0.28	0.55	0.94
BV_{t-1}/P_{t-1}		0.56	0.55	0.19	0.43	0.79
$(BV_{t-1}-RE_{t-1})/P_{t-1}$		1.08	0.95	0.43	0.78	1.40
RE_{t-1}/P_{t-1}		-0.51	0.69	-0.65	-0.26	-0.09

Loss making firms with positive retained earnings

Variable	N	Mean	Standard deviation	Lower quartile	Median	Upper quartile
P_t/P_{t-1}	7,311	0.91	0.48	0.59	0.83	1.11
X_t/P_{t-1}		-0.12	0.14	-0.16	-0.07	-0.03
RI_t/P_{t-1}		-0.25	0.19	-0.31	-0.19	-0.12
BV_t/P_{t-1}		0.94	0.57	0.52	0.82	1.24
BV_{t-1}/P_{t-1}		1.05	0.63	0.58	0.93	1.38
$(BV_{t-1}-RE_{t-1})/P_{t-1}$		0.50	0.44	0.20	0.38	0.65
RE_{t-1}/P_{t-1}		0.55	0.46	0.21	0.46	0.80

Loss making firms with negative retained earnings

Variable	N	Mean	Standard deviation	Lower quartile	Median	Upper quartile
P_t/P_{t-1}	15,431	0.95	0.70	0.47	0.75	1.18
X_t/P_{t-1}		-0.18	0.18	-0.24	-0.12	-0.05
RI_t/P_{t-1}		-0.24	0.21	-0.32	-0.17	-0.09
BV_t/P_{t-1}		0.42	0.48	0.11	0.27	0.57
BV_{t-1}/P_{t-1}		0.50	0.54	0.14	0.33	0.69
$(BV_{t-1}-RE_{t-1})/P_{t-1}$		0.95	0.92	0.35	0.64	1.21
RE_{t-1}/P_{t-1}		-0.45	0.69	-0.59	-0.21	-0.05

^a the sample contains all of the firm-year observations on compustat with the necessary data after deleting the following (1) observations in the top or bottom one percent of observations ranked on deflated price, earnings, residual income, book value, lagged book value, book value less retained earnings and retained earnings (2) all distressed firms (A distressed firm is defined as a firm that is not in the sample 3 years later because of bankruptcy or liquidation. This variable cannot be calculated from 1995 onwards because the data is not available.)

^b X_t is the firm's earnings per share before extraordinary items and P_{t-1} is the firm's price at the end of year t-1. RI_t is residual income for year t ($RI_t=X_t-(BV_{t-1} \times 12)$). BV_t is book value at the end of year t and BV_{t-1} is book value at the end of year t-1. RE_t is retained earnings at the end of year t.

Table 5

Results from pooled cross-sectional regressions, without an intercept, excluding outliers and distressed firms^a, of price on book value and the components of residual earnings. All variables are deflated by beginning-of-period price. The sample covers 1980-1997 and is divided by sign of earnings and sign of retained earnings.

$$\text{Model 1 } \frac{P_t}{P_{t-1}} = \alpha_0 + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_1 \frac{RI_t}{P_{t-1}} + \varepsilon_t$$

$$\text{Model 2 } \frac{P_t}{P_{t-1}} = \alpha_0 + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_2 \frac{X_t}{P_{t-1}} + \beta_3 \frac{BV_{t-1}}{P_{t-1}} + \varepsilon_t$$

$$\text{Model 3 } \frac{P_t}{P_{t-1}} = \alpha_0 + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_2 \frac{X_t}{P_{t-1}} + \beta_4 \frac{(BV_{t-1} - RE_{t-1})}{P_{t-1}} + \beta_5 \frac{RE_{t-1}}{P_{t-1}} + \varepsilon_t$$

Panel A: Profit making firms with positive retained earnings

Regression coefficients for the profit making firms with positive retained earnings^c. (N=55,727)

Model	α_0	β_0	β_1	β_2	β_3	β_4	β_5	Adj. R ² F: H ₀ : $\beta_4 = \beta_5$	Vuong's Z ^f
Model 1	0.940 *** (191.265)	0.389 *** (67.010)	3.416 *** (69.202)					17.15	
Model 2	0.952 *** (193.249)	0.785 *** (28.838)		2.847 *** (49.366)	-0.801 *** (-29.906)			18.04	-8.145 &&&
Model 3	0.950 *** (192.570)	0.759 *** (27.838)		2.909 *** (49.749)		-0.727 *** (-25.895)	-0.817 *** (-30.602)	18.18	94.745 +++ -4.362 &&&

