The relative value relevance of earnings and book value across industries.

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ABSTRACT

Many studies evaluate the impact of accounting information on price. This study, based on Collins, Maydew, and Weiss (1997), examines the disparity in the impact of book value and earnings on price over a twenty-year time period and for many industries. This paper extends Collins et al. (1997) by looking at changes in value relevance over a more recent time period. Also, this paper examines the differences in the value relevance of earnings and book values across industries. The results of this study suggest that the joint value relevance of earnings and book values has not decreased over the sample period. This study also demonstrates that the incremental value relevance of earnings (book value) has increased (stayed constant) for the sample period. Finally, this study demonstrates that there is no significant variation in the incremental value relevance of earnings and book values across industries.

Keywords: value relevance, earnings, book value, industries, time

INTRODUCTION

Many studies from the past fifteen years examine the relative and joint impact of earnings and book value on stock price. This study, based primarily on Collins, Maydew, and Weiss (1997), will focus specifically on the variations in the value relevance of earnings and book value over time and across industries. The first purpose of this study is to update and extend the Collins et al. (1997) paper by looking at the changes in the value relevance of earnings and book value over a more recent twenty year time period. This study also examines the differential effects of the variation in value relevance of earnings and book values across many different industries. Finally, this paper provides a brief discussion of the evolution of value relevance literature as it relates to this study.

Several important findings should be noted. First, this study confirms the Collins et al. (1997) finding that the joint value relevance of earnings and book values has not decreased over the twenty year period examined. Second, the results demonstrate that, over the sample period, the incremental value relevance of earnings has been enhanced and the incremental value relevance of book value has not changed significantly. Third, the results suggest that there is not a significant difference in the incremental value relevance of earnings and book values or in the joint explanatory power of earnings and book values across industries.

LITERATURE REVIEW

Changes in Value Relevance over Time

As previously mentioned, this study will extend the Collins et al. (1997) paper related to the variation in the value relevance of earnings and book value over an extended period of time. The Collins et al. (1997) study has three primary findings. First, the authors determine that "the combined value-relevance of earnings and book values has not declined over the past 40 years and, in fact, appears to have increased slightly" (p. 41). Second, Collins et al. (1997) find that the incremental value relevance of earnings has diminished and been replaced by an increase in the value relevance of book values over a forty year window. Third, Collins et al. suggest that "much of the shift in value-relevance from earnings to book values can be explained by the increasing significance of one-time items, the increased frequency of negative earnings, and changes in average firm size and intangible intensity across time" (p. 65).

Although the Collins et al. (1997) study is the foundation for this paper, many other studies have examined important issues related to changes in the value relevance of earnings and book value. Holthausen and Watts (2001) and Negakis (2005) identify and summarize some of the issues addressed in the extant value relevance literature. Lev and Zarowin (1999) find a decrease in the value relevance of earnings over the period from 1978-1996. The authors of several other studies have established that negative earnings and special items have had a negative impact on the value relevance of earnings over time (Hayn, 1995; Elliot and Hanna, 1996; Basu, 1997; Kang, 2003). These studies have also determined that companies have become more likely to report losses over time, which may further reduce the value relevance of earnings.

Although some studies have documented a decline in the value relevance of earnings over time, other studies including Barth, Beaver, and Landsman (1998) have found that book values are more value relevant than earnings when losses are present or when earnings include

special items. This may be because book value serves as a surrogate for a firm's abandonment value or because book values better predict future earnings if current earnings have many short-term components. Burgstahler and Dichev (1997) determine that "equity value is a convex function of both earnings and book value, where the function depends on the relative values of earnings and book value" (p. 187).

Chandra and Ro (2008) find that the combined value relevance of earnings and revenues has stayed constant and that the value relevance of earnings has declined while the impact on price of revenues has not decreased. Jenkins, Kane, and Velury (2009) find that the value relevance of earnings is higher during economic contractions if an estimate for future earnings expectations is included in the model, and they show that the value relevance of expected future earnings is greater during expansions. In summary, these studies have primarily found that earnings and book values move in opposite directions.

Reasons for Documented Changes in Value Relevance over Time

Several findings documented in prior studies may have caused the value relevance of both earnings and book values to change over time. First, the increased number of firms in technological industries over time may have affected the value relevance of earnings and book values because of the importance of intangibles to these firms. Both Amir and Lev (1996) and Lev and Zarowin (1999) establish that financial accounting information is less important to investors if they are focusing on firms from service and technological companies because accounting standards require the immediate expense of accounting intangibles in many cases.

Second, the large number of special items that companies are reporting may impact the value relevance of earnings and book values over time. Elliot and Hanna (1996) indicate that the market does not put as much credence in special items as in earnings before special items and that there has been an increase in the number of special items that companies have reported over time. Also, Ohlson (1995) indicates that the decrease in the persistence of earnings connected with the increase in the number of special items may cause less weight to be placed on earnings than on book values.

Third, the number of losses reported by companies has increased over time, and this increase is expected to impact the value relevance of earnings and book values. Basu (1997) examines the function of conservatism in accounting and suggests that firms incorporate bad news more quickly into earnings than good news, which implies that losses are more short-lived than increases in earnings. The increase in the number of losses over time may also reduce the ability of earnings to predict returns. Hayn (1995) finds that firms with losses have smaller ERCs than firms that report positive earnings and confirms that firms have indeed reported more losses over time. Taken together, the findings of Hayn (1995) and Basu (1997) indicate that the increased number of losses over time may be one cause for the decline in the incremental value relevance of earnings over time.

