Returns to Buying Earnings and Book Value: Accounting for Growth

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Abstract

This paper provides an explanation of how the earnings yield and book-to-price combine to indicate required equity returns, along with empirical support. Earnings yields predict returns, consistent with standard formulas that show that the earnings yield equals the required return when there is no expected earnings growth beyond that from retention. With growth, those same formulas show that the earnings yield is increasing in the required return but decreasing in the growth, and that growth can be accommodated in inferring the required return. However, if growth is risky and so requires a higher return, growth has both an increasing and decreasing effect on the earnings yield, making the determination of the required return from a given earnings yield problematical. The paper shows that book-to-price facilitates the determination: for a given earnings yield, book-to-price indicates additional return associated with expected growth. This finding provides a rationalization of the well-documented book-to-price effect in stock returns: book-to-price indicates the risk in buying earnings and earnings growth. Book-to-price is positively associated with earnings yields (that indicate expected returns) but, in addition, book-to-price indicates risky growth that adds to expected returns. Growth identified by a high book-to-price as yielding a higher return is quite different, however, from "growth" typically attributed to a low book-to-price as yielding a lower return. Accordingly, the notion of "growth" versus "value" is redefined.

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This paper documents that earnings-to-price and book-to-price jointly predict stock returns in a way that is consistent with rational pricing. The documented returns are those from a joint sort on earnings-to-price and book-to-price, a scheme that has been trolled many times by value-growth investors but one developed here with recognition of how accounting for earnings and book value bears on risk. The paper shows that, for a given earnings-to-price, book-to-price indicates expected earnings growth. If both short-term earnings and subsequent earnings growth are at risk – as the accounting suggests – returns to investing on the basis of earnings-to-price and book-to-price are returns for risk born. Accordingly, the paper supplies an accounting explanation for the well-documented book-to-price effect in stock returns.

Research shows that earnings-to-price (the earnings yield) predicts stock returns (in Basu 1977 and 1983 and Jaffe, Keim, and Westerfield 1989, for example). Whether those returns are reward for risk or the result of mispricing is the subject of perennial discussion, but the idea that earnings yields predict return for risk, posited in Ball (1978), has some foundation. First, standard formulas show that the earnings yield equals the required return if there is no expected earnings growth beyond that from retention. Second, beginning with Ball and Brown (1968) and Beaver (1968), a stream of papers documents that realized stock returns are related to earnings realizations. More recently, Dubinsky and Johannes (2006) estimate that a disproportionate portion of anticipated stock price volatility is associated with uncertainty resolution around earnings

announcements. It appears that expected earnings are at risk; investors "buy earnings" and the return outcome depends on the difference between actual and expected earnings.[1]

Research (in Fama and French 1992, for example) shows that book-to-price (B/P) also predicts stock returns, so emphatically so that Fama and French (1993 and 1996) have built asset pricing models based on the observation. The same discussion of rational pricing versus market inefficiency ensues but, despite extensive modeling (and numerous conjectures), the phenomenon remains a mystery. The mystery deepens when it is said that B/P is inversely related to earnings growth while positively related to returns; low B/P stocks (referred to as "growth" stocks) yield lower returns than high B/P stocks (referred as "value" stocks). Yet investment professionals typically think of growth as risky, requiring higher returns, consistent with the risk-return notion that one cannot buy more earnings (growth) without additional risk. The predictable returns to book-to-price have not been reconciled with those associated with earnings yields, even though earnings and book value articulate as a matter of accounting. Fama and French (1992) claim that book-to-price "subsumes" earnings-to-price as an indicator of returns, but one typically thinks of earnings (payoffs) as being at risk rather the book value from which earnings flow.

Earnings yields (E/P) used to predict stock returns are typically short-term (usually annual) yields. But investors buy not only short-term earnings but also

[1] Aggregate earnings yields have been used widely as a predictor of market-wide equity risk premiums, in Fama and French 1998, Campbell and Shiller 1988 and 1998, Campbell and Thompson 2007, and Maio 2007, for example.

subsequent growth in earnings, and one would expect both to be at risk.[2] If so, how do the earnings yield and growth combine to indicate the required return for the risk? The issue is subtle. Under standard formulas, E/P is increasing in the required return but decreasing in expected earnings growth.[3] If growth is risky and requires a higher return, then growth has both an increasing and decreasing effect on E/P, so teasing out the required return from a given earnings yield and the expected growth it implies is problematical.

This paper confirms that earnings yields predict returns. However, it also shows that, given E/P, B/P identifies subsequent expected earnings growth that adds to the returns indicated by E/P. The identification of growth by B/P follows as a matter of accounting: for a given short-term earnings yield, a higher book-to-price implies higher long-term earnings over those expected to be added to book value in the short-term. Accounting principles defer earnings (and create earnings growth) when earnings "realization" is uncertain so, if that growth indicates risk that is priced, book-to-price adds to expected returns. Earnings and book value, the bottom-line numbers of the income statement and balance sheet, articulate in an accounting sense, but they also articulate to indicate growth, risk and expected return.

Accordingly, the paper explains the B/P premium in stock returns as reward to the risk of buying earnings and earnings growth. B/P is positively correlated with E/P so, as the earnings yield is positively related to subsequent returns, so is B/P. However, for a

[2] Relative to R-squares observed in regressions of realized annual returns on realized annual earnings, R-squares increase significantly when earnings and returns are observed over longer periods, in Easton, Harris and Ohlson (1992) and Ohlson and Penman (1992), for example.

[3] The common Gordon formula, $P/E = 1/(r-g)$, where r is the required return and g is the growth rate, exhibits the property, although this formula holds only for full payout. The formula also shows that, in the case of no growth, $E/P = r$. Ohlson and Juettner-Nauroth (2005) provide a formula for P/E with the same property but which is payout insensitive. Empirical research has robustly demonstrated the growth aspect of the P/E ratio, in Beaver and Morse (1974), Fuller, Huberts, and Levinson (1992), Fairfield (1994), and Penman (1996), for example.

given earnings yield, B/P further identifies growth that the market prices to yield higher returns. “Growth” is redefined, with growth indicated by a higher B/P (rather than a lower B/P) associated with higher returns.

We estimate expected returns from average realized returns, with the pretense that average observed returns are reward for risk. Of course one can interpret the observed returns as reward to discovering market mispricing by forecasting earnings and earnings growth with an accommodation for book value. However, the paper provides support for the risk-return explanation by recognizing how the accounting for earnings and book value relates to risk.

The Key Ideas

The paper embraces two ideas. The first recognizes that E/P and B/P are in part accounting phenomena so, if these ratios are to indicate risk and return, it may have something to do with the accounting. The second acknowledges the accounting principle that defers earnings recognition under uncertainty, creating expected earnings growth; earnings growth and risk connect by construction of the accounting.

We move to the formal construction in short order, but some elaboration here may aid intuition. With respect to the first point, consider a benchmark case where B/P = 1. Here B/P cannot indicate risk: both a money market fund and a hedge fund have B/P = 1 but very different risk. For these funds, B/P =1 is a property of mark-to-market or “fair value” accounting, and the accounting removes any role for B/P to indicate risk. So, if B/P is to indicate risk, it must be that accounting principles depart from mark-to-market accounting in recognition of (or in manner that is correlated with) risk. Similarly, as earnings are also determined by accounting principle, the expected short-term earnings

yield will indicate risk and expected return only under a particular accounting construction of earnings.

