Connecting Book Rate of Return to Risk: The Information Conveyed by Conservative Accounting

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ABSTRACT. This paper investigates how the book rate of return relates to risk and the required return for investing and documents the role of conservative accounting in making the connection. In contrast to the standard risk-return relation that predicts that a higher book rate of return is associated with a higher required return, the paper demonstrates the opposite: With the effect of conservative accounting, a lower book rate of return indicates higher risk and a higher required return. The empirical analysis indicates that the market prices equities accordingly.

Keywords: *book rate of return, conservative accounting, risk and return*

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I. INTRODUCTION

This paper investigates how book rate of return under GAAP relates to risk and the required return for investing. A common view sees the book rate of return as a measure of profitability to be compared to the required return to evaluate the success of an investment. A contrasting view sees the book rate of return as indicative of the required return: A higher book return results from taking on more risk, consistent with the standard risk-return tradeoff. There clearly is some sorting out to do. The book rate of return is an accounting measure, so the interpretation of the measure requires an understanding of how accounting impinges on the book return as an indicator of risk and/or a measure of profitability. This paper supplies that understanding, along with empirical documentation.

The view that a higher book return on equity (ROE) indicates a higher required equity return is common in asset pricing research in finance, for example in Voulteenaho (2002), Fama and French (2006), Chen, Novy-Marx, and Zhang (2010), and Novy-Marx (2012). Chen, Novy-Marx, and Zhang (2010), Hou, Xue, and Zhang (2012), and Fama and French (2013) build asset pricing models where higher book rates of return indicate higher expected stock returns, along with other attributes. These constructions embrace the economic intuition that connects return to risk, but fail to appreciate how ROE is affected by accounting methods. After recognizing the accounting effects, this paper shows that book rate of return is indeed related to the required return, but not in the way envisioned in these papers: Increasing risky investment results in a lower ROE under GAAP, so that a lower ROE, so affected, implies a higher required return.

The view of ROE as a profitability measure to be compared with the required return is more common in accounting research and, indeed, in practice. Much of this research recognizes that book rate of return under GAAP and IFRS suffers as a measure of "true" profitability because of accounting methods—some would call them accounting distortions. The critique points to accounting that omits assets from the balance sheet or carries them at low amounts. So, Coca-Cola Company, for example, reports an ROE typically in the 25% - 30% range—considered too high for an "economic rate of return"—because the brand asset is missing from the balance sheet. Similarly so for mature pharmaceutical firms with ROE typically over 20%: Their R&D investment is expensed rather than capitalized on the balance sheet. The practice is known as conservative accounting. Rogerson (1997; 2008), Dutta and Reichelstein (2005), Rajan and Reichelstein (2009), McNichols, Rajan, and Reichelstein (2013), and Liu, Ohlson, and Zhang (2013), among others, propose alternative accounting to rectify the problem. Practitioners also make such adjustments to calculate a corrected rate of return which, when compared to the required return, is said to render "economic value added," as in Stewart (1990). This paper shows that the book rate of return conveys information, not only about the profitability of investment, but also its risk. Attempts to remove the so-called accounting distortions from the book rate of return remove information that is useful to the investor for assessing risk and the required return.

Like these accounting studies, the paper focuses on the effects of conservative accounting. However, the focus is on a feature of conservative accounting that is complementary to that which reports lower book values: Growing investment with conservative accounting reduces earnings in the numerator of the book rate of return. By reducing current earnings, conservative accounting shifts income to the future, and an accounting principle connects that

income shifting to risk: Under uncertainty, earnings recognition is deferred until the uncertainly has largely been resolved.[1] In asset pricing terms, earnings are not booked until the firm has a low-beta asset, cash or a near-cash receivable. The principle is evident with revenue recognition where "realization" is necessary to book revenue. But it also applies to the expensing of investment: When the outcome to investment is uncertain, the investment is subject to rapid expensing, as in the case of R&D and advertising where there is risk that sales (or even a product) may not be forthcoming. Expensing in response to uncertainty about new investment yields a lower book rate of return (via the numerator effect on earnings), and the resolution of uncertainty with successful outcomes yields a higher book rate of return (via the numerator effect of realized earnings). If that uncertainty is risk that is priced in the stock market, a lower ROE, so affected, requires a higher stock return while a higher ROE requires a lower return. There is no necessity that conservative accounting be tied to priced risk, of course, but our empirical analysis suggests so.

The effects of conservative accounting on book value, earnings, and the book rate of return have been modeled with a given required return, in Feltham and Ohlson (1995), Zhang (2000), Rajan, Reichelstein, and Soliman (2007), for example. With no effect on the required return (nor on price), these papers implicitly cast conservative accounting as a pure accounting phenomenon that shifts income to the future, unrelated to the economics of the firm—noise to be accommodated in performance evaluation and valuation. Our results indicate that conservative accounting conveys information about the required return.

[1] We recognize that "risk" is sometimes distinguished from "uncertainty," the term mainly used in the accounting literature. We treat them as equivalent in this paper.

II. CONSERVATIVE ACCOUNTING, RISK, AND THE BOOK RATE OF RETURN

Many papers have demonstrated the effects of accounting methods on the book rate of return, notably Greenball (1969), Fisher and McGowan (1983), Livingstone and Salamon (1970), Brief and Lawson (1992), Feltham and Ohlson (1995), Zhang (2000), Beaver and Ryan (2000), Danielson and Press (2003), Monahan (2005), and Rajan, Reichelstein, and Soliman (2007). The latter three papers, along with Penman and Zhang (2002), provide empirical documentation. The main insight is that conservative accounting (of the Coca-Cola type) increases the book rate of return on average but decreases it when there is investment growth.

Intuitively, if assets are missing from the balance sheet but earnings from the missing assets are flowing through the income statement, earnings-to-book must be high (due to a denominator effect). But, the only way that investments can be missing from the balance sheet is by expensing them rapidly, as with the expensing of advertising and R&D or with accelerated depreciation methods. With investment growth, such expensing reduces earnings and thus depresses the book rate of return (due to a numerator effect). A high book rate of return is realized only on the success of the investment, for then earnings are reported on a low book-value base (the denominator effect). Accrual accounting allocates earnings to periods so, for given life-long expected earnings, lower current earnings due to conservative accounting implies higher future earnings. This earnings deferral connects conservative accounting to growth. Indeed, the formal modeling of the book rate of return in Feltham and Ohlson (1995) and Zhang

(2000) shows that conservative accounting combined with growth in investment increases expected earnings growth.[2]

These properties are simply by construction of the accounting, and are well known. The insight in this paper is to connect conservative accounting and its effect on the book rate of return to risk. The connection is via accounting principles that deal with uncertainty: Under uncertainty, earnings recognition is deferred until the uncertainty has been substantially resolved. This principle is applied on two ways. First, the revenue recognition principle prescribes that revenue is not recognized until it is "realized." This usually involves waiting until there is a transaction with a customer, with the receipt of cash reasonably certain. Second, if revenue from an investment is particularly uncertain, the investment is expensed immediately—as in the case of R&D and advertising—or subject to rapid amortization. The FASB's *Statement of financial Accounting Concepts No. 2* (1975) defines conservative accounting as "a prudent reaction to uncertainty." In justifying the immediate expensing of R&D under FASB Statement No. 2, the FASB focused on the "uncertainty of future benefits." In IAS 38, the IASB applied the criterion of "probable future economic benefits" to distinguish between "research" (which is expensed) and "development" which is capitalized and amortized. Both the deferral of revenue recognition and the expensing of investment result in lower earnings and lower book rates of return, *ceteris paribus*.

The paper shows empirically that low book rates of return are associated with conservative accounting. And, in confirmation that conservative accounting is a reaction to uncertainty, the lower book rates of return are associated with a higher variance in earnings

[2] Penman (2013, Chapter 17) provides examples and the Rajan, Reichelstein, and Soliman (2007) four quadrants depicts it well.

outcomes and with more extreme outcomes. The paper also indicates that this risk is (non-diversifiable) risk that is priced in the stock market: Earnings outcomes associated with low book rates of return due to conservative accounting are more sensitive to market-wide beta shocks and yield the higher average stock returns that investors require as reward for bearing risk.

Conservative accounting practices permeate accounting—accelerated depreciation, recognizing liabilities but not assets, lower-of-cost-or-market and LIFO for inventories, reserving, impairments and write-downs, and recognizing anticipated losses but not gains.[3] The refusal to recognize sales from prospective customers, even if they are in the order book, obeys the principle of waiting until uncertainty is resolved. Recording deferred (or "unearned") revenues pushes revenues to the future, even though a customer has performed, because there is remaining uncertainty about the firm's performance. The treatment of R&D investments and brand building (advertising) are extreme cases where the investment is viewed as particularly risky—the investment may not produce revenue—so the expenditure is expensed against earnings immediately, yielding a lower book rate of return but future earnings growth and higher subsequent book rates of return *if* the expenditures produce realized earnings. The *if* implies that the expected earnings are at risk. In a similar way, organization costs, store opening costs, film development costs, software development, and merger costs are expensed. And investments in employee training and the development of distribution systems and supply chains are expensed as part of selling, general, and administrative expense.

From this perspective, a low (or negative) ROE for a start-up biotech firm with R&D expenditures but few sales is not interpreted as "low profitability." Rather it is interpreted as

[3] Research distinguishes "conditional conservatism" from "unconditional conservatism." The former is applied only on receipt of negative information about future earnings outcomes, requiring a write-down of assets. We are referring to unconditional conservatism though a write-down arising from uncertainty about whether outcomes will be achieved comes within the scope.

potentially high profitability, but expected profitability that has yet to be realized and thus at risk: The investment in R&D has yet to pay off. In contrast, a mature pharmaceutical firm where R&D investment has paid off reports a high ROE and thus is considered low risk; the uncertainty has been resolved. But, of course, firms can have low (or negative ROE) due to realizations—the risky investment did not pay off—so there is some sorting out to do.

Further case studies illustrate:

Facebook, Inc. traded in 2013 with significant growth prospects built into its market price. However, the firm was reporting an ROE of only 4 percent, due to the expensing of development costs to foster the growth. The development costs were investments to gain future revenue. Should those revenues be realized, Facebook will have significant earnings growth, not only from the revenues but because only variable costs will have to be covered: the fixed costs have already been expensed. The low ROE due to the expensing of these investments indicates potential earnings growth, but growth that is uncertain.

