

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

***Stephen H. Penman\****

*Graduate School of Business*

*Columbia University*

shp38@columbia.edu

and

***Xiao-Jun Zhang***

*Haas School of Business of Business*

*University of California, Berkeley*

xzhang@haas.berkeley.edu

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**ABSTRACT.** This paper investigates how the book rate of return relates to risk and the required return for investing and describes the role of conservative accounting in making the connection. The effect of conservative accounting on the book rate of return has been extensively modeled, but that modeling sees conservative accounting as noise that has no effect on valuation and a nuisance to be removed in using the book rate of return in performance evaluation. In contrast, this paper shows that conservative accounting conveys information about the risk and that, in turn, bears on the interpretation of the book rate of return. Rather than viewing the book rate of return as a measure of profitability to be compared to the required return to assess superior profitability, the paper shows that the book rate of return conveys information about the required return. However, while the standard risk-return relation might predict 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. Our empirical analysis shows that the market prices equities accordingly.

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

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

## **I. INTRODUCTION**

This paper investigates how book rate of return under GAAP relates to risk and the required return for investing. A standard 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, 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 of book return on equity (ROE) as an indicator of the 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 (including the capitalization of brand assets and R&D) 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 uncertainty has largely been resolved.<sup>1</sup> 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.

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<sup>1</sup> 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.<sup>2</sup>

These properties are simply by construction of the accounting, and are well known. The insight in this paper is to connect conservative accounting 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. 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 deferral of revenue recognition and the expensing of investment result in lower net assets on the balance sheet and, correspondingly, lower earnings, *ceteris paribus*.

In confirmation that conservative accounting is a reaction to uncertainty, this paper shows that conservative accounting is associated with a higher variance in earnings 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 conservative accounting are more sensitive to market-wide beta shocks. And conservative accounting is associated with higher

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<sup>2</sup> Penman (2013, Chapter 17) provides examples and the Rajan, Reichelstein, and Soliman (2007) four quadrants depicts it well.

average stock returns that one expects as a reward for bearing risk. Further, higher average stock returns are associated with book rates of return that are depressed with the numerator effect of conservative accounting.

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.<sup>3</sup> 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 potentially high profitability, but expected profitability that is at risk: The investment in R&D

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<sup>3</sup> 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.



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 27 percent in 2013 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.<sup>4</sup>

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.<sup>5</sup>

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<sup>4</sup> 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.

<sup>5</sup> 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 ACCOUNTING 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.<sup>6</sup>

We do, however, gain some insights from the characteristic model of Penman, Reggiani, Richardson, and Tuna (2012) 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

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

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

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<sup>6</sup> 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 2012. 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 is no growth in investment in R&D. 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 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.<sup>7</sup> 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.<sup>8</sup> 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.

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 assumes

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<sup>7</sup> 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.

<sup>8</sup> 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.

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. However, the connection of conservative accounting to priced risk remains an empirical question, to which we now turn.<sup>9</sup>

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 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.

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<sup>9</sup> 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 Resuttek (2012) see the returns as part of the value-growth spread phenomenon.

#### IV. DATA, VARIABLE CALCULATION, AND SUMMARY STATISTICS

Our sample covers all U.S. firms available on Compustat files for any of the years, 1963-2011, 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.<sup>10</sup> 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 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:

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

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<sup>10</sup> Firms classified as Membership Organization or Unknown SIC are also excluded from our analysis.

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:

$$C_{it} = (\text{RD}_{it}^{\text{res}} + \text{ADV}_{it}^{\text{res}} + \text{INV}_{it}^{\text{res}} + \text{BD}_{it}^{\text{res}} + \text{DEP}_{it}^{\text{res}} + \text{DEF.REV}_{it}^{\text{res}} + \text{ACC.EXP}_{it}^{\text{res}}) / \text{NOA}_{it}. \quad (4a)$$

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

- R&D reserve ( $\text{RD}_{it}^{\text{res}}$ ) 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 ( $\text{ADV}_{it}^{\text{res}}$ ) 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 ( $\text{INV}_{it}^{\text{res}}$ ) equals the LIFO reserve reported in the financial statement footnotes.
- Bad-debt reserve ( $\text{BD}_{it}^{\text{res}}$ ) 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 ( $\text{DEP}_{it}^{\text{res}}$ ) 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 ( $DEF.REV_{it}^{res}$ ) equals the excess amount of deferred revenue, estimated by multiplying NOA by the difference of the deferred-revenue-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 ( $ACC.EXP_{it}^{res}$ ) 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.<sup>11</sup> 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 revenue 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 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.