Now consider a case where accountants carry book values lower than price, as is typical for non-investment firms. Historical cost accounting with positive net-present-value investing typically results in B/P < 1, for example. For a given price (that values real activity), lower book value must result in higher expected future earnings; by accounting principle, lower book value (cum-dividend) can only be reported by increasing expected earnings in the future, and higher future earnings is earnings growth. With this built-in mechanism, accounting could be designed to report book values and earnings at a level that produces expected earnings growth corresponding to risk; indeed, Olson (2008) constructs a hypothetical accounting where a constant growth rate equals the risk premium. More generally, earnings deferred to the short-term could produce an expected short-term earnings yields that indicates risk and expected return or, with earnings deferred further into the future, expected "long term" earnings growth that provides the indication.

The second point – accounting defers earnings under uncertainty – suggests that the growth created by earnings deferral might align with risk. Earnings recognition rules under U.S. GAAP and international accounting standards focus on the resolution of uncertainty: rather than marking to market or fair value and recognizing all value in current book value, earnings are deferred until realization of cash is relatively certain. In accounting parlance, earnings are "unrealized" until certain "realization" criteria -- typically a confirmed sale in the market -- are met, all the more so when earnings realizations are deemed particularly uncertain (as in the case of R&D activities, for

example). The accounting treatment ties back to risky dividends: dividends are paid out of book value so dividends cannot be paid until earnings are recognized and closed to book value.[4] Accounting rules also determine the division of total expected future earnings (not yet added to book value) between the short-term and the long-term. Some rules (such as those involving earnings from existing inventory), typically result in earnings being recognized in the immediate future, and yet others (such as the expensing of anticipated near-term R&D and brand-building expenditures, and the recognition of earnings from anticipated investments not yet made) require deferral of more uncertain earnings to the more distant future.

In applying these principles, U.S. GAAP accounting is particularly conservative.[5] The conservative accounting features that defer income to the future and lower the book value are modeled in Felltham and Olson (1995) and Zhang (2000).[6] Ceteris paribus (holding real activity constant), conservative accounting reports lower book value − and so increases expected short-term earnings relative to current book value − but continued application of conservative accounting shifts earnings from the short-term to the long-term. The features are by construction of the accounting. However, these papers are modeled with a fixed discount rate, unrelated to the accounting, so do not deal with the

[4] Firms can borrow against future earnings to pay dividends, of course, but the added leverage adds risk and expected return.

[5] For example, research and development and brand-building expenditures are expensed immediately rather than capitalized in book value and amortized against income in the future. Liabilities tend to be booked while (intangible) assets are omitted from the balance sheet. The practice of recognizing losses early while deferring gains (in the application of the lower-of-cost-or-market rule, and in asset impairment and restructuring charges, for example) is a hallmark of conservative accounting.

[6] The accounting effects are demonstrated with examples in Penman (2007, Chapter 16). Empirical documentation of the effects of conservative accounting under U.S. GAAP can be found in Cheng (2005), Beaver and Ryan (2005), Monahan (2005), and Penman and Zhang (2002).

issue of how conservative accounting, and the B/P and growth it generates, relate to risk and return.

The idea of earnings deferral aligning with investment risk is merely suggestive; in a market where only systematic risk is priced, it would have to be that growth created by the accounting bears on outcomes correlated with common factors such as the market portfolio in CAPM pricing. (Note that revenue recognition rules delay income recognition until "receipt of cash is reasonably certain" and cash is a low-beta asset.) Nor is there any necessity that the earnings deferral under a particular accounting system − U.S. GAAP, for instance − delivers expected growth that is indicative of risk and return: too much earnings could be deferred (for a low-B/P R&D firm, for example) or too little (for a high B/P firm whose assets have not been written down). Whether a particular accounting system results in expected growth that is indicative of risk is an empirical matter which we investigate for U.S. GAAP.

The accounting points aside, the idea that growth is associated with risk carries a certain persuasion. If investors see expected short-term earnings at risk, they must see that subsequent earnings (growth) is also at risk; firms' life-long dividends are at risk so, unless short-term earnings are sufficient to indicate life-long expected dividends, one would expect subsequent earnings growth that generates those dividends to be at risk as well. Intuition suggests that added earnings come with added risk, consistent with a risk-return tradeoff. Leverage, for example, adds earnings growth but also adds risk. Common investment wisdom embraces the idea that growth is risky; "growth" funds, for example, are deemed to yield higher expected returns than "income" funds and correspondingly are deemed to be higher risk. In valuation practice one usually regards the "terminal value"

part of a valuation as relatively uncertain, based as it is on long-term growth prospects. Relative to their forecasts for the short-term, analysts' long-term growth estimates perform poorly against actual realizations, indicating they contain considerable uncertainty.

Our paper is in the vein of recent research (in Lettau and Ludvigson 2005, Menzly, Santos and Veronesi 2004, and Santos and Veronesi 2005, for example) that sees risk associated with growth, though the growth referred to there is dividend growth rather than earnings growth. These papers see the dividend yield as increasing in risk and decreasing in dividend growth, and we see the earnings yield in the same way (if for different reasons). But when earnings are involved, so are book values, so we also bring light to the B/P effect in stock returns. Other papers associate risk with the long-term (Bansal and Yaron 2004, Dechow, Sloan and Soliman 2004, Bansal, Dittmar and Lundblad 2005, Croce, Lettau, and Ludvigson (2006), and Malloy, Moskowitz and Vissing-Jorgensen 2006). Some papers (such as Zhang 2005, Anderson and Garcia-Feijóo 2006, Xing 2006, and Zhang and Chen 2007) see growth (options) as risky but develop rationalizations to explain why low B/P requires lower returns, even though a low B/P is attributed to these growth options. With an appeal to Merton (1973), some papers view "growth opportunities" as a hedge against economy-wide shocks to investment opportunities so that "growth" requires a lower return.

We do not claim to have solved the mystery of the B/P effect in stock returns. B/P may indicate risk and expected return simply because it is correlated in the cross section with some risk characteristic (distress risk or liquidity risk, for example) or because of the variety of explanations offered in Cochrane (1996), Berk, Green and Naik (1999),

Gomes, Kogan and Zhang (2003), Cooper (2006) , and Lettau and Wachter (2007), for example. But we do bring an accounting interpretation to the B/P effect and demonstrate empirically that expected short-term earnings and subsequent earnings growth differentiate actual average returns to investing, with B/P playing a role. By interpreting book value for what it is, an accounting number with defined properties, we avoid attributions– "assets in place", "investment", "tangible assets", "distress", "growth opportunities" – by mere labeling.