In contrast, Coca Cola Company was reporting an ROE of 25 percent in 2014 due to a brand investment that is omitted from the balance sheet, but one that actually delivers sales. This is a low-risk ROE, for the risk taken with the brand building investment has been resolved or "realized." Coke had a beta of 0.4.

Amazon.com, Inc. reported a loss for the third quarter of 2013, as it had done for the full year, 2012. Both losses were on rising sales. The losses were attributed to "spending on technology and content, such as video streaming and grocery delivery to mobile devices" and the firm's "willingness to win customers by losing money." While high expectations were built into the share price, the results of these investments are uncertain; the added customers have yet to be realized.[4]

During the 1990s, Starbucks Corporation reported a book rate of return on its operations of less than 10 percent. However, it traded at a price-to-book ratio of about 5, a multiple that one associates with a much higher book return. Starbucks was expanding stores aggressively, expensing start-up costs, advertising, employee training, and supply chain development. This expensing depressed the book return, an indication that the growth strategy was risky. As it happened, the strategy paid off, with the book rate of return rising to over 20 percent by 2005. But the strategy was risky; it could have gone the other way.[5]

[4] See press reports in *The Wall Street Journal*, October 25, 2013, p. B3 and *Financial Times* of the same date, p. 13. *The Wall Street Journal* also reported (p. C1) a study by Morgan Stanley that 89 percent of a present value calculation on Amazon related to cash flow forecasted for years after 2020, that is, on growth expectations in the long term.

[5] Penman (2012, Chapter 5) lays out this case in more detail.

With the increased uncertainty in the aftermath of the financial crisis in 2008, banks increased their loan loss reserves significantly, thus reducing their ROE. In 2013, with the improvement in credit conditions and resolution of uncertainty, the banks began releasing those reserves into earnings, producing earnings growth and a higher ROE.

III. CONNECTING CONSERVATIVE ACCOUNTNG AND THE BOOK RATE OF RETURN TO THE REQUIRED RETURN

To be more formal, one might model an accounting system where conservative accounting connects directly to the required return, along the lines of Ohlson (2008) who constructs a hypothetical accounting where earnings growth aligns with the risk premium, one-to-one. We are concerned with GAAP accounting and our modeling is less ambitious; we recognize the accounting principles of GAAP and IFRS, as practiced, but do not model how those principles explicitly connect to a firm's risk premium.[6]

We do, however, gain some insights from the characteristic model of Penman, Reggiani, Richardson, and Tuna (2014) which ties expected returns to accounting numbers. These insights structure our empirical tests. Given clean-surplus accounting, the expected equity return, one period ahead, can be expressed as

$$E(R_1) = E\left[\frac{Earnings_1}{P_0} + \frac{P_1 - B_1 - (P_0 - B_0)}{P_0}\right] \tag{3}$$

$$= E\left[\frac{Earnings_1 + B_0}{P_0} + \frac{P_1 - B_1}{P_0} - 1\right] \tag{3a}$$

[6] The Ohlson (2008) paper involves accounting that requires anticipation of the future such that a permanent earnings number can be calculated that is sufficient for forecasting future earnings (with a growth constant). This differs from GAAP accounting that defers earnings recognition to the future because it cannot be anticipated with any certainty.

where P is price and B is book value. This expected return is the required return, r, if P_0 prices these expectations efficiently. Equation (3) equates the expected return to the expected forward earnings yield plus the price-denominated expected change in premium, price minus book value. An expected change in premium reflects expected earnings growth, as shown in Shroff (1995) and demonstrated with examples in Penman, Reggiani, Richardson, and Tuna (2014). The point can be appreciated by recognizing that the current price, P_0, is an expectation of all future (life-long) earnings so, for a given price, lower expected $Earnings_1$ must mean a higher subsequent earnings, that is, earnings growth. Thus, with the price denomination in P_0 that discounts expectations for risk, the expected return can be equated with the expected earnings yield and expected earnings growth that the market prices as risky.

With no expected change in premium, $r = \frac{Earnings_1}{P_0}$, the forward earnings yield. This is the case of no expected earnings growth but it is also a special case of the application of conservative accounting. Conservative accounting induces a difference between price and book value (due to lower assets on the balance sheet), but does not affect earnings if the "error" in the balance sheet, price minus book value, is constant over the period. This "cancelling error property" is the lesson in first accounting class that says that earnings are the same whether R&D is capitalized and amortized or expensed immediately, provided there in no growth in investment in R&D.[7] Turning to equation (3) there is no effect on earnings or on the change in premium in this case and conservative accounting does not bear on the expected return. Nor does it affect the numerator of the book rate of return, as shown in equation (3a) where earnings are compared to

[7] Johansson and Östman (1995, pp. 118-120) lay out the cancelling error property of accounting and its effect on the book rate of return.

book value. Accordingly, if conservative accounting comes into play in the assessment of the expected return, it must involve investment growth.

In this no-growth case, $E(R_1) = \frac{Earnings_1}{P_0} = \frac{B_0}{P_0} ROE_1$, so it is the earnings yield rather than ROE that indicates the expected return. Both B/P and ROE are products of conservative accounting, they mirror each other: Conservative accounting that produces a high ROE (via a denominator effect, like Coke) also produces a low B/P ratio, but the two cancel, with the earnings yield then the indicator of the expected return. For a given earnings yield (in this no-growth case), ROE and B/P can be any amount but neither will indicate the expected return.[8] Thus, if ROE has something to do with the expected return, it must be associated with growth.

The effect of investment growth on the book rate of return and potentially the expected return is demonstrated by reference to equation (3a). Conservative accounting now reduces $Earnings_1$ relative to B_0 (lowering the ROE) but that induces a higher premium: $B_1 = B_0 + Earnings_1 - Net\ Dividends_1$, so lower $Earnings_1$ induced by expensing R&D expenditure (for example), implies higher $P_1 - B_1$, and higher $P_1 - B_1$ indicates higher expected earnings shifted to the future.[9] Put differently, P_0 represents expected life-long earnings (in period 1 and after) so, if $Earnings_1$ is depressed because of conservative accounting, subsequent earnings must be higher, that is, one expects higher earnings growth. If the market prices that growth as risky, the growth induced by conservative accounting will change the required return.

[8] It follows that, given B/P, ROE indicates the expected return one-to-one (and vice versa). This is the representation in many of the asset pricing papers quoted earlier. But this is so only in the no-growth case.

[9] While dividends also affect B_1, they reduce book value dollar-for-dollar by accounting principles. They also reduce price dollar-for-dollar under Miller and Modigliani assumptions. Thus dividends do not affect premiums.

There is no necessity that growth induced by conservative accounting indicates priced risk, of course. As tautologies, equations (3) and (3a) hold for any accounting with no necessary effect on the expected return. Indeed, the standard modeling of conservative accounting in Feltham and Ohlson (1995) and Zhang (2000) assumes that the expected growth induced by conservative accounting does not change the expected return in the left-hand side (it's just accounting!). The expected return changes only if higher earnings growth induced by lower $Earnings_1$ is priced as risky and thus is discounted in P_0 to yield the higher expected return. That is suggested by the principle for recognizing earnings under uncertainty: Revenue recognition is deferred and risky investment is subject to rapid expensing. This accounting produces expected earnings growth, but growth that is deemed risky. And it yields a lower book rate of return, connecting a low book rate of return to risk. However, the connection of conservative accounting to priced risk remains an empirical question, to which we now turn.[10]

The formulation here instructs the design of the tests. Those tests ask whether ROE depressed by the effects of conservative accounting is associated with higher average stock returns. The tests then evaluate ROE within the framework of equation (3a). The starting point is E/P, for E/P = r in the no-growth case and conservative accounting that induces a premium over book value but no change in premium, adds nothing to the expected return. The tests ask whether, given E/P, lower earnings relative to book value, induced by conservative accounting, is associated with higher stock returns, as equation (3a) suggests. The answer is in the

[10] Research has reported that R&D investment is associated with higher stock returns, in Lev and Sougiannis (1996), Lev, Sarath, and Sougiannis (2005), and Eberhart, Maxwell, and Siddique (2004), for example. There are differing interpretations of the result, with Chambers, Jennings, and Thompson (2002) attributing the returns to risk and Chan, Lakonishok, and Sougiannis (2001) attributing them to investor misunderstanding of the accounting. Donelson and Resutek (2012) see the returns as part of the value-growth spread phenomenon.

affirmative. Further, those higher returns are in anticipation of earnings outcomes that are risky—earnings outcomes with higher variance and more susceptible to market-wide shocks.

IV. DATA, VARIABLE CALCULATION, AND SUMMARY STATISTICS

Our sample covers all U.S. firms available on Compustat files for any of the years, 1963-2012, and which have stock price and returns for the corresponding years on CRSP files. Financial firms (in SIC codes 6000-6999) are excluded because they practice fair value accounting where the deferral principle is not operative. Utilities are also excluded because the book rate of return is subject to regulation.[11] Firm-years are deleted for any year in which Compustat reports a missing number for book value of common equity, income before extraordinary items, total assets, or long term debt. Firm-years with negative book value are also eliminated. Market prices are observed on CRSP three months after each fiscal year, by which time the annual accounting numbers for the fiscal year should have been reported (as required by regulation). Stock returns, also observed on CRSP, are annual returns after this date, calculated as buy-and-hold compounded monthly returns.

To capture the effect of conservative accounting on earnings and book value, we follow procedures in Penman and Zhang (2002). Deferred earnings that result from reducing income with investment effectively creates hidden reserves that are released into earnings if and when investment slows. The amount of reserves at any point in time is the amount by which balance sheet carrying values are reduced by the application of conservative accounting (and that, of course, is equal to the amount by which earnings have been reduced). Accordingly, we calculate

[11] Firms classified as Membership Organization or Unknown SIC are also excluded from our analysis.

a C-Score as the amount by which the balance sheet would have been higher without conservative accounting, relative to net operating assets actually booked to the balance sheet:

$$C_{it} = \frac{ER_{it}}{NOA_{it}}, \quad (4)$$

where ER is the estimated reserve created by conservative accounting and *i* indicates firms and *t* indicates balance sheet dates.

