Searching for value relevance of book value and earnings: a case of premium vs. discount firms

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Abstract We examine the premium/discount firm characteristic that fundamentally affects the value relevance of two key accounting line items, earnings and book values. We argue that from the perspective of both the residual income and option-style valuation models, the relative valuation roles of earnings and book values differ fundamentally between firms that trade at a premium vis-à-vis discount to book value. We find that book values play a significantly more important role in equity valuation than earnings when firms trade at a discount. We also find that other known influential conditions, such as the sign of earnings (Collins et al. 1999) or the relative levels of earnings and book value (Burgstahler and Dichev 1997), become inconsequential when the premium/discount condition of the firm is controlled for. The discovered relationships between the relative valuation roles of book values and earnings and the discount/premium characteristics of the firm are robust to the effect of time, information environment and the industry of the firm.

Keyword value relevance · book value · earnings · premium · discount
JEL Classifications M41 · G14 · G12

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Searching for Value Relevance of Book Value and Earnings: A Case of Premium vs. Discount Firms

1 Introduction and related prior literature

Theories and empirical assessments of the relationship between firm book and market values for a variety of purposes are a feature of the literature in economics, finance, and accounting. A large body of empirical market-based accounting research demonstrates that the relative valuation roles of book values, earnings and dividends are fundamentally affected by firm characteristics. The influential and well-documented characteristics include (i) the sign and permanence of earnings (Hayn 1995; Collins et al. 1999 Jefferson et al. 2000), (ii) the relative levels of earnings and book value (Burgstahler and Dichev 1997), and (iii) the financial health of the firm (Barth et al. 1998; Ashton et al. 2003).

Our study adds to this literature by identifying yet another highly influential firm characteristic. We posit that the relative valuation roles of book values and earnings differ fundamentally between firms that trade above book value of equity (premium context) and firms that trade below book value of equity (discount context). The impact of premium vs. discount firm characteristic has not been studied in value-relevance literature. Yet we argue that the premium/discount characteristic of the firm is an important and influential condition that affects the roles of book value and earnings in stock valuation.

This firm characteristic merits investigation in empirical terms as the percentage of stock exchange-listed non-financial companies that traded below book value over the period covered in this study (1996-2010) was above 16%, and in years 2002 and 2008 it reached 28% and 42%, respectively. Thus, despite the conventional historical cost accounting, accounting conservatism and the absence of deflation in the USA over the sample period, a significant proportion of non-financial firms traded at a discount.

The main hypothesis of the paper posits that, consistent with both the residual income and options-style valuation frameworks, book value and earnings should play fundamentally different valuation roles, when the firm trades at a premium vs. discount. We predict that for premium (discount) firms, earnings will be more (less) important than book value. We also hypothesise that, if reported earnings are negative, book value should be more important than earnings, irrespective of the premium/discount condition. Therefore, we assert that failing to explicitly control for the premium and discount firm characteristic would result in erroneous value-association inferences, as would failing to control for the sign of earnings effect. We therefore argue that the premium/discount firm characteristic should be factored into valuation frameworks that rely on earnings and book values, and into research that deals with value-relevance of accounting numbers.

During the past decade technology has emerged as a dominant force in the U.S. and World economies. The value that has been created by technological innovations is enormous. One of the criticisms of current accounting procedures is that much of this technology-based economic value, referred to by Lev (2001) as ‘knowledge capital’, is created by investments that are not found anywhere on a firm’s balance sheet. According to this view, the new economy has made the book value (as currently reported in the financial statements) obsolete. Furthermore, there has been much discussion in

the financial media (e.g., Lev 2000b) regarding the poor role of book value of common equity in measuring the firm's net assets. Consequently, book value of common equity may be a downward-biased estimate of net assets value for some firms, especially in recent years.

Burgstahler and Dichev (1997) expose another influential condition: the relative level of earnings and book value. They combine earnings and book values in an option-style valuation model and show that when the earnings-to-book value ratio is high (low), earnings (book value) is a relatively more important value determinant. They argue that a high earnings-to-book ratio signals that the firm is likely to continue its current activities successfully; hence, earnings play a relatively more important valuation role. Conversely, when the ratio is low, the firm is more likely to adapt its resources to some superior alternative usage; therefore, the book value is a more important value driver. On the other hand Hayn (1995) recognizes the sign of earnings as an important attribute and finds that in returns-earnings regression, losses are less informative and value relevant than profits. She posits that because investors have an option to sell their shares at a price commensurate with the market value of the net assets of the firm, losses are not expected to persist, as they are perceived by investors as transitory. Consistent with this argument, Collins et al. (1999) find that losses are not value relevant, while the corresponding book values are highly value relevant. They find that in the presence of losses, book value plays two roles in equity valuation: it provides information about *both* expected future normal earnings *and* abandonment/liquidation value.

Financial health of the firm is yet another influential condition. Barth et al. (1998) find that as financial health decreases the importance of book value increases, while the importance of earnings decreases. They argue that because liquidation values and probability of default affect equity values, the balance sheet (income statement) increases (decreases) in importance as financial health decreases.

Our results show that the value relevance and incremental information content of book values and earnings differ fundamentally between the firms that trade at a discount and those that trade at a premium to book value. Consistent with our predictions, we find that book value plays a more important valuation role than earnings when firms trade at a discount to book value, regardless of the sign of reported earnings. These findings remain unaffected when we control for other influential factors documented in prior research, e.g., the sign of earnings (Collins et al. 1999), the relative levels of earnings and book value (Burgstahler and Dichev 1997), and the information environment of the firm (Atiase 1987; Grant 1980). Thus, controlling for whether the firm trades at a premium or discount to book value appears to have a robustly significant impact on the relationship between equity market values and accounting variables.

The remainder of this paper proceeds as follows. Section 2 discusses the development of hypotheses and empirical predictions. Section 3 outlines the test design. Section 4 describes the sample selection criteria and data. Section 5 reports empirical findings, while Section 6 discusses the robustness of the results. Section 7 presents conclusions.

2 Development of hypotheses and empirical predictions

2.1 Pricing at a premium

Two explanations can be offered as to why, in an efficient market, a non-financial firm may trade at a *premium*. The first explanation relates to the findings of Beaver and Ryan (2000), which suggest that the firms' reported equity book values are biased downwards due to a conservative and/or historical costs accounting system. Under such conditions, the book value would understate or fail to capture the fair value of all tangible and intangible value-generating assets of the firm. In the knowledge-based economies of the developed world the role of intangibles, which are omitted from the financial statements, in explaining the gap between the market and book values, has become particularly important.

The success of the U.S. economy and stock markets during the 1990s is often attributed to technology-related R&D (Boulton et al. 2000; Lev 2000a). In a growing number of companies, the role and the amount of intangibles (e.g., human, structural, managerial, technological and customer capital, patents, etc.) increase to such points that their value completely overwhelms the value of all the other assets combined (Hirschey et al. 2001; Daum 2003, Hand and Lev 2003).[1] Nevertheless, these important assets are not captured on the balance sheet. For example, R&D and advertising expenditures are often regarded as investments in future value creation but, due to their uncertain nature, are being expensed, contributing to the gap between book and market value of equity.[2] The immediate expensing of R&D has become to many a prime example of excessive and detrimental conservatism in U.S. GAAP (Lev 2001; Chan et al. 2007). R&D impacts the market value and book value of equity primarily in two ways: economic and accounting. From an economic point of view, increases in the fundamental profitability due to R&D should increase the market value of equity. From an accounting point of view, however, greater spending on R&D decreases the book value of equity, since under U.S. GAAP virtually all R&D costs are immediately expensed. A similar case can be made for advertising expenditures. Even though advertising expenditures are expensed, they can generate unrecorded intangible assets with short useful lives (Ravenscraft and Scherer 1982; Bublitz and Ettredge 1989). Furthermore, advertising expenditures are also associated with lower cost of capital (Huang and Wei 2012), which is likely to positive affect the firm's value.