Fourth, the increased number of small firms on the COMPUSTAT database over time may be one source for the incremental importance of book value over earnings in explaining market values. Finally, Dontoh, Radhakrishnan, and Ronen (2004) suggest that the decline in the value relevance of accounting information over time has been "driven by an increase in non-information-based trading" (p. 30).

Industry Differences in Value Relevance

A review of the extant value relevance literature indicates a gap in the research related to a general examination of industry-specific effects on the value relevance of earnings and book values. The study will attempt to fill in this gap. Many prior value relevance studies have examined specific industries, but most prior research does not examine a broad range of different industry classifications. For example, many studies examine the value relevance of various financial and nonfinancial performance measures in specific high-tech industry sectors (Amir and Lev, 1996; Hirschey et al., 2001; Aaker and Jacobson, 2001; Graham et al., 2002; Al-Harbi, 2003; Xu, 2003; Liang and Yao, 2005; Junttila et al., 2005; Tan and Lim, 2007;).

Barth et al. (1998) examine the value relevance of earnings and book values across three different industry classifications chosen based on how likely unrecognized intangible assets are in these industries. The authors determine that for pharmaceutical firms, the value relevance of earnings is greater than that of book value and that for financial service firms, the impact on price of earnings is significantly lower than that of book value. The authors also find that the incremental value relevance of earnings and book value are equivalent for firms in manufacturing industries.

Hughes (2000) examines the electric utility industry and determines that industry-specific nonfinancial information including measures of air pollution is value relevant. Boone (2002) determines that oil and gas asset present values are more value relevant than oil and gas assets measured at historical cost. Riley, Pearson, and Trompeter (2003) examine the value relevance of nonfinancial performance measures and traditional accounting information for the airline industry. Stunda and Typpo (2004) and Kang and Zhao (2010) examine the real estate industry to determine the value relevance of several industry-specific financial measures. Although the papers discussed in this section examine the value relevance of many financial and nonfinancial items for specific industries, none of these studies examine the relative value relevance of earnings and book value across different industries over time; therefore, this paper will address these issues.

Developing Value Relevance Topics

Other important value relevance paradigms have also been examined over the last decade. Many studies examine the value relevance of various financial and nonfinancial measures in countries around the world (Alsalman, 2003; Martinez, 2003; Habib, 2004, Junttila et al., 2005; Goodwin & Ahmed, 2006; Wulf, 2007; Ibrahim et al., 2009, Bo, 2009). Marquardt and Wiedman (2004), Habib (2004) and Lapointe-Antunes et al. (2006) examine the effects of earnings management on the value relevance of financial performance measures. Callen, Livnat, and Segal (2006) and Caylor, Lopez, and Rees (2007) examine issues related to whether the value relevance of earnings is dependent on the timing with which earnings information is released. Ou and Sepe (2002) and Tan and Lim (2007) determine how analyst forecasts impact value relevance. As the economy becomes more global and high-tech over time, the number of issues for future research related to value relevance have increased.

METHODOLOGY

The initial regression model for this study demonstrates that price can be modeled as a function of earnings and book value, as in Ohlson (1995) and Collins et al. (1997):

$$P_{it} = \alpha_0 + \alpha_1 E_{it} + \alpha_2 BV_{it} + \varepsilon_{it}, \quad (1)$$

where P is the price per share, E is earnings per share, BV is book value per share, and ε is other value relevant information. The explanatory power of earnings and book value can be disaggregated by breaking the total explanatory power into two parts as follows:

$$P_{it} = \beta_0 + \beta_1 E_{it} + \varepsilon_{it} \quad \text{and} \quad (2)$$

$$P_{it} = \gamma_0 + \gamma_1 BV_{it} + \varepsilon_{it}. \quad (3)$$

Next, as in Collins et al. (1997), this paper attempts to determine whether the value relevance of earnings and book values has changed over time by regressing the R-squared values from equations (1), (2), and (3) on a time dummy variable over time as follows:

$$R_t^2 = \varphi_0 + \varphi_1 TIME + \varepsilon_{it}, \quad (4)$$

where TIME = 1, …, 20, which corresponds to years 1982-2001. The incremental explanatory power is said to have declined if φ_1 is significantly negative. Because the purpose of this paper is to examine whether the changes in the incremental explanatory power of earnings and book value is the same across industries, an industry dummy variable will be substituted into equation (4) as follows:

$$R_t^2 = \varphi_0 + \varphi_1 SIC + \varepsilon_{it}, \quad (5)$$

where SIC = 1, …, 10 where 1 represents the agriculture, forestry, and fishing industry (codes 01-09), 2 represents the mining industry (codes 10-14), 3 represents the construction industry (codes 15-17), 4 represents the manufacturing industry (codes 20-39), 5 represents transportation and public utilities (codes 40-49), 6 represents whole trade firms (codes 50 and 51), 7 represents retail trade firms (codes 52-59), 8 represents the finance, insurance, and real estate industries (codes 60-69), 9 represents the service industry (codes 70-89), and 10 represents nonclassifiable establishments (code 99).

SAMPLE SELECTION

The sample for this study is all the data available for the period from 1982 to 2001 from the COMPUSTAT and CRSP databases. The initial selection of the sample results in a sample of 108,412 firm-years. Various restrictions related to data availability are imposed on the sample. First, earnings, book value, price, and share information are all required to be obtained from the COMPUSTAT database. Next, total assets and stockholders' equity must not be negative. To control for extreme values, observations in the top and bottom one-half percent for book value per share, earnings per share, and price are removed. Finally, all observations identified as outliers in the regressions are also removed.[1] The final sample used throughout this paper contains 98,284 firm-year observations.