The Penman and Zhang (2002) C-score was estimated from the accounting effects of R&D expensing, advertising expensing, and LIFO accounting for inventories. We expand that score to include the effects of conservative accounting applied to bad-debt allowances, depreciation allowances, deferred revenue, and accrued expense:

$$C_{it} = (RD_{it}^{res} + ADV_{it}^{res} + INV_{it}^{res} + BD_{it}^{res} + DEP_{it}^{res} + DEF.REV_{it}^{res} + ACC.EXP_{it}^{res})/NOA_{it}. \quad (4a)$$

The calculation for the C-score components is as follows:

- R&D reserve $\left(RD_{it}^{res}\right)$ is calculated as the estimated amortized R&D asset that would have been on the balance sheet if R&D had not been expensed. We capitalize R&D expenditures, then amortize them using the industry coefficients estimated by Lev and Sougiannis (1996). In a sensitivity analysis, we also amortize using the sum-of-the-years-digits method over five years.

- Advertising reserve $\left(ADV_{it}^{res}\right)$ is the estimated brand asset created by advertising expenditures. We capitalize advertising expenses and then amortize them using a sum-of-the-year's digits method over two years. Bublitz and Ettredge (1989) and Hall (1993) indicate that advertising has a short useful life, typically one to two years.

- Inventory reserve $\left(INV_{it}^{res}\right)$ equals the LIFO reserve reported in the financial statement footnotes.

- Bad-debt reserve $\left(BD_{it}^{res}\right)$ equals the excess amount of allowance for bad-debt expenses, estimated by multiplying the gross amount of receivables by the difference of the allowance-to-gross-receivable ratio and the median allowance-

to-gross-receivable ratio of all firms within the same revenue decile as well as the same revenue growth decile in the same industry (2-digit SIC).

– Depreciation reserve $\left(DEP_{it}^{res}\right)$ equals the excess amount of accumulated depreciation, estimated by multiplying the gross amount of PP&E by the difference of the accumulated-depreciation-to-gross-PP&E ratio and the median accumulated-depreciation-to-gross-PP&E ratio of all firms within the same revenue decile as well as the same revenue growth decile in the same industry (2-digit SIC).

– Deferred revenue reserve $\left(DEF.REV_{it}^{res}\right)$ equals the excess amount of deferred revenue, estimated by multiplying NOA by the difference of the deferred-revnue-to-NOA ratio and the median deferred-revenue-to-NOA ratio of all firms within the same revenue decile as well as the same revenue growth decile in the same industry (2-digit SIC).

– Accrued expense reserve $\left(ACC.EXP_{it}^{res}\right)$ equals the excess amount of accrued expenses, estimated by multiplying the gross amount of NOA by the difference of the accrued-expense-to-NOA ratio and the median accrued-expense-to-NOA ratio of all firms within the same revenue decile as well as the same revenue growth decile in the same industry (2-digit SIC).

Establishing the benchmark of the carrying value without conservative accounting is difficult. So the measures are presumably noisy and bias our empirical analysis against a result.[12] For R&D and advertising, the score is calculated against a benchmark with an assumed amortization rate. For LIFO, the score is available from the reported LIFO reserve. However, the other measures are calculated against industry medians (with a matching also on revenue and reveune growth). This is appropriate if industry medians differ across industries for "real" as opposed to accounting reasons (as they presumably do). However an industry benchmark is problematic if the application of conservative accounting varies across industries (as well it might). Further, bad debt allowances, depreciation, deferred revenue, and accrued expenses may

[12] McNichols, Rajan, and Reichelstein (2013) calculate a measure to correct for conservative accounting, but that measure aims to correct the book value to replacement cost as prescribed by Tobins *q*.

differ within industry for "real" reasons, or be affected by income shifting due to inter-period earnings management rather than the application of conservative accounting. Thus, we conduct the test using the full measure here and with just the R&D, advertising, and inventory component. Results are reported for the full measure, but results are qualitatively similar under the narrower measure.

With no growth in investment, the cancelling error property says earnings and the balance sheet are unaffected, so the C-score does not change. Added investment (with conservative accounting) reduces earnings and adds to the C-score while a decline in investment releases reserves into earnings. Accordingly, the joint effect of investment and conservative accounting on the numerator of ROE is measured by the change in the C-score:

$$\Delta C_{it} = \frac{ER_{it}}{NOA_{it}} - \frac{ER_{it-1}}{NOA_{it-1}}. \qquad (5)$$

Table 1 reports summary statistics for the variables used in the analysis. The notes to the table define the variables and the Appendix details how each was calculated. ROE includes the effect of leverage that is related to risk and the expected return but is not affected by conservative accounting. So, we also examine the (unlevered) return on net operating assets (RNOA), calculated as operating income relative to net operating assets. RNOA is in Table 1, along with leverage, NFO/P, that explains the difference between ROE and RNOA. The positive mean and median for the C-score indicates that conservative accounting is typically operating, though there is significant variation around these measures of central tendency.

The median ROE and RNOA, about 9.5%, are roughly equal to what one typical views as a normal return to equity investing: about 10%. It is often claimed that conservative accounting

typically yields a book rate of return that is "too high" relative to the required return due to the denominator effect, but that that does not appear to be the case on average. The numerator effect also operates to reduce the reduce ROE and RNOA such that these numbers typically approximate the required return. (Mean ROE and RNOA in the table are affected by left skewness from loss firms.) The positive mean and median C-scores indicate that conservative accounting is typically operating. Median ΔC is close to zero, indicating that releases of earnings from conservative accounting reserves (that increase the book rates of return) are offset by increases in those reserves in the cross-section (that reduce the book rates of return).

Table 2 reports correlations between variables, with Pearson correlations above the diagonal and Spearman rank correlations below. The correlation coefficients are means over time of estimates from the cross-section for each year. E/P is positively correlated with returns, as equation (3) indicates. ROE and RNOA are strongly correlated and we obtain similar results (below) with both. Both the C-score and ΔC are negatively correlated with ROE and RNOA: The application of conservative accounting is stronger in firms with low book rates of return. The C-score and ΔC are positively correlated: Firms with high estimated reserves tend to grow those reserves with more investment. The negative correlation of leverage (NFO/P) with the book rates of return and with both conservative accounting measures is to be noted: Inferences from observed correlations between one of these variables and returns must consider leverage as explanation.

V. EMPIRICAL ANALYSIS: BOOK RATE OF RETURN, CONSERVATIVE ACCOUNTING, AND STOCK RETURNS

The empirical analysis documents the relationship between book rate of return and stock returns and assesses how conservative accounting bears on the issue. The analysis proceeds in three

stages. First, we investigate whether book rate of return is positively correlated with average stock returns unconditionally. This answers the question of whether book returns, like stock returns, reflect reward for risk (on average), consistent with the standard risk-return tradeoff. The answer is no: There is little correlation between book return and average stock return. Second, we examine whether the book return is related to stock returns conditional upon the effect of conservative accounting. The answer is yes: A low book rate of return depressed by conservative accounting with growing investment is associated with higher returns, consistent with conservative accounting conveying information about risk. In contrast, a high book return that reflects realizations of earnings from investing is associated with lower returns, consistent with earnings being recognized when uncertainty has been resolved. Finally, we conduct tests within the framework of section 2: For a given E/P (that indicates the expected return without growth), does the addition of ROE add to the expected return, and is that added return associated with the effect of conservative accounting? The answer is yes. Complementary analysis connects both conservative accounting and the observed returns to risk in earnings outcomes.

Unconditional Correlation of Book Rate of Return with Stock Returns

Table 2 indicates that the cross-sectional correlation between ROE and subsequent stock returns is low, though positive, and so for RNOA and returns. Table 3 investigates further. Panel A reports returns and other metrics for 10 portfolios formed from ranking firms each year on their ROE. Panel B does the same for a ranking on RNOA. There is little variation in returns over the book return portfolios, and the differences between the returns for the high and low portfolios are not significantly different from zero. ROE is negatively correlated with beta in Penman (1991) and in Table 2, but is actually U-shaped over the portfolios here. There is little here to indicate that average book rates of return in the cross-section are related to risk and expected return. ROE

is increasing in leverage, so one might expect ROE to have a positive relationship with returns because of a leverage effect, but that is not the case. The reason is that leverage (NFO/P) is negatively correlated with RNOA, the unlevered component of ROE, as Panel B demonstrates: Higher RNOA firms have lower leverage, as documented in Nissim and Penman (2003). Indeed, the correlation between ROE and leverage in Panel A is negative.

As in Table 2, the C-score is negatively correlated both ROE and RNOA in Table 3, which may be surprising as conservative accounting is presumed to result in high book rates of return on average. The relationship in Table 3 is actually U-shaped over the portfolios, with both low and high ROE and RNOA associated with higher C-scores. The scores for the high portfolios coincide with the standard presumption. Those for the low ROE and RNOA portfolios are confined to portfolios 1 – 3 which are in fact loss firms (with negative book rates of return). These are firms with earnings depressed by conservative accounting, from the continual expensing of R&D and advertising (for example) that has not yet paid off—as is typical of early-stage firms.

The effect of conservatism and investment growth, captured by ΔC, is decreasing in the book rate of return: Lower ROE and RNOA, associated with positive ΔC, are those where the accounting depresses numerator earnings, while the negative ΔC for high ROE and RNOA are indicative of increasing earnings from decreasing investment. Despite these patterns, forward stock returns are not related to the book rate of return. However, a given book return is not only affected by the conservative treatment of investment, but also by the realizations of earnings from past investments.

We proceed to Table 4 sort this out. We report results for RNOA, but results are similar for ROE, as the high correlation between ROE and RNOA in Table 2 suggests.

Returns Associated with Conservative Accounting

Table 4 reports returns associated with conservative accounting and its effect on the book rate of return. In Panel A, firms are formed onto 10 portfolios each year from a ranking on ΔC, the measure of how conservative accounting affects the numerator of the book return. It is clear that the ranking on ΔC also ranks returns, and the difference between the high and low portfolio returns is statistically significant at the 1% level: The numerator effect on earnings of conservative accounting and investment growth is associated with higher average returns, with lower earnings indicating higher risk and return.