The Construction of Book-to-Price

In accounting, book value is constructed by a periodic operation (clean-surplus accounting):

$$B_t = B_{t-1} + Earnings_t - d_t \qquad (1)$$

where B is book value, d is net dividends (dividends plus share repurchases, net of share issues), and *Earnings* are comprehensive (clean-surplus) earnings. The clean-surplus relation says that book value is created by earnings, with dividends paid out of book value. Thus, expected future dividends are based on expected future book values and those book values are determined by the future earnings to be added to book value. Accordingly, the dividend discount model can be restated in terms of book value and expected earnings to be added to book value. The resultant residual earnings valuation model is well known, but bears restatement to demonstrate the accounting issues when one considers the relationships between book value, earnings, and price. Given a constant discount rate, r, the price of common equity now (at time t) is

$$P_t = \sum_{\tau=1}^{\infty} \frac{d_{t+\tau}}{(1+r)^{\tau}} \qquad (2)$$

where $d_{t+\tau}$ in the expected dividend to common in period, $t + \tau$. (Here and throughout the paper, variables time-subscripted with $\tau > 0$ are expected values.) This model is, of course, a statement of the no-arbitrage price if r is the required return for risk borne. If price violates the no-arbitrage principle, r is simply a number that reconciles expected payoffs to price, that is, the expected return or internal rate of return to buying at the current price.[7] Substituting $d_{t+\tau} = Earnings_{t+\tau} - (B_{t+\tau} - B_{t+\tau-1})$ into equation (2) for all $\tau > 0$,

$$P_t = B_t + \sum_{\tau=1}^{\infty} \frac{Earnings_{t+\tau} - rB_t}{(1+r)^{\tau}} \tag{3}$$

$Earnings_{t+1} - rB_t$ is expected residual earnings for year $t+ \tau$. While the dividend discount model sees expected dividends at risk, one can equivalently see expected earnings and book vales at risk. Summarizing expected residual earnings for years after t+1 with a growth rate, g, applied to residual earnings expected in t+1 presents the model in a form that distinguishes earnings expected in the short-term (t+1) and earnings expected from subsequent growth:

$$P_t = B_t + \frac{Earnings_{t+1} - rB_t}{r - g} \tag{3a}$$

$$= B_t + \frac{(ROCE_{t+1} - r)B_t}{r - g} \tag{3b}$$

where $ROCE_{t+1} = Earnings_{t+1} / B_t$ is the one-year ahead return on common equity.

[7] A constant discount rate is, of course, not entirely palatable. The formulation here suffices to introduce the empirical analysis which is concerned with documenting the yield (in returns) to buying stocks in the cross-section (at a point in time) based on accounting characteristics. However, the attribution of observed yields to reward for risk is made with some hesitancy; market efficiency issues aside, a constant discount rate is inconsistent with no-arbitrage if discount rates are stochastic, and observed returns include the effect of changes in discount rates with which accounting characteristics could be correlated. See Hughes, Liu and Liu (2008). Rubinstein (1976) and Breeden and Litzenberger (1978) provide dividend discount models with varying discount rates and Feltham and Ohlson (1999), Ang and Liu (2001), and Christensen and Felltham (2009) lay out residual earnings valuation models with stochastic discounts rates.

The model states that the difference between price and book value is due to expected earnings implicit in the price that has not yet been booked to book value. Further, the value (in price) can be divided between book value, short-term earnings, and growth. That allocation is a matter of how the accounting is executed; for a given price preserved, a lower book value means higher earnings expected in the future, but those earnings can be recognized in the short-term or the long-term. Note that growth in this model refers to residual earnings growth, but residual earnings growth can be restated as earnings growth.[8]

Earnings Yield, Book-to-Price, Growth, and the Required Return

Our inquiry deals with how book-to-price (B/P), earnings-to-price (E/P), and growth connect to risk and return. From equations (3a) and (3b),

$$r = \frac{Earnings_{t+1}}{P_t} + (1 - \frac{B_t}{P_t})g \qquad (4a)$$

$$= \frac{B_t}{P_t} ROCE_{t+1} + (1 - \frac{B_t}{P_t})g \qquad (4b)$$

(The expressions require $ROCE_{t+1} > g$, an issue that will be addressed in the empirical work[9]).Variants of equation (4a) appear in Brief and Lawson (1992), Danielson and Press

[8] One infers earnings growth from residual earnings growth by reverse engineering residual earnings to infer earnings.

[9] From equation (3b),

$$P_t = B_t \times \frac{ROCE_{t+1} - g}{r - g}$$

from which equations (4a) and (4b) are derived. Thus a positive price requires $ROCE_{t+1} > g$ as well as the standard condition, $r > g$. Rather than starting from the residual earnings valuation, one could start from an abnormal earnings growth valuation (in Ohlson and Juettner-Nauroth 2005) where price is based on expected forward earnings capitalized at the required return plus value from abnormal earnings growth. This model is more general (and removes the restriction), but does not involve book value. See Ohlson and Gao (2006).

(2003), Ohlson (2005), and Rajan, Reichelstein, and Soliman (2007), among others. Papers that reverse engineer the expected return or the "cost of capital" implicit in prices utilize these formulas with various estimates of growth (Claus and Thomas 2001; Gebhardt, Lee and Swaminathan 2001; and Easton, Taylor, Shroff and Sougiannis 2002, for example).

Equation (4b) describes r as a weighted average of $ROCE_{t+1}$ and g with weights (summing to unity) supplied by B/P. It thus emphasizes that B/P is, in the first instance, an attribute (observed in the present) that combines expected short-term earnings and growth – the future payoffs that are at risk – rather than a risk attribute itself. (The weighting could also represent an inefficient market's inappropriate combination of the two components, to yield expected returns different from that implied by risk.) How then might B/P indicate risk and return? We consider three cases.

Case 1*: *P* = *B. In this case, B/P cannot indicate the required return, as illustrated with the money market fund and the risky hedge fund example in the previous section. The property is by application of a particular accounting, mark-to-market accounting. From (4a) and (4b), $r = \frac{Earnings_{t+1}}{P_t} = ROCE_{t+1}$: While B/P does not reveal risk, the forward E/P is sufficient.

Case 2: No Growth. Setting $g = 0$ in equation (3a),

$$P_t = B_t + \frac{Earnings_{t+1} - rB_t}{r}. \tag{5a}$$

But book value cancels such that

$$P_t = \frac{Earnings_{t+1}}{r} \tag{5b}$$

and $r = \frac{Earnings_{t+1}}{P_t}$, as in the case of B/P = 1.[10] In this no-growth case, book-to-price is not an indicator of the required return (unless correlated with E/P). Rather, *r* is indicated by the forward E/P, as in Case 1, and, given E/P, B/P can add nothing to the explanation of returns. Further, this case challenges the standard claim that B/P unconditionally indicates growth. A low B/P here can be due to high short-term earnings relative to book value, but with no subsequent growth; book-to-price can vary with no growth implied (Penman 1996 elaborates).[11]

Case 3: Growth. Cases 1 and 2 suggest that E/P is the starting point for forecasting expected returns. The discussion of the equations (5a) and (5b) in the no-growth case also demonstrate that, if B/P adds as an indicator of the expected return for a given earnings yield, it must have to do with growth. Accordingly, our empirical tests examine whether E/P forecasts returns and then, conditional on earnings-to-price (that indicates the expected return with no growth) investigate whether book-to-price adds to the explanation of returns. That will be the case if B/P indicates growth and growth is priced as risk. The accounting discussion in the previous section on the deferral of earnings under uncertainty gives credence to the idea.

To gain further insight unto whether B/P and growth might add to expected return, we consider two accounting scenarios. The first involves accounting that

[10] As expected return equals the earnings yield, one might estimate the risk premium by estimating the covariance between earnings and earnings indentified with common factors (such as earnings for the market portfolio in the CAPM). Nekrasov and Shroff (2008) find that covariances estimated in this way predict returns. This approach ignores shocks to returns that arise from revision of expected growth, however.

[11] For an example, an R&D firm can have a high P/B (because the R&D asset is missing from the balance sheet), a high $ROCE_{t+1}$ (because of the missing book value), but no growth. Stated differently, the firm can have a have a high P/B and a normal P/E = 1/*r*.

constructs B/P and growth that have nothing to do with risk. In the second scenario, B/P and growth indicate risk and return.

