

Book-to-market, retained earnings, and earnings in the cross section of stock returns*

Ray Ball^{†1}, Joseph Gerakos², Juhani T. Linnainmaa^{3,4} and Valeri Nikolaev¹

¹University of Chicago Booth School of Business, United States

²Tuck School of Business at Dartmouth College, United States

³University of Southern California Marshall School of Business, United States

⁴National Bureau of Economic Research, United States

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Abstract

The ratio of the book value of equity to the market value of equity is a common measure of value. We propose that the information contained in the book value of equity differs substantially across its components. We first decompose the book value of equity into capital contributed by shareholders and earnings retained by the firm. We show that, except for Microcaps, the ratio of retained earnings to the market value of equity subsumes the book-to-market ratio in predicting the cross section of stock returns. Although contributed capital represents, on average, 53% of the book value equity, it has no predictive power. We next show that the predictive power of retained earnings arises from accumulated earnings rather than accumulated past dividend distributions. Accumulated earnings are likely a good proxy for expected cash flows to investors and, when scaled by current price, for expected returns. These findings challenge conventional interpretations of book-to-market and suggest that the value premium is a version of the earnings yield premium.

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[†]Corresponding author. Mailing address: University of Chicago Booth School of Business, 5807 South Woodlawn Avenue, Chicago, IL 60637, United States. E-mail address: Ray.Ball@ChicagoBooth.edu. Telephone number: +1 (773) 834-5941.

1. Introduction

The ratio of a firm’s book value of equity to its market value of equity is a commonly used measure of value. We propose that the components of the ratio’s numerator—the book value of equity—contain different information about the cross section of stock returns, and that the differences shed light on the source and interpretation of the value premium.

We first investigate contributed capital and retained earnings, which are the two primary components of book value of equity reported on a firm’s balance sheet. Contributed capital represents net contributions received from shareholders for issuances and repurchases of common stock. Retained earnings comprise the accounting accumulation of the total earnings a firm has generated over its history that have not yet been distributed to shareholders as dividends.

Contributed capital and retained earnings likely differ in their implications for the cross section of average returns. Retained earnings reflect past levels of profitability. Because earnings follow close to a random walk process (Ball and Watts, 1972; Gerakos and Gramacy, 2012), past earnings likely proxy for expected future equity cash flows and thus, when deflated by market values, for expected stock returns (Ball, 1978). By contrast, the relation between contributed capital relative to market value and the cross section of returns is unclear *ex ante*.

An early indication that contributed capital and retained earnings contain different information about stock returns is obtained from the effect of deflators on the correlation between the two variables. When they are deflated by the book value of equity, contributed capital and retained earnings are essentially perfectly negatively correlated, because they jointly comprise 96% of the book value of equity. However, when deflated by market value of equity, they are almost uncorrelated. Introducing price in the denominator substantially alters the relation between the variables, suggesting that the two components contain different information about stock returns.

We initially conduct Fama and MacBeth (1973) regressions, decomposing the book-to-market ratio into contributed capital and retained earnings, with both components deflated by the market value of equity. We find that, except for Microcaps, the ratio of retained earnings to the market value of equity subsumes the book-to-market ratio in explaining the cross section of average returns.

In contrast, the ratio of contributed capital to the market value of equity has no explanatory power over the cross section.¹ This result suggests that the value premium might be better described as a retained earnings premium.

We then dig deeper into the composition of book value and investigate the accumulated earnings and accumulated dividends components of retained earnings. Here too, accumulated earnings and accumulated dividends likely differ in their implications for the cross section of average returns. The evidence indicates that the accumulated dividends component of retained earnings is uninformative of the cross section of average returns, consistent with book-to-market's explanatory power arising because it provides a good proxy for expected earnings yield. This result suggests that the value premium could be a version of the long-standing earnings yield premium.

We next show that the retained earnings component of book-to-market reliably explains the cross section of average returns further into the future than book-to-market itself. Its explanatory power persists at least as far as seven years ahead. We interpret this result as the net effect of two factors. First, as we argue above, retained earnings incorporate past earnings, which likely proxy for expected future cash flows to investors. Deflating past earnings by current market value of equity then produces a proxy for expected future cash flows to investors relative to current value, and thus for expected returns. Second, the ability of variables deflated by current market values to predict stock returns inevitably declines over time. Future stock returns are deflated by future prices, and the variance of the ratio of the future and current price deflators on opposite sides of the regression grows over time. Consequently, the explanatory effect of retained earnings for future returns persists but also decays over time.

Our finding that the contributed capital and accumulated dividends components of the book value of equity do not explain expected returns is difficult to reconcile with mispricing theories of book-to-market's explanatory power, in which book value of equity is viewed as a benchmark for a correctly priced market value of equity. For example, Investopedia provides a growth-mispricing

¹A third component of book equity on balance sheets is Accumulated Other Comprehensive Income, an accumulation of largely transitory past gains and losses that is described in the following section. On average, it comprises 4% of book value. We find that—as is the case for contributed capital—the ratio of this component to the market value of equity has no explanatory power for the cross section of expected returns.

interpretation: “If the goal is to unearth high-growth companies selling at low-growth prices, the price-to-book ratio (P/B) offers investors a handy, albeit fairly crude, approach to finding undervalued companies.”² Lakonishok, Shleifer, and Vishny (1994, p. 1541) also provide a value-mispricing explanation:

For many years, scholars and investment professionals have argued that value strategies outperform the market. These value strategies call for buying stocks that have low prices relative to earnings, dividends, book assets, or other measures of fundamental value. While there is some agreement that value strategies produce higher returns, the interpretation of why they do so is more controversial. This article provides evidence that value strategies yield higher returns because these strategies exploit the suboptimal behavior of the typical investor and not because these strategies are fundamentally riskier.

Our results raise the following question: Why would only one component of book value be a benchmark for the entire market value of equity? Conversely, our finding that only retained earnings and the accumulated earnings component have explanatory power for the cross section of average returns is consistent with the value premium being a variant of the earnings proxy thesis. That is, when scaled by price, accounting earnings have economic determinants in common with expected returns. It seems highly unlikely that current earnings yields and expected near-future market returns are orthogonal (Ball, 1978).³

Our evidence highlights the value of digging deeper into accounting numbers, whose components generally have different implications for the cross section of stock returns. Novy-Marx (2013) and Ball, Gerakos, Linnainmaa, and Nikolaev (2015, 2016) show that decomposing “bottom line” earnings into operating versus non-operating components and into accruals versus cash flow components increases the predictive power over the cross section of average returns. This study obtains similar insights from decomposing “bottom line” book value of equity into retained earnings versus contributed capital, and suggests an alternative interpretation of the value premium.

²<http://www.investopedia.com/articles/fundamental/03/112603.asp>, accessed on November 14, 2016.

³For a discussion of this point, see Section 7 of Ball, Gerakos, Linnainmaa, and Nikolaev (2015).

2. Book value of equity, retained earnings, and contributed capital

The book value of common equity can be decomposed as follows, with the Compustat data items in brackets:

$$\text{Common/Ordinary Equity [CEQ]} = \text{Contributed capital} + \text{Retained earnings} + \text{Other},$$

where

$$\begin{aligned} \text{Contributed capital} &= \text{Common/Ordinary Stock [CSTK]} \\ &\quad + \text{Capital Surplus/Share Premium Reserve [CAPS]} \\ &\quad - \text{Treasury Stock [TSTK]} \\ \text{Retained earnings} &= \text{Retained Earnings [RE]} \\ &\quad - \text{Accumulated Other Comprehensive Income [ACOMINC]} \\ \text{Other} &= \text{Accumulated Other Comprehensive Income [ACOMINC]}. \end{aligned}$$

Contributed capital represents the net contribution of capital from shareholders that a firm receives from offerings and repurchases of its common stock. It consists of capital contributions that are recorded as the par value of common stock [CSTK] plus capital paid in excess of par value (i.e., “additional paid in capital”) [CAPS], net of returns of capital to shareholders that are recorded as the book value of treasury stock [TSTK]. The par value of common stock and the capital paid in excess of par value do not differ in economically important ways and can therefore be combined.⁴ Treasury stock is the cost of stock repurchased from shareholders (but not retired) by the corporation. If the firm does not retire the repurchased stock (often the case, because cancellation forgoes options to reissue the stock on the market or under executive compensation schemes), their repurchase cost is reported on the balance sheet as a negative offset to book equity.