Panel B of Table 4 reports returns associated with conservative accounting for a given level of RNOA. The same RNOA portfolios in Table 3 are spilt into three according to how they are affected by ΔC. Note, first, that for a given ΔC, there is little variation in returns over RNOA portfolios (along rows in the table), expect for portfolio1 (with extreme negative RNOA). However, the partitioning on ΔC within RNOA portfolios orders returns. In contrast with papers that associate high book rates of return with risk and return, high returns are associated with high RNOA only if the RNOA is affected in the numerator by conservative accounting. The same applies to low RNOA portfolios but more so, and it is these portfolios where ΔC is relatively high in Table 3: These are portfolios where RNOA is particularly depressed by conservative accounting.

Panel B brings another point to the fore. Low ΔC are cases where the RNOA is less affected by conservative accounting, so reflect realizations of earnings from investment rather

that the depressing effect on earnings of investment. Under GAAP, earnings realizations are the resolution of uncertainty which (presumably) lowers risk and the required return. The lower returns for RNOA associated with low ΔC suggest so.

Conservative accounting affects RNOA in both the numerator and the denominator, with ΔC being the measure of the numerator effect and the C-score the measure of the denominator effect. So, one might ask whether it is ΔC or the C-score that is associated with returns. Indeed, in unreported tests we found that the C-score also ranked returns. The two are positively correlated—the average rank correlation is 0.316 in Table 2. Thus Panel C of Table 4 forms portfolios first on the C-score and then on ΔC within each C-score portfolio. The difference in returns between high and low ΔC for a given C-score is positive and significant, except for low C-score portfolios where conservative accounting has little impact.[13]

ΔC is negatively correlated with leverage in Table 2. Thus sorts on these variables are unlikely to pick up leverage which also explains return differences, but in a positive direction. To check, we repeated the analysis in Panel B of Table 4, replacing ΔC with the leverage variable, NFO/P. The returns associated with ΔC cannot be explained by leverage.

Returns Conditional upon Earnings-to-Price

Equation (3) expresses the expected return in terms of the forward earnings yield and expectations of subsequent earnings growth. Given the earnings yield, E/P, a variable adds to the expected return if it forecasts earnings growth that the market prices as risky. Is the book rate of return such a variable? Conservative accounting with investment reduces the book rate of return

[13] In this test, the results were stronger with the less-noisy C-score and ΔC involving just R&D, advertising, and inventory. Differences in returns between the high and low ΔC portfolios were significant at the 5% level for C-score portfolios 4-10.

and complementarily increases expected earnings growth. But the expected growth is risky, for earnings are not yet realized. Thus, for a given E/P, low book rates of return should be associated with higher returns if the risk to which conservative accounting responds is risk that is priced in the market. Table 5 investigates. For these tests, portfolios are formed by ranking firms each year on E/P, the first component of equation (3). Then, within each E/P portfolio, portfolios are formed by ranking on ROE. The ranking on E/P is for positive E/P firms only, with loss firms assigned to their own portfolio. The analysis is with levered numbers, E/P and ROE, but the results are similar with unlevered earnings-to-price and RNOA.[14]

Equation (3) shows that, with no expected change in premium (and thus no growth), E/P indicates the required return. Panel A of Table 5 shows that returns are indeed positively related to E/P (across the top row), with the exception of the negative EP portfolio. However, E/P typically imbeds growth expectations, so presumably is not a sufficient indictor of the expected return. Equation (3a) shows that, for a given price, lower earnings relative to book value—a lower ROE—induces a change in premium (and growth). However, that will only add to the required return if the growth is priced as risky. The second ranking on ROE in Panel A of Table 5 (down columns) indicates that this is so: For a given positive E/P, ROE is negatively related to returns.[15] Significantly, although E/P and ROE are positively correlated in Table 3 (with a mean rank correlation of 0.620 in Table 2), E/P ranks returns unconditionally here, while ROE (in Table 3) does not. Rather, ROE serves to supplement E/P as an indicator of the expected return.

[14] In equation (3), the E/P ratio is the forward (expected) E/P. Here we use the trailing earnings (before extraordinary and special items) as a forecast of the forward earnings. The earnings accordingly are the same as in the book rate of return. The mean Spearmen correlation between the trailing earnings-to-price and subsequent realized forward earnings-to-price is 0.64, and the mean Spearman correlation between successive ROE is 0.71. We do not use analysts' forecasts for forward earnings because our interest is in the information in reported accounting numbers. Further, analysts' forecasts introduce behavioral issues that presumably have nothing to do with the accounting.

[15] Further analysis shows that the ranking on ROE within E/P portfolios is not just a further ranking on E/P.

Panel B of the table, which reports the mean ΔC for each portfolio, provides an explanation: Lower ROE firms have a higher ΔC. That is, these are firms where earnings in the E/P ratio are depressed by conservative accounting and deferred to the future. The associated returns in Panel A indicate that the accounting is connected to risk. In contrast, high ROE are associated with negative ΔC which indicates the release of reserves into earnings; these are firms with earnings realizations that imply lower risk and return. Unreported results on the returns for the ΔC portfolios in Panel B show that returns are strongly related to ΔC.[16]

As further demonstration that the returns to ROE in Panel A are associated with conservative accounting, Panel C forms portfolios in the same way as in Panel A, except that the lowest ROE portfolios, 1 and 2, retain only firms with the highest 40 percent of ΔC from a ranking on ΔC within the E/P portfolio, while the highest ROE portfolios, 4 and 5, retain only the lowest 40 percent of ΔC from that ranking. The differences in returns between the high and low ROE portfolios (in the last row of the panel) are significantly enhanced over those in Panel A. Regressions of returns on both ROE and ΔC within each E/P portfolio (not reported) find that there is still some explanatory power in ROE after controlling for ΔC. However, our ΔC measure may not capture all the effects of conservative accounting on ROE. Indeed, many contend that a good deal of S, G & A expense is expensed investment—on employee training, start-up costs, customer development, distribution and supply chain development, for example—and this we have not captured.

These observations apply to firms with positive E/P. For loss firms (with negative E/P) in Table 5, mean returns are positively correlated with these negative ROE portfolios. This is

[16] The High-Low returns for the ΔC ranking were (in percent) 6.55, 6.39, 7.04, 8.28, and 7.61 for the positive E/P portfolios 1 – 5, respectively, and 8.95% for the negative E/P portfolio. All were significant at the 1% level.

despite the fact that Panel B shows that the ROE ranking is also a ranking on ΔC, as in the positive E/P portfolios. Indeed, the unreported results from ranking on ΔC for these loss firms produced significant return spread, just as in the positive E/P portfolios. We have no clear interpretation of the Panel A results for loss firms, but make two observations. First, in contrast to the positive E/P portfolios where we observed that E/P is fairly constant over ROE within a given E/P portfolio, E/P is strongly positively correlated with ROE for the negative E/P portfolio, and expected returns are positively correlated with E/P in equation (3): E/P for the low ROE portfolio is -0.36, compared with -0.02 for the high ROE portfolio. Second, unlike positive E/P, current E/P is not a good forecast of the forward E/P in equation (3) for loss firms. To check, we grouped all negative E/P on their forward E/P as indicated by analysts' consensus earnings forecasts and then, within each group, formed portfolios based on ROE. In four out of the five E/P portfolios, ROE showed a negative correlation with future returns, just like the positive E/P portfolios. In the remaining forward E/P portfolio, the correlation was positive, but not significant.

With ROE negatively correlated with leverage in Table 2, the returns associated with ROE here could represent return premiums for leverage. To investigate, we repeated the analysis in Table 5 but now forming portfolios within each E/P portfolio by ranking on NFO/P rather than on ROE. We observed no significant difference in returns across the NFO/P portfolios. This is possibly because E/P (on which stocks are first ranked) reflects leverage already.

A further test strengthens the inferences. It effectively administers a placebo by repeating the test with pseudo ROEs calculated by capitalizing the conservative accounting reserve indicated by the C-score. This effectively reverses the effect of conservative accounting by reconstructing what the balance sheet would have looked like without conservative accounting.

As we are unlikely to have captured all the conservative accounting effects in the C-score, the reconstruction is probably not perfect. So we see this as a weak check. Indeed, in repeating the analysis with the pseudo ROEs, there were still differences in returns across ROE portfolios, but they are reduced. The calculation of a second pseudo ROE provided a stronger comparison. When ROE was calculated with mark-to-market accounting (with book value set equal to market value), there were no significant differences in returns across ROE portfolios. Mark-to-market accounting removes all the effects of conservative accounting, of course.

VI. EMPIRICAL ANALYSIS: BOOK RATE OF RETURN, CONSERVATIVE ACCOUNTING, AND UNCERTAINTY ABOUT EARNINGS

Accounting principles apply conservative accounting when there is significant uncertainty about outcomes. Thus, if the returns associated with book rate of return and conservative accounting are pricing that uncertainty, they should be associated with variance in earnings outcomes. Kothari, Laguerre, and Leone (2002) and Amir, Guan, and Livne (2007) find that the variance of earnings from R&D investment is higher than that from other capital expenditure. This section explores further.

Table 6 constructs the same portfolios as in Table 5, but now reporting the mean standard deviation (Panel A) and interdecile range (Panel B) of *realized* earnings one-year ahead (relative to current price). The mean values are means over years of the within portfolio measures for each year. The interdecile range (IDR) emphasizes tail risk about which investors are particularly concerned, the size of extreme negative outcomes relative to extreme positive outcomes. There is some positive correlation between E/P and these volatility measures over the positive E/P portfolios, corresponding to the increasing returns over these E/P portfolios in Table 5. But, to

the issue, both measures are decreasing in ROE for a given E/P: The mean returns in Table 5 are associated with uncertainty about year-ahead earnings outcomes, the first component of the expected return in equation (3).

