The Value Relevance of Dividends, Book Value and Earnings

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Abstract

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This paper compares the value relevance of book value and dividends versus book value and reported earnings. Our work is motivated by recent research including Ohlson (1995), Feltham and Ohlson (1995), Bernard (1995), Burgstahler and Dichev (1997), Collins, Maydew and Weiss (1997), Barth, Beaver and Landsman (1998) and Hand and Landsman (1999).

We justify modeling price in terms of book value and dividends in two ways. First, using Modigliani and Miller's (1959) argument, dividends may have a stronger correlation with permanent earnings than reported earnings. Second, we derive a model of price in terms of book value and dividends from basic analytical relationships.

Three sets of findings are reported. First, overall, the variables, book value and dividends, have almost the same explanatory power as book value and reported earnings. Second, for firms with transitory earnings, dividends have greater explanatory power than earnings but book value and earnings have about the same explanatory power as book value and dividends.

Most important, when earnings are transitory and book value is a poor indicator of value, dividends have the greatest explanatory power of the three variables. The value relevance of dividends is confirmed further in statistical tests using holdout samples.

The Value Relevance of Dividends, Book Value, and Earnings

I. Introduction

In this paper we compare the value relevance of book value and dividends versus book value and reported earnings. Our methodology of examining the information content of various income statement and balance sheet items is based on cross-sectional regressions of share price on the value measures. While most research in this area has concentrated almost exclusively on explaining price by book value and reported earnings (or their components), our focus is on the relation between share price and book value and dividends.

We justify modeling price in terms of book value and dividends in two ways. First, we argue that when earnings are transitory, dividends are a better proxy for permanent earnings than reported earnings. Second, we develop the relation between price, book value, and dividends using basic analytical relationships. Overall, book value is the most value relevant variable, having the highest R^2 and incremental R^2 of the three variables, book value, reported earnings and dividends.

Comparing dividends and earnings, book value and dividends have almost identical explanatory power as book value and reported earnings in the full sample of firms studied. Furthermore, earnings and dividends have almost identical individual explanatory power. These empirical results are surprising because the justification for accrual accounting is based on the enhanced value relevance of accruals versus pure cash flows or dividends. For firms with transitory earnings, dividends have greater explanatory power than earnings, but book value and earnings have almost the same explanatory power as book value and dividends. Thus, book value

picks up the slack when earnings are transitory.

More importantly, when book value is a poor indicator of value (for example, due to the presence of unrecognized assets), and when earnings are transitory, dividends have the greatest value relevance of the three measures. The superior valuation relevance of dividends in such cases holds not only for explaining share price within the sample, but also for out of sample forecasts of price. Thus, our evidence highlights the overlooked valuation role of dividends and implies an important practical role for dividends such as comparable firms valuation, where the valuations implied by a given sample are applied to a holdout sample.[1]

Our work is motivated by recent research in accounting, both theoretical and empirical. Ohlson (1995) and Feltham and Ohlson (1995), who base their theory of valuation on the residual income valuation model (RIVM), show that under certain conditions share price can be expressed as a weighted average of book value and earnings. The Ohlson and Feltham-Ohlson models have spawned much empirical research examining the comparative valuation relevance of the balance sheet and the income statement.

Bernard (1995) was one of the first to gauge the value relevance of accounting data. He compared the explanatory power of a model in which share price is explained by book vaue and earnings versus a model of share price based on dividends alone. He found that the accounting variables dominate dividends, which is interpreted as confirming the benefits of the linkage between accounting data and firm value.

Burgstahler and Dichev (1997) develop and test an option style valuation model and find that the relevance of earnings versus book value varies by return-on-equity. Collins, Maydew, and Weiss (1997), who base their empirical work on Feltham and Ohlson (1995), find that over the

past 40 years, the value relevance of earnings (book value) has decreased (increased). Barth, Beaver, and Landsman (1998) motivate their research by the differing roles of the balance sheet and the income statement. They show that for firms in financial distress, the value relevance of book value dominates that of earnings, and more generally, the relative importance of each variable differs across industries due to the degree of unrecognized assets (the greater the amount of unrecognized assets, the lower the relevance of book value).[2]

Hand and Landsman (1999) test the differing predictions that emerge in Ohlson's (1995) model by examining the information content of dividends. Like us, Hand and Landsman find that dividends have information content, and this information content is greatest when earnings are transitory. While their findings are complementary to ours, this paper differs from theirs in two ways. First, we motivate the empirical models in a different way. As pointed out by Modigliani and Miller (1959), dividends might have a greater correlation with a true measure of earnings potential (and therefore price) than current earnings itself. Further, just as the dividend discount model (DDM) and RIVM are algebraically equivalent, it can be shown that a model in which price is related to book value and dividends can be derived from both the RIVM and from the accounting identity which defines initial book value as the present value of future dividends discounted at the accounting rate of return. Second, while both our paper and Hand and Landsman show that dividends are value relevant, we show that in certain contexts dividends have greater value relevance than either earnings or book value. The motivation for developing the statistical models and the empirical results are the paper's main contributions.

