Earnings, retained earnings, and book-to-market in the cross section of expected returns*

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Abstract

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JEL classification: G11, G12, M41.

Keywords: Book-to-market; Contributed capital; Earnings yield; Mispricing; Retained earnings; Value premium.

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1. Introduction

The book-to-market ratio has long been used as an indicator of value. We predict that book-to-market strategies work because the book value of equity includes the accumulation and, hence, the averaging of past earnings. Our thesis is that this averaging attenuates timing issues in accounting and transitory real factors that affect individual-year earnings, resulting in a better proxy for the firm's underlying earnings yield (Ball, 1978; Berk, 1995). Consistent with our thesis, we show that book-to-market predicts returns only because it contains retained earnings-to-market, and only because retained earnings contains past earnings. This result confirms the conjecture of Graham and Dodd (1934) that investors should not use book value as a measure of intrinsic value; they should instead develop measures of a firm's average earnings power by removing transitory real effects such as current business conditions, and transitory accounting effects such as one-time items and manager manipulation.

We start with the observation that the book value of equity consists of two main parts: contributed capital and retained earnings. These parts are of approximately equal size but represent different economic constructs. The contributed capital component records the net capital transactions between the firm and its shareholders, and hence comprises accumulated past equity issuances less past share repurchases. The fact that investors contributed capital to a firm does not necessarily reveal information about its riskiness; it merely indicates that investors were prepared to bear such risk. Recent net issuances could, however, lead to a negative relation between contributed capital and stock returns.[1] We therefore predict either no relation or a weak negative relation between contributed capital and the cross section of expected returns.

Retained earnings comprise the accumulated total earnings the firm generated over its history, less accumulated dividend distributions.[2] Our thesis is that retained earnings-to-market predicts the cross section of expected returns for two reasons. First, when deflated by market values,

[1] See Ikenberry, Lakonishok, and Vermaelen (1995), Loughran and Ritter (1995), Daniel and Titman (2006), Bradshaw, Richardson, and Sloan (2006), and Pontiff and Woodgate (2008).

[2] "Earnings" here refer to bottom-line net income, which is what accountants transfer into retained earnings each period. As described below, some stock repurchase transactions reduce retained earnings.

earnings likely share common economic determinants with expected returns: over the life of the firm, total earnings equal total distributions to shareholders. Ball (1978, p. 113) argues that scaling earnings by price therefore creates an earnings yield variable that "could be a good surrogate for the determinants of securities' equilibrium expected returns."

Second, timing issues in accounting reduce the informativeness of bottom-line net income in individual years (Novy-Marx, 2013; Ball, Gerakos, Linnainmaa, and Nikolaev, 2015, 2016), but these timing issues tend to "average out" when net income accumulates in retained earnings. For example, overestimating uncollectible receivables from credit sales initially reduces earnings, but the effect reverses later when the higher than predicted collections are realized. Similarly, one-time items such as asset impairment charges impact current-period earnings, but they substitute for depreciation or other charges that otherwise would have been made against earnings over an extended period. The accumulated past earnings component of retained earnings is therefore comparatively immune to individual-year accounting effects.

The effect of different deflators on the correlation between retained earnings and contributed capital provides an early indication that they contain different information about equity valuations. When they are deflated by the book value of equity, contributed capital and retained earnings are almost perfectly negatively correlated, because, on average, they represent 95% of the deflator.[3] However, when they are deflated by the market value of equity, the correlation between the two measures is -0.19.

We start by estimating Fama and MacBeth (1973) regressions to compare the information contained in retained earnings and contributed capital. We find that retained earnings-to-market subsumes book-to-market in explaining the cross section of average returns. By contrast, contributed capital-to-market has no explanatory power either on its own or when controlling for retained earnings-to-market. Moreover, when we include both book-to-market and contributed

[3] A third component is "Accumulated Other Comprehensive Income," which accumulates largely transitory past gains and losses. On average, it represents 5% of the book value of equity. We describe this component in the following section.

capital-to-market, they are both significant but with opposing signs. Thus, book-to-market only predicts stock returns because it contains retained earnings.

To test more directly our thesis that book-to-market contains information about expected returns because book values contain accumulated past earnings, we next examine whether retained earnings' predictive power arises from earnings or dividends. Our evidence indicates that retained earnings only predict stock returns because they contain accumulated past earnings.

We next demonstrate the source of book-to-market's explanatory power by entering it in a "horse race" against our own accumulation of past earnings over increasing windows. In Fama and MacBeth (1973) regressions, the coefficient and t-value for this backward-accumulated earnings measure increase almost monotonically as we increase the accumulation window. Conversely, the coefficient and t-value for book-to-market both decrease monotonically, losing significance after earnings are accumulated back two years. These results are consistent with our thesis that the accumulation of past earnings reduces timing issues in accounting that affect individual-year earnings, thereby making retained earnings-to-market a good proxy for the firm's underlying earnings yield.

Consistent with retained earnings-to-market being a proxy for earnings yield, we further demonstrate that it is a significant predictor of earnings growth. We estimate regressions that predict earnings growth with book-to-market, earnings-to-price, and retained earnings-to-market. The slopes on book-to-market are all negative and sometimes significant; those on earnings-to-price are all negative and significant, consistent with mean reversion; and those on retained earnings-to-market all are positive and significant, consistent with it being a good proxy for the firm's underlying earnings yield.

Several additional tests demonstrate the stability of retained earnings-to-market's predictive power, and thus provide comfort that it does not represent a statistical artifact (Lo and MacKinlay, 1990; Harvey, Liu, and Zhu, 2016). First, we find similar results for non-U.S. firms. Second, when we split the U.S. sample into subperiods, we find that retained earnings-to-market predicts returns both pre- and post-1990 even though book-to-market fails to do so in the latter subperiod

(Asness, Frazzini, Israel, and Moskowitz, 2015). Third, we show that book-to-market loses its predictive power in the latter subperiod because its correlation with retained earnings-to-market drops. Fourth, we obtain similar results for U.S. firms over a pre-Compustat period from 1938 through 1964.

An alternative explanation for our results is that investors overweight current earnings, or components of current earnings, when forecasting future earnings. For example, Sloan (1996) argues that investors fixate on current-year earnings, seemingly unaware that earnings contain accounting accruals that are more transitory than cash flows. Consequently, they overweight the transitory accruals component and underweight the more persistent cash component. Dechow and Ge (2006) make a similar argument with respect to special items, a component of earnings that also is comparatively transitory.

Under this form of functional fixation, retained earnings contain incremental information about future earnings that investors initially underweight. Retained earnings-to-market then predicts the cross section of stock returns because transitory components constitute a minor part of a firm's earnings accumulated over its entire history. Transitory components wash out in the accumulation, or averaging, of past earnings in retained earnings. Retained earnings-to-market could therefore contain information about permanent earnings components that investors underweighted in past years and that will subsequently be incorporated into prices.

Several results are inconsistent with this functional fixation explanation. In Fama and MacBeth (1973) regressions, the coefficients on earnings-to-price should be negative when controlling for retained earnings-to-market. If retained earnings indeed control for the permanent earnings component, these regressions should isolate the transitory component in the current earnings variable. We find, however, that the coefficients on earnings-to-price are positive and that retained earnings-to-market subsumes earnings-to-price's predictive power. Moreover, in spanning regressions, a retained earnings-based factor contains all of the valuable information in current-period's earnings-to-price. This result holds in both halves of our 1964–2017 sample period, when we replace

the market value of equity with the book value of equity as the deflator of current period's earnings, and when we predict returns five years out.

We also revisit Dechow and Ge (2006) who reason that functional fixation causes investors to overweight transitory negative special items when forecasting future earnings. They find that negative special items positively predict the cross section of average returns. Retained earnings-to-market then could predict the cross section of returns because it washes out the transitory negative special items that investors initially overweight. We replicate their results and then show that retained earnings-to-market's predictive power is distinct from the predictive power of special items. We acknowledge, however, that it is notoriously difficult to differentiate between rational and irrational pricing explanations (Fama, 1998).

We draw the following major conclusions. First, book-to-market explains the cross section of average returns only because of its retained earnings-to-market component. Second, in value investing strategies, the book value of equity in book-to-market does not act as a measure of intrinsic value. Third, in later years book-to-market does not predict the cross section of average returns because it loses most of its correlation with retained earnings-to-market. Fourth, our results imply that in asset pricing tests it is preferable to use a retained earnings-to-market factor rather than a book-to-market factor, especially in later years. Fifth, retained earnings-to-market is a good proxy for earnings yield, because retained earnings attenuate accounting effects on individual-year earnings.[4] Although we find that retained earnings-to-market is a good proxy for a firm's underlying earnings yield, we do not claim that retained earnings is a better predictor of future earnings and cash flows than the myriad of variables examined in prior research.[5] Instead, our goal is to demonstrate the source of book-to-market's predictive power for the cross section of average returns.

Our evidence highlights that commonly used accounting measures can be decomposed into parts

[4]Our results can be thought of as a cross-sectional version of Shiller's cyclically adjusted price-to-earnings (CAPE) ratio, which uses a moving average of the S&P 500 aggregate earnings to predict the market return (Campbell and Shiller, 1988). Just as the CAPE smooths out transitory shocks to aggregate income, retained earnings smooths out transitory shocks at the firm-level.

[5]For example, the implied cost of capital literature combines forecasts of earnings or cash flows with current prices to estimate expected returns (Easton, 2009; Etcherling, Eierle, and Ketterer, 2015).

that contain different information about 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.

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

Our thesis is that the components of the book-to-market ratio's numerator—the book value of equity—contain different information about the cross section of stock returns, and that differences in their informativeness can shed light on the source and interpretation of book-to-market's predictive ability for the cross section of returns. In this section, we describe the components of the book value of equity, what these components represent, and how these components evolve over time.

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 issuances 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.[6] Treasury stock is the cost of stock repurchased from shareholders (but not retired). If the firm does not retire the repurchased stock, the repurchase cost is reported on the balance sheet as a negative offset to contributed capital. Firms typically do not retire the repurchased stock because cancellation forgoes options to reissue the stock on the market or under executive compensation schemes.

Retained earnings are the earnings (i.e., net income) accumulated since the firm's inception less accumulated distributed 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. These transactions can, however, reduce retained earnings. As discussed in the appendix, companies can account for treasury stock using either the cost or par method. Under the cost method, paid in capital is reduced when previously repurchased treasury stock is reissued at a price lower than that paid to repurchase it. If paid in capital is depleted, then retained earnings are reduced. Under the par method, retained earnings are reduced by the difference between the repurchase price and the amount originally received when the stock was issued.[7] Retained earnings can therefore become negative if a firm generates a series of book losses either during a growth phase or due to poor economic performance, or if it engages in certain stock repurchase transactions.[8]

A third and typically much smaller component of the book value of equity is accumulated other comprehensive income [ACOMINC]. Accumulated other comprehensive income is a technical ac-

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

[7]The cost method appears to be more prevalent method. In 2010, the American Institute of Certified Public Accountants surveyed 500 firms about their accounting policies (AICPA, 2010). Of these 500 firms, 340 engaged in stock repurchases with 321 using the cost method and 19 using the par method.

[8]Treasury stock transactions can reduce retained earnings by economically significant amounts. Microsoft, for example, 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 shares that were reissued to employees. This difference between the repurchase and strike prices largely explains the $29.46 billion retained deficit it reported at June 30, 2007.

count that accumulates the amount of various paper (i.e., not realized in cash) gains and losses that primarily originate in shocks to prices of financial assets in which companies have either long or short positions. Accounting rules exclude these shocks from earnings until they subsequently are realized, and "park them" in the meantime in a separate book value-of-equity account. These items include unrealized gains and losses on those marketable securities that are designated as "securities available for sale," 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 these paper gains and losses are later realized, they are removed from accumulated other comprehensive income, recognized as earnings, and then moved into retained earnings. If they are not realized, they remain on the balance sheet in accumulated other comprehensive income.

Accumulated other comprehensive income measures price changes and liabilities that are largely unrelated to firms' operations (we remove financial firms from our sample). We therefore do not expect this component to be informative about firms' expected returns. Even though U.S. GAAP does not include accumulated other comprehensive income in retained earnings, and firms therefore report retained earnings without it, Compustat adds ACOMINC to their retained earnings variable [RE]. Because we expect this component to differ from retained earnings in terms of informativeness about the cross section of stock returns, we back it out from retained earnings and study its contribution separately.

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 gains and losses due to shocks to asset prices. Consequently, book-to-market ratios consist of several components we expect to have different implications for asset pricing. In particular, we expect retained earnings (when scaled by the current market equity) to proxy for the firm's underlying earnings yield and hence for expected returns. We expect no such effect for contributed capital and accumulated other comprehensive income.