The first scenario is implied when valuations are performed with *r* and *g* in models (3a) and (3b) as independent inputs. It is also embraced implicitly in the afore-mentioned reverse engineering papers when the growth rate is specified irrespective of risk. In such applications, B/P and the earnings growth it is associated with are regarded as accounting phenomena unrelated to risk and return. Price is based on expected dividends, as in equation (2), and the accounting does not modify that expectation; risk arises from real activity, price incorporates a discount for risk, but the accounting is not related to the discount rate. So, equations (4a) and (4b) merely serve to recover *r* from a particular accounting: given price, the expected return can be expressed as a configuration of book value, expected short-term earnings and long-term growth, and this configuration will change with alternative accounting methods but with price and *r* preserved. (It's just accounting!)

In this scenario, B/P serves to adjust for growth created by the accounting that is unrelated to risk and return. Equation (4a) expresses the expected return in terms of the forward earnings yield, adjusted for long-term growth, with the B/P ratio giving weight to the adjustment. With no growth, forward E/P indicates *r*. But the forward E/P typically reflects growth as well as risk, with growth depressing E/P, so is adjusted by applying B/P to the expected growth (that depressed E/P) to recover the *r* that would be inferred if there were no growth. B/P cancels growth that is not related to risk, and the higher the growth (and lower the B/P), the higher is the weight applied to *g* in the second term of equation (4a). The adjustment also recovers the expected return if the accounting were

mark-to-market accounting. In equation (4b), B/P serves to correct $ROCE_{t+1}$, created by B/P ≠ 1, to yield *r* in the no-growth case equal to that in the case of B = P. In this scenario, growth may arise from expected earnings in excess of required earnings because of positive net-present-value investing or from pure accounting growth from excessive earnings deferral under (very) conservative accounting. The former is valued, so adds to price, reducing B/P; the latter does not add to price but, for a given E/P, can only be generated by lower book value, also reducing B/P. In either case, B/P cancels the growth to recover *r*.

In the second accounting scenario, deferred earnings that produce B/P < 1 add to expected growth and that growth indicates risk. Growth that adds risk does not add to price, for price that would other wise anticipate growth is discounted for the risk implied; risk and return would be at work in the price. Rather than B/P offsetting growth, as in the first accounting scenario, growth and risk would offset in price; B/P ratio would be higher than that for growth in the first accounting scenario. Accordingly, growth and the required return cannot be considered as independent inputs to a valuation model like (3a). Adding growth to a valuation – on the basis of projected sales or earnings growth, for example – requires a corresponding adjustment to the required return.[12]

The case of added leverage provides an illustration of the effect of growth and risk on price. While we know of no formal derivation, Penman (2007, Chapter 13) shows via examples that added leverage adds expected earnings growth. However, as a zero-

[12] As price reflects both growth and risk, reverse engineering the formulas (4a) and (4b) still "works" provided the estimated growth inserted in the exercise corresponds to the risk. In the typical exercise this is not so, and reverse-engineering papers have typically been unsuccessful in identifying implied expected returns that are validated with actual realized returns, though methodological issues also are involved (see Easton and Monahan 2005 and Guay, Kothari, and Shu 2005). Gode and Mohanram (2003) appears to be an exception.

NPV activity, the added leverage does not add to price, despite the higher growth. The reason is that leverage also adds to risk and expected return (under the standard weighted-average cost-of-capital formula) so that growth that would otherwise add to price also reduces price for added risk; growth and risk cancel to leave price unchanged.

Business operations, unlike leverage, presumably involve positive-NPV activity. Accordingly, expected earnings growth can indicate both required earnings for risk born and earnings in excess of that requirement. In addition, earnings growth could also be due to accounting that is too conservative by deferring too much earnings to the long-term future. The forward earnings yield will be increasing in the growth that requires return for risk and decreasing in excess growth over that required to compensate for risk. Presumably both are at work, but again it depends on the accounting; Ohlson (2008) presents a model where a permanent earnings accounting generates only the growth related to risk such that growth cancels risk in the price and the earnings yield, one-for-one, such that the forward earnings yield is approximately equal to the risk-free rate.[13] [14]

We investigate the case for U.S GAAP. With the two accounting scenarios in mind, we move to the empirical work to answer the question: for a given earnings yield, does B/P indicate growth that yields additional return or does B/P indicate growth that is

[13] The Fed Model of stock prices implies that risk and growth cancel in price. Thomas and Zhang (2008) present empirical support for the Fed Model at the aggregate level of stock prices.

[14] Fama and French (2006) have the flavor of what's going on here, but their setup is quite different. In a model that involves clean surplus accounting, as in equation (3b), they express the expected return in terms of B/P, profitability (earnings relative to book value, *ROCE*), and growth in book value (which they call "investment"). They investigate the relationship between returns and each one of these, holding the other two constant. But their comparative statics do not accord with the way that accounting works: One cannot vary an accounting component of equation (3b) while holding the other components constant. To produce more growth (for a given *r* and price), for example, the accountant has to change either book value or short-term earnings or both. In contrast to our results, growth (as they define it) is negatively related to expected returns in the cross section (holding their other accounting attributes constant). These points aside, the results of our paper are indicative of the rational pricing of risk that the stream of Fama and French papers emphasize.

unrelated to risk and return? The empirical construction laid out below shows that, for a given E/P, B/P indicates growth in accordance with the accounting for earnings deferral. The empirical results then show that the growth so indicated is related to average stock returns.

The Empirical Construction

The empirical analysis involves observing book value then separating earnings expectations implicit in the difference between book value and price into short-term and long term earnings. The residual earnings (*RE*) model (3a) is divided into three components, as follows:

$$P_t = B_t + \frac{RE_{t+1}}{r} + RE_{t+1}\left[\frac{1}{r-g} - \frac{1}{r}\right] \qquad (6)$$

(1) (2) (3)

The investor buys three component of the price, (1) book value, (2) earnings to be added to book value in the short term, without growth, and (3) long-term earnings from growth over the short term. Component (3) amounts to a price multiplier over the no-growth case, but note that, to the extent that higher growth involves higher risk, the multiplier does not increase. Figure 1 depicts how a price of $21 per share for Cisco Systems, with forward earnings of $0.89 and a required return on 12%, is comprised of the three components. Under this construction, value versus growth is not identified by high versus low P/B, but rather by a non-zero component (3), as in the discussion of the no-growth case earlier. If Cisco traded at a price of $7.42 per share, component (3) would be zero but, with a book value of $3.84 per share, the book-to-price would be 0.52 even though

the market anticipates no growth beyond the short term. As in equation (5b), components (1) and (2) amount to

$$P_t = \frac{Earnings_{t+1}}{r} \tag{7}$$

Thus $Earnings_{t+1}/P_t = r$.[15] Our empirical tests ask whether, given the earnings yield, additional long-term expected earnings add to expected returns, and also ask whether book-to-price features in that discovery.

With r specified, component (3) of equation (6) is growth in excess of that required for the risk born. But r is not known – indeed it is the object of the endeavor – and the endeavor requires an investigation of the implication of growth for the required return rather than growth in excess of the required return. The required return is that in excess of the risk-free rate, and the risk-free rate is known (so the endeavor amounts to evaluating the return premium over the risk-free rate). Thus we measure the first two components in equation (6) as

$$P_t = B_0 + \frac{RE_{t+1}}{r_f} \tag{8}$$

(1) |____| (2)

where r_f in the risk-free rate, given by the 10-year Treasury yield for the relevant year, and residual earnings is earnings in excess of r_f applied to book value. Dividing by price,

$$\frac{B_t}{P_t} + \frac{STE}{P_t} + \frac{LTE}{P_t} = 1 \tag{9}$$

[15] For Cisco Systems, forwards earnings at the time were \$0.89 per share. With a price of \$7.42 for components (1) and (2) of the valuation, the earnings yield is 12%, equal to the required return. For a positive price, equation (7) holds only for positive earnings. This point is accommodated in the empirical work.

where $\frac{STE}{P_t}$ is the short-term component (2) relative to price and $\frac{LTE}{P_t}$ identifies that portion of price associated with long-term earnings expectations. A dollar of price is divided over the three components: the investor is seen as spending a dollar on buying book value, expected earnings to be added to book value in the short term, and additional earnings expected to be added to book value in the long term, and the issue is how the expected return is related to that allocation. We will refer to short-term earnings and long-term earnings components as *STE* and *LTE*, with the reminder that they are price denominated.