The rest of the paper is organized as follows. Section II provides justification for replacing earnings with dividends in the valuation model explaining price. Section III describes our data and

methods. Sections IV through VI reports our statistical results. Section VII concludes.

II. Justification for Replacing Earnings with Dividends

The justification for replacing earnings with dividends in the regression of price on book value and earnings is based on two separate arguments. First, it has long been argued that dividends have "information content" in the sense that dividends provide information about the firm's permanent earnings. Therefore, dividends can be viewed as a surrogate for permanent earnings. Second, given the algebraic properties of an accounting system based on the clean surplus relation, an accounting valuation model can be derived in terms of book value and dividends.

Information Content of Dividends

The proposition that dividends have information content was made by Modigliani and Miller (1959) who argued that the earnings reported by firms for any short period like a year are affected by many random factors and distortions. Current income is, therefore, only an imperfect measure of the noise-free earnings potential upon which rational investors base their valuations. Furthermore, other variables are correlated with the "true" measure of earnings potential. Therefore, regressions of price on dividends alone or on dividends and these other correlated variables would yield significant regression coefficients even if we knew that the only factor entering into the firm's valuation was its earnings potential and that dividends had no independent effect. Thus, replacing earnings with dividends in the accounting valuation model can be viewed as a test of the Modigliani and Miller proposition that dividends may have as much or more correlation with price as current earnings.

Valuation Model in Terms of Book Value and Dividends

It can be argued that Bernard's study (1995) provides a motivation for substituting dividends

for earnings in valuation model relating price to book value and dividends. He contrasts regression results for two models, the first based on DDM and the second based on RIVM. He finds that a regression model based on RIVM outperforms the DDM with R^2 values of .69 and .29, respectively. However, this comparison is "unfair" because we will show that the RIVM contains information about both book value and dividends whereas the DDM contains only information on dividends.

To explain this, we consider discrete-time perfect-certainty model over a finite time horizon. Let MV_t be market value of common equity at the end of period t, BV_t accounting book value at the end of period t, d_t, the net dividends paid at the end of period t, a_t, the accounting rate of return and k the cost of capital.

DDM defines market value as

$$MV_t = \sum_{t=1}^{T} \frac{d_{t+t}}{(1+k)^{t+t}} + \frac{MV_T}{(1+k)^{t+t}} \qquad (1)$$

over the finite time horizon (t,T) and RIVM defines market value in terms of discounted residual earnings:

$$MV_t = BV_t + \sum_{t=1}^{T} \frac{(a_t - k)BV_{t+t-1}}{(1+k)^t} + \frac{MV_t - BV_t}{(1+k)^T}. \qquad (2)$$

Bernard specified cross section regression models based on DDM in equation (1) and RIVM in equation (2) for four-year forecasts of dividends and residual earnings as:

Model 1. $MV_t = b_0 + \sum_{t=1}^{4} b_{t+1} \frac{d_{t+t}}{(1+k)^t} + e_t$

Model 2. $MV_t = b_0' + b_1 BV_t + \sum_{t=1}^{4} b_{t+1}' \frac{(a_t - k)BV_{t+t-1}}{(1+k)^t} + e_t'$

In both cases, terminal values were ignored in the model specification.

To see why RIVM contains more information than DDM, equate the right hand sides of equations (1) and (2) and define discounted residual earnings in terms of dividends and book value:

$$\sum_{t=1}^{T} \frac{(a_t - k)BV_{t+t-1}}{(1+k)^t} = \sum_{t=1}^{T} \frac{d_{t+t}}{(1+k)^T} + \frac{BV_T}{(1+k)^t} - BV_t \quad (3)$$

Substituting equation (3) into equation (2) and simplifying,

$$MV_t = BV_t(\frac{1+g}{1+k})^T + \sum_{t=1}^{T} \frac{d_{t+t}}{(1+k)^t} + \frac{MV_T - BV_T}{(1+k)^T} \quad (4)$$

where $g = (BV_T / BV_t)^{\frac{1}{T}} - 1$

Bernard based regression models on equations (1) and (2), but in specifying the two regression models, he left out the last term, $\frac{MV_t}{(1+k)^T}$, in equation (1) and the last term, $\frac{MV_T}{(1+k)^T} - \frac{BV_t}{(1+k)^T}$, in equation (2). But the term that is left out of equation (1) is generally much larger (and, therefore, will have a greater influence on R^2) than the term left out of equation (2). This will create a bias in favor of Model 2 since the variables in Model 2 will account for more of the variation in market value than the variables in Model 1. Therefore, since the last terms in equations (2) and (4) are the same, specifying a regression model based on equation (4) instead of equation (1) leaves the same term out of both regression models, resulting in a more level playing field:

Model 3. $MV_t = b_0^{"} + b_1^{"} BV_t + \sum_{t=1}^{4} b_{t+1}^{"} \frac{d_{t+t}}{(1+k)^t} + e_t^{"}$

where $b_1^{"}$ depends partly on $(\frac{1+g}{1+k})^T$. Both Models 2 and 3 are based on RIVM, not DDM, and both models exclude the same terminal value, i.e., $\frac{MV_t}{(1+k)^T}$

Thus, the equivalent form of RIVM in Model 3 provides a motivation for substituting dividends for earnings to determine which of these two variables has a greater association with price..