Retained earnings are the entire earnings (i.e., net income) accumulated since the firm’s in-

⁴For example, the par value of common stock is commonly set to an arbitrarily small amount such as one cent. This practice circumvents restrictions in some jurisdictions against issuing stock at a price below par.

ception less accumulated dividends. Retained earnings increase as the firm generates and books earnings, and decrease as the firm books losses or declares dividends. A corporation cannot create earnings through trading in its own capital stock, so treasury stock transactions never increase retained earnings. However, treasury stock transactions do occasionally reduce retained earnings when previously repurchased treasury stock is reissued at a lower price than paid to repurchase it. Retained earnings therefore can become negative if a firm generates a series of book losses either during a growth phase or due to poor economic performance, or if a firm reissues substantial quantities of treasury stock at a lower price than it paid to purchase them into treasury.⁵

A third and typically much smaller component of book value of equity consists of accumulated other comprehensive income [ACOMINC]. Accumulated other comprehensive income is a technical account that keeps track of paper gains and losses that primarily originate in transitory shocks to asset prices and that accountants exclude from earnings unless they subsequently are realized. These items include unrealized gains and losses on a class of marketable securities, unrealized gains and losses on cash flow hedging instruments, unrealized gains and losses on pension plan assets net of liabilities, and foreign currency translation adjustments. If they later are realized, these gains and losses are removed from accumulated other comprehensive income and recognized in earnings, at which time they become part of retained earnings.⁶

Other comprehensive income violates the dictum of Black (1993, p. 5) that “[i]f we want to maximize the information about value in the earnings figure, and minimize the noise, we can choose accounting rules that make earnings look more like value and less like change in value. In other words, we can choose rules that minimize transitory components of earnings, while leaving the permanent components.”⁷ As a rough rule of thumb, other comprehensive income typically relates to stock prices on a dollar-for-dollar basis, whereas stock prices trade at multiples of reported

⁵A notorious example is provided by Microsoft, which historically granted generous amounts of stock options to employees and also purchased substantial amounts of treasury shares. The options generally had exercise prices substantially below the cost to Microsoft of buying back the stock that was reissued to employees who exercised. This difference largely explains the \$29.46 billion retained deficit it reported at June 30, 2007.

⁶These gains and losses bypass the income statement and therefore violate “clean surplus” accounting until they are realized, at which time they run through the income statement.

⁷A similar dictum was stated earlier by Paton (1934), among others.

earnings (Chambers, Linsmeier, Shakespeare, and Sougiannis, 2007). Similarly, earnings excluding comprehensive income are a better predictor of future operating cash flow (Dhaliwal, Subramanyam, and Trezevant, 1999). Compustat adds ACOMINC to their retained earnings variable RE, and because we expect it to have different implications for the cross section of stock returns, we back it out and study its contribution separately.⁸

Book value of equity therefore evolves over time as a function of net capital transactions with shareholders (new issuances less treasury stock purchases), net earnings retention (earnings less dividends), and some transitory gains and losses due to shocks to asset prices. Consequently, book-to-market ratios consist of several components with potentially different implications for asset pricing. In particular, retained earnings (when scaled by current market equity) likely is a proxy for current earnings yield and hence expected returns, but no such effect is expected for contributed capital and accumulated other comprehensive income.

3. Data

We take monthly stock returns from the Center for Research in Security Prices (CRSP) and annual accounting data from Compustat. Firms' dividend histories are taken from CRSP. We start our sample with all firms traded on NYSE, Amex, and NASDAQ, and exclude securities other than ordinary common shares. Delisting returns are taken from CRSP; if a delisting return is missing and the delisting is performance-related, we impute a return of -30% (Shumway, 1997; Beaver, McNichols, and Price, 2007). We match the firms on CRSP against Compustat, and lag annual accounting information by six months. For example, if a firm's fiscal year ends in December, we assume that this information is public by the end of the following June. We start our sample in July 1963 and end it in December 2015. The sample consists of firms with non-missing market value of equity, book-to-market, current month returns, and returns for the prior one-year period. We

⁸In contrast with Compustat's treatment of ACOMINC, U.S. GAAP does not include accumulated other comprehensive income in retained earnings.

exclude financial firms, which are defined as firms with one-digit standard industrial classification codes of six.

We generate two measures of book-to-market that differ in their numerators. First, we follow Fama and French and calculate the book value of equity as shareholders' equity, plus balance sheet deferred taxes, plus balance sheet investment tax credits, plus postretirement benefit liabilities, and minus preferred stock. We set missing values of balance sheet deferred taxes and investment tax credits equal to zero. To calculate the value of preferred stock, we set it equal to the redemption value if available, or else the liquidation value or the carrying value, in that order. If shareholders' equity is missing, we set it equal to the value of common equity if available, or total assets minus total liabilities. We then use the Davis, Fama, and French (2000) book values of equity from Ken French's website to fill in missing values.⁹

For the second measure of book-to-market, we use Compustat's book value of common shareholders' equity measure [CEQ]. The benefits of the second measure are that it reflects the book value of common equity reported on firms' balance sheets, and also that it can be broken down into the components that we expect to be differently priced, including contributed capital and retained earnings.

In Fama and MacBeth (1973) regressions, we re-compute the explanatory variables every month. In some of our empirical specifications, we split firms into All but microcaps and Microcaps. Following Fama and French (2008), we define Microcaps as stocks with a market value of equity below the 20th percentile of the NYSE market capitalization distribution. In portfolio sorts, we rebalance the portfolios annually at the end of June.

Table 1 presents descriptive statistics for book-to-market its components. Panel A presents descriptive statistics for book-to-market and retained earnings-to-market. The first two rows compare the Fama and French book-to-market measure and book-to-market based on the book value of equity reported on balance sheets. The distributions of the two measures are almost identical with

⁹See http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/variable_definitions.html and Cohen, Polk, and Vuolteenaho (2003, p. 613) for a detailed discussion of this book value of equity measure is calculated.

means of 0.86 and 0.83. The third row describes the distribution of retained earnings-to-market. This measure is skewed with a mean of -0.05 and a median of 0.27.

The next two rows present the distributions of contributed capital-to-market and accumulated other comprehensive income-to-market. The mean of contributed capital-to-market is similar to the means of the book-to-market measures (0.88 versus 0.86 and 0.83), but the median is smaller (0.38 versus 0.72 and 0.68). Accumulated other comprehensive income-to-market is smaller than the other components with mean of 0.03 and a median of 0.01.

In Panel B, we present the distributions of the components of the book value of equity as a percentage of the book value of equity.¹⁰ On average, contributed capital represents a larger percentage of the book value of equity (53%). Fewer than four percent of the sample firms have negative contributed capital. On average, retained earnings are 42% of the book value of equity, and 13% of the sample firms have negative retained earnings. Accumulated other comprehensive income represents a much smaller share of the book value of equity, with a mean of 4%.

Panel C presents the distributions of the ratios of the components to the total book value of equity for the six Fama and French portfolios. Several patterns emerge from these distributions. First, larger firms have higher percentages of retained earnings and lower frequencies of negative retained earnings. Second, large growth firms have higher percentages of retained earnings while small growth firms have lower percentages of retained earnings.