The second explanation of why a firm's stock may trade at a premium could be that the market expects future periods' earnings to exceed the required level of earnings. As Collins and Kothari (1989) point out, the market-to-book ratio depends upon the extent to which the firm's return on its existing assets and expected future investments exceeds its required rate of return on equity (e.g., as a result of the growth opportunities and expected positive net present value projects). That is, the market will price the firm at a premium if the firm is expected to generate positive abnormal earnings. The present value of these abnormal earnings would then account for the positive difference between the market and book value of equity. The market's expectation of positive abnormal earnings implies that the firm is perceived to possess some specific assets, which are not fully captured by the balance sheet (e.g., brand names

[1] It is implied that investors can learn about the existence of such assets from non-financial statement sources of information, and price them into the market value of firms accordingly.

[2] Statement of Financial Accounting Standards (SFAS) 2 requires R&D expenditures to be expensed. SFAS 86 allows software firms to capitalize software development costs after technological feasibility is established, and is an exception to SFAS 2.

created through advertising, superior managerial talent, perceived future benefits from R&D, customer loyalty, technological superiority, growth options, monopolistic economic rents, etc.). One could argue that in a more general sense these are intangible assets, which cannot be reliably captured by the accounting system and reported in the balance sheet. It follows that the case of valuation at a premium boils down to possible under-recognition of value-generating assets on the balance sheet.

While book value cannot capture all value-generating assets, earnings are more likely to reflect value created by both the recognised and unrecognised assets. For example, in order to follow the conservative accounting policy the future economic benefit associated with internally developed intangible assets (R&D or advertising) will not show on the balance sheet because these costs are expensed in full in each year as they are incurred.[3] However, the current reported earnings, on the other hand, will reflect the realised economic benefits of past periods' investments in intangibles, such as R&D and advertising. Even when the firm earns a normal rate of return on unrecognised assets, these earnings will be capitalised in equity market value. As Barth et al. (1998) note, earnings fulfil their role in equity valuation by providing information about the firm's abnormal earnings opportunities, i.e., unrecognised net assets. To the extent that earnings are not transitory in expectation, they are more likely than book value to provide information about the firm's abnormal earnings. Because earnings reflect value created by both recognised and unrecognised value-generating assets, information contained in earnings is likely to be more value relevant. It is important to note that for a going concern firm, the positive sign of earnings is a necessary condition for earnings not to be transitory in expectation. Therefore, positive earnings of a premium firm should be more value relevant than book value. Conversely, negative or extremely low positive earnings are bound to be transitory in expectation, if the premium firm is projected to continue operating as a going concern.

Alternatively, if negative earnings are expected to perpetuate, the firm becomes a candidate for financial distress, whereas the premium condition is a mere result of omitting or understating the fair market value of net assets in the balance sheet. In either case the transitory earnings will not be able to provide information about the firm's abnormal earnings and values to be generated by recognised and unrecognised net assets. The book value, in contrast, would provide at least partially useful information as it reflects the value of the recognised net assets. According to Burgstahler and Dichev (1997) book value would provide information on liquidation/adaptation value of net assets in place. Therefore, when earnings are negative we expect book value to play a more important valuation role than earnings. The preceding discussion leads to the following hypothesis:

H1: The value relevance and incremental information content of book value will be lower (higher) than those of earnings, when the premium firms report positive (negative) earnings.[4]

2.2 Pricing at a discount

[3] Statement of Financial Accounting Standards (SFAS) 142 requires costs of internally developed intangible assets that are not specifically identifiable or have an indefinite life to be expensed.

[4] In this study *value relevance* is defined as the magnitude and the level of statistical significance of the regression coefficient attached to the variable of interest and *incremental information content* is defined as the portion of the valuation regression model's R^2 that can be specifically attributed to the variable of interest.

Two explanations can be offered as to why firms may trade at a discount. First, the book value of net assets in place could exceed their fair value. This is a rather unrealistic scenario, considering that under U.S. GAAP tangible assets tend to be recognised at historical costs and there was no deflation in the U.S. economy over the sample period (1996-2010). The book value of net assets could exceed fair value as a result of the overvaluation of intangibles and goodwill from acquisitions. However, this conjecture can be refuted on the following accounts. The Statement of Financial Accounting Standard (SFAS) 142 requires goodwill to be tested for market impairment. Furthermore, if the overvalued intangibles and goodwill were responsible for the discount condition, the discount condition should disappear if intangibles and goodwill are completely removed from net assets. However, on average 70% of the discount firms in our sample still remain in the "discount" category even after the exclusion of goodwill and intangibles from net assets. This means that the intangibles-driven scenario is not what causes a firm's valuation at a discount in most cases. The second and perhaps a more plausible explanation of the discount condition draws from the logic of the residual income model: a firm would trade at a discount if the present value of future abnormal earnings is negative. This would be the case when the firm's future expected earnings are (a) negative, or (b) positive, but fall short of the required level of earnings and do not cover the cost of equity capital.[5] If this situation is expected to be transitory and earnings are to revert to the required level, then book value would proxy for the capitalised required earnings. Therefore, when negative or unsustainably low earnings are transitory in expectation, book value would play a more important role in valuation than the reported earnings.

Alternatively, if negative abnormal earnings are expected to perpetuate, then the firm is a distress candidate. What would matter to investors when valuing such a firm is the liquidation or adaptation value of its net assets (after the liquidation/adaptation costs and capitalised negative abnormal earnings before the liquidation date). Consistent with Barth et al. (1998), since equity book value is the best accounting proxy for the liquidation or adaptation value, book value would play a more important valuation role than earnings. The preceding discussion leads to the following hypothesis:

H2: The value relevance and incremental information content of book values will be higher than those of earnings when firms trade at a discount regardless of the sign of earnings.

3 Test design

We employ a research design that examines the empirical association between market value of equity, earnings and book value. Association studies investigate whether accounting value drivers' measurements are consistent with the underlying events and information set reflected in stock prices. According to Collins and Kothari (1989) association studies typically do not infer causality but focus on whether the process that determines earnings, book values or other accounting value drivers captures in a

[5] Indeed, as shown in Table 4, the median value of the return on common equity of profitable firms that trade at a discount is only 6.6%, which is likely to be less than the cost of equity capital for these firms.

meaningful and timely fashion the valuation-relevant events. The association studies typically model these relationships either in the spirit of residual income (Ohlson 1995; Rees 1997; Hand and Landsman 2005), or the option-style valuation framework (Burgstahler and Dichev 1997; Wysocki 1998; Ashton et al. 2003).

Building on the classical Dividend Discount Model and clean surplus accounting, the residual income valuation model (RIV) expresses the value of equity as a function of contemporaneous book value and the present value of future expected residual earnings.[6] Under the assumption of linear information dynamics, Ohlson (1995) demonstrates that RIV can be reduced to a model where equity market value is a linear function of book value, earnings and dividends.

The options-style model, on the other hand, expresses equity market value through two complementary value determinants: the recursion value and the adaptation value (Burgstahler and Dichev 1997). The adaptation value reflects the value of the firm's resources in place, which becomes relevant whenever resources can be adapted to alternative uses or sold to third parties, while the recursion value subsumes the discounted stream of future earnings under the assumption that the firm is expected to continue as a going concern. By combining the recursion and adaptation values, this model assumes that the firm has an option to adapt resources to uses other than the use under the going concern.

Despite the conceptual differences, both theoretical frameworks are often translated into the same empirical model, whereby equity market value is regressed on book value, earnings and, often, additional control variables (Rees 1997; Burgstahler and Dichev 1997; Hand and Landsman 2005). In the RIV context, this is normally achieved through such simplifying assumptions as constant growth rates for earnings and book value (Rees 1997), or linear information dynamics of the formation of expectations (Ohlson 1995; Hand and Landsman 2005). The same empirical model is also often attained through the option-style framework, where the adaptation value is proxied by book value of equity, while earnings proxy for the recursion value (Burgstahler and Dichev 1997).