Valuation Model With Book Value and Dividends Based on Accounting Identity

While equation (4) is derived from RIVM, it is not necessary to rely on RIVM to derive a valuation model in terms of book value and dividends. This can be done in a straightforward way, once it is recognized that a firm's book value can be expressed as

$$BV_t = \sum_{t=1}^{T} \frac{d_{t+t}}{(1+a)^t} + \frac{BV_T}{(1+a)^T} \quad (5)$$

where *a* is the constant accounting rate of return.[3] Combining equations (1) and (5),

$$MV_t = BV_t + \sum_{t=1}^{T} \frac{d_{t+t}}{(1+k)^t} - \sum_{t=1}^{T} \frac{d_{t+t}}{(1+a)^t} + \frac{MV_T}{(1+k)^T} - \frac{BV_T}{(1+a)^T} \quad (6)$$

Equation (6) also provides a motivation for Model 3.

III. Data and Methodology

The results in section II provide the rationale for comparing a regression model of price on book value and earnings with a model of price on book value and dividends. Our empirical tests are based on five regression models:

1. $MV_{it} = a_0 + a_1 BV_{it} + u_{it}$

2. $MV_{it} = b_0 + b_1E_{it} + v_{it}$

3. $MV_{it} = c_0 + c_1BV_{it} + c_2E_{it} + w_{it}$

4. $MV_{it} = d_0 + d_1D_{it} + x_{it}$

5. $MV_{it} = e_0 + e_1BV_{it} + e_2D_{it} + y_{it}$

where MV = market value of common equity at fiscal year end, BV = book value of common equity at fiscal year end, E = annual net income, D = annual dividends paid.[4] All variables are on a per share basis, and are taken from the current Compustat File which covers the twenty year period 1978-1997, including the research file, and a firm is included in the analysis in any year in which it both pays dividends and has the other three variables; i.e., the sample includes only dividend payers. Analogous to Collins, Maydew and Weiss (1997), we deleted as outliers observations in the top or bottom **2**% of the ratios, book/price (BP), dividends/price (DP), or earnings/price (EP) based on the pooled distribution.[5] We measure value relevance by the R^2 of the simple regression of share price on each variable and incremental value relevance as the incremental R^2 of the multiple regressions over the R^2 of the simple regressions.

Note that while Model 3 is based on net dividends, we exclude share issuances and repurchases in estimating regressions 4 and 5. By contrast, Hand and Landsman include share flows through their NETCAP (net capital contributions) variable. Adding NETCAP could only raise the R^2 of the dividend based valuation model. Thus, by excluding NETCAP, we bias our results against finding a primary valuation role for dividends.

We first present the results for the full sample (Section IV), and then report the findings after splitting the sample into firms with permanent and transitory earnings (Section V). We provide the results for intangible intensive industries (Section VI).

Full Sample Results

Panel A of Table 1 shows statistics on the pooled, outlier truncated, sample.[6] In order to provide comparisons with recent valuation model research that does not require firms to be dividend payers, Panel B of Table 1 reports statistics for a broader sample that also includes zero dividend firms (also outlier truncated). Despite deletion of outliers, there is still wide dispersion of all three ratios and especially of the raw variables themselves. Using the median as the criterion, the dividend payers tend to be larger both in terms of market and book values (the sample mean MV of 50.67 is driven by some large observations) and have relatively fewer cases of negative earnings. The mean book-to-market ratios of both samples, however, are similar.

Panel A of Table 2 reports R^2 and incremental R^2 statistics from annual estimation of the five valuation models on the sample of dividend paying firms from Table 1, Panel A. For comparison, Panel B of Table 2 reports mean R^2 and incremental R^2 statistics from annual regressions for the broader sample that also includes zero dividend firms (from Table 1, Panel B). Consistent with most recent valuation model literature, we focus on the model's explanatory power, rather than the estimated slope coefficients. Like Collins, Maydew and Weiss (1997), we estimate first pass regressions on the respective samples, and then delete observations with (absolute values of) studentized residual greater than 4.0, and we then re-estimate the regressions. In order to make valid R^2 comparisons, all five second pass regressions are run on the same set of observations.[7]

Several characteristics of the statistical results in Table 2 merit comment. First, Panel A shows that BV is the dominant valuation variable, both in terms of its own value relevance and its incremental value relevance with respect to either earnings or dividends. This is expected, given

prior research, such as Collins, Maydew and Weiss (19970. Second, what is noteworthy and surprising, however, is that dividends have almost equal (raw and incremental) value relevance as earnings. The mean R^2 values in the simple regressions of price on earnings and price on dividends are .444 and .455, respectively, and there is no statistically significant difference. Similarly, the incremental R values of E given BV and D given BV are .049 and .031, and this difference is not statistically significant. A similar pattern of information content of dividends versus earnings is observed when comparing the BV&E and the BV&D models, where the mean R^2 statistics are .669 and .651, respectively. Again, this difference is not statistically significant. These results are surprising, because one would expect the accrual accounting model to make earnings more informative than dividends. Yet, for the full sample, dividends have about the same explanatory power as earnings.[8]