3. Data

Our primary sample is U.S.-listed securities over 1964–2017. We take monthly stock returns and dividend histories from the Center for Research in Security Prices (CRSP) and annual accounting data from Compustat. We start our sample with all firms traded on NYSE, Amex, and NASDAQ, and exclude securities other than ordinary common shares. We exclude financial firms, which are defined as firms with one-digit standard industrial classification codes of six. Delisting returns are taken from CRSP; if a delisting return is missing and the delisting is performance-related, we impute a return of -30% for NYSE and Amex firms and -55% for Nasdaq firms (Shumway, 1997; Shumway and Warther, 1999; 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 1964 and end it in December 2017. We start the sample in 1964 as opposed to the usual 1963 start year because Compustat did not collect the retained earnings variable for most firms until the 1963 fiscal year.[9] 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.

In Fama and MacBeth (1973) regressions, we exclude microcaps to avoid having them exert undue influence (Novy-Marx, 2013). Following Fama and French (2008), we define microcaps as stocks with market values of equity below the 20^{th} percentile of the NYSE market capitalization distribution. These comprise only 3.1% of aggregate market capitalization. In Fama and MacBeth (1973) regressions, we re-compute the explanatory variables every month. In portfolio sorts, and when constructing return factors, we include all stocks and rebalance the portfolios annually at the end of June.

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

[9]Compustat reports retained earnings (RE) for just 27.0% of the firms for fiscal years ending during 1962. For fiscal years ending in 1963, this fraction is 86.5%. From 1964 through the end of the sample in 2017, this fraction is almost always above 99%.

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.[10] We then use the Davis, Fama, and French (2000) book values of equity from Ken French's website to fill in missing values.

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

Table 1 presents descriptive statistics for book-to-market and its components. Panel A presents time-series averages of the distributions. The first two rows compare the Fama and French book-to-market measure with book-to-market based on the book value of equity reported on balance sheets. The distributions of the two measures are almost identical with means of 0.83 and 0.79 and medians of 0.67 and 0.64. The third row describes the distribution of retained earnings-to-market. This measure is more skewed, with a mean of -0.16 and a median of 0.23.

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 (0.95 versus 0.83 and 0.79), but the median is smaller (0.38 versus 0.67 and 0.64). Accumulated other comprehensive income-to-market is the smallest component with a mean of 0.03 and a median of 0.01.

The bottom of Panel A presents the distributions of the components as a percentage of the

[10] See `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 how this book value of equity measure is calculated.

book value of equity.[11] On average, contributed capital represents a larger percentage of the book value of equity (54%) and four percent of the sample firms have negative contributed capital. On average, retained earnings are 41% of the book value of equity, and 16% of the sample firms have negative retained earnings. Accumulated other comprehensive income represents the smallest share of the book value of equity, with a mean of 5%.

Panel B 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, lower frequencies of negative retained earnings, and lower percentages of contributed capital. Second, of the six portfolios, large growth firms have the highest percentage of retained earnings (mean = 62%) and the lowest percentage of contributed capital (mean = 35%), while small growth firms have the lowest percentage of retained earnings (mean = 27%) and the highest percentage of contributed capital (mean = 71%).

Panel C presents Pearson and Spearman correlations for book-to-market, retained earnings-to-market, contributed capital-to-market, and accumulated other comprehensive income-to-market. All three components positively correlate with book-to-market. Because retained earnings and contributed capital comprise 95% of the book value of equity, they should be almost perfectly negatively correlated when deflated by book value of equity. In the data (not reported in Panel C), the Pearson and Spearman rank correlations between retained earnings-to-book equity and contributed capital-to-book equity are -0.96 and -0.95. Retained earnings-to-market and contributed capital-to-market, however, are only slightly negatively correlated; the Pearson and Spearman correlations -0.19 and -0.17. These correlations indicate that each explains less than four percent of the other's variance. The change in correlations when switching the denominator from the book value of equity to the market value of equity implies that the components contain different information

[11] In the bottom half of Panel A, we restrict the sample to firms with positive book values of equity and drop firms for which a single component accounts for more than 200% or less than -100% of the book value of equity. These restrictions are why the fractions of negative values (reported in column "Pct < 0") differ between the top and bottom halves of Panel A.

about market values. That is, the market appears to price these two components differently. This difference, in turn, suggests that they contain different information about expected stock returns.

4. The cross section of returns

4.1. Retained earnings versus contributed capital

Table 2 presents our Fama and MacBeth (1973) regressions that compare book-to-market, retained earnings-to-market, and contributed capital-to-market. We require non-missing values of retained earnings and contributed capital and that the book value of equity is positive. We take the natural logarithm of each ratios.

Panel A uses the book-to-market definition as per Fama and French. Column 1 reports the baseline regressions that include as control variables size, prior one-month return, and prior one-year return skipping a month. Book-to-market is statistically significant (coefficient of 0.22 with a t-value of 3.17) and in line with prior studies.

In column 2, we replace book-to-market with retained earnings-to-market and an indicator variable for negative retained earnings.[12] The coefficient on retained earnings-to-market is positive and its t-value is greater than the t-value for book-to-market (4.39 versus 3.17). In column 3, we include book-to-market along with retained earnings-to-market. Book-to-market is no longer statistically significant—its t-value is 0.69. By contrast, the t-value on retained earnings-to-market is 4.60, showing that the information in retained earnings-to-market subsumes the information in book-to-market.[13]

In columns 4, and 5, 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, it is statistically insignificant (coefficient of 0.00 with a t-value of 0.09). When we include it along with book-to-market in column 5, book-to-market's coefficient and t-value are larger than when

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

[13]The estimates in Table 2 are for all but microcaps. Controlling for retained earnings-to-market, book-to-market has predictive power among microcaps.

book-to-market is included on its own in column 1 (coefficients, 0.32 versus 0.22; t-values, 4.12 versus 3.17). Moreover, contributed capital-to-market is now negative and significant (coefficient of -0.12 with a t-value of -4.11). These estimates imply that it is the difference—that is, retained earnings-to-market—that predicts returns.

In columns 6 and 7, we repeat the regressions with accumulated other comprehensive income-to-market. This regressor is insignificant on its own. When we include it along with book-to-market in column 7, accumulated other comprehensive income-to-market is statistically insignificant and the t-value on book-to-market is similar in magnitude to that in column 1. In column 8, we include retained earnings-to-market, contributed capital-to-market, and accumulated other comprehensive income-to-market along with indicators for negative values of the three ratios. In this specification, only retained earnings-to-market is significant (t-value = 4.84).

Panel B of Table 2 repeats the analysis in Panel A using the book-to-market ratio based on the book value of equity reported on the firm's balance sheet (i.e., without the adjustments implemented by Fama and French). Reported book-to-market has a coefficient of 0.22 (versus 0.22) and a t-value of 3.35 (versus 3.17). Similar to Panel A, book-to-market loses its statistical significance when we control for retained earnings-to-market (coefficient of 0.04 with t-value of 0.60). By contrast, retained earnings-to-market is highly significant with coefficient of 0.17 and t-value of 4.61. The estimates in the remaining columns closely mimic the findings in Panel A. This analysis suggests that the findings above are not sensitive to the definition of the book value of equity.

Overall, the regressions in Panels A and B show that book-to-market predicts the cross section of returns only because it contains retained earnings. The other components of the book value of equity 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. These results are

consistent with our thesis and imply that in asset pricing tests it is preferable to use the retained earnings-to-market ratio rather than the book-to-market ratio.[14]

4.2. Addressing negative observations

In Panel C of Table 2, we examine whether the previous results are sensitive to how we handle negative observations of the book value of equity and retained earnings. In columns 1 and 2, we expand Panel A's sample to include firms with negative book values of equity. When 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. In column 1, the coefficient and t-value for book-to-market are same as those presented in Panel A. When we add retained earnings-to-market in column 2, book-to-market is statistically insignificant (t-value = 0.73) and retained earnings-to-market is again significant (t-value = 4.51).

Our main results in Panel A include firms with negative retained earnings, and we control for such firms with an indicator variable. In columns 3 and 4, we present specifications that examine whether this treatment of negative values influences our estimates. It could be, for example, that the non-linearity arising from the indicator variable affects the coefficients on retained earnings-to-market. Columns 3 and 4 restrict the sample to firm-years with positive retained earnings. Again, our results for retained earnings-to-market remain essentially unchanged (t-value = 4.85).

[14]The sample in Table 2 excludes financial firms. Asset pricing studies typically exclude these firms out of the concern that the levels and the interpretation of accounting ratios may substantially differ between financial and non-financial firms (Fama and French, 1992; Novy-Marx, 2013). Barber and Lyon (1997) use the "holdout" sample of financials to re-test Fama and French's (1992) finding that book-to-market predicts the cross section of stock returns. They confirm the existence of the value effect among both financial and non-financial firms. In Table A.1 of the appendix, we report estimates from Fama-MacBeth regressions that include only financial firms. The specifications in this table are identical to those reported in Panel A of Table 2. The results in Table A.1 show that, similar to the main sample, book-to-market derives its predictive power for financials from the retained earnings component. However, in contrast to the non-financials sample, contributed capital-to-market is marginally significant. In column 8, which includes each of the three components of the book value of equity as its own regressor, the t-values on retained earnings-to-market and contributed capital-to-market are 3.42 and 1.70.

4.3. Earnings-to-price

Retained earnings-to-market, by definition, relates to another commonly used predictor of stock returns, earnings-to-price. The difference between the two predictors is that while the numerator in earnings-to-price is the most recent earnings, the numerator in retained earnings-to-market includes the entire history of a firm's earnings (net of dividends).

In Panel D of Table 2, we examine the relation between book-to-market, retained earnings-to-market, and earnings-to-price. In column 1, we present baseline results that include earnings-to-price along with control variables. In this specification, the coefficient on earnings-to-price is positive and significant (t-value = 3.30). We include both book-to-market and earnings-to-price in column 2. Both coefficients are significant but attenuate from the baseline regressions presented in column 1 of this panel and that of Panel A. In column 3, we include retained earnings-to-market and earnings-to-price. In this specification, retained earnings-to-market is statistically significant (t-value = 4.32), while earnings-to-price is not (t-value = 1.50).

In the first three columns, retained earnings-to-market includes current earnings in its numerator, as does earnings-to-price. To remove this source of correlation between the two regressors, we lag retained earnings by one year and deflate by the current market value of equity in column 4. In this specification, the coefficient and t-value on lagged retained earnings-to-market increase (coefficient = 0.16 and t-value = 4.61), while the coefficient and t-value on earnings-to-price remains positive but decreases and loses statistical significance (coefficient = 0.07 and t-value = 1.38). Controlling for average past earnings, transitory noise appears to drown out the incremental information for expected returns contained in current earnings, despite it being the most recent earnings observation. This finding is consistent with our thesis that the accumulation (hence averaging) of past earnings in retained earnings creates a better proxy for underlying earnings yield than is obtained from using current-period earnings alone. Section 10 below discusses the implication of this finding for an alternative thesis based on functional fixation.

5. Portfolio sorts

We next perform portfolio tests, which provide a potentially more robust method to evaluate predictive ability. These portfolio sorts do not impose the parametric assumptions embedded in the Fama and MacBeth (1973) regressions. Table 3 reports excess returns, CAPM alphas, and three-factor model alphas, together with their 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 2.43) and retained earnings-to-market (45 basis points per month with a t-value of 2.81). The high-minus-low portfolio for contributed capital-to-market, by contrast, generates only 12 basis points a month with a t-value of 0.91. The pattern in CAPM alphas is the same: book-to-market and retained earnings-to-market spread returns, while contributed capital-to-market does not.

The three-factor model alphas display a different pattern. The high-minus-low portfolio for book-to-market has a negative but insignificant alpha (-10 basis points per month with a t-value of -1.36). The high-minus-low portfolio for contributed capital-to-market has a negative and significant alpha (-23 basis points per month with a t-value of -2.18). This result is the portfolio-sort equivalent of the Fama and MacBeth (1973) regression reported in column 5 in Panel A of Table 2. In that regression, the coefficient on contributed capital-to-market is significantly negative because it is the difference, retained earnings-to-market, that predicts returns.[15] The three-factor model alpha on the retained earnings-to-market high-minus-low portfolio, by contrast, is close to zero (12 basis points per month with a t-value of 1.16).

In Table A.2 of the appendix, we use two-way sorts to further demonstrate that the predictive power in book-to-market arises from its retained earnings component. In Panel A, we first sort stocks into quintiles based on retained earnings-to-market and then, within each retained earnings-to-market quintile, sort stocks into quintiles based on book-to-market. The CAPM alphas for

[15] Gerakos and Linnainmaa (2018) find a similar result when they decompose book-to-market into prior changes in the market value of equity and a residual component. They find that a high-minus-low strategy that trades the residual component earns a significantly negative three-factor model alpha.

the book-to-market high-minus-low portfolios are not significantly different from zero within any of the retained earnings-to-market quintiles. In Panel B, we reverse the order and first sort on book-to-market and then, within each book-to-market quintile, on retained earnings-to-market. In this specification, the CAPM alphas for the retained earnings-to-capital high-minus-low portfolios are statistically significant for four of the five quintiles, showing that retained earnings-to-market has information content holding book-to-market constant. The average of the five high-minus-low portfolios—which represents a book-to-market-neutral strategy—has a CAPM alpha of 45 basis points per month; this alpha is associated with a t-value of 4.31.