Applying the algebra that equates the first to components of equation (6) with equation (7),

$$\text{B/P} + STE = \frac{Earnings_{t+1}}{r_f P_t}, \tag{10}$$

that is, the first two components equal the forward earnings yield relative to the risk free rate, effectively the earnings yield spread. The use of the risk-free rate merely scales E/P by a cross-sectional constant. From equations (9) and (10), the long-term component,

$$LTE = 1 - \frac{Earnings_{t+1}}{r_f P_t} \tag{11}$$

Thus *LTE* is the residual in price after that explained by the earnings yield. It expresses the notion that higher long-term earnings expectations are associated with a lower earnings yield (a higher P/E ratio). From equation (10),

$$\text{B/P} = \frac{Earnings_{t+1}}{r_f P_t} - STE \tag{12}$$

This equation suggest why B/P might indicate additional expected returns for a given earnings yield: B/P is the earnings yield adjusted for the amount of earnings added to book value in the short term, relative to the book value. Thus, if B/P is to indicate risk and return over the earnings yield, it must have to do with the earnings yield relative to the amount of earnings expected to be added to book value in the short term, *STE*. As the earnings yield mirrors *LTE*, by equation (11), it must then have to do with *LTE* relative to *STE*, that is, the amount of earnings expected to be added to book value in the long-term relative to that in the short term. Such growth accords with the notion that accounting defers more earnings from the short term to the long-term when outcomes are risky. The construction captures the property of conservative accounting (presumably applied in response to risk): Feltham and Ohlson (1995) and Zhang (2000) show that conservative accounting decreases book value but does not affect forward earnings with no growth, but adding growth reduces forward earnings relative to book value as earnings are shifted to the future.

Data Description

The analysis covers U.S. listed firms over the period 1963-2006 whose book value of common equity and earnings before extraordinary items are available on Compustat for any fiscal year within the period and whose stock prices and returns are on CRSP. Price per share is observed three months after fiscal-year end at which time financial statement data for the fiscal year are assumed to have been reported. Monthly returns are observed for the 12 months following this point. The book-to-price ratio and earnings yield are calculated at this same point, with book value per share at fiscal-year end adjusted for stock splits and stock dividends over the three months after fiscal year end. To ensure that

book value refers to the common shares, book value is Compustat's common equity plus any preferred treasury stock, less any preferred dividends in arrears.

In addition to firms with missing book value of common equity (data item 60) and earnings before extraordinary items (Item 18) on Compustat, firms with negative book value or price less than 20 cents are excluded from the analysis. (We repeat the analysis with exclusion at higher prices.) Firms are also excluded if shares outstanding (item 25) is missing. Other missing Compustat data items are set equal to zero.

In order to carry out the investigation over an extended period and to incorporate the full range of B/P ratios, forward earnings (for year t+1) is initially estimated as reported earnings for year t before extraordinary and special items, with a tax adjustment to special items at prevailing tax rates for the year. Other forecasts based on trailing earnings are also applied. However, we also run the analysis with analysts' consensus forecasts of forward earnings from IBES files for the period, 1977-2006. Using an estimate of forward earnings based on current (recurring) earnings not only enhances the coverage, but also avoids the problems of bias in analysts' forecasts evidenced in Hughes, Liu, and Su (2008) and Gode and Mohanram (2008). However analysts' forecasts presumably incorporate other information. Using current earnings for the yield effectively expresses growth against a base of earnings currently reported by the accounting (and added to book value).

There are 153,858 firm-years in the investigation over the 44 years, with an average of 3,497 firms per year and a range of 375 in 1963 to 6,025 in 1996. Table 1 gives the distribution of monthly returns from the 12 months over which they are observed and also distributions of the estimated forward earnings yield (E/P), return on

common equity *(ROCE*$_{t+1}$), and *STE* and *LTE* . The note to the table explains the trimming of variables for the means and standard deviations. The table reports that the distributions of returns, B/P, and E/P in the sample are quite similar to those for all firms on CRSP and Compustat.

The median B/P for the sample in Table 1 is 0.606 (with a mean of 0.744), indicating that less than half of the value in price is represented by (discounted) expected future residual earnings. The observation accords with the notion that accounting, on average, defers earnings relative to a mark-to-market accounting. B/P values less than the median indicate relatively more earnings expected in the future, and those greater than the median indicate relatively lower anticipated earnings to be added to book value. The distributions of *STE* and *LTE* (deflated by price) indicate how total expected residual earnings implicit in the price are typically broken down into earnings in the short term versus the long term. From the distribution of *STE,* one infers that, at the median, 21.9% of price is accounted for by forward residual earnings if those residual earnings were assessed relative the risk-free rate and were to continue as a perpetuity (without growth). However, there is considerable variation around this median. Median *LTE,* identified with growth beyond the short term, is 19.0%, that is, 19.0% of price is explained by expectations of long-run residual earnings over that for the short term without growth. Again, there is considerable variation around this median.[16]

Basic Correlations

[16] As *LTE* is the complement of the earnings yield relative to the risk-free rate (equation (11)), it is also scaled by the risk-free rate. The scaling leads to higher *LTE* for firms with low E/P and lower *LTE* for firms with high E/P. As the risk-free rate a constant in the cross section at a point in time, the relative ranking of *LTE* across firms at a point in time is preserved however.

Table 2 reports mean Pearson and Spearman correlations coefficients between variables, with the means referring to average coefficients calculated each year. For the Pearson correlations, the top and bottom percentiles of variables (other than stock returns, betas and size) were rejected each year. However, Table 1 indicates that *STE* and *LTE* involve some extreme numbers even after this treatment, so the product-moment Pearson correlations involving these two variables should be scrutinized against the Spearman (rank) correlations. (Our tests are based on ranks.)

While B/P is perfectly negatively correlated with total earnings deferred to the future (per dollar of price), by construction of the accounting, Table 2 indicates that B/P is also negatively correlated with both *STE* and *LTE*: lower B/P means higher short-term earnings relative to book value but lower B/P also means higher subsequent earnings. But the correlations are not high, indicating that there is considerable variation in the mix of *STE* and *LTE* for a given B/P in the cross section. The mean Spearman correlation between B/P and *LTE* minus *STE* (not reported in the table) is only -0.093. This indicates that, while B/P is often identified as having a negative relationship with "growth," it actually has low correlation with long-term earnings relative to earnings added to book value in the short term, pertinent to the discussion of B/P and growth around equation (5a) earlier. The well-know positive correlation between B/P and subsequent returns, is evident in the table, but note that the average rank correlation between B/P and E/P is 0.312.