Third, by splitting the sample into two ten year subperiods, we see that all of the R^2 statistics of the five models decline over time. However, the incremental R^2 statistics of both earnings and dividends given book value and of book value given dividends increase over time. Although not our focus, the intertemporal pattern of R^2 is interesting, especially for the dividend-only model, because it suggests that the declining value relevance of book value and earnings that has been found by us and by others, e.g., Collins, Maydew and Weiss (1997), Chang (1998) and Lev and Zarowin (1999), is not necessarily caused by accounting rules for measurement and recognition that have become increasingly outmoded in the current high-tech economy. If accounting rules were the primary cause of the declining R^2, then how do we explain the decline in R^2 for the dividend only model?

The most striking result for the broader sample in Table 2, Panel B, compared with the

results for the dividend payer only sample in Panel A, is the lower value relevance of earnings (average R^2 of .262 versus .444), and the consequent increase in the incremental value relevance of book value given earnings (average incremental R^2 of .403 versuss .226). By contrast, the valuation relevance of book value, both by itself and together with earnings, is virtually identical for both samples. The lower value relevance of earnings in Panel B compared to Panel A is not surprising because zero dividend firms tend to be smaller firms with more variable (transitory) earnings, which reduces the value relevance of earnings.

For example, comparison of Panels A and B of Table 1 shows that the median share price of the broader sample is 8.25, as compared with 13.50 for the dividend payers, and the standard deviation of E/P in the broader sample is .286, compared with .097 for the dividend payers. Similarly, 27% of the firm-year observations of the broader sample have negative earnings, as compared with 7% for the dividend payers, and it is well known, e.g., Hayn (1995) and Collins, Pincus and Xie (1999), that negative earnings have little valuation relevance.

IV. Statistical Results for Permanent Versus Transitory Earnings Firms

We now examine further the value relevance of dividends alone and book value and dividends, by focussing sequentially on specific groups of firms. First, we divide the dividend paying sample into two groups, firms with permanent earnings and firms with transitory earnings, and we separately study each group. When earnings are transitory, they have low information content; therefore, we would expect dividends have greater information content than earnings in this case.

The important question, however, is which full model has greater explanatory power, book value and earnings or book value and dividends; i.e., does book value compensate enough

for transitory earnings? If the answer is yes, then the standard book value and earnings model dominates the book value and dividend model, even when earnings are transitory.

Next, we focus on specific industries where book value is known to be a poor measure of value. Here the question is reversed: does earnings compensate enough for the noisy book value? Again, a yes answer means that the book value and earnings model still dominates. However, the answer might differ depending on whether earnings are permanent or transitory. Thus, we first examine all firms together and then firms with permanent versus transitory earnings separately.

Since earnings have their lowest information content when they are transitory, it is not surprising that Hand and Landsman (1999, Table 6) find that when earnings are negative (an extreme case of transitory earnings), dividends have greater information content than earnings (based on their slope coefficients and t-statistics in regressions of share price on book value, earnings, and dividends). When comparing the book value and earnings model versus the book value and dividends model, however, we are interested in the full model explanatory power, not just a comparison of the two flow variables. This is because even if dividends dominate earnings as in the Hand and Landsman tests, if book value compensates for earnings, the full model with earnings might still be the superior model. If this were the case, then the book value and dividend model would be primarily a theoretical curiosity without much empirical benefit. Indeed, in Hand and Landsman (Table 6), when earnings are negative, the mean coefficient on dividends and its t-statistic both rise compared to the positive earnings case, but the mean R^2 is unaffected.[9]

Extreme ratios of earnings per share divided by beginning of period share price, E_t/P_{t-1}, imply transitory earnings whereas E_t/P_{t-1} ratios in the middle of the distribution designate more permanent earnings. Therefore, to classify the sample into permanent versus transitory earnings

groups, we use the ratio E_t/P_{t-1}. Each year we rank firms into quintiles by E_t/P_{t-1}. The ratios in the two outer quintiles are defined as the transitory earnings firms, and the ratios in the three inner quintiles are defined as the permanent earnings firms. We then estimate the five valuation models separately for each group each year, using the two stage outlier procedure previously described. The results are shown in Table 3.[10]

For the permanent earnings firms in Panel A, earnings are the dominant individual valuation variable with a mean R^2 of .793, and the book value and earnings combination dominates the book value and dividends combination with mean R^2 that is .201 higher (.799 versus .598). These results confirm the valuation relevance of reported earnings when they are permanent.

For the transitory earnings firms in Panel B, dividends dominate earnings on an individual basis (mean R^2 of .383 versus .218), but book value is the premiere variable with a mean R^2 of .606. Most important, the mean R^2 statistics of the two models are virtually identical (.631 vs .635). Comparison of the R^2 values shows that even though dividends are superior to earnings on an individual basis, book value compensates for the less valuation-relevant earnings and rescues the standard model.