Panel D presents Pearson and Spearman correlations for book-to-market, retained earnings-to-market, contributed capital-to-market, and accumulated other comprehensive income-to-market. Not surprisingly, all three components positively correlate with book-to-market, to which they sum. The informative result is that retained earnings-to-market and contributed capital-to-market are only slightly negatively correlated (Pearson -0.09 , Spearman -0.16). These components comprise 96% of book value of equity, so when deflated by book value they are essentially perfectly negatively correlated. However, when deflated by market value they are almost uncorrelated, indicating they

¹⁰In this analysis, we drop firms for which a single component contributes more than 200% or less than -100% of the book value of equity. Excluding these firms drives the differences between Panel A and Panel B in the percentages of firms with negative values of the components.

contain different types of information about expected returns. Simply changing from a book to a market denominator substantially alters the relation between the variables, suggesting that the two components contain different information about stock returns.

4. The cross section of returns

4.1. Retained earnings versus contributed capital

Panel A of Table 2 presents our Fama and MacBeth (1973) regressions for All but microcaps. For these regressions, we require that the book value of equity is positive and we take the natural logarithm of all ratios. Columns (1) and (2) report the baseline regressions that include as control variables size, the prior one-month return, and the prior one-year return skipping a month. Column (1) includes book-to-market calculated as per Fama and French (coefficient of 0.24 with a t -value of 3.48) and column (2) reports book-to-market using reported common equity (coefficient of 0.25 with a t -value of 3.62). Hence, the two measures of book-to-market have virtually identical relations with the cross section of returns in our sample.

In column (3), we replace book-to-market with retained earnings-to-market and an indicator variable for negative retained earnings.¹¹ The coefficient on retained earnings-to-market is positive and its t -value is greater than the t -values for book-to-market (4.92 versus 3.48 and 3.62). In columns (4) and (5), we include the two book-to-market ratios along with retained earnings-to-market. Neither book-to-market ratio is statistically significant—the t -value for the Fama and French book-to-market ratio is 0.85 and the t -value for the book-to-market ratio based on reported book value of equity is 0.72. By contrast, the t -values on retained earnings-to-market increase to 5.27 and 5.31, showing that the information in retained earnings-to-market subsumes the information in book-to-market.

In columns (6), (7), and (8), we run similar regressions that replace retained earnings-to-market with contributed capital-to-market. When contributed capital-to-market is included on its own,

¹¹When retained earnings are negative, we replace the log of retained earnings-to-market with zero and include an indicator variable for negative values.

it is statistically insignificant (t -value = 0.33). When we include it along with book-to-market in columns (7) and (8), the t -values on book-to-market increase to 4.55 and 4.77, while the t -values on contributed capital are large and negative (-4.48 and -4.61), suggesting that including contributed capital-to-market in the regression purges book-to-market of information that is irrelevant for the cross section of stock returns.

In columns (9), (10), and (11), we repeat the regressions with accumulated other comprehensive income-to-market. In these regressions, accumulated other comprehensive income-to-market is never statistically significant and the t -values on book-to-market are similar in magnitude to those presented in columns (2) and (3). In column (12), we include retained earnings-to-market, contributed capital-to-market, and accumulated other comprehensive income-to-market along with indicators for negative values for the three ratios. In this specification, only retained earnings-to-market is significant (t -value = 5.31).

Overall, the regressions in Panel A show that book-to-market predicts the cross section of returns only because it contains retained earnings. Other components of book-to-market provide no significant information about the cross section of average returns, and removing these other components (i.e., using retained earnings alone) increases the t -value.

4.2. Alternative samples

In Panel B, we present results for alternative samples and specifications. In columns (1) and (2), we expand the sample in Panel A to include firms with negative book values of equity and include an indicator variable for such firms.¹² Our results for retained earnings-to-market are essentially unchanged by this modification (t -value = 5.20).

Our main results in Panel A include firms with negative retained earnings, and we control for such firms with an indicator variable. It could be that the non-linearity arising from the indicator variable affects the coefficient on retained earnings-to-market. In columns (3) and (4), we therefore

¹²When the book value of equity is negative, we replace the log of book-to-market with zero and include an indicator variable for negative values.

restrict the sample to firms with positive retained earnings. Again, our results for retained earnings-to-market remain essentially unchanged (t -value = 5.49).

4.3. *Accumulated dividends versus accumulated earnings*

Because retained earnings represent the difference between accumulated earnings and accumulated dividends, differences in firms' payout policies can drive differences in retained earnings. For example, a firm could have low retained earnings because historically it paid out a large portion of earnings as dividends. To rule out the possibility that dividend policies rather than the firm's underlying earnings drive our results, we use CRSP to estimate the cumulative amount of dividends distributed by the firm since it went public.

In column (2) of Table 3, we include the natural logarithm of the ratio of cumulative dividends to the market value equity. In this specification, retained earnings-to-market remains positive and significant (coefficient of 0.17 with a t -value of 5.04) and the estimates are similar to the baseline regression presented in column (1) (coefficient of 0.18 with a t -value of 5.25). By contrast, cumulative dividends-to-market is negative and insignificant (t -value = -1.28). The insignificance of the accumulated dividends component of retained earnings is consistent with book-to-market's explanatory power over the cross section arising because it provides a good proxy for expected earnings yield. This result provides additional evidence that the value premium is a version of the long-standing earnings yield premium.

4.4. *Fama and MacBeth (1973) regressions with earnings cumulated over different back windows*

We next examine the accumulated earnings component of retained earnings. We accumulate earnings backward in time over windows ending with the most recent year and extending back by an increasing number of years.¹³ The natural logarithm of the sum then is deflated by the most

¹³We cannot directly calculate accumulated earnings from the origin of older firms because earnings data are from Compustat. In contrast, dividends data are obtainable from CRSP back to 1926. We therefore create our own accumulation of earnings over various windows.

recent market value of equity. In all of the regressions, we include as controls: size, prior one-month return, and prior one-year returns skipping a month.

Panel A of Table 4 presents the Fama and MacBeth (1973) regressions using this backward-accumulated earnings measure. The top of the panel presents results for regressions that include the accumulated earnings measures, indicators for negative accumulated earnings, and the control variables, but exclude book-to-market.¹⁴ For all accumulation windows, the coefficients on the accumulated earnings measures are statistically positive, with t -values ranging from 2.21 for the two-year-back window to 3.02 for the ten-year-back window.

In the bottom half of the panel, we include book-to-market in the regressions. For most of the windows, the coefficient on accumulated earnings-to-market remains statistically positive with the highest t -value being for accumulating back ten years (3.07). Importantly, the coefficients and their associated t -values for book-to-market almost monotonically decrease in the length of the back accumulation, starting at 3.04 for the current period's earnings alone to 0.03 for earnings accumulated ten years back.

In Panel B, we use income before extraordinary and special items as the earnings measure, again deflated by the most recent market value of equity. This profit measure excludes accounting-based items that are unlikely to persist. In the top half of the panel, the coefficients and their associated t -values are larger than when we use the net income-based measure in Panel A, starting at 3.47 at the one year horizon and ending at 3.07 at the ten year horizon. When we include book-to-market in the bottom half of the panel, the t -values on book-to-market monotonically decrease in the horizon starting at 3.04 for the current period and decreasing to 0.67 at ten years. By contrast, the coefficients and t -values remain relatively constant for accumulated earnings across the horizons, ranging from 3.07 at the one year horizon to 2.44 at the ten year horizon.

The differences between Panels A and B appear to be driven by one-time extraordinary and special items in earnings. When these items are removed from the earnings measure, accumulated earnings-to-price gains statistical significance and book-to-market loses significance as the horizon

¹⁴When the backward-accumulated earnings are negative, we set the log of accumulated earnings-to-market equal to zero and include an indicator variable for negative values.

increases. This effect is similar to the “washing-out” that occurs when earnings are accumulated in the retained earnings component of book-to-market. By accumulating earnings, retained earnings effectively “wash out” one time accounting shocks.

To further illustrate this point, in Figure 1 we plot average Fama and MacBeth (1973) regression slopes and their associated 95% confidence intervals from cross sectional regressions that predict monthly returns using lagged measures of accumulated earnings-to-price. We estimate these regressions using stocks with a market value of equity above the 20th percentile of the NYSE market capitalization distribution (All but microcaps). In the regressions, we include size, prior one-month return, prior one-year return skipping a month, and lagged earnings accumulated over the prior five years. Note that we only lag the accumulate earnings measures and keep the values of the other regressors current. Panel A of Figure 1 presents results for net income and Panel B for income before extraordinary and special items. The average slopes and 95% confidence intervals are higher for income before extraordinary and special items, which removes one time accounting-based shocks to earnings.