Tables 1 and 2 (Appendix) provide the descriptive statistics and the correlations for the entire sample. As shown in Table 1 (Appendix), the average firm has approximately 64 million shares of common stock outstanding and a liquidation value for common equity of $414 million. Average firms have approximately $2.64 billion of assets, $1.64 billion of liabilities, and $427 million of owners' equity. The sample firms have mean net income of $44.65 million, price per

[1] To control for outliers, observations with residuals of more than four standard deviations from zero for any of the regressions are removed. This same rule was used to handle outliers in Collins et al. (1997).

share of $11.36, book value per share of $6.53 and earnings per share of only $0.34. Table 2 (Appendix) shows that earnings and book value are correlated positively with each other and with price, as expected.

Tables 3 and 4 (Appendix) provide the sample breakdown by year and by 2-digit SIC code. Several observations should be noted from an examination of these tables. Table 3 (Appendix) shows that the number of observations varies significantly across years, and Table 4 (Appendix) shows that the number of firms varies a lot across two-digit SIC codes. Two-digit SIC codes represented by more than 3,000 firm-year observations include codes 13 (oil and gas extraction), 28 (chemical and allied products), 35 (industrial machinery and equipment), 36 (electronic equipment), 38 (manufacturing instruments), 49 (electric, gas, and sanitary services), 60 (depository institutions), 67 (holding and other investment offices), and 73 (business services). Because these representations may have an impact on the results, the sample will be broken down into SIC code groups in later regressions.

RESULTS

Table 3 (Appendix) provides the results of the yearly cross-sectional regressions of equations (1) to (3) for the pooled sample (1982-2001) and for each of the individual sample years. Earnings and book value are both significant predictors of price in the pooled sample and in almost every sample. The adjusted R-squared for the pooled cross-sectional time-series regression indicates that earnings and book value together explain about 41.3% of the variation in stock prices. This result can be compared to the Collins et al. (1997) finding that earnings and book value mutually explain about 54% of the variation in price for a pooled sample covering the from period from 1953 to 1993. In order to facilitate direct comparisons to Collins et al. (1997), I also regress of the values for the period from 1983 to 1993. The R-squared value of 0.37 is lower than the 0.75 value obtained by Collins et al. (1997) for this same time period.

Although the t-statistic for earnings in this study of 36.107 is close to the Collins et al. (1997) earnings t-statistic of 34.89, the t-statistic in this study for book value of 121.429 is much higher than the comparable value from Collins et al. (1997) of 56.66. Because the twenty year period examined in this study is shorter than the period examined by Collins et al. (1997), the results for each year are reported individually. The incremental book value and earnings are also provided for each time period in Table 3 (Appendix). Incremental book value is greater than incremental earnings in the pooled sample and in every sample year, and this difference is shown in untabulated results to be significant across all year groups (t = 10.139).

Figure 1 (Appendix) provides a line plot of the changes in the total adjusted R^2, the incremental earnings value, and the incremental book value over the period from 1982 to 2001. This figure shows that the incremental explanatory power of book value is higher in almost all cases than the explanatory power of earnings, which indicates the increased importance of book values over earnings over time. The graph also shows that the incremental explanatory power of book value increases and declines over time but that it always remains higher than the incremental explanatory power of earnings. This finding confirms the Collins et al. (1997) finding that book value has become more value relevant than earnings over time.

Table 4 (Appendix) provides the results of the regressions to examine the differences in the value relevance of earnings and book values across industries. The sample is broken into various industry classifications using two-digit SIC codes. Specifically, the sample is broken into the following industry groups: the agriculture, forestry, and fishing industry (codes 01-09),

the mining industry (codes 10-14), the construction industry (codes 15-17), the manufacturing industry (codes 20-39), the transportation and public utility industry (codes 40-49), wholesale trade firms (codes 50 and 51), retail trade firms (codes 52-59), the finance, insurance, and real estate industry (codes 60-69), the service industry (codes 70-89), and a code for nonclassifiable establishments (code 99). The sample is further broken down by examining each group of ten SIC codes if they are not already examined in the first breakdown, so this adds the regressions for codes 10-17, 20-29, 30-39, 50-59, 70-79, and 80-89. The sample contains no firms with two-digit codes between 91 and 97. Earnings and book value are both significant predictors of price in the pooled sample and in almost every SIC code sample. Incremental book value is greater than incremental earnings in every SIC group, and untabulated findings demonstrate that the incremental book value variable is significantly greater than incremental earnings ($t = 10.342$).

Figure 2 (Appendix) provides a line plot of the changes in the total adjusted R-squared, the incremental earnings value, and the incremental book value for the ten groups SIC codes. This figure demonstrates that the incremental explanatory power of book value is higher in all cases than the explanatory power of earnings, which indicates the increased incremental importance of book values over earnings for all industry classifications. The figure also shows that the incremental explanatory power of book value increases and decreases over time, but that it always remains greater than the incremental explanatory power of earnings. Also, the figure shows that in several different periods, the incremental explanatory power of book value over earnings approaches the total R-squared value, which indicates that earnings provide very little additional value relevant information in these industries. The results in this paper show that book value provides significant incremental explanatory power over earnings. However, the results of this study are not able to confirm Barth et al.'s (1998) specific findings for the pharmaceutical and financial services industries.