Thus, the results for BV&E versus the results for E alone show that for firms overall, when earnings have little value relevance because they are transitory, book value picks up the slack. This implies that for dividends to play the important valuation role, both earnings and book value must be of low valuation relevance, i.e., earnings must be transitory and book value must be a noisy measure of market value (due, for example, to a large degree of unrecognized assets). We now examine this issue.

V. Statistical Results For Two Intangibles Intensive Industries

In this section, we replicate the statistical analysis on two industries, pharmaceuticals and chemicals, and then we analyze the results using out-of-sample estimation.

Within Sample Estimation

Barth, Beaver, and Landsman (1999) show that the value relevance of earnings and book values differs across industries, due to factors such as risk, growth, earnings persistence, and accounting practices. In particular, they find (Table 5, Panels B and C) that for industries such as pharmaceuticals whose firms have large amounts of unrecognized intangible assets (as evidenced by their low book-to-market ratios in Table 5, Panel A), book value is a relatively poor indicator of value, and thus earnings has greater value relevance than book value. This evidence, together with our results (and others) about transitory earnings implies that in industries where book value is a poor value measure, and when earnings are transitory, dividends may be the dominant valuation variable. Importantly, we can identify such industries and firms by their observable B/M and E/P ratios.

We test this implication by estimating the five valuation models for firms in two industries that are characterized by a relatively large proportion of intangible assets, chemicals and pharmaceuticals. For similar reasons, Barth, Beaver and Landsman (1998) also focused on these industries. Separately for each industry, we rank firms into quintiles each year by E_t/P_{t-1} and we designate the two outer quintiles as having transitory earnings and the three inner quintiles as having permanent earnings. We estimate the five valuation models for each industry as a whole, and separately for the permanent and transitory earnings firms within each industry. Like Barth, Beaver and Landsman (Table 5) we pool the observations within each industry and we use fixed

year effects. When examining individual industries, pooling is preferable to running separate annual regressions because there are too few firms per cross-section, especially when we separate by permanent versus transitory earnings. In any event, since the fixed year effects are in each regression, they do not affect the R^2 comparisons across regressions.[11]

Table 4 shows pooled sample statistics for the ratios and the raw variables for each industry. Our sample period, 1978-1997, is longer than the time horizon in Barth, Beaver and Landsman (1988-1993), so we have more observations per industry. Despite the fact that our samples only include dividend payers, whereas they include non-payers as well, our sample statistics are similar to theirs (see their Table 5, Panel A) . For example, our mean B/P and E/P for the pharmaceutical industry are .393 and .060, whereas they get .31 and .05. Likewise, our mean B/P and E/P for the chemical industry are .633 and .076 compared to .50 and .07.

The industry regression results are shown in Table 5. When each industry is examined as a whole (Panel A), earnings is the dominant valuation variable, with R^2 values of .764 and .733 for pharmaceuticals and chemicals, respectively, for the earnings-only model. By comparison, the R^2 statistics of the book value-only model are .523 and .675. These results are consistent with Barth, Beaver and Landsman, and show that book value is a relatively poor proxy (compared with earnings) for value in industries with a large amount of unrecognized assets on the balance sheet. Thus, it is not surprising that these two industries differ from the full sample, wherein book value is the dominant valuation variable. Also as expected, when earnings are permanent (Panel B), its dominance is even greater, with R^2 valuesof .890 and .865. In both cases, the model with book value and earnings dominates the model with book value and dividends.

For our purposes, the most interesting case is when earnings are transitory, because it is

here when we expect the valuation relevance of both book value and earnings to be weakest. In this case, dividends are expected to have the greatest explanatory power for price. The results are shown in Panel C. As expected, the R^2 values of the earnings-only models, .417 for pharmaceuticals and .189 for chemicals, are lower than for the full sample and for the permanent earnings subsample. These R^2 statistics are even lower than for the book value-only model, .424 for pharmaceuticals and .552 for chemicals. Most importantly, dividends are the dominant valuation variable in Panel C, with R^2 statistics of .591 for pharmaceuticals and .690 for chemicals. Even more impressive, the explanatory power of dividends alone is greater than the combined explanatory power of book value and earnings (.483 for pharmaceuticals and .619 for chemicals). Also for pharmaceuticals, dividends has the greatest incremental R^2, .192. For chemicals, the raw R^2 of (transitory) earnings is so low (.189), that book value has substantial incremental explanatory power in this case (.430). In summary, the regression results in Table 5, Panel C show that for dividend paying firms in industries with large amounts of unrecognized assets, dividends are more important for valuation than either earnings or book value, when earnings is transitory. This is the first empirical evidence that we are aware of showing the dividends are more strongly correlated with price than both book value and earnings.

Out-of-Sample Prediction

The results in Table 5 are obtained within the sample. Another approach for assessing the valuation relevance of dividends comes out-of-sample, where dividends could be used to predict price. Out-of-sample prediction is important in practical cases such as a comparable firms valuation, where results from one sample are applied to a holdout sample.