5. Portfolio sorts

We next perform portfolio tests, which provide a potentially more robust method to evaluate predictive ability without imposing the parametric assumptions embedded in the Fama and MacBeth (1973) regressions. Table 5 reports excess returns, CAPM alphas, and alphas from the three-factor model and their associated t -values for quintiles sorted on book-to-market, retained earnings-to-market, and contributed capital-to-market.

With respect to excess returns, the high-minus-low portfolios generate positive returns for book-to-market (35 basis points per month with a t -value of 2.60) and retained earnings-to-market (43 basis points per month with a t -value of 2.73). By contrast, the high-minus-low portfolio for contributed capital-to-market generates only 7 basis points a month with a t -value of 0.54. When we examine CAPM alphas, the pattern is the same: book-to-market and retained earnings-to-market spread returns, while contributed capital-to-market does not.

A different pattern emerges when we examine alphas from the three-factor model. The high-minus-low portfolio for book-to-market has a significantly negative alpha (-14 basis points per month with a t -value of -2.39), as does the high-minus-low portfolio for contributed capital-to-market (-29 basis points per month with a t -value of -2.95). The three-factor model, however, prices the retained earnings-to-market high-minus-low portfolio with the alpha being effectively zero (3 basis points per month with a t -value of 0.33). We interpret this result as further evidence that the value premium is a version of the earnings yield premium.

In Table 6, we further demonstrate that the predictive power in book-to-market arises from its retained earnings component. To do so, we implement conditional two-way sorts on the two measures. We then present CAPM alphas and t -values associated with those alphas for value-weighted portfolios.

Panel A presents a conditional two-way sort in which we first sort stocks into quintiles based on retained earnings-to-market and then, within each retained earnings-to-market quintile, we sort stocks into quintiles based on book-to-market. Consistent with our previous results, within each retained earnings-to-market quintile, the CAPM alphas for the book-to-market high minus low portfolios are not significantly different from zero.

Panel B reverses the order of the conditional sorts. We first sort on book-to-market and then, within each book-to-market quintile, sort based on retained earnings-to-market. In this specification, the CAPM alphas for the retained earnings-to-capital high-minus-low portfolios are statistically significant in four of the five quintiles, showing that retained earnings-to-market has information content holding book-to-market constant.

6. Retained earnings and contributed capital factors

We next construct factors that capture the relation between average returns and the components of the book value of equity. We augment the Fama and French (1993) three-factor model with these factors and then examine their information content. To construct the factors, we follow the six-portfolio methodology used in Fama and French (2015); this is also the methodology that Fama and

French (1993) use to construct the HML factor. We first sort stocks by size into small and big subgroups depending on whether a company is below or above the median NYSE market capitalization breakpoint. We then perform an independent sort of stocks based on the ratio of the component of the book value of equity (i.e., retained earnings and contributed capital) to the market value of equity into high (i.e., above the 70th NYSE percentile breakpoint) and low (i.e., below the 30th NYSE percentile breakpoint) portfolios. We construct each factor by taking the average of the two high component portfolios minus the average of the two low component portfolios.

Panel A of Table 7 presents the average annualized returns, standard deviations, and t -values for HML and the factors based on the three components. We present these statistics for two versions of HML. The first is standard HML and the second is based on our sample (HML^{*}). The two versions of HML have similar annualized average returns (4.05 and 4.08) and similar t -values (2.96 and 3.03). When we calculate a version of HML based on retained earnings-to-market value (HML_{RE}), the average return increases to 5.02 and the t -value to 3.43. By contrast, when we calculate a version of HML based on contributed capital-to-market (HML_{CC}), the average return is not significantly different from zero (0.46 with a t -value of 0.44).

Panel B presents correlations between the factors. There are several important takeaways from the correlations. First, the correlation between HML and HML_{RE} is 0.86, while the correlation between HML and HML_{CC} is only 0.45. Second, HML and HML_{RE} have similar correlation with MKT (−0.30 and −0.31), while the correlation between MKT and HML_{CC} is approximately zero. Third, HML and HML_{RE} have similar negative correlations with SMB (−0.23 and −0.30), while HML_{CC} is positively correlated with SMB (0.24). Although retained earnings and contributed capital represent similar proportions of the book value of equity, HML and HML_{RE} have similar correlations with the other factors, while HML and HML_{CC} do not.

Panel C measures of the information contents of HML, HML_{RE}, and HML_{CC} by reporting estimates of spanning regressions. In these regressions, the dependent variable is the monthly return on the factor of interest and the independent variables are the other factors. If the intercept

is significant in these regressions, then the factor of interest (i.e., the dependent variable) is valuable to an investor who already trades the factors used as explanatory variables.

In the first two columns, the dependent variable is the monthly return on HML. In column (1), we include as explanatory variables MKT, SMB, and HML_{RE} . The intercept for this regression is approximately zero with a t -value of 0.06. The insignificant intercept implies that if an investor already trades MKT, SMB, and HML_{RE} , there is no useful information in HML. In column (2), we replace HML_{RE} with HML_{CC} . The intercept of this regression is 0.44 with a t -value of 4.75, implying that there is useful information in HML if an investor already trades a factor based on the contributed capital-to-market along with MKT and SMB.

In the next two columns, we replace the dependent variable with the monthly return on the retained earnings-based factor (HML_{RE}). The intercepts are positive and significant with t -values of 2.52 and 4.89 when we include HML in column (3) and HML_{CC} in column (4). These regressions show that the HML_{RE} is valuable to an investor who already trades MKT, SMB, and either the standard or contributed capital-based HML factors.

In the final two columns, the dependent variable is the monthly return on the contributed capital-based factor (HML_{CC}). When we include HML as an explanatory variable, the intercept is negative and significant (t -value = -2.29), suggesting that investor who already trades MKT, SMB, and HML would be better off shorting HML_{CC} . In contrast, when we replace HML with HML_{RE} in column (6), the intercept is not significantly different from zero (t -value = -0.52).

Overall, the spanning regressions show that when combined with MKT and SMB, the retained earnings based factor captures the valuable information in HML. By contrast, HML and HML_{CC} do not capture all of the information embedded in the retained earnings-based factor.

7. Predicting average returns over increasing horizons

We next compare how far ahead book-to-market and its retained earnings component predict returns. We modify the Fama and MacBeth (1973) regressions in Table 2 to assess the longevity of the information embedded in the two measures. We replace the current values of book-to-market

and retained earnings-to-market with increasingly stale values, but retain the current values of the control variables. Thus, we assume the investor knows the current values of the control variables, but does not know the current values of the balance sheet measures. Would an investor still benefit from these stale measures? How far ahead do these measures predict the cross-section of returns?

Figure 2 plots average monthly Fama and MacBeth (1973) regression t -values for both variables, increasing the horizon in one-month increments up to ten years. The cross-sectional regressions are estimated for each month from July 1973 through December 2015 using data for All-but-microcaps. By starting in 1973, we ensure that the same left-hand side data are used for all lags. Control variables are updated each month, but the book-to-market and retained earnings-to-market variables are not. Figure 2 shows that both book-to-market and retained earnings-to-market reliably predict returns several years ahead. Book-to-market has significant explanatory power for approximately three years. The effect of retained earnings-to-market is stronger, and persists for approximately seven years.