The next step in this study is to examine some additional explanations for the variation in the incremental explanatory power of earnings and book value over time to further extend the results of Collins et al. (1997). Amir and Lev (1996) suggest "that unreported intangibles cause traditional historical cost financial statements to be less informative with respect to share prices" (p. 51). In contrast, Collins et al. (1997) suggest that the value relevance of earnings and book value is higher for intangible-intensive firms. Collins et al. (1997) also find that intangible-intensive firms have lower incremental R-squared values for earnings compared to nonintensive firms and higher incremental R-squared values for book values.

The results provided in Table 5 (Appendix) confirm Amir and Lev's (1996) expectations regarding the value relevance of earnings and book values. First, Table 5 (Appendix) shows that the value relevance of earnings and book values is greater for non-intangible intensive firms than for intangible-intensive firms (0.451 vs. 0.343). The results in Table 5 (Appendix) demonstrate that the intangible-intensive firms have lower incremental R-squared values for earnings than the nonintensive firms (0.017 vs. 0.041) and higher incremental R-squared values for book values (0.228 vs. 0.221). Because approximately 24.5% of the sample firms are from intangible intensive industries, this may partially explain why the incremental value relevance is greater for book value than for earnings for most of the sample firms.

Based on Collins et al. (1997), book values should be more value relevant and earnings less value relevant as firms experience losses. However, Barth et al. (1998) find that the incremental explanatory power of book value is higher for firms with losses and lower for firms with losses. Panel B of Table 5 (Appendix) shows that firm-years with losses have much lower value relevance for earnings (0.025 vs. 0.067) compared to firms with positive earnings. The

panel B results also demonstrate that the incremental value relevance of book values is greater in firm-years with losses (0.200) than it is in years with positive earnings (0.052). These results confirm the findings of both Collins et al. (1997) and Barth et al. (1998). The large prevalence of losses in the full sample (31% of sample firm-years have losses) and the low mean level of EPS for the full sample of $0.34 may provide reasons why book value has a higher incremental value relevance than earnings in all other cases.

Next, this study determines whether there are any significant differences across time or industry in the total mutual value relevance of earnings and book value or in the relative incremental value relevance of earnings or book value. Table 6 (Appendix) provides the results of the regressions of equations (4) and (5). The results from regressing the R-squared values on a time-trend variable as shown in equation (4) demonstrate that there is not a significant change in the total R-squared or the incremental explanatory power of book value over the sample period. However, the significant coefficient on the TIME variable (t = 2.129) suggests that there is a significant increase in the incremental value relevance of earnings over the sample period. The results in panel B of Table 6 (Appendix) for the regression of the R-squared values on SIC group membership using equation (5) show that there is not a significant change in the total R-squared or the incremental value relevance of earnings or book value across the industries in the sample. This indicates that there is not a significant difference in the value relevance of earnings and book value across the industry classifications used in this study.

Table 7 (Appendix) provides the results of the re-estimation of equations 4 and 5 after putting the coefficients on earnings and book values into the equation as the dependent variables. When the coefficients on book value and earnings are included as the dependent variables in equation (4), the coefficient on TIME is significant for book value (t = 2.508) and for earnings (t = 4.868). The R-squared value for the coefficient model of .544 is the highest R-squared obtained throughout this study. The positive significant coefficients on TIME for both the earnings and the book value models indicates that over the period from 1982-2001, the value relevance of earnings and book values increased. The panel B results show that when the coefficient on book value and earnings are substituted as the dependent variable in equation (5), the coefficients on the SIC variable are still insignificant. This indicates that there is not a significant difference in the value relevance of earnings and book values across industries. The results of this study confirm many of the findings from Collins et al. (1997), and this study extends the Collins et al. (1997) paper by showing that there is no difference in the combined value relevance of earnings and book values across industries.

MODEL SPECIFICATION TESTS

To determine whether there are model specification problems, tests are run on the full model for this study to detect problems with autocorrelation, multicollinearity, and heteroscedasticity. An assessment of the Durbin-Watson statistics for the full models indicates that the residuals are not auto-correlated. There does not appear to be a major problem with multicollinearity because there is not a high R-squared with few significant t-statistics, and there are no correlations greater than 0.8. Because the variance inflation factors (VIFs) are less than 1.248 in all cases, it appears that there is not a multicollinearity problem.

An initial examination of the White's Chi-squared statistic indicates that there is a problem with heteroscedasticity ($\chi^2 = 3068.54$; $p < 0.0001$). Although this problem appears to be significant, it must be noted that this problem is very common and difficult to avoid when cross-

sectional data are examined. However, to determine whether the problem may be reduced for this model, the full model is regressed again with Weighted Least Squares (WLS) using the inverse of the residuals as the weight. The results of this modified regression model show that it does act to reduce but not to completely eliminate the heteroscedasticity problem ($\chi^2 = 15.84$; $p < 0.0147$). The results of weighted least squares for the full model also show that the R-squared increases to 86.23% from 41.3%, which illustrates how much the reduction in heteroscedasticity improves the model specification. Unfortunately, the sample size is reduced significantly when the WLS regression is run. Although the specification testing indicates that there is a problem with heteroscedasticity, the results of the other tests demonstrate that the results are not caused by model specification problems.