We conduct three forecasting tests comparing the predictive ability of book value,

reported earnings, and dividends. The sample for each test is the set of transitory earnings firms (based on quintiles of the E/P ratio, as described above) in the chemical and pharmaceutical industries, over the 1978-1997 period. For the first test, we fit each model to the first 19 years of data and forecast the last (twentieth) year. For the second, we fit the first ten years and forecast the last ten. For the third, we use the full twenty year data series and we fit each model to every other firm year observation (sorted by cusip and year), and we forecast every other firm year observation. Our second test is motivated by a concern that one particular year may unduly affect the results of the first test. Our third test is motivated a concern that a secular trend in the data might affect the results of the first two tests.

For each test, we first estimate the three simple valuation models (i.e., book value or earnings or dividends alone, each with fixed time effects) and then forecast prices for the holdout sample by multiplying the holdout sample's actual values of BV, E, and DIV by the fitted slope coefficients from the simple regressions. The forecasts are based on the simple regression models to isolate the forecasting ability of each variable. We refer to the forecasted variables as DIVHAT, BVHAT, and EHAT. We then regress the actual price for the holdout sample against the three forecasted variables, including fixed time effects. The results are shown in Table 6.

In five of the six regressions, dividends is a statistically significant explanatory factor (predictor) for price, and in the sixth it is borderline significant (Pharmaceuticals, Panel A, t=1.97).[12] In Table 6, earnings are never a significant predictor of price, and book value is a significant predictor only for the second set of tests (Panel B). Moreover, dividends is the most significant predictor of price for all three tests.

For the chemical industry, earnings (book value) is a significant predictor of price in three

(two) tests, and dividends is the most significant predictor in two out of three tests. In the first set of tests (Panel A), earnings and dividends have almost the same p-values. Clearly, the results in Table 6 confirm the significant predictive role of dividends for price in industries with noisy book value when earnings are transitory.

VI. Conclusion

In this paper we derive and compare alternative valuation models that relate share price to book value and earnings and to book value and dividends. While the model with book value and earnings has been widely studied, the model with book value and dividends has not been evaluated. We then evaluate the book value and dividend model to investigate the largely overlooked valuation role of dividends. This is interesting because it raises questions about the benefits of accrual accounting.

For dividend paying firms on the whole, book value has greater explanatory power for price than either earnings or dividends. However, the combination of book value and dividends has virtually identical explanatory power as book value and earnings. Moreover, earnings and dividends alone have about the same individual and incremental (given book value) explanatory power

For firms with transitory earnings, dividends has greater individual explanatory power than earnings, but once again book value and earnings and book value and dividends have about the same explanatory power. This shows that book value compensates for the largely valuation irrelevant transitory earnings. For firms with permanent earnings, earnings has the greatest explanatory power of the three variables, and the book value and earnings combination dominates book value and dividends.

Our most important contribution is to show empirically that when book value is a poor indicator of value (for example, due to the presence of unrecognized assets), and when earnings are transitory, dividends have the greatest value relevance of the three measures. Furthermore, we show that the superior valuation relevance of dividends in such cases holds not only for explaining share price within the sample, but also for out of sample forecasts of price. This implies an important practical role for dividends such as comparable firms valuation.

Finally, our paper reinforces the importance of "context" in assessing valuation relevance. Whether book value, earnings, or dividends is the most important valuation signal depends on both the firm's (or industry's) overall characteristics and its performance in the particular period.

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Table 1

Pooled Sample Statistics

Panel A - Dividend Payers Only

Variable	Mean	StdDev	Minimum	Median	Maximum
B/P	.831	.504	.063	.725	3.667
E/P	.080	.097	-.853	.080	.426
D/P	.039	.033	.001	.030	.364
BV	24.90	471.4	.002	9.24	34657
E	2.02	84.98	-11200	1.02	6572
MV	34.33	666.3	.014	13.50	63875

Number of firm-year observations = 48,920 % of firms with negative E = 7.4%

Panel B - All Firms

Variable	Mean	StdDev	Minimum	Median	Maximum
B/P	.787	.660	.018	.622	5.825
E/P	-.009	.286	-3.038	.053	.746
D/P	.016	.027	0	0	.190
BV	20.64	517.2	.0003	4.89	74123
E	-2.45	432.6	-87814	.40	6572
MV	50.67	4281	.001	8.25	1315000

Number of firm-year observations = 113,491 % of firms with negative E = 26.8%

Notes
MV = market value of common equity, BV = book value of common equity, E = net income, D = dividends, and all variables are on a per share basis.