These results are difficult to reconcile with the notion of book value being a benchmark for identifying market mispricing. Why would only one component of book value indicate mispricing of the entire equity? Why would it be gradually corrected over an horizon that extends at least as far as seven years? We interpret the results in Figure 2 as reflecting two factors. First, retained earnings incorporate past earnings which, because earnings follow an approximate random walk process (Ball and Watts, 1972; Gerakos and Gramacy, 2012), proxy for expected future cash flows to investors. When deflated by current market value of equity, it becomes a proxy for expected returns (Ball, 1978). Second, the ability of variables deflated by current market values to predict stock returns inevitably declines over time. Future stock returns are deflated by future prices, and the variance of the ratio of the future and current price deflators on opposite sides of the regression grows over time. Consequently, the explanatory effect of retained earnings for future returns persists but also decays over time.

APPENDIX—issuances and repurchases

Share issuances

Par value shares have a face value assigned to them. Such shares may be issued at par, above par or below par. When par value shares are issued exactly at par, cash is debited and common stock or preferred stock account is credited. In case of issuance above par, cash account is debited for the total cash received by the company, common stock or preferred stock is credited for the par value multiplied by number shares issued and additional paid-in capital account is credited for the excess of cash received over the par value multiplied by number of shares issued. When par value shares are issued below par, cash is debited for the actual amount received, common stock or preferred stock is credited for the total par value, and discount on capital is debited for the excess of total par value over cash received. The discount on capital is part of shareholders' equity and it appears as a deduction from other equity accounts on balance sheet.

Share repurchases

How do share repurchases affect the book value of common equity? There are two governing legal principles involved:

- A corporation cannot be its own shareholder, so treasury stock cannot be recorded as assets. The debit therefore must be to reduce stockholders' equity.
- A corporation cannot create earnings through trading in its own capital stock, so treasury stock transactions generally increase or decrease contributed capital. Some treasury stock transactions decrease retained earnings, but never increase.

There are two methods of accounting for treasury stock: the cost method and the par method. Their use depends on what the company intends to do with the repurchased stock. The cost method is used when the company might want to reissue the shares in future. It records the amount paid to repurchase stock as increasing treasury stock, which is a contra account to stockholders' equity

and therefore has a debit balance. No distinction is made between par value and the premium paid in the purchase transaction. The corresponding credit reduces cash. If treasury stock subsequently is sold at a price greater than its repurchase cost, the gain is recorded as additional paid-in-capital (treasury stock). If a subsequent sale is at less than the repurchase cost, the loss is recorded as a reduction in additional paid-in-capital (treasury stock) and, if that account is fully depleted, the balance is a reduction in retained earnings.

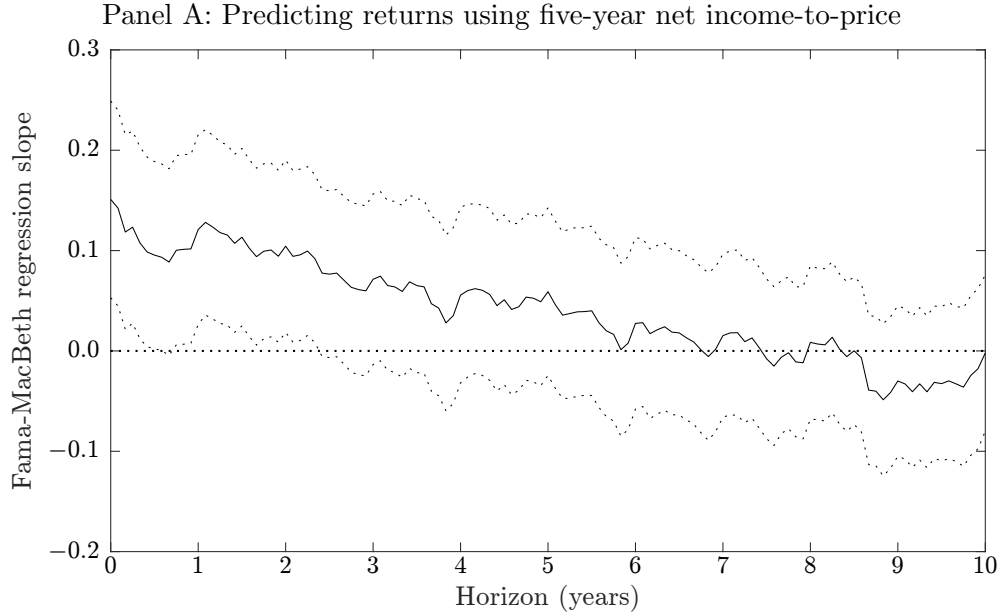
The par method is used if the board retires the stock when it is repurchased. The stock is legally cancelled and common stock and additional paid-in-capital are reduced by the amounts recorded when the stock was originally issued to stockholders. If the repurchase price is greater than the amount originally received when the stock was issued, the “loss” reduces retained earnings. If it is less, the “gain” increases additional paid-in-capital.

The par value method permanently reduces the Stockholders Equity accounts. The cost method reduces them temporarily, using a contra account that is shown on the balance sheet as a deduction from Stockholders Equity.

REFERENCES

- Ball, R., 1978. Anomalies in relationships between securities' yields and yield surrogates. *Journal of Financial Economics* 6, 103–126.
- Ball, R., Gerakos, J., Linnainmaa, J., Nikolaev, V., 2015. Deflating profitability. *Journal of Financial Economics* 117, 225–248.
- Ball, R., Gerakos, J., Linnainmaa, J., Nikolaev, V., 2016. Accruals, cash flows, and operating profitability in the cross section of stock returns. *Journal of Financial Economics* 121, 28–45.
- Ball, R., Watts, R., 1972. Time series properties of accounting income. *Journal of Finance* 27, 663–681.
- Beaver, W., McNichols, M., Price, R., 2007. Delisting returns and their effect on accounting-based market anomalies. *Journal of Accounting and Economics* 43, 341–368.
- Black, F., 1993. Choosing accounting rules. *Accounting Horizons* 7, 1–17.
- Chambers, D., Linsmeier, T., Shakespeare, C., Sougiannis, T., 2007. An evaluation of SFAS No. 130 comprehensive income disclosures. *Review of Accounting Studies* 124, 557–593.
- Cohen, R., Polk, C., Vuolteenaho, T., 2003. The value spread. *Journal of Finance* 58, 609–641.
- Davis, J., Fama, E., French, K., 2000. Characteristics, covariances, and average returns: 1929 to 1997. *Journal of Finance* 55, 389–406.
- Dhaliwal, D., Subramanyam, K., Trezevant, R., 1999. Is comprehensive income superior to net income as a measure of firm performance? *Journal of Accounting and Economics* 26, 43–67.
- Fama, E., French, K., 1993. Common risk factors in the returns of stocks and bonds. *Journal of Financial Economics* 33, 3–56.
- Fama, E., French, K., 2008. Average returns, B/M, and share issues. *Journal of Finance* 63, 2971–2995.

- Fama, E., French, K., 2015. A five-factor asset pricing model. *Journal of Financial Economics* 116, 1–22.
- Fama, E., MacBeth, J., 1973. Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy* 81, 607–636.
- Gerakos, J., Gramacy, R., 2012. Regression-based earnings forecasts, Unpublished working paper, University of Chicago.
- Lakonishok, J., Shleifer, A., Vishny, R., 1994. Contrarian investment, extrapolation, and risk. *Journal of Finance* 49, 1541–1578.
- Novy-Marx, R., 2013. The other side of value: The gross profitability premium. *Journal of Financial Economics* 108, 1–28.
- Paton, W., 1934. Shortcomings of present-day financial statements. *Journal of Accountancy* 57, 108–132.
- Shumway, T., 1997. The delisting bias in CRSP data. *Journal of Finance* 52, 327–340.