CONCLUSIONS

This paper updates Collins et al. (1997) by examining systematic changes in the value relevance of earnings and book values over a different twenty year period. The paper also extends Collins et al. (1997) by examining the effects of the disparity in the value relevance of earnings and book values across industries. Several primary findings should be noted. First, this study confirms the Collins et al. (1997) finding that the joint value relevance of earnings and book values has not decreased over time. Second, this study demonstrates that the incremental value relevance of earnings has increased while the incremental value relevance of book value has stayed relatively constant. Third, the results demonstrate that there is no significant variation in the incremental value relevance of earnings and book values or in the combined explanatory power of both earnings and book values across industries. Finally, the results confirm the assertion of Collins et al. (1997) that historical cost accounting is value relevant.

Several limitations for the results of this study should be noted. First, the variation in the number of observations with available data from each year may introduce bias related to some unknown economic situation. Also, the earnings numbers obtained from COMPUSTAT for the sample in this study seem to be very low or negative in more cases than expected, and the sample contains a very large number of firms in intangible-intensive industries. Both of these items may cause the incremental book values to be higher than the incremental earnings values in too many cases. Next, the SIC industry classification method used in this study may be able to be improved upon in future studies to further examine differences in the value relevance of earnings and book value across industries. Finally, the sample period examined in this study is not the same period used in the Collins et al. (1997) study, so this may diminish the value of direct comparisons between the two studies.

This study raises several interesting questions for future research. First, future studies may attempt to determine whether the documented changes in value relevance over time are due to policy changes made by standard-setters or whether these changes are caused by changes in the economy as a whole. Also, it is possible that the variables that are used in this study to indicate changes in value-relevance are not actually associated with changes in value-relevance, but are instead associated with some other event taking place in the economy. Further research may also attempt to replicate the results of this study for different time periods, while using indicator variables in price models to rule out the impact of other economic occurrences on firm value.

Further studies could also add changes in financial leverage to the models in this study because Dimitrov and Jain (2008) determined that “changes in financial leverage are value-

relevant beyond accounting earnings" (p. 191). Entwistle, Feltham, and Mbagwu (2010) confirm that GAAP earnings per share is value relevant, but they suggest that future studies should use I/B/E/S or pro forma earnings instead because both these measures are both more value relevant than GAAP earnings. Based on Barton, Hansen, and Pownall (2010), future research can also examine the underlying attributes including cash flows that investors find most value relevant instead of focusing on the value relevance of earnings and book value. Finally, this study could be extended by using return models in addition to the price models to further examine differences in value relevance across industries.

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Table 1
Descriptive statistics for firm-year observations over the period from 1982-2001

Variable[a]	Mean	Standard Deviation	Minimum	Maximum
CEQL	413.929	2,061.169	-981.431	224,234.300
CSHO	64.138	407.285	0.001	34,453.600
Total Assets	2,064.354	15,694.804	0.101	902,201.000
Total Liabilities	1,636.758	14,550.439	-0.666	836,004.000
Total Owners' Equity	427.418	2,086.709	0.001	224,234.000
Net Income	44.650	294.400	-16,198.000	17,720.000
Price	11.358	9.956	0.060	61.250
BVPS	6.533	6.806	-12.318	52.215
EPS	0.341	1.422	-11.868	6.269
Valid N	98,284			

Table 2
Pearson correlations between the variables

Variable[b]	Price	Earnings	Book Value
Price	1.000	0.439	0.615
Earnings	0.439	1.000	0.446
Book Value	0.615	0.446	1.000

[a] CEQL is common equity liquidation value in millions of dollars. CSHO is common shares outstanding in millions. Total assets, liabilities, owners' equity, and net income are in millions of dollars. Price is the monthly price per share three months after fiscal year-end in dollars. BVPS is book value per share in dollars, and it is found by dividing CEQL by CSHO. EPS is earnings per share in dollars, and it is calculated by dividing net income by CSHO.

[b] Due to the large sample size, the correlations are all significant at the .001 level.

Table 3: Annual regressions of price on earnings and book value

Models: **(1) $P_{it} = \alpha_0 + \alpha_1 E_{it} + \alpha_2 BV_{it} + \varepsilon_{it}$,**

(2) $P_{it} = \beta_0 + \beta_1 E_{it} + \varepsilon_{it}$

(3) $P_{it} = \gamma_0 + \gamma_1 BV_{it} + \varepsilon_{it}$.