Table 2

Valuation Model R^2 Statistics and Incremental R^2 Statistics From Annual Regressions

Panel A: Dividend Payers only

	R^2					Incremental R^2 of X given Y			
YR	BV&E	BV	E	BV&D	D	E/BV	D/BV	BV/E	BV/ D
78	.920	.903	.827	.910	.859	.017	.008	.093	.051
79	.864	.843	.770	.855	.703	.022	.013	.094	.153
80	.800	.798	.495	.831	.821	.002	.033	.305	.010
81	.898	.882	.833	.883	.796	.016	.000	.066	.087
82	.738	.727	.187	.735	.591	.011	.008	.551	.144
83	.797	.779	.600	.780	.642	.018	.001	.197	.139
84	.804	.791	.580	.854	.702	.013	.063	.224	.152
85	.883	.876	.623	.876	.482	.007	-.000	.260	.394
86	.733	.729	.434	.745	.458	.004	.016	.299	.287
87	.655	.607	.312	.621	.312	.048	.015	.343	.309
88	.585	.526	.427	.536	.220	.059	.010	.158	.316
89	.566	.558	.058	.562	.247	.008	.004	.508	.315
90	.521	.424	.350	.465	.308	.097	.041	.171	.158
91	.479	.404	.176	.477	.338	.075	.073	.303	.138
92	.471	.419	.150	.480	.321	.052	.061	.321	.159
93	.466	.429	.223	.510	.324	.037	.082	.243	.186
94	.521	.445	.371	.510	.313	.076	.065	.150	.197
95	.534	.424	.438	.482	.252	.110	.058	.096	.229
96	.568	.416	.504	.459	.228	.151	.042	.064	.231
97	.586	.422	.519	.453	.177	.164	.031	.067	.275
Avg	.669	.620	.444	.651	.455	.049	.031	.226	.197
78-87	.809	.794	.566	.809	.637	.016	.016	.243	.172
88-97	.530	.447	.322	.493	.273	.083	.047	.208	.221

Panel B: All Firms

	R^2					Incremental R^2 of X given Y			
	BV&E	BV	E	BV&D	D	BV/E	E/BV	BV/D	D/BV
Avg	.666	.626	**.262**	.638	**.259**	**.403**	.040	**.380**	.012

Notes

See notes to Table 1 for variables definitions. Incremental R^2 is the R^2 of the multiple regression minus the R^2 of the simple regression. Numbers in the table are mean R^2 and incremental R^2 from annual cross-sectional estimations of the following 5 models:

1. $MV_{it} = a_0 + a_1 BV_{it} + u_{it}$
2. $MV_{it} = b_0 + b_1 E_{it} + v_{it}$
3. $MV_{it} = c_0 + c_1 BV_{it} + c_2 E_{it} + w_{it}$
4. $MV_{it} = d_0 + d_1 D_{it} + x_{it}$
5. $MV_{it} = e_0 + e_1 BV_{it} + e_2 D_{it} + y_{it}$

Table 3

Mean Valuation Model R^2 Statistics and Incremental R^2 Statistics From Annual Regressions for Dividend Paying Firms with Permanent versus Transitory Earnings

Panel A: Permanent Earnings Firms

R^2					Incremental R^2 of X given Y			
BV&E	BV	E	BV&D	D	BV/E	E/BV	BV/D	D/BV
.799	.569	.793	.598	.416	.006	.230	.182	.029

Panel B: Transitory Earnings Firms

R^2					Incremental R^2 of X given Y			
BV&E	BV	E	BV&D	D	BV/E	E/BV	BV/D	D/BV
.631	.606	.218	.635	.383	.413	.024	.252	.028

Notes

See notes to Table 1 for variable definitions and notes to Table 2 for regression model descriptions. Permanent earnings firms are firms in the 6 middle deciles ranked annually by E/P_{t-1}. Transitory earnings firms are firms in the top two and bottom two deciles.

Table 4

Pooled Sample Statistics for Dividend Paying Firms in
Pharmaceutical (SICs 2830-2836) and Chemical (SICs 2800-2824, 2840-2899) Industries

Panel A - Pharmaceuticals

Variable	Mean	StdDev	Minimum	Maximum
B/P	.393	.283	.036	1.926
E/P	.060	.047	-.386	.262
D/P	.024	.029	.001	.656
BV	5.243	4.758	.168	42.829
E	.906	1.128	-4.203	18.835
MV	16.982	18.701	.181	310.150

Number of firm-year observations = 669 % of firms with negative E = 3.9%

Panel B - Chemicals

Variable	Mean	StdDev	Minimum	Maximum
B/P	.633	.388	-.228	2.396
E/P	.076	.066	-.555	.300
D/P	.034	.021	.002	.164
BV	11.064	14.850	-21.010	283.674
E	1.511	4.679	-22.780	167.672
MV	20.783	30.450	.336	880.000

Number of firm-year observations = 1760 % of firms with negative E = 5.5%

Notes
MV = market value of common equity, BV = book value of common equity, E = net income, B/P = BV/MV, E/P = E/MV, D/P = Dividends/MV, and all variables are on a per share basis.