Panel B: Predicting returns using five-year income before extraordinary and special items-to-price

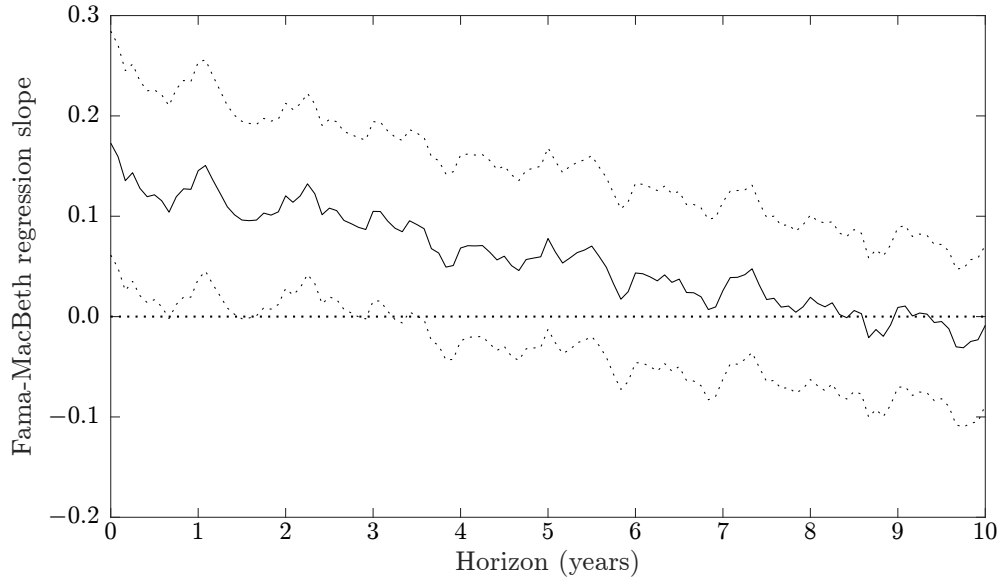


Fig. 1. Fama and MacBeth regressions of stock returns on earnings-to-price. This figure plots average Fama and MacBeth (1973) regression slopes and the 95% confidence intervals associated with these slopes from cross sectional regressions that predict monthly returns. The regressions are estimated monthly using data from July 1973 through December 2015 for stocks with a market value of equity above the 20th percentile of the NYSE market capitalization distribution (All but microcaps). The regressors are prior one-month return, prior one-year return skipping a month, log-size, and lagged earnings-to-price. Panel A computes five-year cumulative earnings using net income, NI; Panel B uses income before extraordinary and special items, IB – SPI. In these regressions, we lag only the earnings-to-price variables and keep the values of the other regressors current.

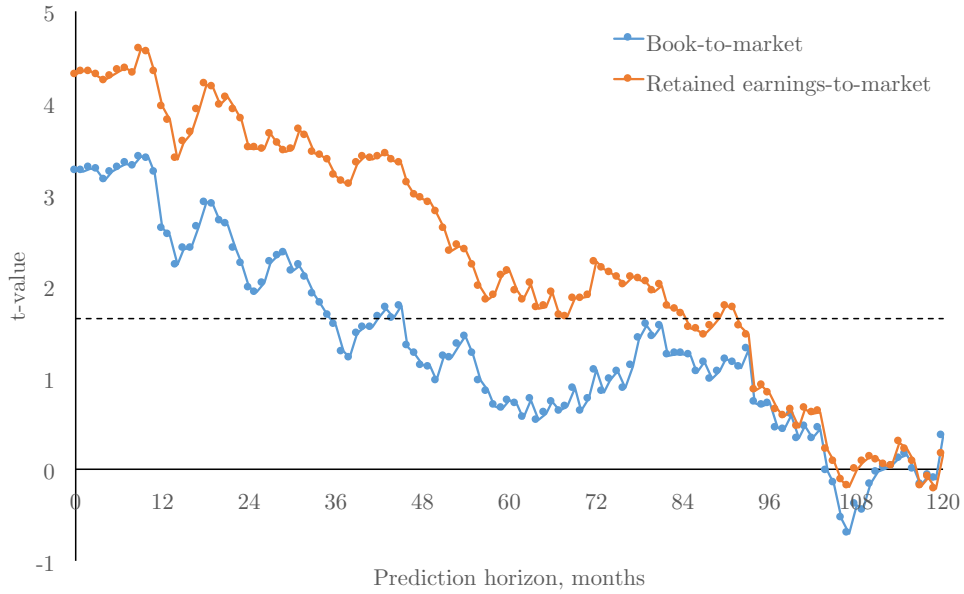


Fig. 2. **Comparison of the predictive power of lagged BE/ME and lagged RE/ME.** This figure plots average t -values for Fama and MacBeth (1973) regression slopes for $\log(\text{BE/ME})$ and $\log(\text{RE/ME})$ from cross-sectional regressions that predict monthly returns. The regressions are estimated monthly using data from July 1973 through December 2015 for stocks with a market value of equity above the 20th percentile of the NYSE market capitalization distribution (All but microcaps). The other regressors are: prior one-month return, prior one-year return skipping a month, and log-size. We lag all regressors by the value indicated on the x -axis. The estimates at $x = 20$, for example, explain cross-sectional variation in returns using the lagged values of $\log(\text{BE/ME})$ and $\log(\text{RE/ME})$ recorded 20 months earlier.

Table 1: Summary statistics and correlations for retained earnings, contributed capital, and book value of equity

Panel A presents distributions of book-to-market and the ratios of the components to market. Panel B presents distributions of the ratios of the components of the book value of equity to the total book value of equity. The components of the book value of equity are contributed capital (CC), retained earnings (RE), and other (OTH). Panel C presents the distributions of the ratios of the components to the total book value of equity for the six Fama and French portfolios. Panel D presents Pearson and Spearman correlations for the measures when they are deflated by the December market value of equity. Panel A includes all firms. Panels B through D include firms with positive book values of equity and require that each book-value-of-equity component is between -100% and 200% of the book value of equity. Our sample period starts in July 1963 and ends in December 2015.

Panel A: Distributions of book-to-market and retained earnings-to-market

Ratio	Mean	SD	Pct < 0	Percentiles				
				10th	25th	50th	75th	90th
Book-to-market	0.86	2.21	2%	0.20	0.40	0.72	1.14	1.72
Reported book-to-market	0.83	1.93	2%	0.20	0.39	0.68	1.08	1.66
Retained earnings-to-market	-0.05	3.47	24%	-0.78	-0.04	0.27	0.56	0.92
Contributed capital-to-market	0.88	2.89	3%	0.05	0.16	0.38	0.81	1.78
Other book-to-market	0.03	0.65	25%	-0.01	-0.00	0.01	0.05	0.15

Panel B: Distributions of the book value of equity components (%)

Component	Mean	Pct < 0	SD	Percentiles				
				10th	25th	50th	75th	90th
Retained earnings (RE)	42%	13%	40%	-10%	20%	47%	71%	87%
Contributed capital (CC)	53%	4%	41%	9%	24%	47%	75%	108%
Other (AOI)	4%	21%	11%	-1%	-0%	2%	7%	17%

Panel C: Book value of equity components by Fama-French portfolios (%)

		RE			CC			AOI		
		Mean	Median	Pct < 0	Mean	Median	Pct < 0	Mean	Median	Pct < 0
Small	Growth	29%	34%	24%	69%	63%	2%	2%	0%	24%
	Neutral	42%	46%	14%	55%	49%	3%	3%	1%	23%
	Value	41%	46%	13%	54%	48%	2%	4%	1%	21%
Big	Growth	62%	66%	6%	34%	30%	10%	4%	3%	20%
	Neutral	55%	57%	4%	37%	33%	6%	8%	6%	16%
	Value	44%	45%	7%	42%	38%	2%	14%	13%	12%

Panel D: Correlations among book value of equity components

	Pearson correlations				Spearman correlations			
	BE/ME	RE/ME	CC/ME	AOI/ME	BE/ME	RE/ME	CC/ME	AOI/ME
BE/ME	1				1			
RE/ME	0.53	1			0.56	1		
CC/ME	0.78	-0.09	1		0.61	-0.16	1	
AOI/ME	0.35	0.01	0.22	1	0.26	0.24	-0.03	1

Table 2: Retained earnings and contributed capital in Fama-MacBeth regressions

This table presents average Fama and MacBeth (1973) regression slopes and their t -values from cross sectional regressions that predict monthly returns. The regressions are estimated monthly using data from July 1963 through December 2015. The sample consists of All but microcap firms with positive book value of equity and non-missing values for retained earnings and contributed capital. All but microcap firms are stocks with market values of equity at or above the 20th percentile of the NYSE market capitalization distribution. Variables are trimmed at the 1st and 99th percentiles based on the four explanatory variables used in the first column: book-to-market, size, prior one-month return, and prior one-year return skipping a month. Negative values of $\log(\text{RE})$, $\log(\text{CC})$, and $\log(\text{OTH})$ are set to zero, and indicator variables at the bottom of the table identify these negative values. Our sample period starts in July 1963 and ends in December 2015. Panel A presents our main results and Panel B presents results for alternative samples.