In equation (3), expected returns are based not only on expected forward earnings but also on subsequent earnings growth and the risk of that growth not being realized. Table 7 reports mean growth rates and the variation in growth rates for the same portfolios in Tables 5 and 6. The mean growth rates in Panel A are those two years ahead, that is, for the year after the forward year. The reported growth rates are the mean over years of portfolio median growth rates each year. The growth measure, described in the heading to the table, ranges between -2.0 and +2.0. It approximates the standard growth rate measure for a wide range of firms, but also accommodates cases with negative or small denominators.[17]

The E/P ratio (or rather its inverse, the P/E) is typically viewed as indicating expected earnings growth, and growth rates are decreasing in the E/P ratio in the panel. Equation (3) describes the expected return in terms of the forward earnings yield and subsequent expected earnings growth and the panel also reports that, for a given positive E/P, the decreasing returns over ROE portfolios align with average ex post earnings growth: Low ROE are associated with higher average earnings growth as well as higher average returns. This accords with the property of conservative accounting whereby investment growth depresses the numerator of ROE but introduces earnings growth due to the complementary deferral of earnings to the future.

[17] Because added investment in the first year ahead adds to earnings growth two years ahead, we also calculated the residual earnings growth rate two years ahead to subtract for the added investment. Residual earnings was calculated as $Earnings_{t+2} - (r_f \times Book\ Value_{t+1})$, where r_f is the yield on the U.S. 10-year Treasury note for the year. Results were similar.

The variation in earnings growth rates in Panels B and C of Table 7 are decreasing in ROE and align with both the mean growth rates in Panel A and the mean returns in Table 5. Thus, the higher mean returns for low ROE portfolios are not only associated with expected earnings growth but also with growth around which there is considerable uncertainty. This accords with the property of conservative accounting under which earnings, the numerator of ROE, is reduced with added investment because the outcomes to the investment are uncertain. The results for the interdecile range in Panel C are quite telling: Conservative accounting conveys information that the investor is exposed to tail risk such that there is a higher probability of very good earnings growth if the investment is successful, but that is offset by a higher probability of an extreme negative outcome.

The variation in earnings outcomes in Tables 6 and 7 aligns with the returns for the portfolios in Table 6. This indicates that the uncertainty that triggers conservative accounting is risk that is priced in the market. Asset pricing theory views priced risk as exposure to factors common to all assets, that is, risk that cannot be diversified away in a portfolio. Accordingly, Table 8 reports on how realized earnings for each portfolio are subject to market-wide shocks to earnings. It reports betas (slope coefficients) estimated from the following time-series regression for each portfolio:

$$\text{Portfolio}\frac{Earnings_1}{P_0}(t) = \alpha + \beta \cdot \text{Market}\frac{Earnings_1}{P_0}(t) + \varepsilon_t$$

The earnings realizations are for the forward year, that is, the same year during which portfolio returns are observed in Table 5, so the betas are those actually experienced during the holding period, not historical betas. To align realizations in calendar time, the regression is estimated for firms with December 31 fiscal-years only. The portfolio earnings yield is the average earnings

yield for the portfolio and the market-wide earnings yield is the average earnings yield for all firms in the sample for the relevant year.[18] The average R-square for the regressions is quite high—an average of 54.4 percent for the unconditional betas in Panel A—indicating that market-wide earnings explain a significant part of portfolio earnings realizations.

The earnings betas in Panel A of Table 8 are increasing with E/P over the positive E/P portfolios and have the same rank order over E/P portfolios as the mean returns in Table 5. Further, the betas are decreasing in ROE for a given E/P portfolio. They, too, align with the returns in Table 5: Low ROE stocks exhibit higher sensitivity to market-wide shocks. Separating years in which the market-wide earnings yield was up from the previous year (up-markets) from years when it was down (down-markets), the conditional betas in Panels B and C indicate that lower ROE have higher up-market betas, delivering higher earnings in good times, but also have higher down-market betas.[19] Upside potential is matched with downside risk. Correspondingly, high ROE portfolios have considerably lower betas in down-markets, but their upside beta is also lower. In sum, the variation in earnings outcomes across ROE portfolios in Tables 6 and 7 is due, in part, to sensitivity to systematic shocks.

VII. CONNECTION TO ASSET PRICING

While the earnings betas in Table 8 that the risk conveyed by the accounting numbers is priced risk, there is no necessity, of course. The joint hypothesis problem, stated by Fama (1970), recognizes that such an attribution can only be made against the benchmark of a valid, generally accepted asset pricing model, and that we do not have. However, the results do connect to one

[18] Results are similar when portfolio earnings and market earnings are calculated as total earnings for the portfolio divided by total portfolio price.

[19] Results were similar when up-markets and down-markets were identified as years in which the stock market return, in excess of the risk-free rate, was positive or negative.

popular asset pricing model, that of Fama and French (1992 and 1993). We explore the connection here.

As E/P = ROE × B/P (approximately), the ranking on B/P for a given E/P in Table 5 is (approximately) an inverse ranking on B/P.[20] Indeed, a ranking on B/P within each of the E/P portfolios in Table 5 produced a similar spread of returns (inversely) to those in Table 5. One might conclude that we have therefore just documented the widely-recognized Fama and French book-to-price effect in stock returns. That is not the case. First, the analysis here also involves E/P, as suggested by equation (3) and thus incorporates a feature not in the Fama and French model. As recognized in Penman, Reggiani, Richardson, and Tuna (2014), the Fama and French model does not accommodate the case with no growth (where $r = \frac{E(Earnings_1)}{P_0}$) nor the case of B/P = 1 (where also $r = \frac{E(Earnings_1)}{P_0}$). But, more to the point of this paper, our analysis provides an explanation for the B/P effect in stock returns. While robustly documented as an empirical regularity, the reasons for B/P effect are not well understood, although there are many conjectures.[21] The analysis here provides a rationale. For a given E/P, the investor buying a high B/P stock is, on average, buying a stock with a low ROE, and conservative accounting conveys the information that the low ROE stock is a risky stock. In short, B/P risk is information conveyed by financial reports. [22]

[20] The "approximate" qualification is because ROE is calculated on beginning book value while B/P involves end-of-period book value. The overall (pooled) mean Spearman correlation between B/P and ROE is -0.321.

[21] Conjectures include distress risk, the risk of assets in place, the risk in growth options, "value" versus "growth: risk, to name a few.

[22] Fama and French (2013) test a model that adds profitability factors (like ROE) to their three-factor model and find that ROE adds positively (but weakly) to the explanation of returns. This setup to capture ROE is quite different

It follows that, if the returns to B/P represent priced risk (as many maintain), so do those related to ROE. Again, there is no necessity, as Daniel and Titman (1997) demonstrate in their commentary on the Fama and French model. But a further question arises: Has our accounting analysis explained returns that are not captured by the Fama and French model?

Table 9 investigates. For this analysis, all stocks in a given quintile ROE portfolio within the positive E/P portfolios in Table 5 are grouped into one portfolio. So, for example, the low ROE portfolio in Table 9 consists of all stocks indicated as low ROE in the positive E/P portfolios in Table 5. The table reports calendar-time, time-series regressions of monthly excess returns for the five portfolios on excess returns for the Fama and French factors, the market (MKT), book-to-price (HML), size (SMB), plus a momentum factor (UMD) which is commonly used in a four-factor extension of the model.

The factor betas in Table 9 indicate that ROE portfolio returns are sensitive to the four factors. Indeed, the lower ROE portfolios are more sensitive to the book-to-price (HML) factor, indicating (as explained) that the ROE portfolio returns are related to the B/P return. Further, lower ROE portfolios are more sensitive to the size factor (SMB). This accords with the notion that conservative accounting and the associated risky growth expectations are more prevalent in small firms while large firms are those where growth expectations have been realized. (Indeed, the mean Spearman correlation between size and ROE is 0.418.) However, the regression intercepts (alphas) are the main focus. They are positive and almost monotonically increasing from the high ROE portfolio to the low ROE portfolio. Even though the returns for the low ROE portfolio are more sensitive to the B/P and size factors, they yield the highest intercept returns.

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from ours. Again recognizing that E/P = ROE × B/P adding profitability to a model that already contains B/P, effectively captures E/P. Our structure, in contrast, looks at ROE conditional upon E/P.

The final column in the table reports results for a portfolio that goes long on the high ROE portfolio and short on the low ROE portfolio (a "hedge" portfolio with zero net investment). The alpha return is highly significant. It is clear that the analysis has captured returns not explained by the four-factor model.[23] Whether these returns represent required return for risk that is not identified by the factor model or abnormal returns remains an open question—as in fact are the returns to the Fama and French factors under the Daniel and Titman (1997) critique.

VIII. CONCLUSION

Investment is risky. Conservative accounting recognizes the uncertainty, deferring earnings recognition until the uncertainty has been resolved and expensing investment when it is particularly risky. The effect is to produce lower earnings and a lower book rate of return with growing investment, but a higher book return when earnings from risky investment are realized. Accordingly, book rate of return conveys information about risk. The empirical analysis documents that this is the case; lower book rates of return affected by conservative accounting are associated with more uncertain earnings outcomes. They are also associated with higher average stock returns, so the risk appears to be priced risk. And these are returns that are not captured by standard asset pricing models.

The paper has implications for common interpretations of the book rate of return, a metric used so often by analysts. The findings provide no support for the conjecture, typical in asset pricing research, that higher book returns indicate higher risk, on average. They also have implications for those who would correct the book rate of return for the effects of conservative

[23] We also estimated intercepts (alphas) for each of the ROE portfolios in Table 5 (with positive E/P) and for the five High-Low "hedge" portfolios in the bottom row of Panel A of that table. The alphas for the five hedge portfolios, 1 to 5, were -0.245, -0.463, -0.432, -0.164, and -0.502, respectively. With the exception of portfolio 4, these intercepts were significant different from zero.

accounting to obtain a better superior measure of profitability. Those corrections are based on the presumption that conservative accounting is noise to be removed in evaluating profitability. That might be warranted when one is attempting to assess the profitability of a past investment ex post, but investors buy going concerns where firms continually invest to generate earnings. So, the primary concern is with the risk of investments currently being made, going forward. This paper indicates that conservative accounting supplies information to this investor: Beware of a low book rate of return, for that may convey risk. Though low, that return may indicate that the firm is potentially very profitable, but that is uncertain. Accordingly, adjustments that purge book return for the effects of conservative accounting remove information that is relevant for the evaluation of risk and expected return.