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<sup>11</sup> 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  $q$ .



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:

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

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 typically 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  $\Delta C$  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  $\Delta C$  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  $\Delta C$  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. 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  $\Delta C$ , is decreasing in the book rate of return: Lower ROE and RNOA, associated with positive  $\Delta C$ , are those where the accounting depresses numerator earnings, while the negative  $\Delta C$  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 Tables 4 and 5 to 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**

Tables 4 and 5 report returns associated with conservative accounting. Our interest is primarily in  $\Delta C$  for this is the measure that captures the numerator effect of conservative accounting on RNOA. However Panel A of Table 4 first reports returns for portfolios formed from a ranking on

C-scores, the level of conservative accounting in the balance sheet and the measure of the denominator effect of conservative accounting on RNOA. Under the canceling error property of accounting, conservative accounting in the balance sheet does not affect earnings, the numerator of the book rate of return, if there is no change in investment. With no effect on earnings (and correspondingly no change in price relative to book value), section 2 shows that conservative accounting does not enter into the assessment of the expected return; this is the no-growth case. However, there is a positive relationship between the C-score and returns in Panel A, though the difference between the returns for the high and low portfolios (H-L) is only marginally significant.

Panel B of Table 4 reports the returns for sorts on the C-score for a given book rate of return: Having observed a given RNOA, is the risk it implies different if the book return is affected by conservative accounting? The results suggest so. The sort on the C-score is within the ten RNOA portfolios in Table 3, with each portfolio divided between low, medium, and high C-scores (a third of the portfolio in each group). The return differences between the high and low C-score portfolios are positive, with the differences larger in the low RNOA portfolios. For these firms, the average return (and the risk they imply) is positively related to the extent to which the denominator of the book return is affected by conservative accounting. An investor observing a stock with a low RNOA affected by conservative accounting should understand that the stock is risky.

However, the C-score and  $\Delta C$  are positively correlated—the average rank correlation is 0.319 in Table 2. It is  $\Delta C$  that captures the numerator effect, and it is this effect that induces a change in premium and expected earnings growth that ties conservative accounting to the expected return in section 2. So Table 5 repeats the design of Table 4, but now with the ranking

on  $\Delta C$  rather than the C-score. In Panel A,  $\Delta C$  ranks returns, with the difference between the high and low portfolio return of 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 5 indicates that the phenomenon is associated with both high and low RNOA. As in Table 4, RNOA portfolios are split into three, but now on  $\Delta C$  rather than the C-score. Note, first, that for a given  $\Delta C$ , there is little variation in returns over RNOA portfolios, except for portfolio 1 (with extreme negative RNOA). But the partitioning on  $\Delta C$  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 by investment growth with conservative accounting. The same applies to low RNOA portfolios but more so, and it is these portfolios where  $\Delta C$  is relatively high in Table 3: These are portfolios the RNOA is particularly depressed by conservative accounting.

Panel B brings another point to the fore. Low  $\Delta C$  are cases where the RNOA is less affected by conservative accounting, so reflect realizations from investment rather than the effect of risky 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  $\Delta C$  suggest so.