Panel A: Main regressions

Regressor	Regression											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
log(ME)	-0.07 (-2.02)	-0.07 (-1.88)	-0.09 (-2.77)	-0.09 (-2.49)	-0.09 (-2.46)	-0.09 (-2.66)	-0.09 (-2.52)	-0.08 (-2.35)	-0.10 (-2.85)	-0.07 (-2.03)	-0.07 (-1.99)	-0.09 (-2.61)
$r_{1,1}$	-3.39 (-7.78)	-3.37 (-7.72)	-3.27 (-7.51)	-3.49 (-8.17)	-3.47 (-8.10)	-3.11 (-6.92)	-3.45 (-8.04)	-3.44 (-7.97)	-3.07 (-6.89)	-3.47 (-8.02)	-3.46 (-8.00)	-3.51 (-8.18)
$r_{12,2}$	0.94 (4.92)	0.94 (4.87)	0.91 (4.78)	0.93 (4.93)	0.92 (4.85)	0.88 (4.52)	0.93 (4.92)	0.93 (4.89)	0.90 (4.61)	0.93 (4.87)	0.93 (4.85)	0.90 (4.78)
log(BE/ME)	0.24 (3.48)			0.06 (0.85)			0.35 (4.55)			0.24 (3.61)		
log(Reported BE/ME)		0.25 (3.62)			0.05 (0.72)			0.36 (4.77)			0.24 (3.75)	
log(RE/ME)			0.20 (4.92)	0.18 (5.27)	0.18 (5.31)							0.20 (5.31)
log(CC/ME)						0.01 (0.33)	-0.12 (-4.48)	-0.13 (-4.61)				0.01 (0.41)
log(AOCI/ME)									0.01 (1.50)	0.00 (0.08)	0.00 (0.54)	0.00 (0.51)
Indicator variables												
RE ≤ 0			-0.50 (-2.48)	-0.44 (-2.21)	-0.44 (-2.17)							-0.51 (-2.52)
CC ≤ 0						0.12 (1.88)	0.22 (2.74)	0.23 (2.78)				-0.04 (-0.63)
AOCI ≤ 0									-0.08 (-1.02)	0.01 (0.21)	-0.04 (-0.54)	-0.02 (-0.36)
Pseudo t -value for joint sig. of add'l regressors												
Avg. Adj. R^2	5.51%	5.42%	5.55%	6.15%	6.06%	4.79%	5.84%	5.75%	4.76%	5.78%	5.73%	6.21%

Panel B: Alternative samples

Regressor	Include firms with negative book value of equity		Require firms to have positive retained earnings	
	(1)	(2)	(3)	(4)
log(ME)	−0.07 (−2.00)	−0.09 (−2.46)	−0.08 (−2.45)	−0.09 (−2.65)
$r_{1,1}$	−3.38 (−7.80)	−3.49 (−8.20)	−3.82 (−8.73)	−3.88 (−8.95)
$r_{12,2}$	0.95 (4.97)	0.93 (4.98)	0.85 (4.22)	0.85 (4.28)
log(BE/ME)	0.24 (3.48)	0.06 (0.88)	0.19 (2.88)	0.01 (0.08)
log(RE/ME)		0.17 (5.20)		0.19 (5.49)
Indicator variables				
BE $\leq$ 0	0.09 (0.47)	0.37 (1.82)		
RE $\leq$ 0		−0.45 (−2.31)		
Pseudo t -value for joint sig. of add'l regressors		4.82		
Avg. Adj. R^2	5.55%	6.18%	5.45%	5.76%

Table 3: Retained earnings, contributed capital, and payout policy in Fama-MacBeth regressions

This table presents average Fama and MacBeth (1973) regression slopes and their t -values from cross sectional regressions that predict monthly returns. The regressions are estimated monthly using data from July 1963 through December 2015. The sample consists of All but microcap firms with positive book value of equity and non-missing values for retained earnings and contributed capital. All but microcap firms are stocks with market values of equity at or above the 20th percentile of the NYSE market capitalization distribution. $\log(\text{Cum. dividends}/\text{ME})$ is the ratio of cumulative dividends distributed since the firm's IPO to the current market value of equity. Variables are trimmed at the 1st and 99th percentiles based on the four explanatory variables used in the first column: book-to-market, size, prior one-month return, and prior one-year return skipping a month. Our sample period starts in July 1963 and ends in December 2015.

Regressor	Regression	
	(1)	(2)
$\log(\text{ME})$	−0.09 (−2.50)	−0.09 (−2.66)
$r_{1,1}$	−3.51 (−8.22)	−3.62 (−8.52)
$r_{12,2}$	0.93 (4.95)	0.92 (4.93)
$\log(\text{BE}/\text{ME})$	0.06 (0.86)	0.06 (0.97)
$\log(\text{RE}/\text{ME})$	0.18 (5.25)	0.17 (5.04)
$\log(\text{Cum. dividends}/\text{ME})$		−0.01 (−1.28)
Indicator variables		
RE $\leq$ 0	−0.43 (−2.21)	−0.41 (−2.14)
Cum. dividends = 0		0.02 (0.15)
Pseudo t -value for joint sig. of add'l regressors	4.86	4.12
Avg. Adj. R^2	6.16%	6.55%

Table 4: Fama-MacBeth regressions with cumulative earnings.

Each line shows estimates from a separate set of Fama-MacBeth regressions in which we accumulate earnings over different windows. Our measure of accumulated earnings is the natural logarithm of the sum of earnings over the window deflated by the most recent market value of equity. The regressions include as (unreported) controls size, prior one-month return, and prior one-year return skipping a month. In the regressions that accumulate earnings up to five years, the sample consist of firms with at least five years of earnings data. The regressions that accumulate ten years of earnings include firms with at least ten years of earnings data. Panel A presents results based on using net income as the measure of earnings and Panel B uses income before extraordinary and special items. The sample starts in July 1963 and ends in December 2015.

Panel A: Accumulated net income to price

Horizon, years	log(BE/ME)		log(Earnings/ME)		Earnings < 0		Avg. adj. R^2
	EST	t -value	EST	t -value	EST	t -value	
Regressions without log(BE/ME)							
1			0.165	3.01	−0.665	−2.93	5.30%
2			0.134	2.21	−0.475	−2.18	5.44%
3			0.155	2.48	−0.360	−1.74	5.51%
4			0.150	2.40	−0.355	−1.71	5.61%
5			0.156	2.51	−0.337	−1.63	5.63%
10			0.188	3.02	−0.127	−0.64	5.80%
Regressions with log(BE/ME)							
.	0.188	3.04					5.20%
1	0.134	2.46	0.108	2.52	−0.554	−2.78	5.92%
2	0.136	2.61	0.065	1.36	−0.366	−1.89	5.97%
3	0.119	2.37	0.091	1.78	−0.283	−1.51	5.98%
4	0.108	2.18	0.090	1.68	−0.297	−1.54	6.05%
5	0.094	1.88	0.108	1.99	−0.301	−1.53	6.05%
10	0.001	0.03	0.199	3.07	−0.105	−0.52	6.18%