There is a final qualification. The returns documented in the paper have been interpreted as compensation for risk, a standard presumption in asset pricing research. There is no necessity, of course, for the returns could also be abnormal returns due to mispricing of the information in book rate of return. Indeed, the perceptive reader will recognize that an earlier paper of ours, Penman and Zhang (2002), also documented returns associated with conservative accounting and there we chose, perhaps cavalierly, to attribute the returns to investors not understanding the effects of conservative accounting. In the absence of a generally accepted asset pricing model to benchmark required returns, the attribution to efficient markets versus inefficient markets cannot be sorted out. However, the association of conservative accounting with risk via an accounting principle for recognizing earnings under uncertainty gives credence to interpreting the returns as connected to risk. The empirical association of conservative accounting with risky earning outcomes in this paper lends further support.

APPENDIX

Calculation of Variables

Dependent Variables	
R_{t+1}	One-year, buy-and-hold return calculated from CRSP monthly returns, starting at the beginning of the fourth month after the current fiscal year end. For firms that are delisted during the 12 months, the return for the remaining months is calculated by first applying the CRSP delisting return and then reinvesting any remaining proceeds at the risk-free rate. This mitigates concerns with potential survivorship biases. Firms that are delisted for poor performance (delisting codes 500 and 520-584) frequently have missing delisting returns (see Shumway 1997). We control for this potential bias by applying delisting returns of -100% in such cases. Results are qualitatively similar if we make no such adjustment. Final accounting data for a fiscal year are presumed to have been published during the three months after fiscal-year end (and before the beginning of the return period).
Levered Variables	
$Earnings_t$	Earnings for fiscal-year t before extraordinary items (Compustat item IB) and special items (item SPI), minus preferred dividends (item DVP), with a tax allocation to special items at the prevailing federal statutory corporate income tax rate for the year.
B_t	Book value of common equity at the end of fiscal-year t. Book value is Compustat common equity (item CEQ) plus any preferred treasury stock (item TSTKP) less any preferred dividends in arrears (item DVPA).
P_t	Market value of equity three months after fiscal-year end for year t. It is calculated as the number of shares outstanding at the end of the fiscal year from Compustat multiplied by the price per share from CRSP at three months after fiscal-year end, adjusted for any intervening stock splits and stock dividends. This excludes any change in the market price from net share issues over the three months. Market price can also be calculated as per-share price at three months after fiscal-year end, adjusted for stock splits and stock dividends over the three months. E/P is based on this price. For this calculation, earnings are on a per-share basis.
Beta	Estimated from monthly returns up to 60 months up to the third month after fiscal-year end by regressing returns on the value-weighted CRSP market index.
Unlevered Variables	
OI_t	Operating income for fiscal-year t before extraordinary items (Compustat item IB) and special items (item SPI), with a tax allocation to special items at the prevailing federal statutory corporate income tax rate for the year. Calculated as $Earnings_t + NFE_t$.
NFE_t	Net financial expense for fiscal-year t, calculated as after-tax interest expense (XINT × (1- marginal tax rate)) plus preferred dividends (item DVP) and minus after-tax interest income (item IDIT × (1- marginal tax rate)).
NFO_t	Net financial obligations at the end of fiscal year t, the difference between financial obligations and financial assets, as measured in Nissim and Penman (2001).

NOA_t	Net operating assets at the end of year t, measured as net financial obligations plus book value of common equity plus minority interest (item MI).
P_t^{NOA}	The market value of operations (enterprise value) at the end of fiscal-year t, measured as equity market capitalization plus net financial obligations at the end of fiscal-year t.
Conservative Accounting Variables	
C-score$_t$	Estimated reserves from conservative accounting at the end of fiscal year t, as described in the text.
ΔC_t	The change in estimated reserves during fiscal year t.

REFERENCES

Amir, E., Y. Guan, and G. Livne. 2007. The relative association of R&D and capital expenditures with subsequent earnings variability. *Journal of Business Finance and Accounting* 34, 222-246.

Beaver, W. and S. Ryan. 2000. Biases and lags in book value and their effects on the ability of the book-to-market ratio to predict book return on equity. *Journal of Accounting Research* 38, 127-148.

Brief, R. and R. Lawson. 1992. The role of the accounting rate of return in financial statement analysis. *The Accounting Review* 67, 411-426.

Bublitz, B. and M. Ettredge. 1989. The information in discretionary outlays: Advertising, research, and development. *The Accounting Review* 64, 108-124.

Chambers, D., R. Jennings, R.B. Thompson II. 2002. Excess returns to R&D-intensive firms. *Review of Accounting Studies* 7, 133-158.

Chan, L.K.C., J. Lakonishok, and T. Sougiannis. 2001. The stock market valuation of research and development expenditures. *Journal of Finance* 56, 2431-2457.

Chen, L., R. Novy-Marx, and L. Zhang. 2010. An alternative three-factor model. Unpublished paper, Washington University in St. Louis, University of Chicago, University of Michigan.

Daniel, K., and S. Titman. 1997. Evidence on the characteristics of cross sectional variation in stock returns. *Journal of Finance* 52, 1-33.

Danielson, M. and E. Press. 2003. Accounting returns revisited: evidence of their usefulness in estimating economic returns. *Review of Accounting Studies* 8, 493-530.

Donelson, D. and R. Resutek. 2012. The effect of R&D on future returns and earnings forecasts. *Review of Accounting Studies* 17, 848-876.

Dutta, S. and S. Reichelstein. 2005. Accrual accounting for performance evaluation. *Review of Accounting Studies* 10, 527-552.

Eberhart, A.C., W.F. Maxwell, A.R. Siddique. 2004. An examination of long-term excess stock returns and operating performance following R&D increases. *Journal of Finance* 59, 623-651.

Fama, E. 1970. Efficient capital markets: A review of theory and empirical work. *Journal of Finance* 25, 383-417.

Fama, E., and K. French. 1992. The cross-section of expected stock returns. *Journal of Finance* 47, 427-465.

Fama, E., and K. French. 1993. Common risk factors in the returns of stocks and bonds. *Journal of Financial Economics* 33, 3-56.

Fama, E. and K. French. 2006. Profitability, investment and average returns. *Journal of Financial Economics* 82, 491-518.

Fama, F., and K. French. 2013. A four-factor model for the size, value, and profitability patterns in stock returns. Unpublished paper, University of Chicago and Dartmouth College.

Feltham, G. and J. Ohlson. 1995. Valuation and clean surplus accounting for operating and financial activities. *Contemporary Accounting Research* 11, 689-731.

Financial Accounting Standards Board (FASB). 1975. *Statement of Concepts No.2: Qualitative Characteristics of Accounting Information.* Stamford, CT: FASB.

Fisher, F. and J. McGowan. 1983. On the misuse of accounting rates of return to infer monopoly profits. *American Economic Review* 73, 82-97.

Greenball, M. 1969. Appraising alternative methods of accounting for accelerated tax depreciation: a relative-accuracy approach. *Journal of Accounting Research* 7, 262-289.

Hall, B. 1993. Industrial research during the 1980s: Did the rate of return fall? *Brookings Papers on Economic Activity, Microeconomics*, 289-344.

Hou, K., C. Xue, and L. Zhang. 2012. Digesting anomalies: An investment approach. Unpublished paper, Ohio State University.

Johansson, S., and L. Östman.1995. *Accounting Theory: Integrating Behavior and Measurement*. London: Pitman Publishing.

Kothari, S., T. Laguerre, and A. Leone. 2002. Capitalizing versus expensing: Evidence on the uncertainty of future earnings from capital expenditures versus R&D outlays. *Review of Accounting Studies* 7, 355-382.

Lev, B., and T. Sougiannis. 1996. The capitalization, amortization and value-relevance of R&D. *Journal of Accounting and Economics* 21, 107-138.

Lev, B., B. Sarath, and T. Sougiannis. 2005. R&D reporting biases and their consequences. *Contemporary Accounting Research* 22, 977-1026.

Liu, J., J. Ohlson, and W. Zhang. 2013. A comparison of Chinese and US firms' profitability. Unpublished paper, Cheung Kong Graduate School of Business and New York University.

Livingstone, J. and G. Salamon. 1970. Relationship between the accounting and the internal rate of return measures: a synthesis and an analysis. *Journal of Accounting Research* 2, 199-216.

McNichols, M., Rajan, M., and S. Reichelstein. 2013. Conservatism correction for the market-to-book ratio and Tobin's *q*. Forthcoming, *Review of Accounting Studies*.

Monahan, S. 2005. Conservatism, growth, and the role of accounting numbers in the fundamental analysis process. *Review of Accounting Studies* 10, 227-260.

Nissim, D. and S. Penman. 2001. Ratio analysis and equity valuation: from research to practice. *Review of Accounting Studies* 6, 109-154.

Nissim, D., and S. Penman. 2003. Financial statement analysis of leverage and how it informs about profitability and price-to-book ratios. *Review of Accounting Studies* 8, 531-560.

Novy-Marx, R. 2012. The other side of value: The gross profitability premium. *Journal of Financial Economics* 108, 1-28.

Ohlson, J. 2008. Risk, growth, and permanent earnings. Unpublished paper, New York University, Stern School of Business.

Penman, S. 1991. An evaluation of accounting rate-of-return. *Journal of Accounting, Auditing and Finance* (Spring), 233-255.

Penman, S. 2012. *Accounting for Value*. New York: Columbia University Press.

Penman, S. 2013. *Financial Statement Analysis and Security Valuation*, 5th ed. New York: McGraw-Hill/Irwin.

Penman, S, F. Reggiani, S. Richardson, and İ. Tuna. 2014. An accounting-based characteristic model for asset pricing. Unpublished paper, Columbia University, Bocconi University, and London Business School.

Penman, S. and X. Zhang. 2002. Accounting conservatism, the quality of earnings, and stock returns. *The Accounting Review* 77, 237-264.

Rajan, M. and S. Reichelstein. 2009. Depreciation rules and the relation between marginal and historical cost. *Journal of Accounting Research* 47, 823-865.

Rajan, M., S. Reichelstein, and M. Soliman. 2007. Conservatism, growth, and return on investment. *Review of Accounting Studies* 12, 325-370.