E/P is perfectly negatively correlated with *LTE* in Table 2, by the construction of equation (11). This of course is the manifestation of the property that earnings yields reflect expectations of subsequent earnings. E/P is less than perfectly correlated with *STE*

that measures the amount of earnings expected in the short term relative to book value. The difference between E/P and *STE* is explained by B/P (in equation (12)), a structural feature that will be highlighted in the interpretation of our results.

The relationship between E/P and other variables is highlighted in Table 3 where characteristics of 10 portfolios formed from ranking firms on E/P are reported. As in Basu (1977 and 1983), among others, E/P is positively correlated with returns over the subsequent 12 months, suggesting that short-term earnings are at risk and require a higher return. The return relationship is not quite monotonic, with the lowest E/P portfolio, comprised of firms with particularly high negative earnings, earning particularly high returns. B/P is positively correlated with E/P (here and in Table 2), indicating that the positive correlation between B/P and returns is in part attributable to B/P identifying short-term earnings at risk. But, again, the relationship is not monotonic, with high B/P associated with both high E/P and low E/P. The higher returns associated with high B/P in portfolio 10 are associated with a correspondingly high E/P. Those associated with relative high B/P but low E/P in portfolio 1 bear of what is to come: these firms have particularly high *LTE* relative to *STE*, that is, earnings expected in the long-term relative to those expected to be added to book value in the short term.

While E/P is positively related to returns in Table 3, it is negatively correlated with beta.[17] *LTE* is positively correlated with beta (and negatively related to returns, as it must be by the constructed negative correlation between E/P and *LTE*). If long-term earnings are risky, with higher beta, they should yield higher returns, but this higher risk should also be reflected in the earnings yield (that incorporates both risk and growth)

[17] Portfolio betas do not average to 1.0 here and in later tables because they are arithmetic means of security betas in each portfolio, with the security betas estimated using a value-weighted market index.

such that E/P yields higher returns for the beta associated with growth. This is not the case, unconditionally, and this tension that cues our tests. Note, in addition, that *LTE* is negatively correlated with size in Table 3 – small firms have more expected long-term earnings – and small firms are identified with higher risk in the asset pricing models.

Empirical Results

Investors are seen as buying the three components in equation (9) and the tests compare returns to portfolios formed with varying amounts of these components. We maintain the pretense that average ex post returns identify return for risk born. There is no necessity that pricing be so rational, of course, so the alternative market inefficiency interpretation in also on the table.

Returns to a Joint Sort on E/P and B/P

Our core result is in Table 4. Every year from 1963-2006, at three months after prior fiscal-year end, firms are ranked on *LTE* and assigned to 5 portfolios, low to high. Then, within each *LTE* portfolio, firms are ranked on B/P to form a total of 25 portfolios. Cut-off points for the portfolio allocations are determined from the ranking for the prior year to avoid look-ahead bias. Panel A reports mean buy-and-hold annual returns over the ensuing 12 months for each portfolio from the full set of replications every year (with *LTE* returns along rows and B/P returns down columns).[18] There is an average of 139.9 stocks per portfolio per year. Panel B gives the average B/P for each portfolio and Panels

[18] Buy-and-hold returns are calculated from CRSP monthly returns. For firms that are delisted during the 12 months, we calculate the return for the remaining months by first applying the CRSP delisting return and then reinvesting any remaining proceeds in a size matched portfolio (where size is measured as market capitalization at the start of the return accumulation period). 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. Our results are qualitatively similar if we make no such adjustment.

C and D the average *STE* and *LTE*. As B/P + *STE* + *LTE* = 1 (equation (9)), the amounts in Panels B, C, and D for a given portfolio sum to 1.0, and the issue is how the weighting of the components within a portfolio is related to portfolio returns.

The portfolio returns from the ranking on *LTE* in Panel A of Table 4 (across the top of the panel) are negatively related to the amount of *LTE* in the portfolio. The t-statistic of -2.47 on the mean difference in return, -9.7%, between the highest and lowest *LTE* portfolio is calculated as the mean of return differences over years relative to the standard error of the mean calculated from the time series of return differences (as are other t-statistics in this an later tables). As *LTE* is an inverse ranking on the short-term earnings yield, by equation (11), the result also informs that returns are positively correlated with E/P ratios (relative to the risk-free rate). Indeed, the portfolios here are just the 10 E/P portfolios in Table 5 reduced to five. As in Table 3, estimated portfolio betas in Panel E are positively related to *LTE*, indicating that long-term earnings are associated with higher (systematic) risk, but negatively associated with E/P that yields higher returns.

The ranking second in Table 4, on B/P, provides insights into resolving this tension. Clearly, B/P ranks returns for a given *LTE* (and a given earnings yield), and Panel G of the table indicates that this is not just a further ranking on the yield: the earnings yield is held constant over the B/P portfolios, except in the highest *LTE* (lowest earnings yield) portfolio where the yield is actually decreasing in B/P. A ranking on B/P for a given *LTE* is an inverse ranking on *STE*, by equation (9), as the values of *STE* and *LTE* over portfolios in Panels C and B attest. Thus, B/P ranks *LTE* relative to *STE*, that is, earnings expected to be added to book value in the long term relative to earnings added to

book value in the short-term – long-term earnings as growth over the short term addition to book value– and this growth also ranks returns. The results accords with the construction of B/P in equation (12): B/P is the earnings yield adjusted for the amount of earnings added relative to book value in the short term (*STE*) so, for a given earnings yield (that implies a given *LTE*), the lower the *STE* (and higher the B/P), the higher the return.[19] In Panel F, high B/P firms are smaller firms to which "growth opportunities" are often attributed. In summary, Panel A shows that earnings yields rank returns unconditionally but, for a given earnings yield, B/P identifies additional returns return associated growth.

Panel H of Table 4 reports intercepts ("alpha" excess returns) from time-series regressions over the sample period of monthly portfolio returns (in excess of the ten-year risk-free rate) on excess returns for portfolios mimicking the market, size, B/P and momentum factors. Results from a three-factor model excluding momentum are similar. For this analysis, returns for firms in a particular portfolio are aligned in calendar time with the month for which factor returns and the risk-free rate are observed. The t-statistics on the estimated intercepts indicate that the excess returns associated with joint values of the earnings yield and B/P cannot be explained by factors in these models (that include a B/P factor). Nor can they be explained by correlations with size that are evident in Panel F, for the factor model also includes a size factor.

At one level, the results just report that a joint sort on E/P and B/P yields higher returns than a sort on E/P alone, an investigation that has been well-trolled in developing

[19] Illustrated from Figure 1, holding component (3) constant for Cisco Systems and increasing B/P means *STE* must increase relative *LTE*. (This is rough, as prices might also change.) Equation (12) corresponds to B/P = E/P × B/E which also shows that, for a given E/P, a higher B/P means lower earnings relative to book value in the short term.

trading strategies. However the analysis employs a construction that acknowledges the accounting for earnings and book value in the presence of risk: book-to-price involves earnings deferral but relatively more earnings are deferred to the long term under risk. Hence, *STE* relative to *LTE* indicates risk and return. The notion of "growth" typically associated with low B/P is thus revised: growth is expected long-term earnings over earnings relative to book value in the short term (*LTE* relative to *STE*). The joint sort on E/P and B/P identifies this growth and, as it turns out, that identification is associated with returns. A joint sort on E/P and B/P may identify a trading strategy that enhances returns, but those returns can be attributed to additional risk associated with growth.

One cannot rule out other explanations, of course. The highest *LTE* portfolio in Table 4 is also the lowest earnings yield portfolio and Panel G indicates that these are loss firms, on average. High B/P for these firms might indicate distress, higher transactions costs, or lower liquidity that warrants higher returns. However, many loss firms have high long-term growth prospects but with further losses expected in the short term (a technology firm expensing R&D in excess of short-term revenues being an example). And the B/P effect in returns is evident in Table 4 across the whole range of earnings yields.