Table 5 (continued)

Panel B: Profit making firms with negative retained earnings

Regression coefficients for the profit making firms with negative retained earnings^c. (N=8,084)

Model	α_0	β_0	β_1	β_2	β_3	β_4	β_5	Adj. R ² F: H ₀ : $\beta_4=\beta_5$	Vuong's Z ^f
Model 1	0.965 *** (76.415)	0.491 *** (28.681)	3.230 *** (25.437)					15.44	
Model 2	0.972 *** (75.973)	0.611 *** (13.659)		2.928 *** (19.278)	-0.511 *** (-11.364)			15.63	-1.594
Model 3	0.956 *** (73.326)	0.578 *** (12.928)		2.790 *** (18.468)		-0.492 *** (-11.027)	-0.566 *** (-12.276)	16.05	41.141 +++ -2.679 &&&

Panel C: Loss making firms with positive retained earnings

Regression coefficients for the loss making firms with positive retained earnings^c. (N=7,311)

Model	α_0	β_0	β_1	β_2	β_3	β_4	β_5	Adj. R ² F: H ₀ : $\beta_4=\beta_5$	Vuong's Z ^f
Model 1	0.715 *** (62.744)	0.285 *** (21.251)	0.282 *** (7.204)					8.05	
Model 2	0.718 *** (63.189)	0.489 *** (11.061)		0.044 (0.728)	-0.247 *** (-5.711)			8.65	-2.676 &&&
Model 3	0.717 *** (63.394)	0.497 *** (11.127)		0.041 (0.682)		-0.265 *** (-5.712)	-0.244 *** (-5.596)	8.65	1.5287 -0.570

Table 5 (continued)

Panel D: Loss making firms with negative retained earnings

Regression coefficients for the loss making firms with positive negative earnings^c. (N=15,431)

Model	α_0	β_0	β_1	β_2	β_3	β_4	β_5	Adj. R ² F: H ₀ : $\beta_4=\beta_5$	Vuong's Z ^f
Model 1	0.870 *** (103.351)	0.288 *** (20.794)	0.179 *** (6.144)					3.37	
Model 2	0.842 *** (99.515)	0.759 *** (21.574)		-0.346 *** (-8.065)	-0.543 *** (-16.480)			6.87	-9.053 &&&
Model 3	0.820 *** (94.023)	0.705 *** (19.785)		-0.255 *** (-5.870)		-0.505 *** (-15.124)	-0.596 *** (-17.832)	7.59	122.515 +++ -4.470 &&&

^a the sample contains all of the firm-year observations on compustat with the necessary data after deleting the following (1) observations in the top or bottom one percent of observations ranked on deflated price, earnings, residual income, book value, lagged book value, book value less retained earnings and retained earnings (2) all distressed firms (A distressed firm is defined as a firm that is not in the sample 3 years later because of bankruptcy or liquidation. This variable cannot be calculated from 1995 onwards because the data is not available.)

^b X_t is the firm's earnings per share before extraordinary items and P_{t-1} is the firm's price at the end of year t-1. RI_t is residual income for year t ($RI_t=X_t-(BV_{t-1} \times 12)$). BV_t is book value at the end of year t and BV_{t-1} is book value at the end of year t-1. RE_t is retained earnings at the end of year t.

^c White (1980) heteroskedasticity-consistent t-statistics in parentheses. The two-tailed significance of the t-statistics are indicated as follows. * Significant at .02 level, ** Significant at .01 level, *** significant at .002 level.

^d An F test for equality of coefficients is significant at .0001 level is indicated by +++.

^e The significance of Vuong's Z stats at .005 level is indicated by &&&

^f Vuong's Z test compares each model with the previous model. The result beside model 5 is a test between model 5 and model 4. A significant negative result indicates that model 5 is 'superior' to model 4. The result beside model 6 is a test between model 6 and model 5. A significant negative result indicates that model 5 is 'superior' to model 4.