The C-score and  $\Delta C$  are positively correlated, and both are correlated with returns to some extent. With a focus on  $\Delta C$  and the numerator effect, the marginal contribution of  $\Delta C$  over the C-score to explaining returns is thus in question. Panel C of Table 5 investigates. Portfolios are now formed on  $\Delta C$  within each C-score portfolio. The difference in returns between high and

low  $\Delta C$  for a given C-score is positive and significant, with the exception of low C-score portfolios where conservative accounting has little impact.<sup>12</sup>

The C-score and  $\Delta C$  are 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 5, replacing  $\Delta C$  with the leverage variable, NFO/P. The returns associated with  $\Delta C$  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 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 6 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.<sup>13</sup>

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<sup>12</sup> In this test, the results were stronger with the less-noisy C-score and  $\Delta C$  involving just R&D, advertising, and inventory. Differences in returns between the high and low  $\Delta C$  portfolios were significant at the 5% level for C-score portfolios 4-10.

<sup>13</sup> 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

Equation (3) shows that, with no expected change in premium (and thus no growth), E/P indicates the required return. Panel A of Table 6 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 indicator 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 6 (down columns) indicates that this is so: For a given positive E/P, ROE is negatively related to returns.<sup>14</sup> Significantly, although E/P and ROE are positively correlated in Table 3 (with a mean rank correlation of 0.617 in Table 2), E/P ranks returns unconditionally here, while ROE (in Table 3) does not. Rather, ROE serves as a supplement to E/P as an indicator of the expected return.

Panel B of Table 6, which reports the mean  $\Delta C$  for each portfolio, provides an explanation: Lower ROE firms have a higher  $\Delta C$ . 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 indicate that the accounting is connected to risk. In contrast, high ROE are associated with negative  $\Delta C$  which indicates the release of reserves into earnings; these are firms with earnings realizations that imply lower risk and return.

These observations apply to firms with positive E/P. For loss firms (with negative E/P) in Table 6, mean returns are positively correlated with ROE (and these are, of, course negative

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return. The mean Spearman 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.

<sup>14</sup> Further analysis shows that the ranking on ROE within E/P portfolios is not just a further ranking on E/P.



ROE). We have no clear interpretation of this finding, 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 6 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 so 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 7 constructs the same portfolios as in Table 6, 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 6. But, to the issue, both measures are decreasing in ROE for a given E/P: The mean returns in Table 6 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 8 reports mean growth rates and the variation in growth rates for the same portfolios in Tables 6 and 7. 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.<sup>15</sup>

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 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.

The variation in earnings growth rates in Panels B and C are decreasing in ROE (for a given E/P) and align with both the mean growth rates in Panel A and the mean returns in Table 6. 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

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<sup>15</sup> 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.

ROE, is reduced with added investment because the outcomes to the investment are uncertain. The results for IDR 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 7 and 8 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 9 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:

$$\text{Portfolio} \frac{\text{Earnings}_1}{P_0}(t) = \alpha + \beta \cdot \text{Market} \frac{\text{Earnings}_1}{P_0}(t) + \varepsilon_t$$

The earnings realizations are for the forward year, that is, the same year during which portfolio returns are observed in Table 1, 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.<sup>16</sup> The average R-square for the regressions is quite

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<sup>16</sup> Results are similar when portfolio earnings and market earnings are calculated as total earnings for the portfolio divided by total portfolio price.

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 4 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 6. Further, the betas are decreasing in ROE for a given E/P portfolio. They, too, align with the returns in Table 6: 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.<sup>17</sup> 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 7 and 8 is due, in part, to sensitivity to systematic shocks.

## VII. 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 is affected by conservative accounting, and this conveys information about risk. The empirical analysis in this paper concludes that conservative

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<sup>17</sup> 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.

accounting coupled with growing investment is indeed associated with higher average stock returns, reflective of higher risk. Conservative accounting connects to risk, as the label might well imply: In the presence of risk, be conservative.

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

<b>Dependent Variables</b>	
$R_{t+1}$	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).
<b>Levered Variables</b>	
$Earnings_t$	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.
<b>Unlevered Variables</b>	
$OI_t$	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 ( $XINT \times (1 - \text{marginal tax rate})$ ) plus preferred dividends (item DVP) and minus after-tax interest income ( $item\ IDIT \times (1 - \text{marginal tax rate})$ ).
$NFO_t$	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.
<b>Conservative Accounting Variables</b>	
$C\text{-score}_t$	Estimated reserves from conservative accounting at the end of fiscal year t, as described in the text.
$\Delta C_t$	The change in estimated reserves during fiscal year t.