Three features in Table 4 do give pause.

First, while B/P ranks growth and returns for a given earnings yield, estimated betas (in Panel E) are negatively associated with B/P, although the beta spread across B/P is not large compared that across E/P. High B/P portfolios are smaller firms (Panel F) and size is known to be negatively related to returns. The negative correlation between B/P and beta is well known, drawing the conjecture that B/P pertains to extra-market risk and

providing impetus to the construction of asset pricing models with a B/P factor (and a size factor) in addition to the market factor. But portfolio returns here exhibit positive alphas from those models. In the 18 years in the sample period when the average return across the whole sample is greater than 20%, there is little difference in returns over E/P portfolios, but B/P (for a given E/P) ranks returns strongly.[20] This suggests that, in years when the market as a whole is up (on growth prospects?), firms with exposure to growth risk do particularly well. In the 13 years with average market returns are below 5%, E/P strongly ranks returns, with low E/P (high *LTE*) firms with higher betas yielding significant negative returns. In these years, the difference in returns between high and low B/P portfolios (for a given E/P) is considerably less, though still positive.[21] Nevertheless, the negative relationship between historical betas and returns across the whole matrix of returns in Table 4 is puzzling. If the returns here are reward to risk, they indicate an inadequacy of the (unconditional) CAPM (and the multi factor model employed as a benchmark in Panel H.) [22]

Second, with the exception of the lowest E/P portfolio 5 and somewhat the highest E/P portfolio 1, differential returns within E/P portfolios are largely associated with high B/P: over a wide range of B/P (for a given earnings yield), returns are little

[20] When ranking on LTE alone in up-markets, the average returns for the Low LTE portfolio is 40.0% and that for the high LTE portfolio is 38.1%. The average returns for the four corner portfolios in Panel A with the second ranking is (Low LTE, Low B/P) = 36.3%; (High LTE, Low B/P) = 24.1%; (Low LTE, High B/P) = 49.7%; (High LTE, High B/P) = 51.5%.

[21] When ranking on LTE alone in down-markets, the average returns for the Low LTE portfolio is 1.9% and that for the high LTE portfolio is -13.1%. The average returns for the four corner portfolios in Panel A with the second ranking is (Low LTE, Low B/P) = -1.6%; (High LTE, Low B/P) = -16.2%; (Low LTE, High B/P) = 5.6%; (High LTE, High B/P) = -4.5%.

[22] See Santos and Veronesi (2005) for possible explanations.

different from those implied by the earnings yield.[23] Central values are typically less discriminating than the extremes, of course, but the observation is noteworthy because, unconditionally, B/P ranks returns over the whole range of B/P (as will be seen in Table 6). B/P is positively correlated with E/P, so the result informs that E/P indicates returns that might otherwise be indicated by B/P. Central E/P values (portfolios 2-4) are cases where E/P ratios (in Panel G) are affected less by potential growth (*LTE* in Panel D is less extreme) and thus E/P is more aligned with the required return, with less additional risk and return to be explained. As indicated by equations (5a) and (5b) where E/P indicates the required return, B/P can vary widely yet will not indicate growth or additional expected return over that indicated by E/P. Further, with most of B/P presumably due to growth that is not related to the required return, B/P is a blunt instrument to identify growth that requires a higher return. Particularly high B/P ratios do indicate additional return, and these are cases where *LTE* relative to *STE* is particularly high. Table 3 reports that particularly high *LTE* relative to *STE* is associated with both high B/P and higher returns in the lowest E/P portfolio and that feature is evident in all E/P portfolios here.

Third, the spread of average returns from the 4.3% for the low E/P, low B/P portfolio to the 30.0% for the high E/P, high B/P portfolio is large, suggesting market inefficiency rather than reward for risk. Of course, the sample period might be one where growth risk paid off handsomely (and likely so).

Returns to a Joint Sort on STE and LTE

If *LTE* relative to *STE* predicts returns for a given earnings yield, the question arises as to whether *LTE* relative to *STE* does so unconditionally. One presumes that some (or even most) of *LTE* represents growth over that required for risk; it represents

[23] There is more spread in return when an 8 × 8 matrix is constructed.

expected earnings from positive NPV investing and earnings deferred by accounting that is too conservative for the risk involved. Table 5 investigates. Firms are formed into five portfolios from a ranking on *STE* (across rows) and then, within each *STE* portfolio, into a further five portfolios from a ranking on *LTE* (down columns). So portfolios vary on *LTE* relative to *STE*. The returns associated with each are given in Panel A of the table, with the other panels reporting the same portfolio characteristics as the corresponding panels in Table 4.

The portfolio returns from ranking on *STE* alone, across the top of Panel A, show that *STE* does not order portfolio returns in any significant way; the t-statistic on the mean difference in returns, 3.5%, between the high and low *STE* portfolio is only 1.00. Note, however that the low *STE* portfolio (containing firms with negative *STE*) has a relatively higher mean return, out of pattern; the difference in returns between portfolios 5 and 2 is 6.9%. We investigate the case of $STE < 0$ later.

On the second ranking on *LTE*, down columns, *LTE* predicts returns for a given *STE*, but in a direction different from what one expects if *LTE* relative to *STE* indicates risk and return. These results are pertinent to the two scenarios earlier: growth as accounting unrelated to risk or growth as risk. As $STE = 1 - (B/P + LTE)$ by equation (9), the ranking on *STE* (across rows) is an inverse ranking on B/P + *LTE* so, given B/P + *LTE*, a ranking on *LTE* (down columns) is an inverse ranking on B/P, as Panel B confirms. So the ranking on *LTE* for a given B/P + *LTE* examines whether there are higher returns associated with the division in the accounting between B/P and *LTE*. If growth is accounting unrelated to risk – for given short-term earnings, lower B/P indicates long-term growth that is not related to risk and return – one would expect the

returns to ranking on *LTE* (and reverse ranking on B/P) here to be zero as B/P and *LTE* cancel each other. And, given the spread of B/P ratios and *LTE* in Table 1, one might expect the variation in B/P and *LTE* due to the accounting to overwhelm variation in B/P and LTE due to risk. The canceling does occur in Table 5, but more so: returns to increasing *LTE* (and reverse ranking on B/P) are negative.

These negative returns to *LTE* (for a given *STE*) could be due to too much earnings deferred to the long-term when firms are less risky; accounting is too conservative, and perversely so. Or, it could be that B/P identifies risk exposures that the accounting for income recognition does not incorporate; explanations other than those to do with the accounting are in play. A third explanation recognizes the earnings yield as the anchor to the expected return in equation (5a) before introducing growth. Table 4 anchored on the earnings yield and observed the associated returns (in the first ranking), but here the E/P returns are spread across portfolios by the construction that introduces growth: Panel G of Table 5 shows that earnings yields are positively related to *STE* (across rows), but negatively related to *LTE* (down columns), and *STE* ranks returns positively (somewhat) while *LTE* ranks returns negatively. As *LTE* is the negative of the earnings yield, the ranking on *LTE* is an inverse ranking on the yield. So that ranking is a recovery of the earnings yield that indicates return. For a given *STE*, the ranking on the earnings yield is also a one-for-one ranking on B/P, by equation (12), underlying the observation that B/P and the earnings yield are positively correlated. The ranking on B/P yields significant alphas from Fama and French time-series regressions in Panel H, even though the benchmark factor model includes a B/P factor, because B/P (for a given *STE*) is in fact an identification of the earnings yield (that is not in the factor model).