Our study adopts the above empirical model because it encapsulates the existing theoretical valuation frameworks. It is also straightforward and allows for direct inferences regarding the pricing and relative roles of our variables of interest in equity valuation. We thus start with a regression model, where the equity market value is a linear function of contemporaneous book value of equity, earnings for common stockholders, and dividends. However, our hypotheses maintain that the relationship is not linear and should be conditioned upon the contexts determined by the premium/discount firm characteristics and the sign of earnings. One way to detect the context-related differences in the pricing of our accounting variables is to estimate the model with dummies and interaction terms for each context. This is a common approach in empirical accounting literature. It implies that the regression error term has context-invariant distributional properties and, therefore, the regression's explanatory power is constant across the contexts. In other words, this approach implies that the combined information content of all accounting value drivers, as well as the information content of each individual value driver, does not change across contexts. This implies that the regression R^2 would not vary across our contexts and that the incremental contribution of, say, book value to the model's R^2 would not vary across contexts. However, detecting the

[6] RIV builds on prior works of Edwards and Bell (1961), Peasnell (1981) and Ohlson (1989).

impact of different contexts on the combined and individual information content of our accounting items *is* the primary objective of this study. Therefore, instead of running a single model with dummies and interaction terms for every context, we run a separate regression for every context's sub-sample.

It may be argued that a regression of market values on book value, earnings and dividends is a stripped down model, which ignores other potentially influential accounting value drivers. Because the basic focus of the paper is on how the relative levels of book and market values (i.e. premium vs. discount) affect the relative valuation importance of earnings and book values, one should also include in the model factors that are potentially responsible for the discrepancy between the book and market value. In the preceding section we argued that the premium condition is most likely to result from firms' conservative accounting systems, or firms' being expected to create abnormal value in the future. We also argued that both cases boil down to the firm's accounting system failing to fully record/account for all of its value-creating assets. We suggested that the R&D and advertising expenses would arguably be some of the most important accounting proxies for under-recognised value drivers. R&D activity has been increasing over time, leading to a potentially larger role for this activity in valuation (Lev and Zarowin 1999). Prior research indicates that R&D expenditures are related to future operating performance (Sougiannis 1994; Lev and Sougiannis 1996; Lev and Zarowin 1999; Nissim and Thomas 2000; Han Chuang 2011) and that the future benefits from R&D are reflected in stock prices (Chan et al. 2001; Chambers et al. 2002; Chan et al. 2007). Likewise, prior research indicates that advertisement expenditures are also likely to signal value creation.[7] For these reasons we add R&D and advertising expense as shown below in Model (1):

$$MV_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 ER_{it} + \alpha_3 DIV_{it} + a_4 R\&D_{it} + a_5 ADVERT_{it} + u_{it} \qquad (1)$$

where MV_{it}, BV_{it}, ER_{it}, Div_{it}, $R\&D_{it}$ and $ADVERT_{it}$ are, the market value of common stock, book value of common equity, earnings available to common stockholders, common dividends, research and development costs, and advertising expenses of firm *i* in year *t*, respectively. All variables, except MV_{it}, are at financial year end. MV_{it} is at two months after the financial year end. This is to ensure that the market had enough time to incorporate the reported financial statement information into the market value of stocks.

Because our sample firms are from three stock exchanges (NYSE, AMEX and NASDAQ), Model (1) regressions are estimated with stock exchange fixed effects in order to control for possible intrinsic differences in the valuation of firms trading in different exchanges.

To determine the information content of individual value drivers we follow the decomposition technique used by Collins et al. (1997) and decompose the total explanatory power of the model into three parts: (i) the incremental explanatory power of the variable of interest, (ii) the incremental explanatory power of the remaining variable(s), and (iii) the explanatory power common to variable(s) in (i) and (ii). For example, if the explanatory power of the model is denoted as R^2_T, the explanatory power

[7] Because advertising expenditures are known to generate intangible assets with short useful lives (Ravenscraft and Scherer 1982; Bublitz and Ettredge 1989), they are likely to convey information on future earnings. Advertising expenditures are also associated with lower cost of capital (Huang and Wei 2012), which is likely to positively affect the firm's value.

of the model, which excludes the book value variable, is denoted as R^2_{rest}, and the incremental explanatory power provided by book value is denoted as R^2_{bv}, then $R^2_{bv} = R^2_T - R^2_{rest}$.

3.2 Scale definition

The estimation of Model (1) without proper control for cross-sectional differences in scale is likely to bias the estimated regression coefficients and inflate the regression's explanatory power. This is because our sample firms differ considerably in size. There is, however, no consensus in the literature on the definition of scale, how it impacts on regression inferences, or how the scale-induced problems should be dealt with (Kothari and Zimmerman 1995; Easton and Sommers 2003; Barth and Clinch 2009; Gil-Alana et al. 2011). It is most likely that scale affects all variables in Model (1) in a multiplicative fashion. To mitigate the econometric effects of scale, one should deflate the model by a scale proxy. Different empirical studies advocate different scale proxies, e.g., the beginning- or end-of-period equity book or market value, the number of shares, group sales, or total assets. The danger of using any single-variable scale proxy as a deflator is that it can itself induce a bias. A particular deflator might be an intrinsically valid characterisation of cross-sectional differences in scale for firms that operate in the same sector or economic context, yet a different deflator might be better suited for firms operating in a different sector or economic context. Because our sample pools firm-years from different sectors and economic contexts, the use of a single-variable deflator may introduce various degrees of distortion across different categories of firms. Furthermore, deflation by a single-variable scale proxy generates an extremely asymmetric and skewed distribution of both the deflated regression variables and the regression error term. In this study a *composite* scale proxy is computed and deployed as a deflator. In contrast to a single-variable deflator, the *composite* deflator diversifies away the scaling deficiencies inherent in single-variable proxies.[8] The deflator is computed as the sum of the most frequently used single-variable deflators: total assets and sales.

Implicit to this scale proxy is the assumption that every constituent variable is of equal merit as a scale proxy. All the empirical tests that follow are based on Model (1) where the dependent and independent variables are scalded by the above composite deflator.

4 Sample and data description

The data are collected from the annual *COMPUSTAT* database and cover the period from 1996 through 2010. The pooled cross section/time series sample includes non-financial companies that traded on NYSE, AMEX and NASDAQ. The initial sample consists of 160,660 firm-year observations. We then eliminate 39,714 observations related to financial institutions (i.e., those with SIC codes starting with '6')

[8] In contrast with the highly asymmetric and skewed distributions of regression variables which are scaled by single-variable deflators, scaling by the composite deflator renders close-to-normal frequency distributions. The use of the composite deflator makes the regression parameters less sensitive to the impact of outliers (results not reported but available upon request). It also results in less skewed and more symmetrically distributed regression error term. In short, the composite deflator mitigates the possible violations in our OLS model.

because their financial reporting is different from those of the rest of the sample. Some 41,618 observations are eliminated as those represent firms listed on stock exchanges other than NYSE, AMEX and NASDAQ; and another 20,408 observations are eliminated due to incomplete *COMPUSTAT* data. To minimize the impact on the OLS regressions, some further 4,063 observations are eliminated as outliers.[9] After the eliminations the final sample consists of 54,857 firm-year observations.

Insert Table 1 about here

The composition of the final sample, the relevant descriptive statistics and the distribution of sample observations across industries and stock exchanges are reported in Table 1. NASDAQ firm-years account for 60% of the sample, while NYSE and AMEX firm-years account for about 32% and 8%, respectively. The manufacturing firms (SIC codes starting with 2 and 3) and services firms (SIC codes starting with 7, 8 and 9) are the two biggest groups and account for 48% and 23% of the sample, respectively.