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**TABLE 1****Distribution of Variables**

This table reports the average of annual cross-sectional distributions from 1963 to 2011. 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 153,691 firm-years observations, though less for some variables.

<i>Variable</i>	<i>Mean</i>	<i>Median</i>	<i>St. Dev.</i>	<i>Q1</i>	<i>Q3</i>
Return	0.171	0.067	0.652	-0.189	0.367
Beta	1.223	1.154	0.622	0.765	1.634
E/P	0.009	0.057	0.163	-0.011	0.091
ROE	0.047	0.097	0.244	-0.020	0.179
RNOA	0.033	0.094	0.363	0.004	0.172
NFO/P	0.349	0.133	0.719	-0.069	0.549
C-score	0.276	0.081	0.600	-0.007	0.326
$\Delta$ C-score	0.017	0.004	0.238	-0.067	0.085

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;  $\Delta$ C 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.

	<i>Return</i>	<i>Beta</i>	<i>E/P</i>	<i>ROE</i>	<i>RNOA</i>	<i>NFO/P</i>	<i>C-score</i>	$\Delta C$
Return		-0.036	0.034	0.036	0.033	0.012	0.015	0.020
Beta	-0.062		-0.106	-0.056	-0.067	-0.022	0.068	0.019
E/P	0.135	-0.143		0.556	0.395	-0.103	-0.105	-0.088
ROE	0.083	-0.040	0.617		0.730	-0.161	-0.120	-0.090
RNOA	0.074	-0.046	0.574	0.910		-0.157	-0.156	-0.093
NFO/P	-0.001	-0.035	0.041	-0.144	-0.296		-0.222	-0.030
C-score	0.022	0.063	-0.095	-0.051	0.006	-0.336		0.340
$\Delta C$	0.022	0.015	-0.079	-0.085	-0.103	-0.041	0.319	

**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**

<i>Portfolios</i>	<i>Return</i>	<i>ROE</i>	<i>RNOA</i>	<i>Beta</i>	<i>NFO/P</i>	<i>E/P</i>	<i>C-score</i>	$\Delta C\text{-score}$
LOW	0.126	-0.581	-0.566	1.449	0.378	-0.233	0.422	0.049
2	0.191	-0.155	-0.158	1.374	0.263	-0.123	0.196	0.034
3	0.196	-0.020	-0.011	1.267	0.237	-0.011	0.090	0.012
4	0.187	0.044	0.050	1.169	0.223	0.044	0.063	0.006
5	0.187	0.081	0.082	1.153	0.189	0.068	0.059	0.004
6	0.167	0.112	0.108	1.125	0.158	0.079	0.062	0.003
7	0.163	0.144	0.133	1.133	0.126	0.082	0.064	0.002
8	0.169	0.179	0.168	1.164	0.084	0.080	0.071	-0.000
9	0.160	0.232	0.217	1.221	0.051	0.077	0.085	-0.002
HIGH	0.161	0.374	0.331	1.307	0.029	0.075	0.109	-0.006
HIGH-LOW	0.034	0.956	0.897***	-0.142**	-0.349***	0.307***	-0.314***	-0.055***

**Panel B: Portfolios Formed by Ranking on RNOA**

<i>Portfolios</i>	<i>Return</i>	<i>ROE</i>	<i>RNOA</i>	<i>Beta</i>	<i>NFO/P</i>	<i>E/P</i>	<i>C-score</i>	$\Delta C\text{-score}$
LOW	0.140	-0.395	-0.860	1.486	0.237	-0.169	0.849	0.075
2	0.177	-0.141	-0.127	1.356	0.391	-0.113	0.160	0.044
3	0.188	-0.014	0.004	1.228	0.446	-0.011	0.055	0.012
4	0.196	0.049	0.053	1.157	0.441	0.047	0.035	0.007
5	0.177	0.087	0.081	1.133	0.387	0.071	0.036	0.005
6	0.176	0.120	0.106	1.130	0.290	0.081	0.044	0.004
7	0.170	0.149	0.134	1.137	0.172	0.083	0.058	0.002
8	0.172	0.180	0.172	1.157	0.074	0.080	0.078	0.001
9	0.149	0.219	0.240	1.206	-0.006	0.075	0.106	-0.004
HIGH	0.155	0.292	0.472	1.325	-0.083	0.066	0.250	-0.031
HIGH-LOW	0.015	0.687***	1.332	-0.161***	-0.320***	0.235***	-0.599***	-0.106***