Table 6

Results from pooled cross-sectional regressions, without an intercept, excluding outliers and distressed firms^a, of price on book value and the components of residual earnings. All variables are deflated by beginning-of-period price. The sample covers 1980-1997 and is divided by the sign of earnings and sign of retained earnings.

$$\text{Model 4 } \frac{P_t}{P_{t-1}} = \alpha_0 \left(\frac{1}{P_{t-1}} \right) + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_1 \frac{RI_t}{P_{t-1}} + \varepsilon_t$$

$$\text{Model 5 } \frac{P_t}{P_{t-1}} = \alpha_0 \left(\frac{1}{P_{t-1}} \right) + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_2 \frac{X_t}{P_{t-1}} + \beta_3 \frac{BV_{t-1}}{P_{t-1}} + \varepsilon_t$$

$$\text{Model 6 } \frac{P_t}{P_{t-1}} = \alpha_0 \left(\frac{1}{P_{t-1}} \right) + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_2 \frac{X_t}{P_{t-1}} + \beta_4 \frac{(BV_{t-1} - RE_{t-1})}{P_{t-1}} + \beta_5 \frac{RE_{t-1}}{P_{t-1}} + \varepsilon_t$$

Panel A: Profit making firms with positive retained earnings

Regression coefficients for the profit making firms with positive retained earnings^c. (N=55,727)

Model	α_0	β_0	β_1	β_2	β_3	β_4	β_5	F: $H_0: \beta_4 = \beta_5$	Vuong's Z^f
Model 4	0.011 (1.236)	1.243*** (290.365)	6.003 (102.407)						
Model 5	0.011 (1.236)	1.277*** (36.506)		5.959*** (85.613)	-0.753*** (-21.738)				-0.495
Model 6	0.011 (1.211)	1.225*** (34.974)		6.068*** (85.760)		-0.610*** (-16.684)	-0.784*** (-22.742)	197.982+++	-90.430&&&

Table 6 (continued)

Panel B: Profit making firms with negative retained earnings

Regression coefficients for the profit making firms with negative retained earnings^c. (N=8,084)

Model	α_0	β_0	β_1	β_2	β_3	β_4	β_5	F: $H_0: \beta_4=\beta_5$	Vuong's Z^f
Model 4	0.027 *** (3.687)	1.376 *** (91.476)	5.882 (37.762)						
Model 5	0.027 *** (3.672)	1.208 *** (21.408)		6.254 *** (33.967)	-0.539 *** (-9.479)				-1.518
Model 6	0.017 * (2.571)	1.075 *** (19.497)		5.636 *** (30.608)		-0.475 *** (-8.616)	-0.707 *** (-12.571)	249.440 ***	-39.67 &&&

Panel C: Loss making firms with positive retained earnings

Regression coefficients for the loss making firms with positive retained earnings^c. (N=7,311)

Model	α_0	β_0	β_1	β_2	β_3	β_4	β_5	F: $H_0: \beta_4=\beta_5$	Vuong's Z^f
Model 4	0.065 *** (4.306)	0.708 *** (50.886)	-0.193 (-4.140)						
Model 5	0.064 *** (4.308)	0.831 *** (15.357)		-0.337 *** (-4.532)	-0.105 (-1.962)				-1.278
Model 6	0.068 *** (4.432)	0.860 *** (15.462)		-0.345 *** (-4.629)		-0.175 ** (-2.960)	-0.093 (-1.720)	13.256 ***	-28.224 &&&

Table 6 (continued)

Panel D: Loss making firms with negative retained earnings

Regression coefficients for the loss making firms with negative retained earnings^c. (N=15,431)

Model	α_0	β_0	β_1	β_2	β_3	β_4	β_5	F: $H_0: \beta_4=\beta_5$	Vuong's Z^f
Model 4	0.068 *** (7.775)	0.647 *** (36.574)	-1.270 *** (-40.201)						
Model 5	0.066 *** (7.914)	1.350 *** (28.647)		-2.000 *** (-40.523)	-0.656 *** (-14.536)				-11.454 &&&
Model 6	0.044 *** (6.311)	1.178 *** (25.174)		-1.676 *** (-33.291)		-0.549 *** (-12.224)	-0.786 *** (-17.604)	546.438 ⁺⁺⁺	-48.642 &&&

^a the sample contains all of the firm-year observations on compustat with the necessary data after deleting the following (1) observations in the top or bottom one percent of observations ranked on deflated price, earnings, residual income, book value, lagged book value, book value less retained earnings and retained earnings (2) all distressed firms (A distressed firm is defined as a firm that is not in the sample 3 years later because of bankruptcy or liquidation. This variable cannot be calculated from 1995 onwards because the data is not available.)