Insert Table 2 about here

Table 2 shows the yearly distributions of firm-year observations across different firm-characteristics. The table reveals some noticeable trends. The yearly variation in the percentage of loss firms and discount firms reflects the changes in financial markets' conditions over the sample period. The frequency of loss firms and discount firms was noticeably larger in years of difficult financial market conditions of the early 2000s, and years of financial meltdown of the late 2000s. The percentage of dividends paying firms varied from 22% to 34%, showed no obvious trend, though was somewhat higher in late 2000s. The percentage of firms with R&D expenditures remained stable at close to 50%, while the percentage of firms reporting advertising expenses increased gradually from 17% in 1996 to over 40% in late 2000s.

Insert Table 3 about here

Tables 3 and 4 show that, based on the median market capitalisation of firms in four contexts, the premium profit (PP) firms are on average: 7 times larger than the discount profit (DP) firms, 5 times larger than the premium loss (PL) firms, and 15 times larger than the discount loss (DL) firms. Somewhat lower but similar directional differences in size are observed if one uses such accounting-based measures of size as the median of total assets, sales or book value of common equity.

Insert Table 4 about here

Table 4 shows that the proportion of firms that pay dividends is the largest among the profitable firms (where 39% and 32% of, respectively, PP and DP firms pay dividends), and lowest among the loss firms

[9] For each year of the sample period we eliminate firm-years in the top and bottom one percentile of scale-deflated variables in Model (1).

(where only 7% and 13% of, respectively, PL and DL firms pay dividends). Some 43% of PP firms trade on NYSE, while much lower percentage of DP, PL and DL firms (34%, 14% and 19%, respectively) trade on NYSE. Based on the exchange listing, size, dividend, and profitability characteristics we may conclude that PP firms are larger and more mature companies. In contrast, PL firms are likely to be younger, new economy firms, with expectations of high growth opportunities built into their current market valuation.[10] Whereas, DP firms are likely to be associated with negative abnormal earnings and loss of value.[11] The above discussions underline the extent of differences associated with premium/discount characteristic and emphasize the importance of determining the impact of these conditions on relative valuation roles of key accounting value drivers.

5 Empirical results and discussion

Table 5 reports our main empirical findings of the effect of four premium/discount firm characteristics on value relevance of book values, earnings and other accounting value drivers. Regression results for firms across the four firm characteristics are reported in two models: basic and full.[12] The basic model includes two key variables – book value and earnings – while the full model, Model (1), includes research & development and advertising expenses.

Insert Table 5 about here

5.1 PP vs. PL firms

Hypothesis 1 posits that the value relevance and incremental information content of book value will be lower (higher) than those of earnings, when the premium firms report profits (losses). Hence Hypothesis 1 is tested for PP and PL firms. The results for PP firms, reported in Table 5, are consistent with Hypothesis 1. In PP firms both earnings and book values have positive and statistically significant coefficients, and the incremental information content of earnings is higher than that of book value. Earnings are found to contribute 10.1% to the entire model's adjusted R^2 of 39.5%, while the incremental contribution of book value is only 6.9%.

The results for PL firms are also consistent with Hypothesis 1. While earnings and book value have statistically significant coefficients, the incremental contribution of book value is higher than that of earnings (7.7% vs. 5.9%). This confirms that in PL firms book value plays a more important valuation role than earnings. Our finding of a higher relative importance of book value than earnings in PL firms is consistent with prior literature. Burgstahler and Dichev (1997) and Collins et al. (1999) examine firm

[10] Several indicators point to this: the highest median price-to-book (2.3) and price-to-sales (2.0) ratios, smallest size in terms of median value of assets ($76 million), sales ($44 million) and book value of equity ($32 million), lowest median asset turnover (0.7), highest percentage of R&D firms (66%), the lowest percentage of dividend paying firms (7%), and the highest percentage NASDAQ firms (77%).

[11] DP firms have much lower median ROE (6.6%), ROA (3.2%) and net profit margin (3.2%) than those of PP firms.

[12] Because the magnitude and statistical significance of book value and earnings coefficients, as well as their incremental contribution to the regression's adjusted R^2, are not materially different between the basic and the full model, we only discuss the results of the full model.

valuation relevance of book value and earnings in the presence of losses and show that book value is more important than earnings as it proxies for the abandonment/adaptation value of the firm.

However, one aspect of our results for PL firms requires further explanation. The earnings coefficient is statistically significant but has an unexpected *negative* sign. To explain this result it is important to examine the nature of PL firms and the causes of the reported losses. The descriptive statistics reported in Tables 3 and 4 indicate that the majority of PL firms are likely to be new economy, younger firms. More specifically: PL firms are on average five times smaller than PP firms; a substantially larger proportion of PL firms (77%) are listed on NASDAQ as compared to PP firms (51%); only 7% of PL firms pay dividends, while 39% of PP firms do so; PL firms are trading at higher Price-to-Book and Price-to-Sales multiples than firms in any other context; the mean value of the ratio of R&D expenditures to book value in PL firms is four times that of PP firms, and the proportion of PL firms engaged in R&D activities is substantially larger (66%) than that of PP firms (46%). This indicates that the majority of PL firms are likely to be new economy, younger firms, which invest heavily in future economic value added activities. Further analysis reveals that the expensing of R&D expenditures have a much stronger impact on the reported earnings of PL firms than firms in any other context. Specifically, we find that 38% of PL firms that engage in R&D would have not reported losses had the U.S. GAAP allowed R&D expenditures to be capitalised.[13] Joos and Plesko (2005) and Darrough and Ye (2007) show that loss firms investing in R&D activity are not distressed as a result of the reported loss and that R&D activity in such firms is positively associated with value. Because a significant proportion of losses in our PL sample are driven by value-generating (value-relevant) R&D expenditures and because losses are negatively correlated with R&D, the coefficient on losses takes a negative value, while R&D is positively priced. These results concur with those reported by Darrough and Ye (2007 pp. 84-85) who provide a detailed discussion of this valuation effect by specifically examining valuation of loss firms in a knowledge-based economy.

5.2 DP vs. DL firms

We test Hypothesis 2 in relation to discount firms with positive (DP) and negative earnings (DL). We hypothesize that the value relevance and incremental information content of book values will be higher than those of earnings when firms trade at a discount regardless of the sign of earnings. Table 5 shows that in DP firms' earnings are statistically significant only at the 10% level, while book values have a positive and highly statistically significant coefficient. Furthermore, the book value alone accounts for 53.5% of the entire model's adjusted R^2 of 71.6%, while earnings virtually have no incremental contribution to the model's R^2. In DL firms, book values have a positive and highly statistically significant coefficient, while the earnings coefficient is close to zero and statistically significant at the 5% level. Furthermore, the book value alone accounts for 53.6% of the entire model's R^2 of 72.2%, while earnings have no incremental contribution to the model. With respect to the role of book value, the above results support our hypotheses, i.e., regardless of the sign of earnings, book value is by far the most value relevant variable for firms that trade at a discount.

[13] In other words, it is the expensing of R&D that drives losses for a substantial percentage of PL firms. Indeed, there is a negative correlation between the reported losses and R&D expenditures in PL firms (Pearson's correlation=-0.55, significant at 1%).

5.3 Value relevance of dividends

It is important to note that only a fraction of firms in each context-based sub-sample pay dividends. [14] Because of the low number of non-zero dividends observations, particularly in PL and DL contexts, little should be read into the estimated values of dividends coefficients. Henceforth, our discussion of dividends coefficients is only tentative.

Data in Table 4 suggest that DP firms are underperforming compared to PP firms in terms of ROE, ROA, and PM, and are likely to have low growth prospects as signalled by their discounted valuation. One could argue that because cash returned to shareholders in the form of dividends is not wasted on underperforming reinvestments of the DP firms, dividends payment could be good news for investors. While dividends coefficient for the DP firms has the expected sign (Table 5), the coefficient is not statistically significant.