In sum, the evidence based on portfolio sorts reconciles with our findings from Fama and MacBeth (1973) regressions. Book-to-market predicts returns only because of the retained-earnings component; neither book-to-market nor contributed capital-to-market carries additional information about the cross section of stock returns.

6. Retained earnings and contributed capital factors

We next construct factors that capture the relation between average returns and the major components of book value of equity. 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 sub-groups depending on whether a company is below or above the median NYSE market capitalization breakpoint. We then perform an independent sort of stocks into high (i.e., above the 70^{th} NYSE percentile breakpoint), low (i.e., below the 30^{th} NYSE percentile breakpoint), and intermediate portfolios based on the ratio of the particular component of the book value of equity (i.e., retained earnings or contributed capital) to the market value of equity. Each factor is the average return on the two high value-weighted portfolios minus the average return on the two low value-weighted portfolios.

Panel A of Table 4 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 the standard HML and the second is based on our sample (HML*). The

difference between the two versions of HML is that we exclude financials and firms with missing retained earnings from our sample. The two versions of HML have similar annualized average returns (4.00 and 3.69) and similar t-values (2.98 and 2.68). When we calculate a version of HML based on retained earnings-to-market value (HML_{RE}), the average return increases to 4.91 and the t-value to 3.24.[16] 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 (0.19 with a t-value of 0.18).

Given the relation between retained earnings-to-market and earnings-to-price, we also present average annualized returns, standard deviations, and t-values for a factor based on earnings-to-price (E/P). The E/P and the HML factors have similar average annualized returns (4.04 versus 4.00 and 3.69) and similar t-values (2.66 versus 2.98 and 2.68). The E/P factor, however, has a lower average annualized return and t-value than HML_{RE}.

Panel B presents correlations between the factors. There are several important takeaways from the correlations. First, the correlation between HML and HML_{RE} is 0.80, while the correlation between HML and HML_{CC} is only 0.37. Second, HML and HML_{RE} have similar correlations with MKT (-0.26 and -0.36), while the correlation between MKT and HML_{CC} is approximately zero. Third, HML and HML_{RE} have similar negative correlations with SMB (-0.19 and -0.30), while HML_{CC} is positively correlated with SMB (0.27). That is, 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_{CC} does not. E/P resembles HML_{RE} in its correlations with MKT and SMB.

Panel C measures the information contents of HML, HML_{RE}, HML_{CC}, and E/P. To do so, we

[16] Prior research finds that the book-to-market premium is to a large extent driven by small-growth stocks. Because the average returns on these stocks are low, they would need to be sold to capture the full value premium. The concern is that it might be prohibitively expensive to short these stocks. We can measure their influence on the factor premiums by constructing the factors from a universe of stocks that excludes small-growth stocks. We define these stocks as the corner portfolio of the 25 Fama and French portfolios. When we remove these stocks and then reform HML and HML_{RE} from the remaining stocks, the premiums are 23 basis points with a t-value of 2.28 and 31 basis points with a t-value of 2.85. That is, even if we remove small-growth stocks, average annualized returns for both HML and HML_{RE} are statistically significant. Because t-values are proportional to Sharpe ratios, the Sharpe ratios decrease by 15% for HML and 12% for HML_{RE}. If anything, HML_{RE} appears more "robust" to removing small-growth stocks.

estimate spanning regressions in which 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 left-hand side factor is valuable to an investor who already trades all the right-hand side factors.

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 0.29. The insignificant intercept implies that an investor who already trades MKT, SMB, and HML_{RE} would not benefit from HML. In column 2, we replace HML_{RE} with HML_{CC}. The intercept of this regression is 0.44 with a t-value of 4.54, 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 2.83 and 4.93 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 columns 5 and 6, 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 $= -2.08$), suggesting that investor who already trades MKT, SMB, and HML would be better off shorting HML_{CC}. This negative alpha, once more, represents the same effect picked up by both the Fama and MacBeth (1973) regressions and portfolio sorts. The alpha is negative because it is the difference between book-to-market and contributed capital-to-market (i.e., retained earnings-to-market) that predicts returns. Indeed, when we replace HML with HML_{RE} in column 6, the intercept is not significantly different from zero (t-value $= -0.19$).

In the final three columns, the dependent variable is the monthly return on the earnings-to-price-based factor (E/P). When we include HML as an explanatory variable, the intercept is positive and significant (t-value $= 2.82$), suggesting that an investor who already trades MKT, SMB, and

HML would be better off by also trading E/P. When we replace HML with HML_{RE} in column 8, the intercept is not significantly different than zero (t-value = 1.33), showing that E/P has no additional information beyond that contained in HML_{RE}. These estimates are consistent with the Fama and MacBeth (1973) regressions reported in Panel D of Table 2, which show that retained earnings-to-market, but not book-to-market, subsumes earnings-to-price's predictive power. By contrast, when we replace HML_{RE} with HML_{CC} in column 9, the intercept is significant (t-value = 4.91), suggesting that E/P is valuable to an investor who trades HML_{CC}.

Asness et al. (2015) find that E/P better predicts the cross section of stock returns than book-to-market since 1990 and Fama and French (1992) find that the combination of book-to-market and size subsumes E/P in the earlier period. When we estimate the spanning tests post- and pre-1990, we find that retained earnings-to-market subsumes the information content in E/P during both subperiods.

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. Moreover, the retained earnings-based factor captures the valuable information in E/P, which is consistent with individual-year accounting issues having an attenuated effect on the accumulated past earnings component of retained earnings.

7. Evidence that earnings yield is the source of the retained earnings and value premiums

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

To examine more closely whether the accumulation of earnings in retained earnings drives retained earnings' predictive ability, we next construct our own accumulation of earnings backward in time. We accumulate over windows ending with the most recent year and extending back to five

years. We deflate the sum by the most recent market value of equity and then take the natural logarithm.[17] Importantly, this measure is unaffected by share repurchases, which could be source of retained earnings' predictive power.

We start the sample in July of 1967, which is five years after Compustat's 1962 start date. Because Compustat was created for industry professionals, the initial database was backfilled for surviving firms listed as of the start date (Ball and Watts, 1977).[18] Commencing our sample in 1967 frees our Fama and MacBeth (1973) regressions from this survivorship bias. All of the regressions include as unreported controls size, prior one-month return, and prior one-year returns skipping a month. Our thesis implies that this accumulation measure should increasingly subsume book-to-market's predictive power as we expand the accumulation period.

Table 5 presents the Fama and MacBeth (1973) regressions that include this backward-accumulated earnings measure. For the top half of Panel A, we accumulate net income. For all of the windows, the coefficient on accumulated earnings-to-market is significantly positive and increases monotonically with the window length. The t-values increase almost monotonically, with the largest being for accumulating back five years (t-value = 3.63). Importantly, the coefficients and their associated t-values for book-to-market monotonically decrease in the length of the back accumulation, starting with a coefficient of 0.16 and t-value of 2.53 for the current period's earnings alone and declining to a coefficient of 0.07 and t-value of 1.24 for earnings accumulated five years back.

In the bottom half of Panel A, we use income before extraordinary and special items as the earnings measure, again deflated by the most recent market value of equity. We remove extraordinary and special items because they likely represent transitory effects on income.[19] For these regressions, the coefficients and t-values on book-to-market monotonically decrease as we extend the earnings accumulation horizon, and the coefficients and t-values on retained earnings-to-market

[17] When the backward-accumulated earnings are negative, we set the log of accumulated earnings-to-market equal to zero and include an indicator variable that identifies these negative values.

[18] Consequently, returns for firms with Compustat data are truncated prior to the start date, thereby leading to biased coefficient estimates. For a discussion of this point, see pages 799–802 of Wooldridge (2010).

[19] Compustat reports special items (SPI) before tax and income before extraordinary items (IB) after tax. This difference in tax treatment could affect the analysis. We obtain qualitatively and quantitatively similar estimates when we replace income before extraordinary and special items with income before extraordinary items in Table 5.

monotonically increase. The coefficients and t-values for this accumulated earnings-to-price measure are larger than when we use net income. This result likely occurs because income before extraordinary and special items is affected less by individual-year accounting effects that reduce the informativeness of bottom-line net income for expected returns (Novy-Marx, 2013; Ball et al., 2015, 2016).

Retained earnings represent the difference between accumulated earnings and accumulated dividends over the firm's history. Hence, the information in retained earnings-to-market for the cross section of returns could be due to differences in firms' dividend policies rather than (as we hypothesize) underlying earnings yield. For example, a firm could have low retained earnings scaled by market value because it has a low earnings yield, or because historically it paid out a large portion of its earnings as dividends.

In Panel B of Table 5, we therefore accumulate both income net of dividends and dividends backward in time. If accumulated past earnings drive retained earnings-to-market's predictive power, then the estimated coefficients on two accumulation measures should be similar in magnitude. In contrast, if dividend payout policies drive the explanatory power, then the estimated coefficients should differ. For all five accumulation windows, we find that the differences between the two estimated coefficients are all within one standard error of zero, showing that accumulated earnings, rather than payout policies, drive retained earnings-to-market's predictive power.

7.2. Predicting earnings growth

To further validate the earnings yield interpretation of retained earnings-to-market's predictive power, we next evaluate its ability to predict future earnings growth and compare its predictive ability to that of earnings-to-price. In Table 6, we evaluate predictive power for the growth in earnings over one, two, and three years. We follow Fama and French (2000) and measure earnings growth as the difference between future earnings and current earnings deflated by the current market value of equity. Fama and French (2000) discuss the econometrics of this specification in detail. This specification has also been adopted by, for example, Novy-Marx (2013). For each horizon,

we estimate a base specification that includes size, earnings-to-price, and an indicator variable for negative earnings-to-price. We then add a second specification that adds book-to-market and a third that adds retained earnings-to-market.

Consistent with retained earnings-to-market being a good proxy for the firm's underlying earnings yield, it is a significant and positive predictor of growth in future earnings across all three horizons, while book-to-market's sign and significance varies by horizon and specification. By contrast, earnings-to-price is a negative and significant predictor for all specifications over the three horizons. This negative relation is consistent with mean reversion in earnings yields.[20]

To further demonstrate that earnings-to-price captures mean reversion in earnings yields, in Fig. 1 we assign firms into quintiles each year by earnings-to-price, and then compute the median earnings-to-price for each quintile-year pair from ten years before the portfolio sort to ten years after. This figure reports the time-series averages of the median earnings-to-price ratios for each quintile. Consistent with mean reversion, the medians for all of the quintiles attenuate before and after the portfolio formation year.

8. Predicting average returns over increasing horizons

We next compare how far ahead book-to-market and retained earning-to-market predict returns. We modify the Fama and MacBeth (1973) regressions in Table 2 by replacing the current values of book-to-market and retained earnings-to-market with increasingly stale values, but retaining 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?

Fig. 2 plots average monthly Fama and MacBeth (1973) regression t-values for both variables, increasing the horizon in one-month increments up to five years. The cross-sectional regressions are estimated for each month from July 1969 through December 2017. By starting in 1969, we

[20] Beaver and Morse (1978) and Ou and Penman (1989) find similar results for the price-earnings ratio.

ensure that we have data for all lags because our data start in 1964. Control variables are updated each month, but the book-to-market and retained earnings-to-market variables are not. Fig. 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 four years.

We interpret the results in Fig. 2 as reflecting two factors. First, the accumulation of earnings in retained earnings "washes out" accounting issues that affect earnings in individual years but reverse over time. Then, when deflated by current market value of equity, they proxy for expected returns (Ball, 1978; Berk, 1995). Second, the ability of variables deflated by current market values to predict stock returns inevitably declines over longer horizons, because expected returns are unlikely to be constant over time.

9. Results for different samples

In this section, we test our hypothesis using data from different countries and time periods. These tests corroborate our main results and address concerns that they could represent statistical artifacts (Lo and MacKinlay, 1990; Harvey et al., 2016). Overall, the results are consistent across time and across countries.

9.1. Evidence for U.S. subperiods

Asness et al. (2015) and Fama and French (2016) show that book-to-market is a not a significant predictor of returns after 1990. We therefore split the U.S. sample in 1990 to evaluate whether retained earnings-to-market has predictive power across our sample period. The pre-1990 sample begins in July 1964 and ends in June 1990. The post-1990 sample begins in July 1990 and end in December 2017.