Year	Firms	α_1	α_2	(A) Adj. R^2	β_1	(B) Adj. R^2	γ_1	(C) Adj. R^2	(A) - (C) incr EARN	(A) - (B) incr BV
Pooled	98,284	1.437	0.766	0.413	3.073	0.193	0.900	0.379	0.034	0.220
		75.162	***191.795***		***153.189***		***244.828***			
1983-	39,130	0.986	0.671	0.370	2.198	0.127	0.728	0.335	0.035	0.243
1993		***36.107***	***121.429***		***75.527***		***140.160***			
1982	4,652	1.287	0.644	0.611	3.486	0.337	0.730	0.561	0.050	0.274
		21.771	***64.025***		***48.461***		***76.590***			
1983	4,892	0.988	0.748	0.634	3.829	0.332	0.826	0.598	0.036	0.302
		16.140	***71.372***		***49.085***		***84.893***			
1984	1,502	0.056	0.085	0.005	0.215	0.001	0.088	0.005	0.000	0.004
		0.368	**2.7*		*1.557*		***3.043***			
1985	1,570	0.162	0.053	0.002	0.238	0.001	0.064	0.002	0.000	0.001
		1.031	*1.540*		*1.600*		**1.968*			
1986	5,159	1.322	0.979	0.642	3.835	0.283	1.096	0.617	0.025	0.359
		20.743	***76.566***		***45.033***		***90.906***			
1987	5,316	1.077	0.877	0.622	3.534	0.286	0.964	0.596	0.026	0.336
		18.325	***75.498***		***45.965***		***88.098***			
1988	3,250	0.885	0.650	0.371	2.569	0.185	0.716	0.341	0.030	0.186
		9.339	***33.237***		***27.111***		***40.893***			
1989	3,139	1.169	0.610	0.360	2.401	0.167	0.698	0.320	0.040	0.193
		12.448	***31.046***		***25.050***		***38.383***			
1990	3,162	1.312	0.539	0.323	2.039	0.130	0.595	0.260	0.063	0.193
		14.913	***29.619***		***21.742***		***33.317***			
1991	3,261	0.992	0.587	0.263	1.748	0.081	0.626	0.228	0.035	0.182
		10.127	***28.318***		***16.935***		***31.055***			
1992	3,473	1.036	0.667	0.278	1.667	0.073	0.709	0.244	0.034	0.205
		11.188	***31.115***		***16.516***		***33.494***			
1993	4,335	0.902	0.593	0.252	1.955	0.090	0.647	0.227	0.025	0.162
		9.580	***30.368***		***20.705***		***35.619***			
1994	6,968	1.246	0.868	0.527	3.622	0.282	0.968	0.486	0.041	0.245
		21.245	***67.763***		***52.089***		***80.735***			
1995	7,470	1.451	0.853	0.469	3.915	0.264	0.998	0.441	0.028	0.205
		21.024	***58.862***		***51.728***		***76.543***			
1996	8,099	1.633	0.953	0.527	4.538	0.323	1.148	0.501	0.026	0.204
		24.067	***65.846***		***61.982***		***89.956***			
1997	7,906	1.933	1.120	0.537	4.762	0.295	1.363	0.506	0.031	0.242
		24.828	***65.594***		***57.438***		***89.877***			
1998	7,740	1.803	0.846	0.470	3.998	0.274	1.041	0.427	0.043	0.196
		25.689	***56.150***		***53.952***		***75.890***			
1999	7,487	1.677	0.652	0.318	3.328	0.192	0.833	0.283	0.035	0.126
		19.729	***37.261***		***42.126***		***54.310***			
2000	7,359	1.881	0.812	0.473	3.456	0.273	1.026	0.410	0.063	0.200
		29.693	***52.861***		***52.628***		***71.561***			
2001	1,223	1.901	0.931	0.496	3.456	0.259	1.137	0.433	0.063	0.237
		12.485	***24.034***		***20.667***		***30.534***			

Notes: The t-statistics are the numbers in italics that are listed on the line after each year. All t-statistics shown in bold are significant at $p < .001$. t-statistics with a * are significant at $p < .05$

P is price per share, EPS is net income divided by the number of common shares outstanding, and BV is book value per share.

Figure 1: Annual cross-sectional regressions showing the total and incremental value relevance of earnings and book values

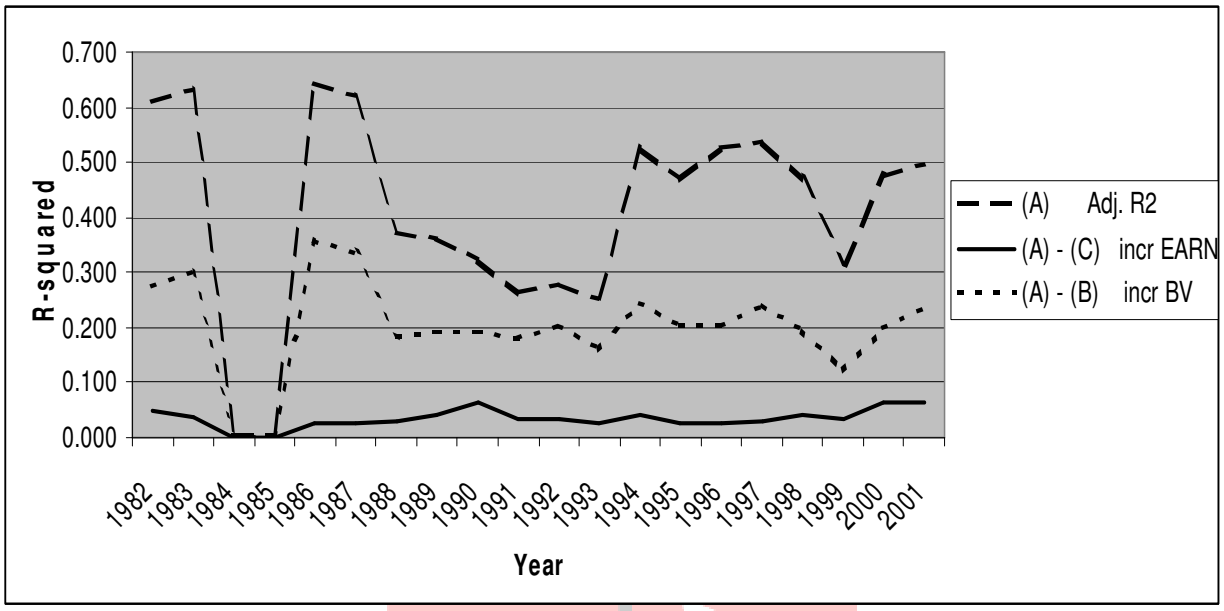

Figure 2: SIC cross-sectional regression showing the total and incremental value relevance of earnings and book values