With regard to PL firms, data in Table 4 indicate that PL firms are likely to be younger, new economy firms, with expectations of high growth opportunities built into their current market valuation. Given the expectations of future growth, drainage of cash in the form of dividend payment should negatively affect the value of the PL firms, hence, a negative coefficient could be predicted for the PL firms. Although the dividend coefficient has the expected sign (Table 5), it is not statistically significant.

Table 4 indicates that DL firms are likely to be low prospect underperformers (negative earnings). Because investors in such firms are likely to favour dividends payment, the dividends coefficient is expected to be positive. However, the estimated dividends coefficient for the DL firms has a positive sign, but not statistically significant (Table 5).

5.4 R&D and advertising expenditures

Table 5 shows that R&D coefficients are positively associated with value creation and are statistically significant at the 1% level regardless of the firm characteristics. The incremental contribution of R&D to the model's R^2 is particularly noticeable in the PP and PL contexts, i.e., in successful or high growth opportunities firms (as discussed in Section 5.1). This is consistent with the findings in prior literature (e.g., Lev and Sougiannis 1996; Chan et al. 2001; Joos and Plesko 2005; Darrough and Ye 2007).

The coefficients of the ADVERT (advertising expenses) variable are positive across the four contexts, but statistically significant only for the PP and PL firms. The incremental contribution of the ADVERT variable to the model's adjusted R^2 is marginal, most likely due to the relatively low percentage of firms with advertising expenditures in each context.

The above results of the valuation role of R&D and advertising expenditures corroborate the findings in prior literature, in that R&D and advertising expenses are associated with the creation of value and intangible assets (Chan et al. 2001; Ravenscraft and Scherer 1982; Bublitz and Ettredge 1989).

[14] Table 4 shows that only 38.8%, 32.1%, 7.3% and 12.7% of firms in PP, DP, PL and DL contexts, respectively, pay dividends.

6 Other influential conditions and robustness analysis

6.1 The impact of information environment (Size)

According to Collins and Kothari (1989) information environment includes all sources of information relevant to assessing firm value: government reports on macroeconomic conditions, industry reports, firm-specific news in the financial press and reports issued by analysts, as well as accounting reports. Atiase (1987) argues that the amount of production and dissemination of non-accounting information is an increasing function of the capitalised value of the firm, and the bigger the firm, the smaller is the proportion of the financial statement information in the entire volume of value-relevant information. Lev and Zarowin (1999) find that earnings represent a decreasing fraction of the total information used by investors and, in the worst case, financial reports are viewed as virtually worthless for investors' decisions. Atiase (1987) and Grant (1980) report there is a much greater price adjustment to accounting data announcements by small firms as compared with large ones.

This seems to suggest that information content of accounting data is likely to be a decreasing function of the firm's information environment proxied by the firm's capitalised value. It is, therefore, important to examine whether our main findings persist across different information environments. To do this we partition our sample into size-based quintiles and estimate the four context-based regression models for each quintile.[15]

Insert Table 6 about here

Table 6 reports regression results for the four contexts across the size quintiles. The incremental contributions of earnings and book values of the PP firms are similar in magnitude across the quintiles, whereas for the PL firms the incremental information content of book values exceeds that of earnings in Quintile 1 and 2, while earnings contribute more in Quintile 3 through 5. In DP and DL firms the incremental contribution of book value accounts for nearly all of the explanatory power of the model across all quintiles, while the incremental information content of earnings is trivial. Overall, the results in Table 6 lend support to our main findings, i.e., for discount firms book value has consistently higher incremental information content than earnings, regardless of the sign of earnings and information environment/size.

6.2 The impact of the earnings-to-book ratio

This section examines whether the valuation effects of the premium/discount condition are influenced by the relative levels of earnings and book values. Burgstahler and Dichev (1997) report that the value relevance of earnings and book value is affected by their relative levels. They show that high ROE is associated with higher value relevance of earnings, and low ROE is associated with higher value

[15] The market value of common equity is used as a proxy for information environment/size.

relevance of book value. Consistent with Burgstahler and Dichev (1997) we partition each of the four context-based samples into ROE-based triciles.[16]

Insert Table 7 about here

Results in Table 7 for PP firms confirm Burgstahler and Dichev's (1997) findings. The coefficient of earnings (book value) in the high ROE tricile is higher (lower) than in the low ROE tricile and the incremental information content of earnings (book value) is higher (lower) in high ROE than in the low ROE tricile. For PL firms the coefficients of earnings are negative and significant in high and low ROE triciles and positive and significant in the mid ROE tricile. However, the incremental contribution of earnings is very small compared to that of book values. Book values have positive and highly significant coefficients across all ROE triciles, and contribute the most to the model's explanatory power.

For the DP and DL firms, the incremental information content of earnings is marginal across all triciles, while book values account for most of the model's explanatory power across all triciles. Thus, the Burgstahler and Dichev (1997) phenomenon is only partially observed in PP firms and does not impact our main findings regarding the differences in the valuation roles of earnings and book values in premium vs. discount firms.[17]

7 Summary and Conclusions

The empirical accounting research asserts that the roles of earnings and book value in equity valuation are affected by firm-level conditions such as the sign of earnings, financial strength of the firm, and relative levels of earnings and book values (Collins et al. 1999; Barth et al. 1998; Ashton et al. 2003; Burgstahler and Dichev 1998). The prior literature stresses the importance of accounting for these conditions both in analytical modelling and empirical testing, as the relationship between equity market value and accounting numbers is complex. The relationship between equity market value and financial data is typically modelled in the spirit of either the residual income or options-style valuation framework. We hypothesise that under either framework the roles of book value and earnings will vary depending on whether the firm is trading at a premium or discount. We argue that the valuation of the firm at a premium vs. discount constitutes a firm characteristic which should affect the relative valuation roles of

[16] For PP firms the triciles include firms with, respectively high ROE, medium ROE, and low ROE while, for PL firms the triciles include firms with large negative ROE, medium negative ROE and small negative ROE. Similarly, for DP firms the triciles include firms with, respectively high ROE, medium ROE, and low ROE while, for DL firms the triciles include firms with large negative ROE, medium negative ROE and small negative ROE.

[17] We further test whether our main findings are an industry-driven phenomenon. We replicate the tests reported in Table 5 for the six largest industry sectors with the Standard Industrial Classification codes starting with 1, 2, 3, 4, 5 and 7. The results show that our principal findings remain unaffected by firms' industrial affiliation. We also test whether our main findings vary across years by estimating yearly regressions for the four contexts, and find only insignificant changes in the coefficients and incremental contributions associated with earnings and book values. Therefore, it can be concluded that the discovered valuation effects of the premium/discount condition are not driven by the industry membership and yearly effects. These results are not reported in the paper, but available upon request by the readers.

book value and earnings. It is rather surprising that this important condition has not yet been explicitly examined in the value-relevance research.

Our study examines the effect of the premium and discount firm characteristics on the relative roles of specific financial data in equity valuation. Our analysis has implications for the design and implementation of empirical studies of informational relevance. Our results suggest that the failure to control for the premium/discount condition will result in misinterpretation of the roles of book value and earnings in equity valuation. The premium/discount characteristic does robustly affect the mapping of these financial data into the equity market value of the firm.

We show that for premium profit and premium loss firms it is earnings that contribute most to the model's explanatory power. Finally, for the discount firms regardless of the sign of earnings, it is book value that has the highest value relevance and contribution to the explanatory power of the regression, while earnings have no contribution.

The above results remain robust when we analyse their sensitivity to other potentially influential conditions: relative levels of earnings and book value, yearly variation, industry membership, and the firm's information environment. Future research should try to explore this finding further and elaborate the theory that explains the effects of the premium/discount condition on the relative importance of specific accounting value drivers.