Table 7 presents CAPM alphas and their associated t-values for quintile portfolios and high-minus-low portfolios sorted on book-to-market, retained earnings-to-market, and contributed capital-to-market. When we examine the book-to-market portfolios, the high-minus-low CAPM alpha is

statistically significant for the U.S. prior to 1990 (55 basis points with a t-value of 2.67). However, consistent with Asness et al. (2015) and Fama and French (2016), book-to-market is not a significant predictor of the cross section for the U.S. post-1990 (26 basis points with a t-value of 1.32). By contrast, the retained earnings-to-market portfolios spread the CAPM alphas essentially as well post-1990 as in the prior subperiod; the post-1990 CAPM alpha is statistically significant (62 basis points with a t-value of 2.68) and similar in magnitude to the pre-1990 CAPM alpha (60 basis points with a t-value of 2.96). The CAPM alphas for the contributed capital-to-market portfolios are not significant for either of the U.S. subperiods.

We next examine why book-to-market loses its predictive power after 1990 while retained earnings-to-market does not. The reason turns out to be that the relation between book-to-market and retained earnings-to-market weakens in the second half of the sample. Our interpretation is that book-to-market became a less effective proxy for underlying earnings-yield. We show this effect in the evolution of cross-sectional means and correlations.

In Panel A of Fig. 3, we plot the annual cross-sectional means of book-to-market, retained earnings-to-market, and contributed capital-to-market over our sample period. Up to 1983, the cross-sectional means of book-to-market, retained earnings-to-market, and contributed capital-to-market are highly correlated. After 1983, retained earnings-to-market diverges while book-to-market and contributed capital-to-market remain correlated. These results suggest that book-to-market lost its predictive power in the second half of the sample because it was less correlated with retained earnings-to-market.

After 1978, Fama and French (2001) find a substantial shift in the composition of public firms that was due to a surge in new listings that were unprofitable and did not pay dividends. In Panel B, we therefore plot the annual cross-sectional means of book-to-market by six cohorts based on when a firm makes its first appearance on CRSP (1926–1969, 1970–1979, 1980–1989, 1990–1999, 2000–2009, and 2010–2017). In general, the annual cross-sectional means of book-to-market move similarly over the six cohorts, indicating that the compositional change documented by Fama and French (2001) did not affect book-to-market.

In Panel C, we similarly plot the annual cross-sectional means of retained earnings-to-market for the six cohorts. Here, we find evidence of the compositional change. The means for the first two cohorts (1926–1969 and 1970–1979) are positive for almost every year in our sample. By contrast, the means for the later cohorts are negative for almost every year after 1980. In Panel D, we plot the annual cross-sectional correlations between book-to-market and retained earnings-to-market and between book-to-market and contributed capital-to-market. The trend for the cross-sectional correlations is similar to the trend for the cross-sectional means. Starting after 1980, there was a marked drop in the correlation between book-to-market and retained earnings-to-market. The correlation for every year prior to 1982 was above 0.75. After 1982, the correlation ranges from 0.15 to 0.60. By contrast, the correlation between book-to-market and contributed capital-to-market remains above 0.60 for almost every year in the sample.

These results suggest that book-to-market predicted the cross section of average returns in the first half of our sample because book-to-market and retained earnings-to-market were highly correlated. In the second half of our sample period, book-to-market lost its predictive power because the change in the composition of public firms substantially reduced book-to-market's correlation with retained earnings-to-market.

9.2. Evidence for the world excluding the U.S.

We next use international data to compare the information contents of book-to-market, retained earnings-to-market, and contributed capital-to-market. We explore only developed markets excluding the U.S.: North America (Canada), Europe (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom), and Asia-Pacific (Australia, Hong Kong, Japan, New Zealand, and Singapore). The sample period begins in November 1989 and ends in June 2016.

We continue to measure accounting variables as of the fiscal year end in year $t-1$ and accumulate monthly returns from the beginning of July in year t through the end of June in year $t+1$. We then form portfolios at the end of each June and compute value-weighted returns on the stocks over

the next year. The world excluding the U.S. sorts use "large" stocks, with the large-stock cutoff determined as the point at which the largest firms in each region account for 90% of total market capitalization. In the appendix, we describe how we construct the sample and variables.

Table 7 also presents CAPM alphas and their associated t-values for the world excluding U.S. portfolios. The retained earnings-to-market portfolios spread the CAPM alphas essentially as well as for the U.S. subperiods. The high-minus-low CAPM alpha for retained earnings-to-market is statistically significant (55 basis points with a t-value of 3.64) and larger than for book-to-market (49 basis points with a t-value of 3.06). Here too, the CAPM alpha for the high-minus-low contributed capital-to-market portfolio is insignificant (6 basis points with a t-value of 0.45).

9.3. Evidence for the pre-1964 period

To further corroborate our main results, we next investigate pre-Compustat U.S. data. To do so, we employ the historical accounting data used in Graham, Leary, and Roberts (2015) and Linnainmaa and Roberts (2018). This database combines the Standard & Poor's Compustat database with accounting data from Moody's Industrial and Railroad manuals along with the historical book value of equity data provided by Ken French. Their database excludes financials and utilities. We merge their database with the CRSP database to obtain returns.

The Securities Exchange Act of 1934 was enacted to ensure the flow of accurate and systematic accounting information. Cohen et al. (2003) analyze the historical SEC enforcement records and determine that post-1936 accounting data is of sufficiently high quality to employ in empirical analysis. They characterize 1935 and 1936 as an initial enforcement period and drop these years from their sample. Following their timing conditions, our return data start in July 1938 and the associated book values of equity start in 1937.

This database does not include retained earnings. It does, however, include net income and the book value of equity. To proxy for retained earnings, we accumulate each firm's past net income for up to 20 years and then regress book-to-market on accumulated past net income. We take the

fitted value from this regression as our proxy for retained earnings-to-market and the residual as our proxy for contributed capital-to-market.

Table 8 presents CAPM alphas and associated t-values for quintiles sorted on book-to-market and the proxies for retained earnings-to-market and contributed capital-to-market. We form portfolios at the end of each June and compute value-weighted returns on the stocks over the next year. The sorts use NYSE breakpoints. For the high-minus-low portfolios, only retained earnings-to-market has a significant CAPM alpha (t-value = 3.11).[21]

9.4. Discussion of results for different samples

The CAPM alphas on the individual retained earnings-to-market portfolios are remarkably similar in magnitude across the different samples presented in Tables 7 and 8: the U.S. 1964–1990, the U.S. post-1990, the U.S. pre-1964, and the World excluding the U.S. post-1990. The high-minus-low CAPM alphas for the four samples are 0.60, 0.62, 0.49, and 0.55. At the same time, not one of the CAPM alphas in the different samples is significant for the high-minus-low contributed capital-to-market portfolios. The stationarity of these results across different eras and regimes provides comfort that they do not reflect data mining (Lo and MacKinlay, 1990; Harvey et al., 2016).

10. Functional fixation

An alternative explanation of our results is based on the notion that investors functionally fixate on reported earnings and consequently weight its components sub-optimally.[22] In the seminal study, Sloan (1996) proposes that investors take earnings at face value without taking into account

[21] The fact that the high-minus-low portfolio based on retained earnings-to-market earns a positive CAPM alpha in these pre-Compustat data is noteworthy. Ang and Chen (2007) note that although HML's average return is statistically significant in the pre-1963 data, its CAPM alpha is not. The reason for this finding is that, before 1963, high book-to-market firms' market betas were typically higher than those of low book-to-market firms. When we examine average excess returns, we find that they are similar to the CAPM alphas for retained earnings-to-market. These results reveal, indirectly, that differences in contributed capital in the pre-1963 data associate with marked differences in market betas.

[22] For a survey and discussion of functional fixation in the context of asset pricing, see Richardson, Tuna, and Wysocki (2010).

the differential persistence between the cash flow component and the more transitory accruals component of earnings. When the resulting mispricing is corrected, the correction is negatively correlated with past earnings. Under this explanation, retained earnings positively predicts the cross section of stock returns because it contains information about future earnings that investors initially underweight and then subsequently incorporate into prices. In this section, we provide additional evidence that bears on the earnings yield versus the functional fixation explanations for retained earnings-to-market's predictive power for the cross section of average returns.

Several results reported above bear on this question. First, Fig. 2 shows that retained earnings-to-market reliably predict returns at least four years ahead. This is difficult to reconcile with mispricing due to functional fixation on reported earnings being corrected when transitory components do not repeat in subsequent earnings observations. Any reconciliation would require transitory components to persist over an extended period. Second, we now note that the results in Panel D of Table 2 for earnings-to-price provide a discriminating test of the competing explanations. Under functional fixation, when returns are regressed on earnings-to-price and retained earnings-to-market, the coefficient on earnings-to-price should be negative and significant because investors initially overweight transitory components of income, while the coefficient on retained earnings-to-market should be positive and significant because it contains information about future earnings that investors initially underweight. Inconsistent with the predictions of functional fixation, all coefficients on earnings-to-price are positive

In this section, we examine the predictive power of the ratio of bottom-line net income to the book value of equity while controlling for retained earnings-to-market. Again, functional fixation predicts a negative coefficient on this variable because investors overweight transitory components of earnings. We deflate bottom-line net income by the book value (rather than market) value of equity to remove any effects of market expectations. Fig. 4, however, shows that the coefficient on bottom-line net income to the book value of equity is positive for predicting returns out to five years into the future when included on its own and when it is included along with retained earnings-to-market.

Dechow and Ge (2006) address a variant of the Sloan (1996) thesis, based on a comparatively transitory earnings component known as special items. They show that negative special items positively predict returns, consistent with investors overweighting current negative special items when forecasting future earnings. We next examine whether their results relate to retained earnings-to-market. For example, retained earnings-to-market could positively predict the cross section of returns because it washes out the transitory negative special items that investors initially overweight.

In Table 9, we examine the information content of factors based on special items and then compare this information with the information contained in retained earnings-to-market. We assign stocks into six portfolios by sorting independently by size (NYSE median breakpoint) and special items-to-total assets (NYSE 30th and 70th percentiles). The sample includes firms that have non-zero special items (Compustat item SPI) and that have non-missing total assets and market values of equity. We rebalance these six portfolios at the end of each June and compute value-weighted returns on them from July in year t through June in year $t + 1$. Factor $\text{SPI}_{\text{small}}$ is the return difference between the small-low and small-high portfolios; factor SPI_{big} is the return difference between the big-low and big-high portfolios; and factor SPI is the average of $\text{SPI}_{\text{small}}$ and SPI_{big}. The other factors are the same those in Table 4. The explanatory variables in the regressions are the market and size factors, and one of the HML factors or a combination of the SPI factors.

In the first two columns of Table 9, the dependent variable is the monthly return on SPI and the specifications vary based on whether we use HML or HML_{RE}. The alphas for these regressions are positive but not significantly different from zero. In the next four columns, we examine the information content of $\text{SPI}_{\text{small}}$ and SPI_{big}. For $\text{SPI}_{\text{small}}$, neither alpha is significantly different from zero. By contrast, both alphas for SPI_{big} are positive and significantly different from zero (t-value = 2.17 for HML; t-value = 2.41 for HML_{RE}), which replicates the findings of Dechow and Ge (2006).

In the final three columns, the dependent variable is the monthly return on HML_{RE}. The first of these specifications includes MKT and SMB as explanatory variables. The next column adds SPI as an explanatory variable and the final column replaces SPI with $\text{SPI}_{\text{small}}$ and SPI_{big}. These

specifications test whether the information contained in the SPI factors subsumes the information contained in HML_{RE}. The alphas for all three regressions are remarkably close (0.57, 0.59, and 0.58) as are the t-values (4.93, 5.15, and 5.04). Thus, the information contained in HML_{RE} is distinct from the information contained in SPI. We conclude that the retained earnings-to-market premium we document is unrelated to the Dechow and Ge (2006) thesis that the market initially overweights and subsequently corrects the transitory earnings component known as special items.

11. Conclusion

Book-to-market consists of two major and economically different components: retained earnings and contributed capital, both deflated by the market value of equity. We predict that retained earnings deflated by the market value of equity contains substantial information about expected returns because it contains an averaging of past earnings, while contributed capital deflated by the market value of equity does not contain substantial information. Consistent with our prediction, we show that retained earnings-to-market entirely subsumes book-to-market in predicting returns even though retained earnings represent averages only 41% of the book value of equity and retained earnings-to-market explains less than 50% of book-to-market's variance. By contrast, contributed capital-to-market has no ability to predict future returns when controlling for retained earnings-to-market. These results are evident in U.S. and non-U.S data over different periods. Our conclusion is that retained earnings-to-market is comparatively free of the individual-year accounting issues that affect current-period earnings yield, and consequently is a better proxy for underlying earnings yield, which has a direct conceptual link with expected returns.

Our thesis and results echo the view of Graham and Dodd (1934, p. 17), expressed as follows:

> In general terms [intrinsic value] is understood to be that value which is justified by the facts, *e.g.*, the assets, earnings, dividends, definite prospects, as distinct, let us say, from market quotations established by manipulation or distorted by psychological excesses. But it is a great mistake to imagine that intrinsic value is as definite and as determinable as is the market price. Some time ago intrinsic value (in the case of common stock) was thought to be the same as "book value," *i.e.*, it was equal to the net assets of the business, fairly priced. This view of intrinsic value was quite definite, but

> it proved almost worthless as a practical matter because neither the average earnings nor the average market price evinced any tendency to be governed by book value.