Panel B: Accumulated income before extraordinary and special items to price

Horizon, years	log(BE/ME)		log(Earnings/ME)		Earnings < 0		Avg. adj. R^2
	EST	t -value	EST	t -value	EST	t -value	
Regressions without log(BE/ME)							
1			0.204	3.47	−0.843	−3.22	5.46%
2			0.216	3.34	−0.648	−2.68	5.57%
3			0.205	3.07	−0.499	−2.18	5.64%
4			0.205	3.05	−0.503	−2.26	5.69%
5			0.201	3.00	−0.535	−2.45	5.72%
10			0.197	3.07	−0.190	−0.85	5.91%
Regressions with log(BE/ME)							
.	0.188	3.04					5.20%
1	0.126	2.18	0.145	3.07	−0.733	−3.08	6.06%
2	0.106	1.96	0.160	3.03	−0.583	−2.61	6.07%
3	0.088	1.67	0.157	2.73	−0.450	−2.11	6.09%
4	0.073	1.42	0.163	2.80	−0.482	−2.30	6.09%
5	0.071	1.37	0.155	2.54	−0.509	−2.42	6.11%
10	0.038	0.67	0.166	2.44	−0.177	−0.80	6.28%

Table 5: Returns on portfolios sorted by book-to-market, retained earnings, and contributed capital

This table reports value-weighted average excess returns and three-factor model alphas for portfolios sorted by operating profitability, accruals, and cash-based operating profitability, each scaled by the book value of total assets. We sort stocks into quintiles based on NYSE breakpoints at the end of each June and hold the portfolios for the following year. The sample starts in July 1963 and ends in December 2015.

Quintile	Book-to-market component			Book-to-market component		
	Total	Retained earnings	Contributed capital	Total	Retained earnings	Contributed capital
Excess returns				<i>t</i>-values		
1 (low)	0.46	0.32	0.53	2.37	1.41	3.03
2	0.52	0.48	0.46	2.90	2.82	2.44
3	0.56	0.58	0.51	3.20	3.42	2.72
4	0.65	0.73	0.54	3.74	4.10	3.06
5 (high)	0.81	0.75	0.60	4.10	3.80	2.96
H–L	0.35	0.43	0.07	2.60	2.73	0.54
CAPM alphas				<i>t</i>-values		
1 (low)	−0.07	−0.28	0.06	1.26	−3.42	1.17
2	0.03	0.02	−0.06	0.67	0.35	−1.49
3	0.10	0.12	0.00	1.59	2.39	0.00
4	0.21	0.27	0.07	2.74	3.82	1.17
5 (high)	0.32	0.26	0.10	3.34	2.77	1.01
H–L	0.39	0.53	0.04	2.87	3.42	0.32
Three-factor model alphas				<i>t</i>-values		
1 (low)	0.10	−0.10	0.15	−2.95	−1.53	3.62
2	−0.01	0.06	−0.05	−0.24	1.49	−1.19
3	−0.04	0.04	−0.06	−0.68	0.94	−1.15
4	−0.05	0.09	−0.08	−1.12	1.79	−1.51
5 (high)	−0.03	−0.06	−0.15	−0.69	−1.18	−1.96
H–L	−0.14	0.03	−0.29	−2.39	0.33	−2.95

Table 6: Two-way portfolio sorts: Book-to-market and retained earnings-to-market

This table reports CAPM alphas and t -values associated with those alphas for value-weighted portfolios sorted by book-to-market and retained earnings-to-market. Panel A sorts stocks first into quintiles by retained earnings-to-market and then, *conditional* on the retained earnings quintile, into quintiles by book-to-market. Panel B reverses the order of the sorts. Each sort uses NYSE breakpoints. The portfolios are rebalanced annually at the end of June. The sample starts in July 1963 and ends in December 2015.

Panel A: Conditional portfolio sorts on retained earnings-to-market and book-to-market

RE/ME	BE/ME (Conditional sort)					H – L
	Low	2	3	4	High	
Monthly CAPM alphas						
Low	−0.34	−0.25	−0.20	−0.14	−0.11	0.22
2	0.06	−0.01	−0.15	−0.10	0.12	0.06
3	0.14	−0.09	0.11	0.16	0.29	0.15
4	0.30	0.21	0.35	0.28	0.26	−0.04
High	0.29	0.22	0.29	0.26	0.52	0.23
H – L	0.63	0.47	0.49	0.40	0.63	
<i>t</i> -values						
Low	−2.48	−2.31	−2.07	−1.29	−0.84	1.08
2	0.75	−0.11	−1.67	−1.02	1.16	0.43
3	1.72	−1.11	1.25	1.67	2.55	1.13
4	3.50	2.07	3.40	2.58	2.23	−0.34
High	2.97	1.85	2.45	1.87	3.49	1.58
H – L	3.14	2.57	3.04	2.36	3.57	

Panel B: Conditional portfolio sorts on book-to-market and retained earnings-to-market

	RE/ME (Conditional)					
BE/ME	Low	2	3	4	High	H – L
Monthly CAPM alphas						
Low	−0.45	−0.21	0.01	−0.01	0.11	0.56
2	−0.17	−0.12	−0.04	0.17	0.20	0.37
3	−0.23	0.03	0.08	0.32	0.18	0.41
4	0.00	0.28	0.29	0.23	0.25	0.26
High	0.23	0.30	0.35	0.33	0.34	0.10
H – L	0.69	0.51	0.34	0.34	0.23	
<i>t</i> -values						
Low	−3.34	−1.88	0.14	−0.08	1.35	3.14
2	−1.70	−1.30	−0.48	2.05	2.24	2.64
3	−2.10	0.31	0.79	3.29	1.75	2.72
4	−0.01	2.61	2.90	2.02	2.11	1.77
High	1.63	2.47	2.72	2.72	2.19	0.60
H – L	3.43	2.64	1.92	2.21	1.34	

Table 7: Information content of HML-factors based book value of equity, retained earnings, and contributed capital.

Panel A shows the annualized average returns and standard deviations of the monthly factors. Panel B shows the Pearson correlations. The factors are the market return minus the risk free rate, MKT; size, SMB; value, HML; and two factors constructed from the retained earnings and contributed capital components of the book value of equity, HML_{re} and HML_{cc} . These additional factors are formed using the same six-portfolio methodology as standard HML. HML is the factor provided by Ken French; HML^* is constructed using our sample. Panel C measures the information content of HML, HML_{re} and HML_{cc} by reporting estimates from spanning regressions. The left-hand side variable is the monthly return on each of these factors. The explanatory variables are the market and size factors, and one of the HML factors. The sample starts in July 1963 and ends in December 2015.

Panel A: Average returns and standard deviations

	Factor					
	MKT	SMB	HML	HML^*	HML_{re}	HML_{cc}
Average annualized return	5.99	2.75	4.05	4.08	5.02	0.46
Standard deviation	15.39	10.75	9.90	9.75	10.59	7.52
t -value	2.82	1.85	2.96	3.03	3.43	0.44

Panel B: Correlations

Factor	Factor				
	MKT	SMB	HML	HML_{re}	HML_{cc}
MKT	1				
SMB	0.30	1			
HML	-0.30	-0.23	1		
HML_{re}	-0.31	-0.30	0.86	1	
HML_{cc}	-0.02	0.24	0.45	0.09	1

Panel C: Spanning regressions

Regressor	Dependent variable					
	HML		HML _{RE}		HML _{CC}	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.00 (0.06)	0.44 (4.75)	0.16 (2.52)	0.55 (4.89)	-0.17 (-2.29)	-0.04 (-0.52)
MKT	-0.03 (1.89)	-0.13 (-5.91)	-0.02 (-1.67)	-0.16 (-5.95)	0.02 (1.00)	-0.03 (-1.50)
SMB	0.04 (2.09)	-0.27 (-8.35)	-0.10 (-4.88)	-0.26 (-6.73)	0.24 (10.09)	0.21 (7.43)
HML			0.89 (39.56)		0.41 (15.72)	
HML _{RE}	0.81 (39.56)					0.12 (3.95)
HML _{CC}		0.68 (15.72)		0.21 (3.95)		
N	630	630	630	630	630	630
Adj. R^2	74.4%	35.8%	75.5%	16.2%	32.7%	8.4%