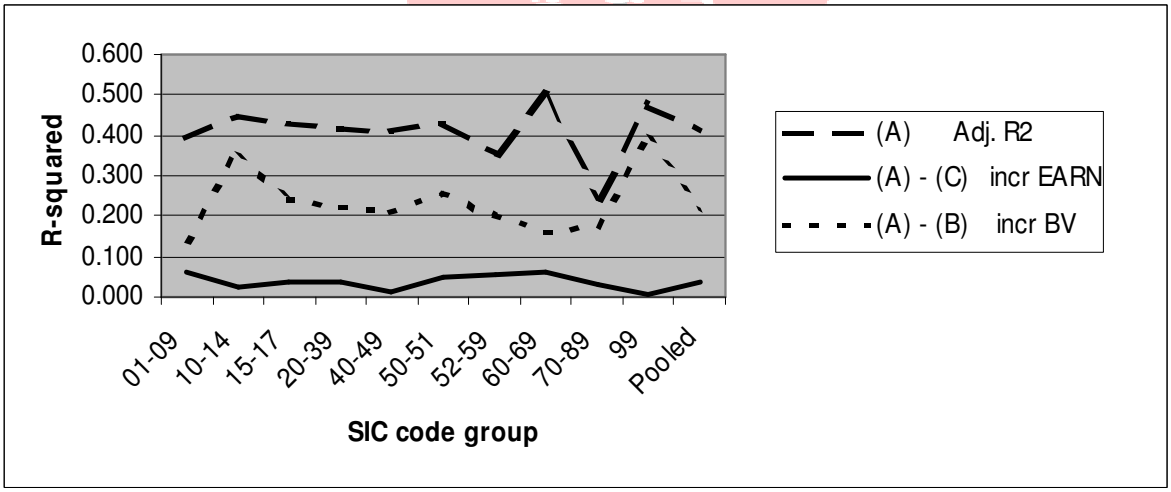

Table 4: Industry cross-sectional regressions of price on earnings and book value

Models:	$P_{it} = \alpha_0 + \alpha_1 E_{it} + \alpha_2 BV_{it} + \varepsilon_{it}$			$P_{it} = \beta_0 + \beta_1 E_{it} + \varepsilon_{it}$			$P_{it} = \gamma_0 + \gamma_1 BV_{it} + \varepsilon_{it}$			
SIC Group	**Firms per group**	α_1	α_2	**(A) Adj. R^2**	β_1	**(B) Adj. R^2**	γ_1	**(C) Adj. R^2**	**(A) - (C) incr EARN**	**(A) - (B) incr BV**
Pooled	98,284	1.437	0.766	0.413	3.073	0.193	0.9	0.379	0.034	0.22
		75.162	***191.795***		***153.189***		***244.828***			
1-9	405	1.916	0.651	0.392	3.329	0.249	0.862	0.33	0.062	0.143
		6.487	***9.778***		***11.631***		***14.148***			
10-19	6,691	0.825	0.845	0.414	1.986	0.106	0.909	0.398	0.016	0.308
		13.718	***59.253***		***28.25***		***66.458***			
10-14	5,438	0.931	0.973	0.444	1.931	0.088	1.002	0.418	0.026	0.356
		13.304	***58.203***		***22.874***		***62.358***			
15-17	1,274	1.118	0.702	0.427	2.309	0.191	0.807	0.39	0.037	0.236
		9.008	***23.11***		***17.374***		***28.52***			
20-29	13,517	1.823	0.768	0.425	3.62	0.227	0.939	0.38	0.045	0.198
		32.843	***68.609***		***62.981***		***90.881***			
30-39	26,135	1.48	0.812	0.412	2.943	0.176	0.92	0.369	0.043	0.236
		40.788	***103.242***		***74.605***		***123.459***			
20-39	39,652	1.6	0.801	0.415	3.218	0.194	0.943	0.376	0.039	0.221
		52.055	***123.447***		***97.605***		***154.43***			
40-49	8,065	0.847	0.777	0.409	2.91	0.198	0.879	0.398	0.011	0.211
		12.487	***53.78***		***44.586***		***73.039***			
50-59	10,259	1.489	0.735	0.375	2.559	0.149	0.824	0.321	0.054	0.226
		26.755	***60.659***		***42.297***		***69.594***			
50-51	4,040	1.258	0.737	0.429	2.628	0.173	0.808	0.38	0.049	0.256
		15.564	***43.935***		***28.974***		***49.526***			
52-59	6,219	1.625	0.74	0.357	2.663	0.152	0.847	0.301	0.056	0.205
		22.026	***44.627***		***33.342***		***51.78***			
60-69	17,674	2.198	0.688	0.496	4.615	0.337	0.882	0.434	0.062	0.159
		47.678	***83.504***		***94.646***		***116.135***			
70-79	11,096	1.187	0.818	0.233	1.724	0.064	0.877	0.199	0.034	0.169
		20.513	***49.062***		***27.627***		***52.539***			
80-89	3,634	1.268	0.843	0.278	1.865	0.069	0.896	0.246	0.032	0.209
		12.422	***32.4***		***16.44***		***34.418***			
70-89	14,730	1.198	0.824	0.243	1.754	0.065	0.883	0.211	0.032	0.178
		23.803	***58.55***		***32.062***		***62.67***			
99	683	0.242	1.192	0.472	1.589	0.088	1.206	0.465	0.007	0.384
		1.493	***22.178***		***8.171***		***24.356***			

Codes 01-09 contain the agriculture, forestry, and fishing industries. Codes 10-14 contain firms in the mining industry. Codes 15-17 contain firms in the construction industry. Codes 20-39 contain firms in the manufacturing industry. Codes 40-49 contain firms from the transportation and public utility industry. Codes 50-51 contain firms from the wholesale trade industry. Codes 52-59 contain firms in the retail trade industry. Codes 60-69 contain firms in the finance, insurance and real estate industry. Codes 70-89 contain firms in the services industry. Code 99 contains nonclassifiable establishments.