Despite this warning (repeated in subsequent editions of that classic text), the abundant evidence that book-to-market reliably predicts stock returns (Rosenberg, Reid, and Lanstein, 1985; Chan, Hamao, and Lakonishok, 1991) continues to be interpreted as evidence that market value can be calibrated against book value to indicate systematic mispricing. For example, Lakonishok, Shleifer, and Vishny (1994, p. 1541) summarize their interpretation as follows:

> 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 confirm another view of Graham and Dodd (1934, p. 432), that "current earnings should not be the primary focus of appraisal" which should be based on an average earnings estimate that is free of transitory real business factors and accounting effects, "legitimate or otherwise" (pp. 351–352). Nevertheless, we interpret our results as inconsistent with Graham and Dodd (1934, p. 432) in two senses. First, they view the market as irrationally focused on current earnings alone (p. 432), and hence view average earnings as an indicator of resulting mispricing, whereas we view it (when scaled by price) as a better proxy for expected returns. Second, they conclude (p. 494) that "we do not think, therefore, that any rules may reasonably be laid down on the subject of book value in relation to market price," whereas we show that components of book value have different relations with market price and that a large component—retained earnings—relative to market price captures the very earnings averaging those authors advocate.

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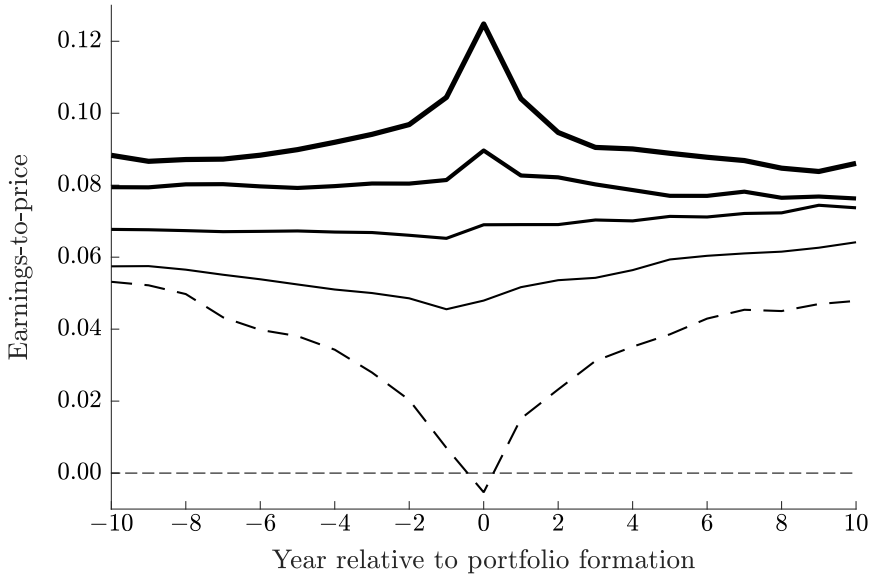


Fig. 1. **Mean-reversion in earnings-to-price.** We assign firms into quintiles each year by earnings-to-price and compute the median earnings-to-price for each quintile-year pair from ten years before the portfolio sort to ten years after. This figure reports the time-series averages of these median earnings-to-price ratios. Earnings-to-price in year t is defined as income before extraordinary items in the fiscal year that ends in calendar year t deflated by the market value of equity in December of year t. The thickest line represents firms with the highest earnings-to-price at the time of portfolio formation; the thinnest line represents those with the lowest earnings-to-price. The sample, at the time of portfolio formation at time 0, consists of all but microcap firms with non-missing income before extraordinary items and non-missing market value of equity. All but microcap firms are stocks with market values of equity at or above the 20^{th} percentile of the NYSE market capitalization distribution.

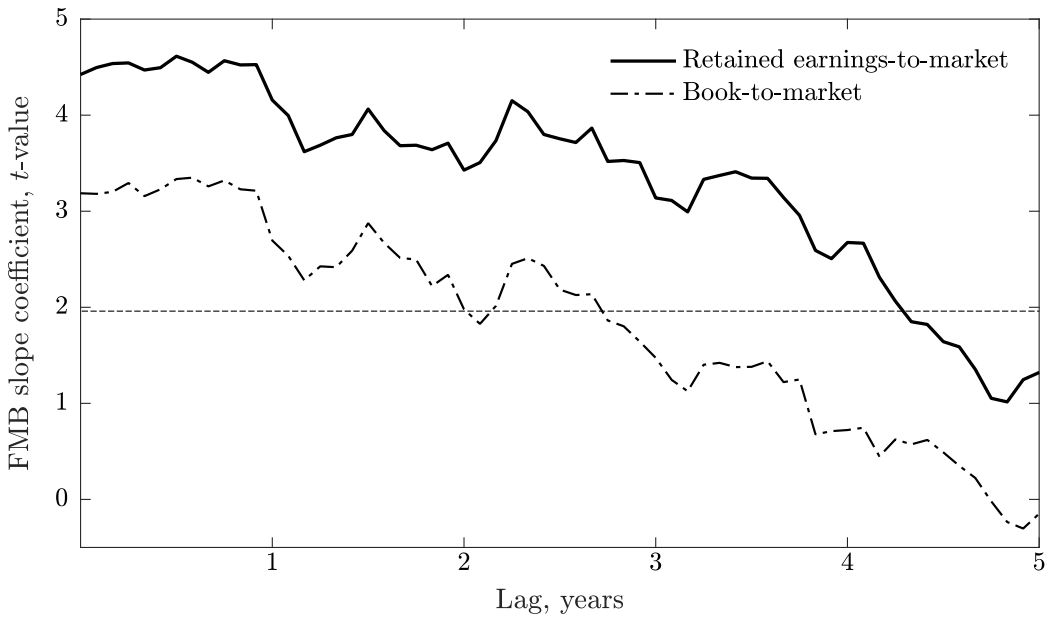
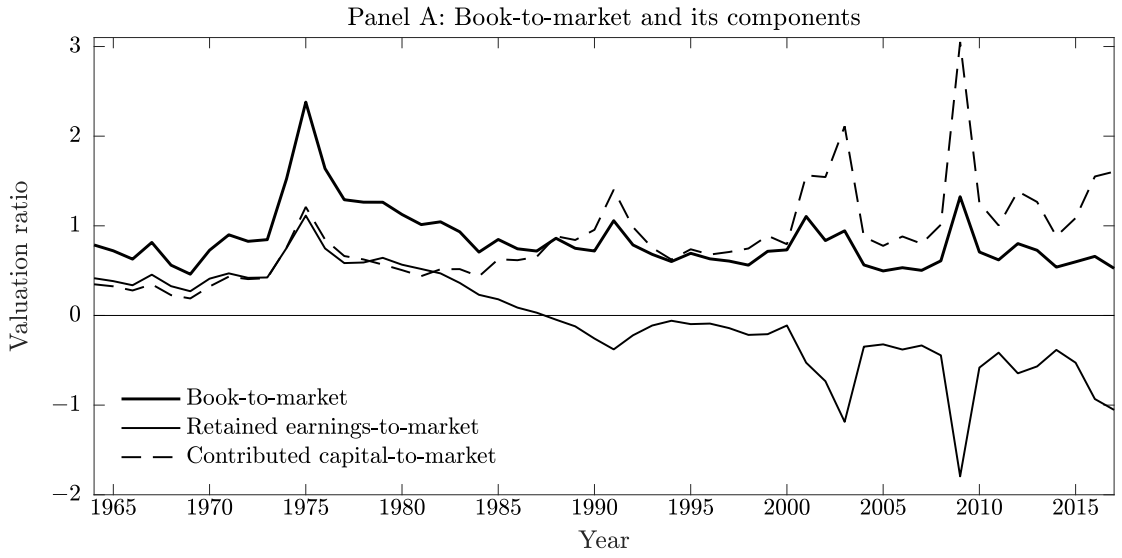
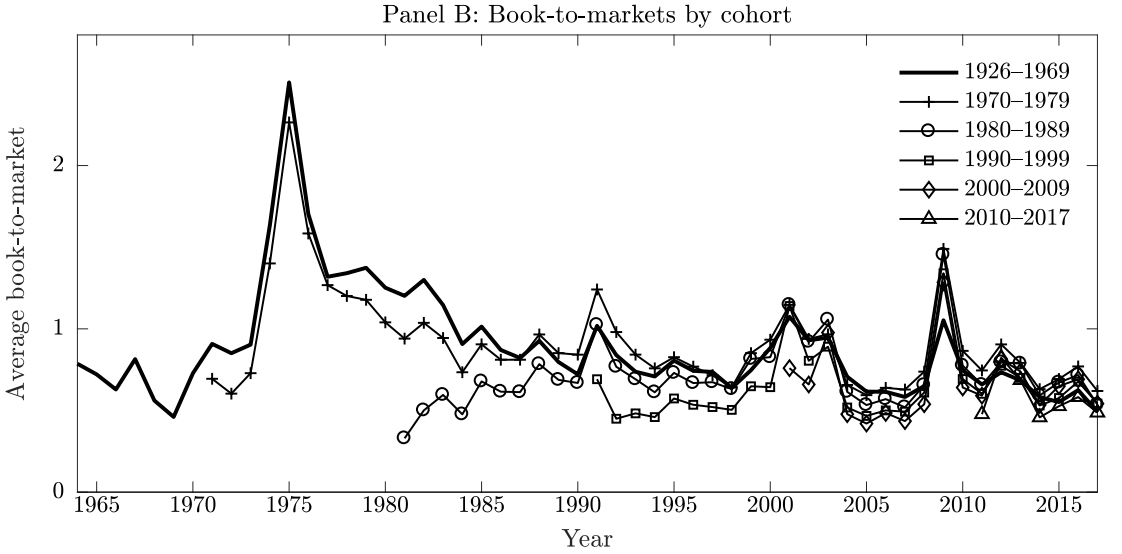


Fig. 2. **Comparison of the predictive power of lagged BE/ME and lagged RE/ME.** This figure plots t-values associated with the Fama and MacBeth (1973) regression slopes for log(BE/ME) and log(RE/ME) from cross-sectional regressions that predict monthly returns. The regressions are estimated using data from July 1969 through December 2017 for stocks with a market value of equity above the 20th percentile of the NYSE market capitalization distribution (all but microcaps), non-missing and positive book value of equity, and non-missing market value of equity. The regressions are estimated separately using book-to-market or retained earnings-to-market as the main regressor. The other regressors are: prior one-month return, prior one-year return skipping a month, and log-size. The regressions with retained earnings-to-market also include an indicator variable that identifies observations with RE ≤ 0; log(RE/ME) is set to zero for these observations. The control variables are updated month, but the book-to-market and retained earnings-to-market variables are lagged by the value indicated on the x-axis. The estimates at $x = 2$, for example, explain cross-sectional variation in returns using the values of log(BE/ME) and log(RE/ME) recorded two years earlier. The dashed line indicates the threshold for statistical significance at the 5% level.