As financial markets expand and become more complex, and accounting standards attempt to keep pace with these changes, it would be a challenge for accounting research to make a significant contribution in addressing questions relating to the value relevance of accounting information. Our findings will be of practical importance both to the market users and the preparers of financial statement information. First, investors will achieve a better understanding of how the market processes specific accounting numbers when valuing firms with different characteristics. Second, managers (within the firms) will know what items of reported accounting information are likely to be perceived by the market as more important under various firm-level scenarios. This would allow managers to focus on communicating a more value-relevant set of information to the market.

Acknowledgements The authors would like to thank Cheng-Few Lee (the editor) and the anonymous referees for helpful comments. We also appreciate helpful comments from Jo Danbolt, John Holland, Karen Lin, Clairmont Carter, Erhan Mergen, Bill Stevenson, Monty Carter, the seminar participants at the Rochester Institute of Technology, the participants at the 2010 American Accounting Association National Meeting, San Francisco, USA; the 2009 British Accounting Association, Dundee, UK; and the 2006 European Accounting Association Congress, Dublin, Ireland.

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Table 1 Stock exchange and sector distribution of sample firm-years

	Stock Exchange			
Industry	**NYSE**	**AMEX**	**NASDAQ**	**Total**
Agriculture, Forestry, and Fishing (SIC 0)	57	4	120	181
Mining, Extraction & Construction (SIC 1)	2102	657	1110	3869
Manufacturing - food, textile, paper & chemical products (SIC 2)	3578	635	4881	9094
Manufacturing (SIC 3)	4677	1316	11513	17506
Transportation, Communications, Electric, Gas, and Sanitary Services (SIC 4)	2760	297	2498	5555
Wholesale & Retail Trade (SIC 5)	2050	382	3393	5825
Leisure, Personal and Business Services (SIC 7)	1761	529	7638	9928
Health, Public & Professional Services (SIC 8)	644	277	1871	2792
Government and Administrative Services (SIC 9)	79	24	4	107
Total	**17708**	**4121**	**33028**	**54857**

Table 2 Yearly percentages of firm-years with different firm-characteristics

Year	Number of Observations	% of Firms Reporting Net Loss	% of Firms Trading at Discount	% of Firms Reporting Net Income and Trading at Premium (PP)	% of Firms Reporting Net Income and Trading at Discount (DP)	% of Firms Reporting Net Loss and Trading at Premium (PL)	% of Firms Reporting Net Loss and Trading at Discount (DL)	% of Firms Paying Dividends	% of Firms Reporting R&D Expenditures	% of Firms Reporting Advertising Expenditure
1996	2463	29.5%	11.0%	63.5%	6.9%	25.5%	4.0%	26.8%	48.8%	17.2%
1997	2672	30.8%	9.1%	63.8%	5.4%	27.1%	3.7%	25.3%	48.8%	18.8%
1998	4209	32.8%	19.1%	56.0%	11.2%	25.0%	7.8%	29.1%	48.5%	20.0%
1999	4235	34.8%	18.7%	52.2%	12.9%	29.0%	5.8%	25.8%	49.7%	23.6%
2000	4211	40.0%	25.1%	46.9%	13.1%	28.0%	12.0%	23.4%	51.5%	27.8%
2001	4084	47.2%	22.7%	43.4%	9.4%	33.9%	13.3%	22.2%	51.9%	30.9%
2002	4101	47.1%	28.6%	40.8%	12.1%	30.6%	16.5%	21.8%	51.4%	32.9%
2003	4063	39.7%	9.0%	55.6%	4.7%	35.4%	4.3%	24.0%	50.8%	36.0%
2004	4152	34.5%	7.5%	61.7%	3.8%	30.8%	3.7%	26.1%	51.6%	39.0%
2005	4154	34.7%	6.9%	61.8%	3.5%	31.3%	3.4%	27.7%	50.7%	39.6%
2006	3791	30.1%	5.6%	66.7%	3.1%	27.7%	2.4%	30.5%	50.4%	40.5%
2007	3252	27.2%	12.4%	65.5%	7.3%	22.1%	5.1%	33.8%	50.3%	40.6%
2008	3183	37.8%	41.9%	41.8%	20.4%	16.3%	21.5%	33.5%	49.1%	41.6%
2009	3168	37.9%	17.7%	54.2%	7.9%	28.1%	9.8%	31.4%	48.9%	40.8%
2010	3119	27.8%	11.8%	65.7%	6.4%	22.5%	5.3%	33.2%	49.1%	40.2%
Total sample	**54857**	**36.0%**	**16.6%**	**55.4%**	**8.6%**	**28.0%**	**8.0%**	**27.3%**	**50.2%**	**32.8%**

Table 3 Selected descriptive statistics for firms in four contexts [a]

	MV	BV	ER	R&D	DIV	ADVERT	ASSETS	SALES
Premium Profit (PP) firms (MV>BV, ER>0)								
Mean	4331.8	1314.1	225.9	136.5	172.8	107.8	3538.0	2973.4
Std. Dev.	18256.8	5128.4	1058.7	574.0	622.3	398.0	17289.6	12406.6
Min.	0.0	-7820.0	0.0	0.0	0.0	0.0	0.0	0.1
Q1	150.2	56.2	6.1	3.8	5.5	1.0	110.8	106.6
Median	580.4	211.9	25.8	14.9	22.6	6.3	447.3	433.1
Q3	2086.5	753.3	103.1	53.2	94.7	43.3	1791.4	1659.0
Max.	465505.8	146839.0	45220.0	12183.0	11713.0	8667.0	795337.0	425071.0
No. of obs.	30398	30398	30398	14053.0	11794.0	10121.0	30398	30398
Discount Profit (DP) firms (MV<BV, ER>0)								
Mean	675.3	1010.7	85.3	25.2	62.5	49.1	2532.2	1536.3
Std. Dev.	3738.6	6107.3	550.3	110.0	369.7	215.3	17965.6	6439.1
Min.	0.2	0.5	0.0	0.0	0.0	0.0	1.1	0.0
Q1	26.5	40.4	1.8	1.4	1.9	0.7	73.2	70.6
Median	81.8	118.4	6.9	4.0	6.4	4.4	237.5	229.2
Q3	280.6	400.6	28.6	15.6	26.1	19.6	237.5	802.4
Max.	90579.1	157318.0	17335.0	3020.0	12649.0	4253.0	797769.0	180929.0
No. of obs.	4719	4719	4719	1396.0	1514.0	1449.0	4719	4719
Premium Loss (PL) firms (MV>BV, ER<0)								
Mean	791.0	268.9	-78.3	46.3	75.2	21.0	919.5	622.4
Std. Dev.	3820.9	1592.2	599.4	263.0	205.3	124.5	5359.9	3799.8
Min.	0.1	-25560.0	-38468.0	0.0	0.0	0.0	0.0	0.0
Q1	32.6	5.6	-34.6	2.5	3.8	0.2	20.2	10.7
Median	117.6	32.4	-10.9	8.6	14.9	1.0	75.9	44.4
Q3	395.8	124.9	-3.2	25.7	57.3	5.4	319.5	209.7
Max.	161958.0	62716.8	0.0	8676.3	2907.9	4600.0	289357.0	225424.0
No. of obs.	15351	15351	15351	10098.0	1126.0	4911.0	15351	15351
Discount Loss (DL) firms (MV<BV, ER<0)								
Mean	248.3	376.9	-122.0	24.3	35.2	28.9	1005.2	703.9
Std. Dev.	1291.9	1713.2	1625.7	113.3	89.0	190.2	4481.9	3231.5
Min.	0.1	0.4	-98696.0	0.0	0.1	0.0	0.4	0.0
Q1	12.5	23.1	-42.4	1.8	1.4	0.3	38.3	26.7
Median	38.7	67.5	-11.3	5.9	5.0	1.8	117.4	89.5
Q3	125.8	203.8	-2.8	18.0	24.9	9.9	440.3	339.6
Max.	48664.2	52817.0	0.0	4110.0	901.0	4530.0	115450.0	118298.0
No. of obs.	4389	4389	4389	2008.0	558.0	1523.0	4389	4389

[a] The descriptive statistics are computed for un-scaled variables and are expressed in millions. MV is the market capitalization of common equity two months after the financial year end, ER is earnings for common stockholders, BV is book value of common equity, DIV is common dividends, R&D is the research and development expenditure, ADVERT is advertising expenditures, ASSETS is the firms' total reported assets, and SALES is total sales. In computing the descriptive statistics for R&D, DIV and ADVERT, only observations with non-zero values were included, hence the reported numbers of observations differ across the variables.