**TABLE 4**

**Mean Returns for Portfolios Formed by Ranking on C-score**

Panel A reports mean returns earned on portfolios formed by ranking on the C-score each year. Panel B reports mean return for portfolios formed by ranking on the C-score each year within each RNOA decile portfolio. 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 C-score, in Percent**

	<i>C Portfolios</i>										
	<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>HIGH</i>	<i>H-L</i>
Return	13.59	14.15	14.18	15.32	15.74	15.65	16.68	18.63	18.92	22.11	8.53*

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

		<i>RNOA Deciles</i>									
		<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>HIGH</i>
<i>C Portfolios</i>	LOW	5.95	12.28	15.86	18.58	15.57	15.92	15.93	14.23	11.87	12.43
	MEDIUM	16.60	13.94	16.75	18.99	17.28	17.19	15.66	17.04	15.96	14.71
	HIGH	18.49	24.89	22.58	21.65	19.74	19.65	19.30	19.95	16.90	18.70
	H-L	12.54***	12.62***	6.72**	3.07	4.17**	3.73*	3.37*	5.73**	5.03**	6.27**

**TABLE 5**

**Mean Returns for Portfolios Formed by Ranking on  $\Delta C$**

Panel A reports mean returns earned on portfolios formed by ranking on  $\Delta C$  each year. Panel B reports mean return for portfolios formed by ranking on  $\Delta C$  each year within each RNOA decile portfolio. Panel C reports mean return for portfolios formed by ranking on  $\Delta C$  each year within each C-score decile portfolios. The flags, <sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> 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  $\Delta C$ -score, in Percent**

	<i><math>\Delta C</math> Portfolios</i>										
	<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>HIGH</i>	<i>HIGH-LOW</i>
Return	13.70	15.76	15.32	16.30	15.67	15.77	17.19	17.57	19.79	21.59	7.89 <sup>***</sup>

**Panel B: Returns for Portfolios Formed by Ranking on  $\Delta C$ -score within each RNOA Decile, in Percent**

		<i>RNOA Deciles</i>									
		<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>HIGH</i>
<i><math>\Delta C</math> Portfolios</i>	LOW	9.87	13.52	16.83	19.23	15.27	17.68	16.45	16.81	12.08	14.17
	MEDIUM	9.46	15.14	17.24	16.77	16.94	16.76	15.61	16.67	15.69	14.75
	HIGH	21.93	22.63	21.27	22.73	20.98	18.65	18.72	18.09	17.25	17.02
	HIGH-LOW	12.06 <sup>***</sup>	9.11 <sup>***</sup>	4.45 <sup>**</sup>	3.50 <sup>**</sup>	5.71 <sup>***</sup>	0.97	2.27 <sup>*</sup>	1.28	5.17 <sup>***</sup>	2.86 <sup>**</sup>

**Panel C: Returns for Portfolios Formed by Ranking on  $\Delta C$ -score within Each C-score Decile, in Percent**

		<i>C-score Deciles</i>										
		<i>ALL</i>	<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>HIGH</i>
$\Delta C$ Portfolios	LOW	15.24	12.20	13.80	16.39	13.09	14.65	13.15	14.26	16.75	16.10	19.47
	MEDIUM	17.37	14.79	13.96	12.30	16.11	16.77	16.42	17.21	19.37	20.00	23.37
	HIGH	18.06	14.71	15.70	14.56	16.68	16.77	16.26	19.89	19.47	21.26	24.01
	HIGH-LOW	2.82 <sup>***</sup>	2.52	1.90	-1.83	3.59 <sup>*</sup>	2.12	3.11 <sup>*</sup>	5.63 <sup>***</sup>	2.71	5.17 <sup>***</sup>	4.53 <sup>**</sup>