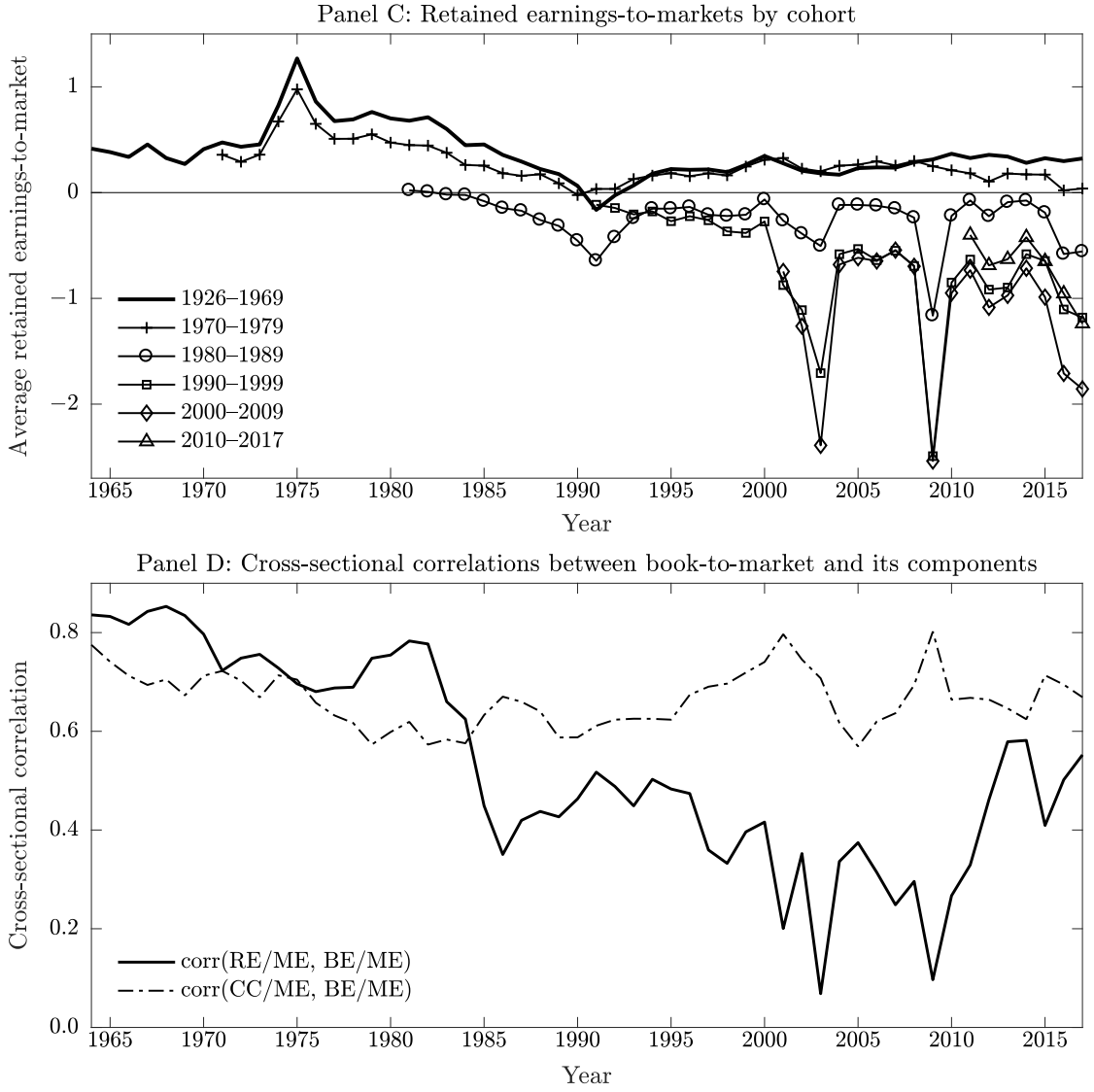


Fig. 3. **Annual cross-sectional means and correlations of book-to-market and its components.** Panel A plots the cross-sectional means of book-to-market, retained earnings-to-market, and contributed capital-to-market from 1964 through 2017. Panel B plots the cross-sectional means of book-to-market for firms classified by cohort. A firm's cohort is determined by its first appearance on CRSP. Panel C plots the cross-sectional means of retained earnings-to-market by cohort. Panel D plots cross-sectional correlations between (a) book-to-market and retained earnings-to-market and (b) book-to-market and contributed capital-to-market.

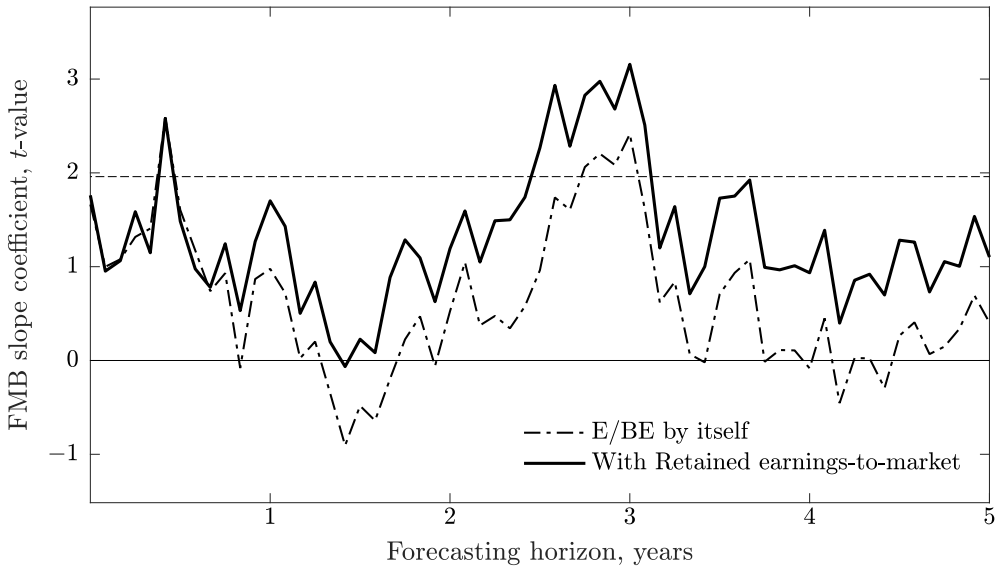


Fig. 4. **Predictive power of current earnings with and without controlling for retained earnings-to-market.** This figure plots t-values associated with the Fama and MacBeth (1973) regression slopes from cross-sectional regressions that predict monthly returns. The regressions are estimated using data from July 1964 through December 2017 for stocks with a market value of equity above the 20th percentile of the NYSE market capitalization distribution (all but microcaps), non-missing and positive book value of equity, non-missing market value of equity, and non-missing net income. The main regressor is E/BE, defined as net income-to-book value of equity. The dotted line presents t-values from regressions that do not include log(RE/ME) as an additional control; the thick solid line presents regressions that include log(RE/ME). Both sets of regressions also control for prior one-month return, prior one-year return skipping a month, and log-size. The regressions with retained earnings-to-market also include an indicator variable that identifies observations with RE ≤ 0; log(RE/ME) is set to zero for these observations. We predict returns at the horizon indicated on the x-axis. The estimates at $x = 2$, for example, are from regressions that predict the cross section of monthly returns two years after the regressors are recorded. The dashed line indicates the threshold for statistical significance at the 5% level.

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

Panel A presents distributions of the book value of equity and its components, scaled either by the market value or book value of equity. The components of the book value of equity are contributed capital (CC), retained earnings (RE), and accumulated other comprehensive income (AOCI). Panel B presents distributions of retained earnings, contributed capital, and accumulated other comprehensive income scaled by the book value of equity for the six Fama-French portfolios. The six Fama-French portfolios assign stocks into portfolios based on size and book-to-market. Panel C presents Pearson and Spearman correlations for the measures when they are deflated by the December market value of equity. The sample consists of all but microcap firms, which are stocks with market values of equity at or above the 20^{th} percentile of the NYSE market capitalization distribution. Except for the top half of Panel A, the sample only includes firms with positive book values of equity and requires that each book-value-of-equity component is between -100% and 200% of the book value of equity. The sample period starts in July 1964 and ends in December 2017.

Panel A: Distributions of book value of equity and its components

				Percentiles				
Ratio	Mean	SD	Pct < 0	10th	25th	50th	75th	90th
	Distributions of book-to-market and its components scaled by the market value of equity							
Book-to-market	0.83	2.19	3%	0.18	0.37	0.67	1.10	1.68
Reported book-to-market	0.79	1.87	3%	0.18	0.36	0.64	1.03	1.61
Retained earnings-to-market	−0.16	3.67	27%	−1.01	−0.13	0.23	0.52	0.88
Contributed capital-to-market	0.95	3.10	4%	0.05	0.16	0.38	0.86	1.97
Other book-to-market	0.03	0.70	28%	−0.01	−0.00	0.01	0.05	0.15
	Retained earnings, contributed capital, and accumulated other comprehensive income scaled by the book value of equity							
Retained earnings (RE)	0.41	0.42	16%	−0.15	0.17	0.45	0.70	0.88
Contributed capital (CC)	0.54	0.43	4%	0.08	0.24	0.48	0.78	1.14
Other (AOCI)	0.05	0.12	24%	−0.01	−0.00	0.02	0.08	0.18

Panel B: Distributions of retained earnings, contributed capital, and accumulated other comprehensive income scaled by the book value of equity for the six Fama-French portfolios

		RE/BE			CC/BE			AOCI/BE		
Size	Book-to-market	Mean	Median	Pct < 0	Mean	Median	Pct < 0	Mean	Median	Pct < 0
Small	Growth	0.27	0.32	26%	0.71	0.65	2%	0.02	0.00	30%
	Neutral	0.40	0.44	16%	0.57	0.51	3%	0.03	0.01	25%
	Value	0.39	0.44	15%	0.55	0.49	3%	0.05	0.02	23%
Big	Growth	0.62	0.65	7%	0.35	0.30	11%	0.04	0.03	23%
	Neutral	0.55	0.58	6%	0.36	0.31	8%	0.09	0.08	16%
	Value	0.41	0.41	8%	0.43	0.39	2%	0.16	0.16	11%

Panel C: Correlations among the book value of equity components

	BE/ME	RE/ME	CC/ME	AOCI/ME
		Pearson correlations		
Book-to-market	1			
Retained earnings-to-market	0.54	1		
Contributed capital-to-market	0.68	−0.19	1	
Other book-to-market	0.37	0.17	0.12	1
		Spearman rank correlations		
Book-to-market	1			
Retained earnings-to-market	0.57	1		
Contributed capital-to-market	0.60	−0.17	1	
Other book-to-market	0.32	0.29	0.01	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 using data from July 1964 through December 2017. 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 20^{th} percentile of the NYSE market capitalization distribution. Variables are trimmed at the 1^{st} and 99^{th} percentiles based on book-to-market, size, prior one-month return, and prior one-year return skipping a month. Regressors log(RE/ME), log(CC/ME), and log(AOCI/ME) are set to zero when RE, CC, or AOCI is non-positive. Indicator variables at the bottom of the table identify these observations. Panel A presents our main results; Panel B presents results that use reported book value of equity instead of the Fama and French (1992) book value of equity; Panel C presents results for alternative samples; and Panel D presents results that include earnings-to-price as an additional regressor. In column 4 of Panel D, retained earnings (RE) are lagged by one year, but the market value of equity in the denominator is not lagged. The second to the last row reports pseudo t-values from tests that examine whether all regressors other than book-to-market, size, prior one-month return, and prior one-year return skipping a month are jointly zero. This t-value is computed by converting the p-value from the Hotelling's test into a z-score. In column 2 of Panel A, for example, the t-value of 4.10 is associated with the test that log-retained earnings-to-market and the RE ≤ 0 indicator variable are jointly zero.

Panel A: Main regressions

	Regression							
Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(ME)	−0.07	−0.09	−0.09	−0.09	−0.09	−0.10	−0.07	−0.09
	(−1.84)	(−2.64)	(−2.35)	(−2.43)	(−2.36)	(−2.74)	(−1.99)	(−2.61)
$r_{1,1}$	−3.08	−2.93	−3.17	−2.83	−3.14	−2.81	−3.15	−3.16
	(−7.22)	(−6.85)	(−7.56)	(−6.44)	(−7.49)	(−6.52)	(−7.47)	(−7.56)
$r_{12,2}$	0.84	0.82	0.83	0.77	0.84	0.79	0.83	0.81
	(4.52)	(4.38)	(4.53)	(4.07)	(4.56)	(4.21)	(4.47)	(4.40)
log(BE/ME)	0.22		0.05		0.32		0.21	
	(3.17)		(0.69)		(4.12)		(3.40)	
log(RE/ME)		0.18	0.17					0.18
		(4.39)	(4.60)					(4.84)
log(CC/ME)				0.00	−0.12			0.01
				(0.09)	(−4.11)			(0.35)
log(AOCI/ME)						0.01	0.00	0.00
						(1.77)	(0.32)	(0.74)
Indicator variables								
RE ≤ 0		−0.60	−0.54					−0.60
		(−3.07)	(−2.81)					(−3.23)
CC ≤ 0				0.14	0.25			−0.02
				(1.98)	(2.69)			(−0.41)
AOCI ≤ 0						−0.13	0.00	−0.02
						(−1.31)	(−0.01)	(−0.30)
Pseudo t-value for joint sig. of add'l regressors		4.10	4.24	1.69	3.69	1.28	0.15	3.98
Avg. Adj. R^2	5.43%	5.45%	6.07%	4.73%	5.81%	4.85%	5.71%	6.11%

Panel B: Regressions using reported book value of equity

	Regression			
Regressor	(1)	(2)	(3)	(4)
log(ME)	−0.07	−0.08	−0.08	−0.07
	(−1.71)	(−2.34)	(−2.18)	(−1.96)
$r_{1,1}$	−3.05	−3.13	−3.12	−3.15
	(−7.12)	(−7.44)	(−7.39)	(−7.45)
$r_{12,2}$	0.83	0.82	0.83	0.82
	(4.44)	(4.43)	(4.49)	(4.43)
log(Reported BE/ME)	0.22	0.04	0.33	0.21
	(3.35)	(0.60)	(4.40)	(3.50)
log(RE/ME)		0.17		
		(4.61)		
log(CC/ME)			−0.12	
			(−4.25)	
log(AOCI/ME)				0.00
				(0.70)
Indicator variables				
RE ≤ 0		−0.55		
		(−2.76)		
CC ≤ 0			0.25	
			(2.71)	
AOCI ≤ 0				−0.05
				(−0.62)
Pseudo t-value for joint sig. of add'l regressors		4.22	3.84	0.28
Avg. Adj. R^2	5.31%	5.95%	5.68%	5.67%