Table 4 Financial and other firm characteristics across four contexts [a]

	PP firms	DP firms	PL firms	DL firms
Median values of financial ratios (%):				
ROE	12.5	6.6	-22.0	-17.9
ROA	6.3	3.2	-15.5	-9.1
PM	6.4	3.2	-22.2	-11.8
SALES / ASSETS	100.0	105.4	69.4	82.3
BV / ASSETS	52.0	53.5	49.8	57.6
Median values of price multiples (times):				
Price-to-Earnings	19.9	10.8	-	-
Price-to-Sales	1.3	0.4	2.0	0.4
Price-to-Book	2.2	0.8	2.3	0.6
Other characteristics (%):				
Dividend paying firms	38.8	32.1	7.3	12.7
R&D firms	46.2	29.6	65.8	45.8
Advertising firms	33.3	30.7	32.0	34.7
Relative differences in firm size (times): [b]				
MV	7.1	1.0	1.4	0.5
SALES	1.9	1.0	0.2	0.4
ASSETS	1.9	1.0	0.3	0.5
BV	1.8	1.0	0.3	0.6
Exchange listing (%:)				
NYSE	43.0	34.5	14.2	19.1
AMEX	5.8	11.9	8.7	10.7
NASDAQ	51.3	53.6	77.1	70.2

[a] Variables are as defined in Table 3. ROE is the ratio of ER to BV; ROA is the ratio of ER to ASSETS; PM is the Net Profit Margin computed as the ratio of ER to SALES.

[b] The median size of DP firms is taken as the 'base', i.e. equal to '1'. Four different proxies of size are considered: MV, Total Assets, Sales and BV.

Table 5 Regression results for the four context-based sub-samples

Model: [a] $MV_{it} = a_0 + a_1 BV_{it} + a_2 ER_{it} + a_3 R\&D_{it} + a_4 DIV_{it} + a_5 ADVERT_{it} + e_{it}$

Variables [b]	Premium Profit (PP) firms (MV>BV, ER>0)	Discount Profit (DP) firms (MV<BV, ER>0)	Premium Loss (PL) firms (MV>BV, ER<0)	Discount Loss (DL) firms (MV<BV, ER<0)
Intercept	-0.121**	0.006**	0.077	0.003
	(-2.284)	(2.677)	(0.940)	(0.559)
BV	1.685***	0.680***	1.684***	0.658***
	(6.405)	(31.403)	(4.387)	(26.844)
ER	10.280***	0.225*	-1.934***	0.031**
	(13.129)	(1.903)	(-6.952)	(2.648)
R&D	7.136***	0.487***	2.766***	0.493***
	(4.618)	(6.450)	(3.894)	(6.327)
DIV	0.420	0.245	-0.567	-0.263
	(0.536)	(1.000)	(-0.658)	(-0.648)
ADVERT	2.917***	0.167***	0.439	0.095
	(5.862)	(3.643)	(0.479)	(1.273)
Adj. R^2	*39.5%*	*71.6%*	*31.8%*	*72.2%*
No. of obs.	30,398	4,719	15,351	4,389
Incremental contribution of individual variables to the model's adjusted R^2 (incremental information content): [c]				
BV	6.9%	53.5%	7.7%	53.6%
ER	10.1%	0.3%	5.9%	0.1%
R&D	4.2%	0.4%	2.8%	1.7%
DIV	0.1%	0.3%	0.0%	0.0%
ADVERT	0.3%	0.0%	0.1%	0.0%

[a] All models are estimated with fixed effects corresponding to the stock exchanges (AMEX, NASDAQ, NYSE). All models are estimated after the exclusion of outliers, i.e., top and bottom
1% of each variable. The reported coefficients are based on Fama-MacBeth estimation of 15 annual regressions, and the t-stats (in parentheses) are based on Newey-West corrected Fama-MacBeth standard errors. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively, using a two-tailed t-test.

[b] All variables are deflated by composite scale proxy. MV, the dependent variable, is the market capitalisation of common stock two months after the financial year end. ER is earnings for
common stockholders; BV is book value of common equity; R&D is the research and development expense; DIV is common dividends; ADVERT is advertising expense (all independent
variables are at the balance sheet date).

[c] The computation of incremental information content of individual variables follows Collins et at. (1997) and represents the difference between the Adj. R^2 of the entire model and the model that excludes the given variable.

Table 6 Test of the impact of firms' information environment (proxied by firm size) on value relevance of accounting data

Model: [a] $MV_{it} = a_0 + a_1 BV_{it} + a_2 ER_{it} + a_3 R\&D_{it} + a_4 DIV_{it} + a_5 ADVERT_{it} + e_{it}$

	Premium Profit (PP) firms (MV>BV, ER>0)					**Premium Loss (PL) firms (MV>BV, ER<0)**				
Variables [b]	**Quintile 1**	**Quintile 2**	**Quintile 3**	**Quintile 4**	**Quintile 5**	**Quintile 1**	**Quintile 2**	**Quintile 3**	**Quintile 4**	**Quintile 5**
Intercept	-0.216***	-0.194***	-0.100***	-0.099***	0.114	-0.998***	-0.122	-0.024	-0.020	-0.004
	-7.301	-9.052	-5.286	-4.400	1.582	-5.975	-1.402	-0.440	-0.435	-0.025
BV	2.220***	1.785***	1.252***	1.298***	0.774***	5.032***	1.849***	1.194***	1.088***	0.585***
	13.744	15.107	11.199	15.677	8.193	7.770	5.094	5.688	6.619	6.437
ER	10.885***	9.804***	8.734***	6.712***	4.866***	-5.958***	-2.635***	-2.925***	-3.391***	-1.862***
	14.159	17.222	15.247	13.643	10.247	-2.980	-3.662	-6.089	-14.406	-16.672
R&D	13.868***	7.183***	6.409***	3.363***	2.720***	11.155***	9.249***	3.913***	0.054	0.496
	11.546	11.496	9.813	8.988	5.610	4.231	7.095	5.341	0.160	1.515
DIV	-2.848***	1.880***	1.211**	0.580	1.598**	3.219	8.689*	-3.399***	-6.128***	-3.978**
	-3.305	2.806	2.063	0.646	2.065	0.653	1.782	-3.101	-2.463	-2.080
ADVERT	2.686***	2.430***	2.045***	2.721***	0.243	8.398***	8.207***	3.363	-2.713	-0.743
	3.642	3.541	4.062	3.819	0.532	2.808	2.751	1.467	-1.480	-0.694
Adj. R^2	32.0%	38.2%	37.2%	28.1%	20.2%	27.0%	27.0%	24.5%	27.7%	20.6%
No. of obs.	9077	7832	6108	4390	2991	1418	2234	3307	3999	4393
Incremental contribution of individual variables to the model's adjusted R^2 (incremental information content): [c]										
BV	3.3%	5.8%	5.1%	7.3%	5.7%	5.1%	2.1%	1.6%	2.1%	1.7%
ER	3.1%	5.9%	7.3%	6.5%	6.3%	1.9%	1.4%	4.5%	15.0%	15.6%
R&D	3.9%	3.1%	6.1%	2.4%	2.4%	2.1%	6.5%	2.5%	0.0%	0.1%
DIV	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
ADVERT	0.1%	0.1%	0.2%	0.3%	0.0%	1.0%	0.2%	0.0%	0.0%	0.0%