Rogerson, W. 1997. Intertemporal cost allocation and managerial investment incentives: a theory explaining the use of economic value added as a performance measure. *Journal of Political Economy* 105, 770-795.

Rogerson, W. 2008. Intertemporal cost allocation and investment decisions. *Journal of Political Economy* 116, 931-950.

Shroff, P. 1995. Determinants of the returns-earnings correlation. *Contemporary Accounting Research* 12, 41-55.

Shumway, T. 1997. The delisting bias in CRSP data. *Journal of Finance* 52, 327-340.

Stewart, G. 1990. *The quest for Value: A Guide for Senior Managers*. New York: HarperCollins Publishers.

Vuolteenaho, T. 2002. What drives firm-level stock returns? *Journal of Finance* 57, 233-264.

Zhang, X. 2000. Conservative accounting and equity valuation. *Journal of Accounting and Economics* 29, 125-149.

TABLE 1

Distribution of Variables

This table reports the average of annual cross-sectional distributions from 1963 to 2012. For the calculation of means and standard deviations, except returns, all variables are trimmed at the top and bottom two percent, each year. There is a maximum of 156,646 firm-years observations, though less for some variables.

Variable	*Mean*	*Median*	*St. Dev.*	*Q1*	*Q3*
Return	0.176	0.073	0.653	-0.184	0.373
Beta	1.220	1.151	0.619	0.763	1.629
E/P	0.009	0.056	0.163	-0.011	0.091
ROE	0.046	0.097	0.245	-0.020	0.179
RNOA	0.034	0.094	0.362	0.004	0.172
NFO/P	0.347	0.132	0.719	-0.070	0.546
C-score	0.279	0.082	0.615	-0.006	0.328
ΔC-score	0.017	0.004	0.239	-0.068	0.086

Accounting data are from Compustat and returns and price data are from CRSP. Financial and utility firms are excluded. The appendix describes the calculation of the variables.

Return, R_{t+1}, is the one-year, buy-and-hold return from the beginning of the fourth month after the current fiscal year end.

Beta is estimated from monthly returns over a 60-month period up to the third month after the end of the current fiscal year.

E/P is the (levered) earnings-to-price ratio reported for the fiscal year, calculated as earnings divided by the market price at the end of the third month after the fiscal year end.

ROE is the (levered) book rate of return, earnings divided by book value of common equity at the beginning of the fiscal-year.

RNOA is unlevered (enterprise) book rate of return, calculated as enterprise earnings (OI) divided by net operating assets (NOA) at the beginning of the fiscal year.

NFO/P is market leverage at the end of fiscal-year *t*, with the market value of net financial obligations approximated by its book value, NFO.

C-score is the estimated amount of reserve due to conservative accounting relative to net operating assets; ΔC is the change in C-score during the fiscal year.

TABLE 2

Average Pearson and Spearman Correlations Between Variables

This table reports averages of annual correlation coefficients across the sample years. Pearson correlations are presented in the upper diagonal and Spearman correlations in the lower diagonal. For the Pearson correlations, all variables are trimmed at the top and bottom two percent, except for returns. Variables are defined in the notes to Table 1.

	Return	***Beta***	***E/P***	***ROE***	***RNOA***	***NFO/P***	***C-score***	***ΔC***
Return		-0.033	0.031	0.036	0.031	0.013	0.016	0.022
Beta	-0.059		-0.105	-0.056	-0.066	-0.020	0.068	0.019
E/P	0.135	-0.141		0.558	0.398	-0.101	-0.107	-0.088
ROE	0.083	-0.040	0.620		0.730	-0.159	-0.125	-0.088
RNOA	0.074	-0.045	0.577	0.910		-0.154	-0.159	-0.092
NFO/P	0.000	-0.034	0.043	-0.139	-0.294		-0.222	-0.028
C-score	0.022	0.063	-0.096	-0.052	0.005	-0.339		0.332
ΔC	0.024	0.014	-0.077	-0.085	-0.104	-0.040	0.316	

TABLE 3

Characteristics of Portfolios Formed by Ranking on ROE and RNOA

This table reports characteristics of portfolios formed by ranking on ROE and RNOA. Values reported are the average of the portfolio medians, over the sample years, except for return which is the mean of the portfolio mean returns. With the exception of the ranking variable, ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively from a comparison of means with their standard error estimated from the time series on means. Variables are defined in the note to Table 1.

Panel A: Portfolios Formed by Ranking on ROE

Portfolios	*Return*	*ROE*	*RNOA*	*Beta*	*NFO/P*	*E/P*	*C-score*	*ΔC-score*
LOW	0.151	-0.436	-0.367	1.393	0.306	-0.170	0.305	0.044
2	0.203	-0.129	-0.120	1.328	0.254	-0.099	0.162	0.028
3	0.197	-0.012	-0.002	1.248	0.236	-0.003	0.089	0.011
4	0.197	0.045	0.052	1.166	0.225	0.045	0.066	0.005
5	0.191	0.081	0.082	1.155	0.192	0.067	0.061	0.004
6	0.173	0.112	0.107	1.127	0.160	0.078	0.064	0.003
7	0.167	0.141	0.131	1.131	0.130	0.080	0.066	0.002
8	0.175	0.175	0.162	1.152	0.089	0.079	0.070	-0.000
9	0.166	0.222	0.206	1.198	0.057	0.075	0.084	-0.001
HIGH	0.168	0.329	0.283	1.274	0.028	0.071	0.105	-0.004
HIGH-LOW	0.017	0.765***	0.650***	-0.119**	-0.278***	0.242***	-0.200***	-0.048***

Panel B: Portfolios Formed by Ranking on RNOA

Portfolios	*Return*	*ROE*	*RNOA*	*Beta*	*NFO/P*	*E/P*	*C-score*	*ΔC-score*
LOW	0.174	-0.296	-0.539	1.414	0.224	-0.131	0.556	0.070
2	0.183	-0.114	-0.097	1.319	0.368	-0.082	0.143	0.035
3	0.191	-0.005	0.011	1.213	0.423	0.001	0.054	0.010
4	0.200	0.052	0.055	1.154	0.414	0.049	0.039	0.007
5	0.183	0.088	0.082	1.133	0.373	0.071	0.037	0.004
6	0.184	0.119	0.105	1.128	0.283	0.079	0.045	0.003
7	0.173	0.148	0.132	1.139	0.177	0.082	0.060	0.002
8	0.179	0.176	0.167	1.145	0.078	0.079	0.078	0.001
9	0.152	0.210	0.226	1.191	0.000	0.074	0.104	-0.003
HIGH	0.164	0.262	0.388	1.277	-0.073	0.065	0.205	-0.015
HIGH-LOW	-0.011	0.558***	0.927***	-0.138***	-0.296***	0.198***	-0.351***	-0.085***

TABLE 4

Mean Returns for Portfolios Formed by Ranking on ΔC

Panel A reports mean returns earned on portfolios formed by ranking on ΔC each year. Panel B reports mean return for portfolios formed by ranking on ΔC each year within each RNOA decile portfolio. Panel C reports mean return for portfolios formed by ranking on ΔC each year within C-score decile portfolios. The flags, ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on t-statistics calculated as the mean return divided by a standard error estimated from the time series of means.

Panel A: Returns for Portfolios Formed by Ranking on ΔC-score, in Percent

	ΔC Decile Portfolios										
	LOW	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*HIGH*	*HIGH-LOW*
Return	14.21	15.87	15.40	16.98	15.34	16.97	17.96	18.51	20.48	22.27	8.06***

Panel B: Returns for Portfolios Formed by Ranking on ΔC-score within each RNOA Decile, in Percent

		RNOA Decile Portfolios									
		LOW	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*HIGH*
ΔC Portfolios	LOW	11.10	14.11	17.17	19.54	15.61	17.16	16.81	16.65	12.07	14.63
	MEDIUM	8.93	16.96	18.39	17.81	17.61	17.58	16.18	17.55	15.75	15.05
	HIGH	22.57	22.80	21.38	23.13	21.53	20.26	19.18	18.95	18.38	17.57
	HIGH-LOW	11.47***	8.70***	4.21***	3.60**	5.91***	3.12**	2.36*	2.30	6.31***	2.94**

Panel C: Returns for Portfolios Formed by Ranking on ΔC-score within C-score Decile Portfolio, in Percent

			C-score Decile Portfolios									
		ALL	*LOW*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*HIGH*
ΔC Portfolios	LOW	15.87	12.14	15.51	16.65	15.36	15.12	15.84	15.61	16.27	16.89	19.67
	MEDIUM	17.52	13.78	14.13	14.36	15.20	17.14	16.68	18.47	19.51	20.83	23.72
	HIGH	18.92	14.62	16.17	16.98	15.54	18.10	18.16	19.52	20.22	21.51	25.04
	HIGH-LOW	3.05***	2.48	0.66	0.32	0.18	2.97**	2.32*	3.91**	3.95***	4.62***	5.37***

TABLE 5

Mean Returns and ΔC for Portfolios Formed by Ranking on ROE within E/P Portfolios

Panel A reports mean returns earned on portfolios formed each year by ranking on ROE within E/P portfolios. E/P quintile portfolios are formed from firms with positive earnings, with firms with negative earnings assigned to their own portfolio. Panel B reports mean ΔC for each portfolio. In Panel C, ROE portfolios 1 and 2 within each E/P portfolio consist only of those with ΔC in the highest 40 percent of ΔC from a ranking on ΔC within the E/P portfolio, while portfolios 4 and 5 consist only of firms with the lowest 40 percent of ΔC from that ranking. The flags, ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on t-statistics calculated as the mean divided by a standard error estimated from the time series of means.