Table 5
Regressions of price on earnings and book value for several groups of firms

Models:

$$P_{it} = \alpha_0 + \alpha_1 E_{it} + \alpha_2 BV_{it} + \varepsilon_{it},$$

$$P_{it} = \beta_0 + \beta_1 E_{it} + \varepsilon_{it}$$

$$P_{it} = \gamma_0 + \gamma_1 BV_{it} + \varepsilon_{it}.$$

	# of Firms	α_1	α_2	(A) Adj. R^2	β_1	(B) Adj. R^2	γ_1	(C) Adj. R^2	(A) - (C) incr EARN	(A) - (B) incr BV
Panel A: Intangible-intensive[c]										
Non intangible-intensive	74,164	1.601	0.759	0.451	3.391	0.230	0.903	0.410	0.041	0.221
		75.169	***176.411***		***148.730***		***226.706***			
Intangible-intensive	24,024	1.122	0.950	0.343	2.464	0.115	1.066	0.326	0.017	0.228
		27.592	***91.306***		***55.967***		***107.868***			
Panel B: Profitability[d]										
Positive Earnings	67,625	4.031	0.539	0.441	7.115	0.389	0.898	0.374	0.067	0.052
		89.413	***92.019***		***207.175***		***200.882***			
Negative Earnings	30,179	-0.213	0.593	0.229	-0.755	0.029	0.567	0.204	0.025	0.200
		-8.910	***88.896***		***-30.163***		***87.652***			

[c] Intangible intensive industries: SIC codes 28 (chemical and allied products), 357 (computer and office equipment), 367 (electronic components and accessories), 48 (communications), 73 (business services), and 87 (engineering, management, and R&D services).
[d] Positive earnings are those that are greater than 0. Negative earnings are those that are less than 0.

Table 6

Panel A:
Regressions of total R-squared, incremental book value R-squared, and incremental earnings R-squared on the time-trend dummy variable [e]

$R_t^2 = \varphi_0 + \varphi_1 \text{ TIME} + \varepsilon_{it}$

Dependent variable[f]	N	φ_0	φ_1	Adj. R^2
(1) Total R-squared	20	0.368	0.004	-0.040
		4.153	*0.525*	
(2) Incremental earnings R-squared	20	5.138	154.527	0.157
		1.838	***2.129***	
(3) Incremental book value R-squared	20	10.651	-0.745	-0.055
		3.083	*-0.048*	

Panel B:
Regressions of total R-squared, incremental book value R-squared, and incremental earnings R-squared on the SIC dummy variable

$R_t^2 = \varphi_0 + \varphi_1 \text{ SIC} + \varepsilon_{it}$

Dependent variable	N	φ_0	φ_1	Adj. R^2
(1) Total R-squared	10	0.425	-0.003	-0.106
		8.453	*-0.371*	
(2) Incremental earnings R-squared	10	0.046	-0.001	-0.069
		3.322	*-0.648*	
(3) Incremental book value R-squared	10	0.217	0.003	-0.108
		3.812	*0.353*	

[e] The t-statistics are in italics (boldness indicates significance). Variable definitions: TIME is equal to 1 for the year 1982, and it increases by one for each additional year through 2001. SIC = 1, …, 10 where 1 represents the agriculture, forestry, and fishing industry (codes 01-09), 2 represents the mining industry (codes 10-14), 3 represents the construction industry (codes 15-17), 4 represents the manufacturing industry (codes 20-39), 5 represents transportation and public utilities (codes 40-49), 6 represents whole trade firms (codes 50 and 51), 7 represents retail trade firms (codes 52-59), 8 represents the finance, insurance, and real estate industries (codes 60-69), 9 represents the service industry (codes 70-89), and 10 represents nonclassifiable establishments (code 99).

[f] The dependent variables are the R-squared from the yearly or SIC regressions of price on earnings and book value, the incremental R-squared of book value, and the incremental R^2 of earnings.

Table 7
Panel A:
Regressions of coefficients on time-trend dummy variable for the sample[g]

Coefficient = $\varphi_0 + \varphi_1$ TIME + ε_{it}

Dependent variable[h]	N	φ_0	φ_1	Adj. R^2
(1) Coefficient on book value	20	0.462	0.023	0.218
		4.213	***2.508***	
(2) Coefficient on earnings	20	0.546	0.066	0.544
		3.376	***4.868***	

Panel B:
Regressions of total R-squared, incremental book value R-squared, and incremental earnings R-squared on SIC dummy variable

Coefficient = $\varphi_0 + \varphi_1$ SIC + ε_{it}

Dependent variable	N	φ_0	φ_1	Adj. R^2
(1) Coefficient on book value	10	0.691	0.021	0.055
		6.426	*1.236*	
(2) Coefficient on earnings	10	1.537	-0.044	-0.062
		3.855	*-0.690*	

[g] T-statistics are in italics. Significant t-statistics are also in bold. All variables are as previously defined.
[h] The dependent variables are the coefficients on book values from the yearly and SIC regressions of price on earnings and book values and the coefficients on earnings from the yearly and SIC regressions of price on earnings and book values.