^b X_t is the firm's earnings per share before extraordinary items and P_{t-1} is the firm's price at the end of year t-1. RI_t is residual income for year t ($RI_t=X_t-(BV_{t-1} \times 1.2)$). BV_t is book value at the end of year t and BV_{t-1} is book value at the end of year t-1. RE_t is retained earnings at the end of year t.

^c White (1980) heteroskedasticity-consistent t-statistics in parentheses. The two-tailed significance of the t-statistics are indicated as follows. * Significant at .02 level, ** Significant at .01 level, *** significant at .002 level.

^d An F test for equality of coefficients is significant at .0001 level is indicated by ⁺⁺⁺.

^e The significance of Vuong's Z stats at .005 level is indicated by &&&

^f Vuong's Z test compares each model with the previous model. The result beside model 5 is a test between model 5 and model 4. A significant negative result indicates that model 5 is 'superior' to model 4. The result beside model 6 is a test between model 6 and model 5. A significant negative result indicates that model 6 is 'superior' to model 5.

Table 7

Results from pooled cross-sectional regressions, without an intercept, excluding outliers and distressed firms^a, of price on book value and the components of residual earnings. All variables are deflated by beginning-of-period price. The sample covers 1980-1997.

$$\frac{P_t}{P_{t-1}} = \alpha_0 \left(\frac{1}{P_{t-1}} \right) + \beta_0 \frac{BV_t}{P_{t-1}} + \beta_2 \frac{X_t}{P_{t-1}} + \beta_4 \frac{(BV_{t-1} - RE_{t-1})}{P_{t-1}} + \beta_5 \frac{RE_{t-1}}{P_{t-1}} + \varepsilon_t$$

Regression coefficients for loss making firms with above median age relative to industry (RAGE); R&D spend relative to industry (RR&D); and market value relative to industry (RMV)^c.

	N	α_0	β_0	β_2	β_4	β_5	F: $H_0: \beta_4 = \beta_5$
RAGE < 1	14,358	0.039 ^{***} (5.801)	1.281 ^{***} (22.622)	-1.739 ^{***} (-28.507)	-0.600 ^{***} (-10.757)	-0.819 ^{***} (-15.017)	430.101 ⁺⁺⁺
RR&D > 1	6,373	0.091 ^{**} (3.088)	2.016 ^{***} (20.121)	-1.866 ^{***} (-17.573)	-0.994 ^{***} (-10.037)	-1.326 ^{***} (-14.131)	377.441 ⁺⁺⁺
RMV < 1	15,340	0.056 ^{***} (8.049)	0.935 ^{***} (23.642)	-1.294 ^{***} (-28.110)	-0.326 ^{***} (-8.338)	-0.512 ^{***} (-13.456)	633.904 ⁺⁺⁺

^a the sample contains all of the firm-year observations on compustat with the necessary data after deleting the following (1) observations in the top or bottom one percent of observations ranked on deflated price, earnings, residual income, book value, lagged book value, book value less retained earnings and retained earnings (2) all distressed firms (A distressed firm is defined as a firm that is not in the sample 3 years later because of bankruptcy or liquidation. This variable cannot be calculated from 1995 onwards because the data is not available.)

^b X_t is the firm's earnings per share before extraordinary items and P_{t-1} is the firm's price at the end of year t-1. RI_t is residual income for year t ($RI_t = X_t - (BV_{t-1} \times 12)$). BV_t is book value at the end of year t and BV_{t-1} is book value at the end of year t-1. RE_t is retained earnings at the end of year t.

^c White (1980) heteroskedasticity-consistent t-statistics in parentheses. The two-tailed significance of the t-statistics are indicated as follows. * Significant at .02 level, ** Significant at .01 level, *** significant at .002 level.

^d An F test for equality of coefficients being rejected at the at the .0001 significance level is indicated by +++.