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Variables [b]	Discount Profit (DP) firms (MV<BV, ER>0)					Discount Loss (DL) firms (MV<BV, ER<0)				
	Quintile 1	**Quintile 2**	**Quintile 3**	**Quintile 4**	**Quintile 5**	**Quintile 1**	**Quintile 2**	**Quintile 3**	**Quintile 4**	**Quintile 5**
Intercept	-0.008	0.024***	-0.003	-0.007	-0.023**	0.001	0.002	-0.014**	-0.005	-0.024***
	-1.294	3.692	-0.520	-1.333	-1.974	0.048	0.201	-2.243	-0.767	-2.517
BV	0.806***	0.627***	0.718***	0.639***	0.669***	0.735***	0.697***	0.682***	0.625***	0.566***
	25.513	19.659	27.310	27.502	34.463	14.003	20.171	26.165	29.391	33.693
ER	-0.081	0.160	-0.043	0.185	0.173*	-0.036	0.118***	0.087***	0.096***	0.043***
	-0.413	1.057	-0.263	1.422	1.641	-1.019	2.788	3.145	4.835	2.742
R&D	0.340	0.925***	0.584***	0.579***	0.236**	0.141	0.518**	0.258**	0.348***	0.293***
	0.905	3.471	2.810	4.024	2.396	0.727	2.271	2.107	5.015	5.479
DIV	-0.127	-0.412	0.188	0.455	0.397	-1.051**	0.756	0.079	-0.286	0.071
	-0.351	-1.239	0.643	1.640	1.133	-2.311	1.332	0.127	-0.778	0.246
ADVERT	0.264	0.091	0.118	0.316***	-0.098	0.025	-0.220	0.734***	-0.236**	-0.021
	0.786	0.457	1.166	3.150	-0.737	0.033	-0.461	4.924	-1.949	-0.228
Adj. R^2	74.7%	66.6%	73.3%	69.8%	68.90%	85.1%	81.7%	78.4%	69.4%	59.9%
No. of obs.	334	594	924	1379	1488	142	311	633	1204	2099
Incremental contribution of individual variables to the model's adjusted R^2 (incremental information content): [c]										
BV	61.8%	50.0%	52.8%	48.2%	55.6%	43.5%	51.5%	42.7%	47.7%	47.8%
ER	-0.1%	0.0%	0.0%	0.1%	0.1%	0.0%	0.9%	0.5%	1.0%	0.3%
R&D	0.0%	0.7%	0.4%	0.8%	0.2%	-0.1%	0.6%	0.3%	1.1%	1.4%
DIV	-0.1%	0.2%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
ADVERT	0.0%	0.0%	0.0%	0.1%	0.0%	-0.1%	0.0%	0.3%	0.1%	0.0%

[a] The model is as defined in Table 5, except that the reported results are based on pooled over time data because the Fama and MacBeth (1973) estimation was not possible due to insufficient number of observations in some quintiles. Reported in parentheses are White (1980) heteroskedasticity-adjusted t-ratios. **Quintile 1** through **Quintile 5** represent, respectively, the quintiles of sample firms with largest through the smallest market capitalisation. Quintiles are first created within each year of the sample period. Then the observations in the respective quintiles are pooled over the sample period.

[b] Variables are as defined in Table 5.

[c] The measurement of incremental contribution is as defined in Table 5.

Table 7 The effect of relative levels of earnings and book value (ROE) on the premium/discount results

Model: [a] $MV_{it} = a_0 + a_1 BV_{it} + a_2 ER_{it} + a_3 R\&D_{it} + a_4 DIV_{it} + a_5 ADVERT_{it} + e_{it}$

	Premium Profit (PP) firms (MV>BV, ER>0)			Discount Profit (DP) firms (MV<BV, ER>0)			Premium Loss (PL) firms (MV>BV, ER<0)			Discount Loss (DL) firms (MV<BV, ER<0)		
Variables [b]	**High ROE**	**Mid ROE**	**Low ROE**	**High ROE**	**Mid ROE**	**Low ROE**	**Large Negative ROE**	**Mid Negative ROE**	**Small Negative ROE**	**Large Negative ROE**	**Mid Negative ROE**	**Small Negative ROE**
Intercept	-0.102***	-0.198***	-0.194***	0.017***	0.008*	0.001	-0.180***	-0.392***	-0.165***	-0.006	0.006	0.009
	-5.319	-9.616	-7.034	2.664	1.663	0.335	-3.984	-7.222	-2.995	-1.173	1.078	1.784
BV	1.726***	1.990***	2.600***	0.758***	0.776***	0.662***	3.025***	4.644***	2.670***	0.656***	0.673***	0.610***
	12.034	8.290	16.955	24.313	17.403	38.887	12.761	12.285	13.194	26.746	27.217	34.008
ER	9.579***	9.144***	2.332	-0.272**	-0.772**	0.498**	-1.638***	2.258**	-0.946***	0.056***	0.267***	0.110***
	17.437	5.369	1.192	-2.196	-2.097	2.128	-9.053	2.264	-4.664	3.376	3.723	4.285
R&D	8.505***	7.156***	5.394***	0.221	0.264	0.388***	1.977***	2.223***	4.134***	0.169***	0.386***	0.620***
	11.477	11.113	9.858	1.623	1.374	3.426	5.092	3.391	7.952	2.847	5.886	8.050
DIV	1.617***	-2.613***	-2.979***	-0.459*	0.053	0.558***	-3.204*	-6.561***	0.826	-0.257	0.107	-0.148
	3.435	-3.211	-3.148	-1.679	0.219	2.665	-1.679	-2.943	0.265	-0.837	0.346	-0.409
ADVERT	3.524***	1.121**	2.331***	-0.296	0.186	0.154**	5.079	2.828	0.923	0.197	-0.120	-0.091
	7.850	2.305	2.608	-1.245	1.548	2.033	1.453	0.966	0.687	1.158	-0.842	-0.922
Adj. R^2	28.6%	31.7%	21.7%	74.0%	69.1%	68.2%	17.0%	15.7%	21.1%	69.1%	68.2%	64.7%
No. of obs.	11051	10264	8516	466	1253	3000	4969	4390	4253	1031	1611	1747
Incremental contribution of individual variables of interest to the entire model's adjusted R^2 (incremental information content): [c]												
BV	1.8%	1.2%	7.4%	37.2%	13.7%	42.9%	4.1%	5.6%	9.2%	46.7%	26.5%	51.5%
ER	3.0%	0.4%	0.0%	0.2%	0.2%	0.1%	2.0%	0.2%	0.7%	0.7%	0.6%	0.8%
R&D	3.5%	3.2%	2.1%	0.1%	0.1%	0.4%	0.8%	0.3%	2.2%	0.6%	1.2%	1.9%
DIV	0.1%	0.1%	0.0%	0.3%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
ADVERT	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%

[a] The model is as defined in Table 5 except that the reported results are based on pooled over time data because the Fama and MacBeth (1973) estimation was not possible due to insufficient number of observations in some triciles. Reported in parentheses are White (1980) heteroskedasticity-adjusted t-ratios. High ROE, Mid ROE and Low ROW are the triciles of profitable firms that have, respectively, the largest, the mid-range and the smallest values of the Earnings-to-Book ratio. Large Negative ROE, Mid Negative ROE and Small Negative ROE are the triciles of loss making firms that have, respectively, the largest negative, the mid-range negative and the smallest negative values of the Earnings-to-Book ratio. Triciles are first formed within yearly samples and then pooled across the sample period. Cases with negative BV are eliminated as ROE is meaningless for negative BV.
[b] Variables are as defined in Table 5.
[c] The measurement of incremental contribution is as defined in Table 5.