**TABLE 6**

**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. 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**

		<i>Negative</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
		<i>E/P</i>	<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		17.87	13.25	14.08	16.16	18.73	23.30	
ROE Quintile	LOW	9.17	19.00	20.14	21.72	22.62	25.36	
	2	16.75	15.74	14.17	15.04	18.23	24.42	
	3	19.84	13.00	11.53	14.53	17.86	22.91	
	4	23.96	8.83	11.44	14.75	16.67	22.78	
	HIGH	18.23	9.74	13.27	14.88	18.36	21.11	
HIGH-LOW		9.06**	-9.26***	-6.87***	-6.84***	-4.26**	-4.25**	

**Panel B:  $\Delta C$  for Portfolios Formed by Ranking on ROE within each E/P Portfolio**

		<i>Negative E/P</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
			<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		2.23	0.13	0.29	0.14	0.13	-0.11	-0.24**
ROE Quintile	LOW	4.35	0.30	0.44	0.40	0.39	0.30	
	2	5.89	0.32	0.92	0.31	0.16	-0.06	
	3	2.63	0.51	0.58	0.10	0.37	-0.17	
	4	2.04	-0.02	0.26	0.09	-0.25	-0.20	
	HIGH	1.18	-0.34	-0.63	-0.40	-0.21	-0.91	
HIGH-LOW		-3.16***	-0.63*	-1.07***	-0.80***	-0.60***	-1.21***	

**TABLE 7**

**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, <sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> 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<sub>1</sub>/P<sub>0</sub> for Portfolios Formed by Ranking on ROE within each E/P Portfolio**

		<i>Negative</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
		<i>E/P</i>	<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		0.16	0.08	0.07	0.06	0.07	0.09	0.01 <sup>***</sup>
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	0.07	
	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 <sup>***</sup>	-0.09 <sup>***</sup>	-0.07 <sup>***</sup>	-0.05 <sup>***</sup>	-0.05 <sup>***</sup>	-0.04 <sup>***</sup>	

**Panel B: Mean Interdecile Range (IDR) of Earnings<sub>1</sub>/P<sub>0</sub> for Portfolios Formed by Ranking on ROE within each E/P Portfolio**

		<i>Negative E/P</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
			<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		0.40	0.14	0.10	0.09	0.11	0.18	0.04 <sup>***</sup>
ROE Quintile	LOW	0.42	0.27	0.22	0.19	0.19	0.27	
	2	0.45	0.19	0.11	0.10	0.11	0.17	
	3	0.44	0.13	0.07	0.07	0.09	0.15	
	4	0.38	0.08	0.05	0.06	0.08	0.15	
	HIGH	0.34	0.06	0.06	0.07	0.10	0.17	
HIGH-LOW		-0.08 <sup>***</sup>	-0.21 <sup>***</sup>	-0.17 <sup>***</sup>	-0.12 <sup>***</sup>	-0.09 <sup>***</sup>	-0.10 <sup>***</sup>	

**TABLE 8**

**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**

		<i>Negative</i> <i>E/P</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
			<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		0.20	0.20	0.14	0.11	0.09	0.07	-0.13***
ROE Quintile	LOW	0.16	0.27	0.20	0.17	0.14	0.11	
	2	0.27	0.30	0.17	0.13	0.09	0.09	
	3	0.19	0.21	0.13	0.11	0.09	0.06	
	4	0.22	0.17	0.13	0.19	0.08	0.04	
	HIGH	0.28	0.17	0.12	0.09	0.08	0.03	
HIGH-LOW		0.12***	-0.10***	-0.08***	-0.09***	-0.06***	-0.08***	