Panel C: Alternative samples

	Include firms with negative book value of equity		Require firms to have positive retained earnings	
Regressor	(1)	(2)	(3)	(4)
log(ME)	−0.07	−0.08	−0.08	−0.09
	(−1.79)	(−2.29)	(−2.39)	(−2.55)
$r_{1,1}$	−3.04	−3.13	−3.48	−3.54
	(−7.14)	(−7.46)	(−8.00)	(−8.22)
$r_{12,2}$	0.84	0.83	0.74	0.75
	(4.55)	(4.56)	(3.73)	(3.81)
log(BE/ME)	0.22	0.05	0.16	−0.01
	(3.17)	(0.73)	(2.46)	(−0.15)
log(RE/ME)		0.16		0.18
		(4.51)		(4.85)
Indicator variables				
BE ≤ 0	0.12	0.40		
	(0.60)	(1.90)		
RE ≤ 0		−0.55		
		(−2.88)		
Pseudo t-value for joint sig. of add'l regressors		4.17	2.39	4.85
Avg. Adj. R^2	5.47%	6.10%	5.49%	5.84%

Panel D: Earnings-to-price, book-to-market, and retained earnings-to-market

	Regression			
Regressor	(1)	(2)	(3)	(4)†
log(ME)	−0.09	−0.08	−0.10	−0.10
	(−2.62)	(−2.31)	(−2.73)	(−2.84)
$r_{1,1}$	−2.97	−3.22	−3.07	−3.27
	(−7.00)	(−7.74)	(−7.34)	(−7.87)
$r_{12,2}$	0.81	0.84	0.82	0.77
	(4.43)	(4.63)	(4.52)	(4.17)
log(BE/ME)		0.14		
		(2.37)		
log(RE/ME)			0.15	0.16
			(4.32)	(4.61)
log(E/P)	0.18	0.13	0.07	0.07
	(3.30)	(3.14)	(1.50)	(1.38)
Indicator variables				
RE ≤ 0			−0.46	−0.44
			(−2.63)	(−2.71)
E ≤ 0	−0.65	−0.52	−0.27	−0.24
	(−2.71)	(−2.61)	(−1.26)	(−1.10)
Pseudo t-value for joint sig. of add'l regressors	2.62	2.31	3.98	4.25
Avg. Adj. R^2	5.44%	6.14%	6.04%	6.22%

† Retained earnings (RE) are lagged by one year in this regression.

Table 3: Returns on portfolios sorted by book-to-market, retained earnings-to-market, and contributed capital-to-market

This table reports value-weighted average excess returns and CAPM and three-factor model alphas for portfolios sorted by book-to-market, retained earnings-to-market, and contributed capital-to-market. 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 1964 and ends in December 2017.

	Book-to-market component			Book-to-market component		
Quintile	Total	Retained earnings	Contributed capital	Total	Retained earnings	Contributed capital
	Excess returns			***t*-values**		
Low	0.47	0.35	0.54	2.46	1.51	3.15
2	0.55	0.48	0.49	3.08	2.77	2.61
3	0.59	0.66	0.54	3.38	4.01	2.80
4	0.65	0.75	0.53	3.88	4.38	3.03
High	0.82	0.80	0.66	4.28	4.14	3.27
High − low	0.35	0.45	0.12	2.43	2.81	0.91
	CAPM alphas			***t*-values**		
Low	−0.07	−0.28	0.05	−1.18	−3.08	1.04
2	0.04	−0.02	−0.05	0.81	−0.33	−0.95
3	0.11	0.20	0.00	1.65	3.69	−0.06
4	0.20	0.29	0.05	2.70	4.00	0.72
High	0.33	0.30	0.14	3.33	3.15	1.39
High − low	0.40	0.58	0.09	2.83	3.68	0.67
	Three-factor model alphas			***t*-values**		
Low	0.12	−0.11	0.16	3.13	−1.55	3.74
2	0.03	0.07	0.00	0.67	1.68	0.05
3	0.02	0.16	−0.01	0.28	2.97	−0.20
4	0.01	0.16	−0.04	0.16	2.53	−0.65
High	0.02	0.01	−0.07	0.24	0.21	−0.86
High − low	−0.10	0.12	−0.23	−1.36	1.16	−2.18

Table 4: Information content of HML-factors based book value of equity, retained earnings, contributed capital, and earnings-to-price

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; two factors constructed from the retained earnings and contributed capital components of the book value of equity, HML_{RE} and HML_{CC}; and a factor based on earnings-to-price, E/P. 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, which excludes financials and firms with missing retained earnings. Panel C measures the information content of HML, HML_{RE}, HML_{CC}, and E/P 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 1964 and ends in December 2017.

Panel A: Average returns and standard deviations

	Factor						
	MKT	SMB	HML	HML^*	HML_{RE}	HML_{CC}	E/P
Average annualized return	6.22	2.76	4.00	3.69	4.91	0.19	4.04
Standard deviation	15.32	10.70	9.80	10.07	11.10	8.00	11.08
t-value	2.97	1.88	2.98	2.68	3.24	0.18	2.66

Panel B: Correlations

	Factor					
Factor	MKT	SMB	HML	HML_{RE}	HML_{CC}	E/P
MKT	1					
SMB	0.30	1				
HML	−0.26	−0.19	1			
HML_{re}	−0.36	−0.30	0.80	1		
HML_{cc}	0.01	0.27	0.37	−0.05	1	
E/P	−0.43	−0.39	0.74	0.87	0.00	1

Panel C: Spanning regressions

	Dependent variable								
	HML		HML_{RE}		HML_{CC}		E/P		
Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Alpha	0.02	0.44	0.21	0.57	−0.17	−0.02	0.22	0.08	0.54
	(0.29)	(4.54)	(2.83)	(4.93)	(−2.08)	(−0.19)	(2.82)	(1.33)	(4.91)
MKT	0.01	−0.12	−0.10	−0.22	0.01	−0.04	−0.14	−0.08	−0.25
	(0.89)	(−5.32)	(−5.62)	(−7.98)	(0.53)	(−1.81)	(−7.89)	(−5.18)	(−9.52)
SMB	0.04	−0.23	−0.12	−0.22	0.26	0.22	−0.21	−0.13	−0.32
	(1.75)	(−6.80)	(−4.83)	(−5.39)	(9.57)	(7.18)	(−8.26)	(−6.17)	(−8.43)
HML			0.84		0.36		0.73		
			(31.34)		(12.28)		(26.15)		
HML_{re}	0.72					0.01		0.79	
	(31.34)					(0.28)		(39.09)	
HML_{cc}		0.53		0.01					0.11
		(12.28)		(0.28)					(2.30)
N	642	642	642	642	642	642	642	642	642
Adj. R^2	63.7%	25.5%	67.3%	16.9%	25.0%	7.3%	64.1%	78.1%	26.3%

Table 5: Fama-MacBeth regressions with cumulative earnings

Each line shows estimates from a separate set of Fama-MacBeth regressions in which we accumulate earnings over horizons out to five years in the past. 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. The sample consists of all but microcap firms with positive book value of equity, non-missing values for retained earnings and contributed capital, and at least five years of earnings data. All but microcap firms are stocks with market values of equity at or above the 20^{th} percentile of the NYSE market capitalization distribution. The sample starts in July 1967 and ends in December 2017.

Panel A: Accumulated earnings and book-to-market

Window,	log(BE/ME)		log(Cum. earnings/ME)		Cum. earnings < 0		Avg.
years	EST	t-value	EST	t-value	EST	t-value	Adj. R^2
			Baseline				
None	0.21	3.05					5.23%
			Accumulated net income				
$[t, t]$	0.16	2.53	0.11	2.52	−0.51	−2.61	5.92%
$[t-1, t]$	0.14	2.40	0.11	2.30	−0.43	−2.26	5.97%
$[t-2, t]$	0.12	2.12	0.13	2.57	−0.40	−2.19	5.98%
$[t-3, t]$	0.09	1.59	0.16	3.13	−0.45	−2.36	6.05%
$[t-4, t]$	0.07	1.24	0.19	3.63	−0.49	−2.56	6.05%
			Accumulated income before extraordinary and special items				
$[t, t]$	0.14	2.26	0.14	2.82	−0.78	−3.23	6.10%
$[t-1, t]$	0.11	1.86	0.17	3.27	−0.71	−3.15	6.11%
$[t-2, t]$	0.08	1.39	0.18	3.20	−0.67	−3.08	6.13%
$[t-3, t]$	0.05	0.88	0.22	3.73	−0.71	−3.33	6.14%
$[t-4, t]$	0.04	0.65	0.23	3.90	−0.72	−3.32	6.17%

Panel B: Accumulated earnings and accumulated dividends

Window, years	log(Cum. earnings − cum. dividends/ME)		Cum. earnings −cum. dividends ≤ 0		log(Cum. dividends/ME)		Cum. dividends = 0		Avg.
	EST	t-value	EST	t-value	EST	t-value	EST	t-value	Adj. R^2
$[t, t]$	0.13	4.04	−0.53	−3.82	0.12	2.62	−0.58	−2.21	6.46%
$[t-1, t]$	0.11	3.14	−0.40	−3.00	0.12	2.71	−0.48	−2.11	6.50%
$[t-2, t]$	0.13	3.54	−0.40	−3.18	0.11	2.74	−0.41	−1.93	6.48%
$[t-3, t]$	0.15	3.96	−0.42	−3.36	0.10	2.65	−0.35	−1.74	6.51%
$[t-4, t]$	0.14	3.64	−0.43	−3.47	0.09	2.42	−0.29	−1.48	6.50%

Table 6: Predicting earnings growth

This table presents average Fama and MacBeth (1973) regression slopes and their t-values from cross-sectional regressions that predict 1-, 2-, and 3-year growth in earnings. The regressions are estimated using annual data from 1964 through 2017. The sample consists of all but microcap firms with positive book value of equity and non-missing value for retained earnings. All but microcap firms are stocks with market values of equity at or above the 20^{th} percentile of the NYSE market capitalization distribution. Variables are trimmed at the 1^{st} and 99^{th} percentiles based on book-to-market, size, and retained earnings-to-market. The dependent variable at horizon k is $(\text{IB}_{t+k} - \text{IB}_t)/\text{ME}_t$, where IB_t is income before extraordinary items in the fiscal year that ends in calendar year t and ME_t is the end-of-December market of value of equity in year t. Regressor log(ME) is the log-market value of equity in year t, E/P is income before extraordinary items deflated by the December market value of equity, E/P < 0 is an indicator variable that takes the value of one for firms with negative earnings, and BE/ME and RE/ME are the book values of equity and retained earnings deflated by the December market value of equity. In the horizon 2 and 3 regressions, the standard errors are Newey-West-adjusted with one and two annual lags.

	Regressors						Avg.
Horizon	Constant	log(ME)	E/P	E/P < 0	BE/ME	RE/ME	Adj. R^2
1	0.03	0.00	−0.49	−0.02			22.9%
	(6.12)	(0.08)	(−12.28)	(−1.56)			
	0.04	0.00	−0.50	−0.02	−0.01		24.5%
	(7.97)	(−0.80)	(−12.58)	(−1.99)	(−1.73)		
	0.04	0.00	−0.52	−0.02	−0.02	0.02	25.0%
	(8.28)	(−1.68)	(−12.81)	(−1.67)	(−2.66)	(5.12)	
2	0.05	0.00	−0.56	−0.01			21.1%
	(4.50)	(−0.64)	(−9.87)	(−0.58)			
	0.04	0.00	−0.59	−0.02	0.01		22.4%
	(5.32)	(−0.40)	(−10.73)	(−1.30)	(0.81)		
	0.04	0.00	−0.61	−0.01	0.00	0.02	23.0%
	(5.87)	(−0.99)	(−10.79)	(−1.06)	(−0.22)	(3.82)	
3	0.06	0.00	−0.59	−0.01			19.1%
	(3.62)	(−0.67)	(−7.92)	(−0.36)			
	0.04	0.00	−0.62	−0.02	0.02		20.2%
	(3.36)	(−0.31)	(−8.71)	(−0.97)	(2.14)		
	0.05	0.00	−0.64	−0.01	0.01	0.02	20.7%
	(3.66)	(−0.67)	(−8.89)	(−0.80)	(1.01)	(3.06)	

Table 7: CAPM alphas on portfolios sorted by book-to-market, retained earnings-to-market, and contributed capital-to-market: U.S. subperiod and international evidence

This table reports monthly CAPM alphas for quintiles sorted by book-to-market, retained earnings-to-market, and contributed capital-to-market. We form portfolios at the end of each June and compute value-weighted returns on the stocks over the next year. The U.S. sorts use NYSE breakpoints. The World excluding U.S. sorts use a large-stock cutoff, which is the point at which the largest firms in each region account for 90% of total market capitalization. The pre-1990 U.S. sample begins in July 1964 and ends in June 1990. The post-1990 samples begin in July 1990 and end in December 2017 for the U.S. and in December 2016 for the world. The World excluding U.S. sample includes all countries except the U.S. and emerging markets.