Panel A: Returns for Portfolios Formed by Ranking on ROE within each E/P Portfolio, in Percent

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		18.47	13.74	14.72	16.64	19.29	23.81	10.06***
ROE Quintile	LOW	10.08	19.48	20.73	22.05	23.31	25.73	
	2	17.40	16.19	15.00	15.80	18.88	24.89	
	3	20.27	13.65	12.19	15.08	18.36	23.20	
	4	24.42	9.31	12.15	15.25	17.16	23.42	
	HIGH	18.80	10.14	13.73	15.18	18.76	21.81	
HIGH-LOW		8.72**	-9.34***	-7.01***	-6.87***	-4.54**	-3.93**	

Panel B: ΔC for Portfolios Formed by Ranking on ROE within each E/P Portfolio

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		2.23	0.13	0.32	0.10	0.13	-0.10	-0.23**
ROE Quintile	LOW	4.71	0.33	0.44	0.31	0.48	0.24	
	2	5.89	0.22	0.84	0.35	0.11	-0.12	
	3	2.64	0.36	0.62	0.06	0.32	-0.04	
	4	1.95	0.05	0.34	0.05	-0.35	-0.09	
	HIGH	1.14	-0.62	-0.68	-0.41	-0.26	-0.88	
HIGH-LOW		-3.57***	-0.95**	-1.12***	-0.73***	-0.74***	-1.11***	

Panel C: Returns for Portfolios Formed by Ranking on ROE and ΔC within each E/P Portfolio in Percent

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		18.47	13.74	14.72	16.64	19.29	23.81	10.06***
ROE Quintile	LOW	11.65	20.74	23.04	23.54	26.26	28.67	
	2	17.53	19.25	18.19	17.08	20.28	26.02	
	3	20.27	13.65	12.19	15.08	18.36	23.20	
	4	17.36	7.63	11.95	12.99	14.73	23.62	
	HIGH	17.32	6.50	12.63	13.16	16.26	18.50	
HIGH-LOW		5.67	-14.24***	-10.41***	-10.37***	-10.00***	-10.17***	

TABLE 6

Average Standard Deviation and Interdecile Range (IDR) of Realized Earnings-to-Price One Year Ahead for Portfolios formed by Ranking on ROE within Each E/P Portfolios

The reported numbers are means over years of within portfolio measures each year. The flags, ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on t-statistics calculated as the mean divided by a standard error estimated from the time series of means.

Panel A: Mean Standard Deviation of $Earnings_1/P_0$ for Portfolios Formed by Ranking on ROE within each E/P Portfolio

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		0.16	0.08	0.07	0.06	0.07	0.09	0.01***
ROE Quintile	LOW	0.17	0.12	0.11	0.09	0.10	0.12	
	2	0.18	0.09	0.07	0.06	0.06	0.09	
	3	0.18	0.07	0.05	0.04	0.05	0.08	
	4	0.16	0.05	0.04	0.03	0.04	0.08	
	HIGH	0.15	0.04	0.04	0.04	0.05	0.08	
HIGH-LOW		-0.02***	-0.09***	-0.07***	-0.05***	-0.05***	-0.04***	

Panel B: Mean Interdecile Range (IDR) of Earnings$_1$/P$_0$ for Portfolios Formed by Ranking on ROE within each E/P Portfolio

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		0.40	0.14	0.10	0.09	0.11	0.18	0.04***
ROE Quintile	LOW	0.41	0.27	0.22	0.19	0.19	0.27	
	2	0.44	0.19	0.11	0.10	0.11	0.17	
	3	0.44	0.13	0.07	0.07	0.09	0.15	
	4	0.37	0.08	0.05	0.06	0.08	0.15	
	HIGH	0.33	0.06	0.06	0.07	0.09	0.17	
HIGH-LOW		-0.08***	-0.21***	-0.17***	-0.12***	-0.10***	-0.10***	

TABLE 7

Average Earnings Growth Rates Two Years Ahead and Variation in Growth Rates for Portfolios Formed By Ranking Firms on ROE within Each E/P Portfolio

Mean growth rates in Panel A are the mean over years of the median portfolio growth rate each year. The volatility measures in Panels B and C are the mean over years of the within-portfolio numbers each year. Earnings growth rates are calculated as $\frac{Earnings_{t+2} - Earnings_{t+1}}{(|Earnings_{t+2}| + |Earnings_{t+1}|)/2}$. This measure accommodates small and negative denominators, and ranges between 2 and -2. The flags, ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on t-statistics calculated as the mean divided by a standard error estimated from the time series of means.

Panel A: Mean Earnings Growth Rates Two Years Ahead

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		0.20	0.19	0.14	0.11	0.09	0.06	-0.13***
ROE Quintile	LOW	0.17	0.27	0.20	0.17	0.14	0.10	
	2	0.25	0.29	0.17	0.13	0.09	0.08	
	3	0.19	0.21	0.14	0.10	0.09	0.06	
	4	0.24	0.17	0.13	0.10	0.08	0.04	
	HIGH	0.27	0.17	0.12	0.09	0.08	0.03	
HIGH-LOW		0.10**	-0.10***	-0.08***	-0.08***	-0.06***	-0.07***	

Panel B: Mean Standard Deviation of Earnings Growth Rates Two Years Ahead

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		0.86	0.70	0.54	0.50	0.51	0.58	-0.11***
ROE Quintile	LOW	0.78	0.87	0.69	0.66	0.63	0.67	
	2	0.82	0.77	0.60	0.53	0.52	0.57	
	3	0.86	0.69	0.50	0.42	0.47	0.52	
	4	0.90	0.62	0.42	0.41	0.43	0.55	
	HIGH	0.94	0.51	0.45	0.44	0.48	0.56	
HIGH-LOW		0.16***	-0.36***	-0.25***	-0.22***	-0.15***	-0.11***	

Panel C: Mean Interdecile Range of Earnings Growth Rates Two Years Ahead

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		2.29	1.78	1.19	1.07	1.12	1.33	-0.44***
ROE Quintile	LOW	1.96	2.27	1.79	1.59	1.56	1.67	
	2	2.13	2.03	1.41	1.17	1.21	1.30	
	3	2.26	1.76	1.10	0.88	1.02	1.21	
	4	2.32	1.50	0.85	0.82	0.91	1.21	
	HIGH	2.41	1.16	0.93	0.94	1.06	1.31	
HIGH-LOW		0.45***	-1.11***	-0.86***	-0.65***	-0.50***	-0.36***	

TABLE 8

Earnings Betas and Up-market and Down-market Earnings Betas for Portfolios formed by Ranking on ROE within Each E/P Quintile

The earnings betas are slope coefficients from estimating the following time-series regression of portfolio earnings on market-wide earnings:

$$\text{Portfolio}\frac{Earnings_1}{P_0}(t) = \alpha + \beta \cdot \text{Market}\frac{Earnings_1}{P_0}(t) + \varepsilon_t$$

Only firms with fiscal years ending December 31 are included. Portfolio earnings yield is the average earnings yield for the portfolio and the market earnings yield is the average earnings yield for all stocks in the sample for the relevant year. The flags, ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively, based on a t-statistic on differences in β coefficients from regressions for high and low portfolios estimated in time series as a simultaneous system. Up-market years are those when market earnings were higher than the previous year and down-market years are those when market earnings are less than the prior year.

Panel A: Unconditional Earnings Betas

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		1.13	0.41	0.44	0.52	0.65	0.80	0.39***
ROE Quintile	LOW	1.42	0.67	0.67	0.68	0.89	0.98	
	2	1.40	0.55	0.47	0.56	0.64	0.82	
	3	1.09	0.39	0.39	0.49	0.59	0.75	
	4	0.83	0.26	0.37	0.46	0.57	0.72	
	HIGH	0.69	0.22	0.34	0.43	0.56	0.73	
HIGH-LOW		-0.73***	-0.45***	-0.34***	-0.25***	-0.33***	-0.24**	

Panel B: Up-market Earnings Betas

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		1.09	0.47	0.47	0.58	0.72	0.82	0.35***
ROE Quintile	LOW	1.28	0.73	0.69	0.81	0.98	0.92	
	2	1.43	0.63	0.51	0.61	0.65	0.88	
	3	1.11	0.46	0.40	0.51	0.72	0.78	
	4	0.75	0.34	0.39	0.50	0.66	0.77	
	HIGH	0.71	0.28	0.38	0.48	0.59	0.78	
HIGH-LOW		-0.57**	-0.45***	-0.31***	-0.33***	-0.38***	-0.14	

Panel C: Down-market Earnings Betas

		Negative E/P	*Positive E/P Quintile*					
			LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
		1.19	0.34	0.42	0.46	0.57	0.77	0.43***
ROE Quintile	LOW	1.57	0.62	0.66	0.55	0.80	1.04	
	2	1.40	0.47	0.42	0.51	0.62	0.76	
	3	1.10	0.34	0.39	0.45	0.47	0.72	
	4	0.92	0.17	0.34	0.42	0.49	0.67	
	HIGH	0.68	0.16	0.29	0.38	0.53	0.68	
HIGH-LOW		-0.89**	-0.45***	-0.37**	-0.17	-0.27**	-0.35**	

TABLE 9

Regressions of Monthly Portfolio Excess Returns for ROE Quintile Portfolios on Contemporaneous Fama-French and Momentum Factor Returns

ROE portfolios are formed each year by grouping all stocks in a given ROE quintile (with positive E/P) into one portfolio, yielding five ROE portfolios. α, and β_{MKT} , β_{HML} , β_{SMB} , β_{UMD} are the estimated intercept and slope coefficients from time-series regressions of portfolio excess returns on the market premium, book-to-market, size, and momentum factor returns. The flags, ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on t-statistics calculated as the mean divided by a standard error estimated from the time series of means. Returns for so-called MKT, HML, SMB, and UMD factors are from Kenneth French's web site at the Tuck School at Dartmouth.

	ROE Quintiles					
	LOW	*2*	*3*	*4*	*HIGH*	*HIGH-LOW*
α (%)	0.350^{***}	0.126	0.062	0.069	-0.011	-0.361^{***}
β_{MKT}	1.016^{***}	0.968^{***}	0.994^{***}	0.994^{***}	1.063^{***}	0.048^{**}
β_{HML}	0.318^{***}	0.178^{***}	-0.002	-0.111^{***}	-0.223^{***}	-0.541^{***}
β_{SMB}	0.070^{**}	-0.038	-0.159^{***}	-0.215^{***}	-0.205^{***}	-0.275^{***}
β_{UMD}	-0.019	0.043^{***}	0.046^{***}	0.045^{***}	0.038^{**}	0.058^{***}
N	597	597	597	597	597	597
Adj. R^2	0.943	0.926	0.918	0.915	0.915	0.395