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

		<i>Negative E/P</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
			<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		0.86	0.70	0.54	0.50	0.51	0.58	-0.11***
ROE Quintile	LOW	0.79	0.86	0.69	0.66	0.63	0.66	
	2	0.81	0.77	0.60	0.53	0.52	0.57	
	3	0.86	0.68	0.50	0.42	0.46	0.52	
	4	0.90	0.62	0.41	0.41	0.43	0.55	
	HIGH	0.95	0.51	0.45	0.44	0.48	0.55	
HIGH-LOW		0.15***	-0.36***	-0.25***	-0.22***	-0.16***	-0.11***	

**Panel C: Mean Interdecile Range (IDR) of Earnings Growth Rates Two Years Ahead**

		<i>Negative E/P</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
			<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		2.30	1.78	1.19	1.08	1.12	1.34	-0.44***
ROE Quintile	LOW	2.00	2.26	1.78	1.60	1.56	1.64	
	2	2.08	2.03	1.43	1.20	1.19	1.30	
	3	2.35	1.75	1.10	0.88	1.01	1.23	
	4	2.34	1.53	0.85	0.81	0.90	1.21	
	HIGH	2.41	1.18	0.94	0.94	1.05	1.30	
HIGH-LOW		0.42***	-1.08***	-0.85***	-0.66***	-0.51***	-0.34***	

**TABLE 9**

**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:

$$\text{Portfolio } \frac{\text{Earnings}_1}{P_0}(t) = \alpha + \beta \cdot \text{Market } \frac{\text{Earnings}_1}{P_0}(t) + \varepsilon_t$$

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. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively, based on a t-statistic on differences in  $\beta$  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**

		<i>Negative E/P</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
			<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		1.13	0.41	0.45	0.52	0.64	0.79	0.38***
ROE Quintile	LOW	1.39	0.68	0.69	0.68	0.89	0.97	
	2	1.42	0.54	0.48	0.56	0.63	0.82	
	3	1.12	0.40	0.40	0.48	0.59	0.75	
	4	0.83	0.26	0.36	0.46	0.58	0.71	
	HIGH	0.69	0.22	0.33	0.43	0.56	0.74	
HIGH-LOW		-0.70***	-0.46***	-0.35***	-0.25***	-0.33***	-0.22**	

**Panel B: Up-market Earnings Betas**

		<i>Negative E/P</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
			<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		0.89	0.43	0.47	0.58	0.71	0.83	0.40 <sup>***</sup>
<i>ROE Quintile</i>	<i>LOW</i>	0.96	0.70	0.57	0.60	0.95	0.82	
	<i>2</i>	1.17	0.54	0.51	0.64	0.74	0.78	
	<i>3</i>	0.80	0.50	0.43	0.59	0.60	0.90	
	<i>4</i>	0.53	0.27	0.43	0.53	0.62	0.83	
	<i>HIGH</i>	0.60	0.25	0.42	0.52	0.66	0.81	
<i>HIGH-LOW</i>		-0.36	-0.45 <sup>***</sup>	-0.14 <sup>*</sup>	-0.08	-0.29 <sup>**</sup>	-0.01	

**Panel C: Down-market Earnings Betas**

		<i>Negative E/P</i>	<i>Positive E/P Quintile</i>					<i>HIGH-LOW</i>
			<i>LOW</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>HIGH</i>	
		1.25	0.39	0.43	0.49	0.61	0.78	0.39 <sup>***</sup>
<i>ROE Quintile</i>	<i>LOW</i>	1.64	0.62	0.74	0.72	0.85	1.03	
	<i>2</i>	1.53	0.52	0.46	0.52	0.56	0.84	
	<i>3</i>	1.26	0.33	0.37	0.42	0.60	0.66	
	<i>4</i>	0.98	0.27	0.33	0.42	0.57	0.65	
	<i>HIGH</i>	0.73	0.20	0.29	0.38	0.51	0.71	
<i>HIGH-LOW</i>		-0.90 <sup>***</sup>	-0.42 <sup>***</sup>	-0.45 <sup>**</sup>	-0.34 <sup>***</sup>	-0.34 <sup>****</sup>	-0.32 <sup>**</sup>	