	CAPM alphas			t-values		
	Pre-1990	Post-1990		Pre-1990	Post-1990	
Quintile	U.S.	U.S.	World ex U.S.	U.S.	U.S.	World ex U.S.
			Book-to-market			
Low	−0.12	−0.01	−0.26	−1.38	−0.16	−3.04
2	−0.03	0.13	0.06	−0.50	1.83	0.93
3	0.10	0.12	0.07	1.19	1.20	1.35
4	0.32	0.10	0.16	3.07	0.95	2.14
High	0.43	0.25	0.23	3.06	1.74	2.32
High − low	0.55	0.26	0.49	2.67	1.32	3.06
			Retained earnings-to-market			
Low	−0.26	−0.35	−0.32	−2.62	−2.41	−3.42
2	−0.04	0.00	−0.06	−0.71	0.00	−0.95
3	0.13	0.29	0.14	1.71	3.97	2.41
4	0.29	0.32	0.18	3.29	3.02	2.28
High	0.35	0.27	0.23	2.65	1.98	2.60
High − low	0.60	0.62	0.55	2.96	2.68	3.64
			Contributed capital-to-market			
Low	0.02	0.10	0.03	0.30	1.55	0.34
2	−0.03	−0.06	0.01	−0.52	−0.83	0.11
3	0.02	−0.02	0.03	0.29	−0.19	0.58
4	0.10	−0.01	0.11	1.12	−0.05	1.70
High	0.17	0.05	0.09	1.33	0.32	0.95
High − low	0.15	−0.06	0.06	0.86	−0.30	0.45

Table 8: CAPM alphas on portfolios sorted by book-to-market, retained earnings-to-market, and contributed capital-to-market: Pre-1964 evidence

This table reports monthly CAPM alphas for portfolios covering the period July 1938 through June 1964. We assign stocks into quintiles based on book-to-market and proxies for retained earnings-to-market and contributed capital-to-market. We form portfolios at the end of each June and compute value-weighted returns on the stocks over the next year. The sorts use NYSE breakpoints. To create the proxies for retained earnings-to-market and contributed capital-to-market, we regress book-to-market on income accumulated up to 20 years in the past. We use the fitted value from this regression as the proxy for retained earnings-to-market and the residual as the proxy for contributed capital-to-market. For this analysis, we add to Compustat accounting data from the Graham et al. (2015) database.

	Book-to-market component			Book-to-market component		
Quintile	Total	Retained earnings	Contributed capital	Total	Retained earnings	Contributed capital
Low	−0.04	−0.20	−0.01	−0.63	−2.38	−0.15
2	−0.11	−0.01	−0.10	−1.96	−0.11	−1.93
3	0.15	0.08	0.05	1.97	1.27	0.66
4	0.01	0.09	0.04	0.12	1.31	0.40
High	0.24	0.29	0.17	1.55	2.51	1.21
High − low	0.28	0.49	0.18	1.39	3.11	0.97

Table 9: Special items and retained earnings

This table shows alphas and factor loadings from spanning regressions in which the dependent variable is the monthly return on a factor based either on special items or retained earnings. The construction of the special items factor first assigns stocks into six portfolios by sorting independently by size (NYSE median breakpoint) and special items-to-total assets (NYSE 30th and 70th percentiles). The sample includes firms that report non-zero special items (Compustat item SPI) and that have non-missing total assets and market values of equity. We rebalance these six portfolios at the end of each June and compute value-weighted returns on them from July in year t through June in year $t+1$. Factor $\text{SPI}_{\text{small}}$ is the return difference between the small-low and small-high portfolios; factor SPI_{big} is the return difference between the big-low and big-high portfolios; and factor SPI is the average of $\text{SPI}_{\text{small}}$ and SPI_{big}. The other factors are the same those in Table 4. The explanatory variables in the regressions are the market and size factors, one of the HML factors, or a combination of the SPI factors. The sample starts in July 1964 and ends in December 2017.

	Dependent variable								
	SPI		$\text{SPI}_{\text{small}}$		SPI_{big}		HML_{re}		
Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Alpha	0.13	0.18	−0.03	0.05	0.28	0.32	0.57	0.59	0.58
	(1.29)	(1.91)	(−0.27)	(0.42)	(2.17)	(2.41)	(4.93)	(5.15)	(5.04)
MKT	0.04	0.01	0.07	0.03	0.01	0.00	−0.22	−0.21	−0.21
	(1.61)	(0.61)	(2.26)	(1.13)	(0.28)	(−0.15)	(−8.04)	(−7.84)	(−7.76)
SMB	0.20	0.17	0.24	0.20	0.16	0.14	−0.22	−0.18	−0.18
	(6.02)	(5.28)	(5.74)	(4.94)	(3.52)	(3.16)	(−5.54)	(−4.59)	(−4.49)
HML	−0.02		0.01		−0.04				
	(−0.44)		(0.12)		(−0.77)				
HML_{re}		−0.12		−0.14		−0.09			
		(−3.55)		(−3.53)		(−1.93)			
SPI								−0.17	
								(−3.55)	
$\text{SPI}_{\text{small}}$									−0.12
									(−3.26)
SPI_{big}									−0.05
									(−1.38)
N	642	642	642	642	642	642	642	642	642
Adj. R^2	7.0%	8.8%	6.9%	8.7%	2.1%	2.5%	17.0%	18.5%	18.6%

APPENDIX

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 the number of shares issued, and additional paid-in capital account is credited for the excess of cash received over the par value multiplied by the 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 the 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 is subsequently 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. The cost method appears to be the more prevalent method. Of the 500 firms surveyed by the American Institute of Certified Public Accountants about their accounting policies in 2010, 340 firms engaged in stock repurchases (AICPA, 2010). Of those firms, 321 used the cost method and 19 used the par method.

World excluding U.S. data

We obtain international stock returns from Datastream and international accounting data from Worldscope. We use the Thomson Reuters QI Direct Table to link the two databases. We include inactive companies and exclude financial firms, depositary receipts, real estate investment trusts, preferred shares, and warrants. We retain the major equity security issued by a firm and use the returns from its primary exchange listing. We further restrict the sample to stocks traded on major exchanges. In most countries, these are the exchanges on which the majority of a country's stocks are traded. We follow Hou, Karolyi, and Kho (2011) and include multiple exchanges in China and Japan. We compute returns based on the end of month return index (RI) provided by Datastream ($\text{RI}_t/\text{RI}_{t-1} - 1$). We set equal to zero monthly returns greater than 300% that reverse within one month. To further remove outliers, we exclude monthly returns in the bottom and top 0.1% of the returns distribution in each country and require that a firm has a minimum of 12 monthly returns during the sample period. These filter rules are the same those applied in Ince and Porter (2006) and Hou et al. (2011).

We compute the market value of equity as the end of year share price (Worldscope item 5085) times the number of shares outstanding (Worldscope item 5301). We then use the book value of common equity (Worldscope item 3501) to construct the book-to-market ratio. Retained earnings are defined as the sum of retained earnings excluding reserves (Worldscope item 3495), unappropriated and other appropriated reserves (Worldscope item 3494 plus item 3490), and equity in untaxed reserves (Worldscope item 3490).[23] When reserves data are missing, we assume there are none and set them to zero. We calculate contributed capital as the sum of common stock (Worldscope item 3480) and capital surplus (Worldscope item 3481) less treasury stock (Worldscope item 3499). We set the last two items equal to zero if missing. We compute accumulated other comprehensive income as the difference between the book value of equity and the sum of retained earnings and contributed capital. We do not use negative values of book-to-market or retained earnings-to-market when calculating the portfolio breakpoints.

[23]Regulations in some countries require companies to set aside and classify a proportion of earnings or some of its components as reserves, with restrictions on their distribution as dividends.

Table A.1: Retained earnings and contributed capital in Fama-MacBeth regressions: Financial firms

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 using data from July 1964 through December 2017. The main sample used in this study excludes financial firms, identified as those with SIC codes between 6000 and 6999; the sample here consists of all but microcap *financial* 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 20^{th} percentile of the NYSE market capitalization distribution. The average cross-sectional regression has data on 246.9 financial firms. Variables are trimmed at the 1^{st} and 99^{th} percentiles based on book-to-market, size, prior one-month return, and prior one-year return skipping a month. Regressors log(RE/ME), log(CC/ME), and log(AOCI/ME) are set to zero when RE, CC, or AOCI is non-positive. Indicator variables at the bottom of the table identify these observations. The second to the last row reports pseudo t-values from tests that examine whether all regressors other than book-to-market, size, prior one-month return, and prior one-year return skipping a month are jointly zero. This t-value is computed by converting the p-value from the Hotelling's test into a z-score.

	Regression							
Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(ME)	−0.12	−0.13	−0.12	−0.12	−0.12	−0.14	−0.11	−0.10
	(−2.29)	(−2.63)	(−2.44)	(−2.51)	(−2.43)	(−2.57)	(−2.04)	(−1.90)
$r_{1,1}$	−5.40	−5.29	−5.40	−5.15	−5.44	−5.52	−5.86	−5.82
	(−7.44)	(−7.28)	(−7.40)	(−7.19)	(−7.55)	(−7.46)	(−7.95)	(−7.92)
$r_{12,2}$	0.67	0.71	0.63	0.64	0.63	0.67	0.66	0.62
	(2.41)	(2.61)	(2.28)	(2.31)	(2.29)	(2.43)	(2.40)	(2.24)
log(BE/ME)	0.24		0.14		0.23		0.28	
	(2.37)		(1.19)		(2.46)		(2.75)	
log(RE/ME)		0.18	0.12					0.20
		(3.29)	(1.90)					(3.42)
log(CC/ME)				0.08	0.02			0.10
				(1.41)	(0.34)			(1.70)
log(AOCI/ME)						−0.01	−0.01	−0.01
						(−0.92)	(−1.03)	(−0.96)
Indicator variables								
RE ≤ 0		−0.27	−0.30					−0.29
		(−1.37)	(−1.48)					(−1.42)
CC ≤ 0				0.05	0.10			−0.02
				(0.62)	(1.24)			(−0.23)
AOCI ≤ 0						0.09	0.09	0.04
						(0.69)	(0.66)	(0.33)
Pseudo t-value for joint sig. of add'l regressors		2.97	1.76	1.18	0.88	0.45	0.57	2.13
Avg. Adj. R^2	7.60%	7.40%	8.21%	7.28%	7.95%	7.44%	8.52%	9.05%

Table A.2: 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 then end of June. The estimates in the bottom right corners, preceded by the ↳ signs, correspond to the averages of the five strategies above them. In Panel A, this strategy is a retained earnings-neutral strategy that buys firms with high book-to-markets and sells those with low book-to-markets; in Panel B, it is a book-to-market-neutral strategy that buys firms with high retained earnings-to-market and sells those with low retained earnings-to-market. The sample starts in July 1964 and ends in December 2017.

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

	BE/ME (Conditional sort)					
RE/ME	Low	2	3	4	High	H − L
			Monthly CAPM alphas			
Low	−0.37	−0.22	−0.23	−0.18	0.01	0.37
2	0.08	−0.09	−0.12	−0.08	0.08	0.00
3	0.20	0.11	0.01	0.22	0.41	0.21
4	0.30	0.18	0.43	0.33	0.31	0.01
High	0.32	0.25	0.31	0.21	0.48	0.15
High − low	0.69	0.47	0.54	0.39	0.47	↳ 0.15
			***t*-values**			
Low	−2.62	−1.80	−2.17	−1.57	0.04	1.71
2	0.91	−1.03	−1.28	−0.76	0.71	0.00
3	2.31	1.17	0.13	2.16	3.40	1.44
4	3.36	1.76	3.98	3.15	2.55	0.04
High	3.13	2.15	2.51	1.50	2.94	1.02
High − low	3.47	2.50	3.23	2.29	2.64	↳ 1.41

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	−0.22	0.03	−0.03	0.18	0.63
2	−0.25	−0.07	0.03	0.20	0.26	0.51
3	−0.22	0.02	0.14	0.25	0.31	0.53
4	0.00	0.32	0.32	0.24	0.33	0.33
High	0.21	0.35	0.35	0.30	0.46	0.25
High − low	0.66	0.57	0.32	0.33	0.28	↳ 0.45
			***t*-values**			
Low	−3.04	−1.85	0.35	−0.34	2.12	3.35
2	−2.27	−0.82	0.40	2.36	2.64	3.31
3	−1.95	0.17	1.40	2.42	3.05	3.49
4	−0.04	2.76	3.16	2.08	2.78	2.33
High	1.41	2.74	2.76	2.22	2.83	1.39
High − low	3.13	2.80	1.79	1.91	1.49	↳ 4.31