Table 5

Valuation Model R^2 Statistics and Incremental R^2 Statistics From Pooled Regressions for Dividend Paying Firms in the Pharmaceutical and Chemical Industries

Panel A: All Firms

Pharmaceutical

R^2					Incremental R^2 of X given Y			
BV&E	BV	E	BV&D	D	BV/E	E/BV	BV/D	D/BV
.774	.523	.764	.527	.254	.010	.251	.273	.004

Chemical

R^2					Incremental R^2 of X given Y			
BV&E	BV	E	BV&D	D	BV/E	E/BV	BV/D	D/BV
.851	.675	.733	.708	.572	.118	.176	.136	.033

Panel B: Firms with Permanent Earnings

Pharmaceutical

R^2					Incremental R^2 of X given Y			
BV&E	BV	E	BV&D	D	BV/E	E/BV	BV/D	D/BV
.891	.654	.890	.774	.707	.001	.237	.067	.120

Chemical

R^2					Incremental R^2 of X given Y			
BV&E	BV	E	BV&D	D	BV/E	E/BV	BV/D	D/BV
.866	.709	.865	.740	.618	.001	.157	.122	.031

Panel C: Firms with Transitory Earnings

Pharmaceutical

R^2					Incremental R^2 of X given Y			
BV&E	BV	E	BV&D	D	BV/E	E/BV	BV/D	D/BV
.483	.424	.417	.616	.591	.066	.059	.025	.192

Chemical

R^2					Incremental R^2 of X given Y			
BV&E	BV	E	BV&D	D	BV/E	E/BV	BV/D	D/BV
.619	.552	.189	.744	.690	.430	.067	.054	.192

Notes

See notes to Table 1 for variable definitions and notes to Table 2 for regression model descriptions. Permanent earnings firms are firms in the 6 middle deciles ranked annually by E/P_{t-1}. Transitory earnings firms are firms in the top two and bottom two deciles. The pooled regressions include year dummies to control for fixed time effects.

Table 6

Holdout Sample Results for Firms in the Pharmaceutical and Chemical Industries with Transitory Earnings

Actual Price = b_0 + b_1*BVHAT + b_2*EHAT + b_3 *DIVHAT + e R^2

Panel A: Fit first 19 years, holdout last year

		Pharmaceuticals		
12.55	.141	.270	1.998	.45
(1.16)	(0.09)	(0.14)	(1.97)	
		Chemicals		
10.05	.140	2.120	.776	.72
(3.06)	(0.40)	(3.79)	(3.59)	

Panel B: Fit first 10 years, holdout last 10 years

		Pharmaceuticals		
5.52	1.108	-.040	1.047	.48
(3.45)	(4.94)	(-0.23)	(7.23)	
		Chemicals		
8.89	.322	.395	.647	.67
(8.80)	(3.64)	(2.95)	(17.26)	

Panel C: Fit every other firm, holdout every other firm

		Pharmaceuticals		
6.42	.336	.107	1.038	.44
(4.64)	(1.65)	(0.42)	(5.79)	
		Chemicals		
4.80	.310	.897	.868	.75
(5.83)	(5.23)	(8.41)	(15.23)	

Notes

BVHAT, EHAT, and DIVHAT are the fitted (forecasted) values of price for the holdout sample, constructed by multiplying the holdout sample's actual values of BV, E, and DIV by the fitted slope coefficients from the simple regressions of price on BV or E or DIV (plus fixed time effects). Numbers under BVHAT, EHAT, and DIVHAT are slope coefficients (and t-statistics in parentheses).

Footnotes

[1] In a recent paper, Kim and Ritter (1999) examine comparable firm valuations for IPOs based on book value and earnings

[2] See also Francis, Olsson and Oswald (1997), Sougiannis and Penman (1998) and Penman (1998)

[3] An example showing that equation (5) held for varying accounting rates of return was given by Vatter (1966). Peasnell (1982) proved the result for a constant rate of return.

[4] Compustat data item numbers are: MV=199/27; BV=60/(25*27); E=172/(25*27); D=26/27.

[5] All regression results reported in the paper are based on the **2**% outlier deletion rule. Using a 1% deletion rule produced virtually identical results.

[6] The sample size averaged 2,446 observations per year. It increased over time due to the expansion of the Compustat File, but was always between 2,000 and 3,000.

[7] In the interest of brevity, we do not report the annual results for the broader sample that includes non dividend payers. Pooled regressions, with fixed year effects, produced very similar results for both samples.

[8] It is instructive to compare our results in Table 2 with Bernard's (1995) who based regressions on a subset of about 700 Value Line companies over the 1978-1993 period. Bernard regressed price on BV and three years of residual earnings forecasts and compared the results to regressions of price on three years of dividend forecasts. The resulting R^2 values of .68 and .29, respectively, are close to the R^2 values of our models which are based only on the current year's figures. This suggests two points: first, BV is the critical variable; second, residual earnings does not explain price better than actual earnings or dividends.

[9] Since all the Hand and Landsman regressions include both BV and E, they cannot compare the explanatory power of book value and earnings versus book value and dividends.

[10] We also designated negative earnings as transitory, with similar results. We prefer the E/P ratio, because in the industry specific tests that follow, using negative earnings puts too few firms in the transitory group.

[11] We use the **2**% outlier deletion rule for each industry.

[12] Since the degrees of freedom varies across the three tests, we use a cutoff of t = 2 to define statistical significance.

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