Returns to a Joint Sort on B/P and E/P

Table 6 reports a final set of portfolio returns. Firms are first ranked on B/P (across rows) then, within each B/P portfolio, on *LTE*, reversing the order of the rankings in Table 4. The "B/P effect in stock returns" is clearly evident from the first ranking, with a t-statistic of 5.57 on the mean difference of 15.1% between high and low B/P portfolios. The differences in returns across B/P portfolios can be partly attributed to B/P being positively correlated with earnings yields (that predict returns). However, the return spread is considerably higher than that for earnings yields in Table 4. Equation (12) suggests a reason: B/P picks up two sources of risk. B/P is the earnings yield (with the risk and return implied), adjusted for earnings expected to be added to book value in the short term relative to the long-term (with additional risk and return implied).

The spread of returns over the full range of B/P ratios in Table 6 contrasts with that within E/P portfolios in Table 4: for a given E/P in Table 4, B/P does not rank returns over a wide range of B/P. This indicates that a considerable portion of the B/P effect in stock returns is due to a positive correlation with E/P. The mean rank correlation across the whole cross-section is 0.312 in Table 2, but Table 3 reports that, out of pattern, B/P is high for low (and negative) E/P. The mean rank correlation between B/P and E/P for positive E/P is 0.477, and for positive *STE* is 0.697.

Nevertheless, Table 4 shows that higher B/P adds to returns for a given E/P, with a risk-for-growth attribution. Is it thus the case that B/P "subsumes" returns to E/P as Fama and French (1992) maintain? The second ranking in Table 6 addresses the question. The ranking is on *LTE*, but is an inverse ranking on the earnings yield, as equation (11) and Panel G indicate, so the investigation tests whether B/P "subsumes" the returns

associated with earnings yields. The evidence in the table is mixed but consistent with the results in Table 4. The reported t-statistics indicate significant return differences across earnings yield (*LTE*) portfolios in the lower B/P portfolios, but not the higher B/P portfolios, and in Table 4 it is the higher B/P ratios that add to returns for a given E/P. When a given B/P is identified with different levels of earnings yield, one observes (in Panel H) positive alphas from the four-factor model (that does not include an earnings yield factor). Note that for positive earnings yields – where B/P and E/P are more strongly correlated – E/P adds to return for all levels of B/P (see below).[24]

The combination of findings here and in Table 4 prompt an interpretation for the B/P effect in stock returns: B/P indicates risk in earnings and earnings growth. B/P is positively correlated with short-term earnings yields and thus indicates the risk and return associated with earnings yields. But, in addition, B/P indicates growth over the short term that also is at risk and requires additional return. The additional return to B/P is most striking in the low E/P portfolios where a good deal of risk is attributable to growth. However it is evident across the whole range of E/P where higher B/P ratios indicate considerable long-term earnings expected over the short term. Overall, the results endorse the notion that it is earnings and earnings growth that are at risk and B/P aids in the identification of that risk. The interpretation accords with the insights from equations (5a) and (5b): In the no-growth case, B/P can vary widely but have no relation to growth, and add nothing to the earnings yield in indicating the required return. Only when B/P

[24] Piotroski (2000) observes that high B/P firms with high return on book value (of assets), among other accounting characteristics, earn higher returns than those with low return on book value. Monhanram (2005) observes a similar result for low B/P firms. The authors bring a market inefficiency interpretation to their findings. However, a high return on book value for a given B/P implies a high E/P, so the results are consistent with returns to a joint sort on B/P and E/P, and thus may indicate earnings at risk. Piotroski adds changes in profit margins and asset turnovers to the predictors of returns, measures which may indicate persistent earnings and growth that are at risk.

indicates growth over the short-term can B/P indicate risk and return and then only if the growth indicated is growth that requires a higher return.

Results for Subsamples

To discover how pervasive these findings are, we repeated the tests for varying conditions within the sample. This section reports on these robustness tests.

Firms with Positive Earnings Yields

Although the division of earnings between the short-term and long-term can be made with negative earnings, equation (7) holds only for positive earnings (if price must be positive). Panel A of Table 7 repeats the core test in Panel A of Table 4 for firms with positive earnings yields. As in Table 4, the ranking on *LTE* is a reverse ranking on the earnings yield, and E/P ratios (not reported in the table) range from an average of 2.8% for the high *LTE* (low E/P) portfolio to 14.8% for the low *LTE* (high E/P) portfolio. Corresponding average betas range from 1.27 down to 0.99 and portfolio B/P from 0.56 to 1.08. *LTE* (and the earnings yield) for these positive earnings stocks ranks returns in a similar way to Table 4. Further, B/P ranks returns for a given *LTE* (and that ranking is a ranking on *LTE* relative to *STE*). In short, the results for all firms hold for those with positive earnings yields. The ranking on *LTE* (and earnings yield) for a given B/P, as in Table 6, produced stronger results than those for all firms in Table 5: positive earnings yields add to returns explained by B/P for all B/P portfolios (as already mentioned).

Firms with Negative STE

When forward $ROCE_{t+1}$ is less than the risk-free rate, forward residual earnings is negative under our construction and the negative amount is capitalized as a perpetuity. Equations (4a) and (4b) hold only for $ROCE_{t+1} > g$. This may not be an issue; the

resulting *LTE* is still a determination of long-run earnings expected (in the price) over the short term. However, we investigate the case where $ROCE_{t+1} < r_f$, that is, $STE < 0$. The mean portfolio B/P for these firms is on average higher (1.04 compared with 0.66 for firms with $STE > 0$) so we are investigating firms where a higher B/P is associated with low short-term profitability. Firms with negative earnings also fall in this group.

The return results for $STE < 0$ in Panel B of Table 7 are quite similar to those for all firms in Table 4. *LTE* again ranks returns negatively (and correspondingly the earnings yield ranks returns positively). For all *LTE* portfolios, B/P significantly adds to returns. This makes sense: if a firm is currently reporting low profitability, higher long-term expected earnings looks riskier, requiring a higher return.

Using Consensus Analysts' Forecasts of Forward Earnings

Estimating forward earnings from the most recently reported actual earnings refers to the actual accounting earnings currently being added to the book value in the B/P ratio, couching the issue in terms of growth in the long term over reported earnings and the risk implied. However, while papers such as Hughes, Liu and Su (2008) are skeptical, analysts' forecasts presumably contain further information about forward earnings that is incorporated in the price in the B/P ratio. Conditional upon analysts' forecasts approximating market expectations, using analysts' consensus forecasts of forward earnings essentially takes one year of expected growth from the long-term earnings into the short-term, that is, it evaluates growth after recognizing one year of growth that analysts anticipate. The issue, then, is whether this expectation takes away the ability of B/P to indicate return beyond the correlation of B/P with earnings yield.

The returns from using analysts' forecasts are in Panel C of Table 7, for the period 1977-2006 for which the forecasts are available on IBES files. The sample covers fewer years, but is also limited to firms which analysts and IBES cover. We found that the distribution of B/P ratios for this sample is similar to those for all firms on COMPUSTAT during the same period but there are fewer small firms. (Curiously) we also found that the spread of returns when ranking unconditionally on B/P was considerable less than that in Table 6 for the larger set of firms.

The results in Panel C of Table 7 are not as strong as those in Table 4. Earnings yields still rank returns, though the return spread is not as wide as that in Table 4. For a given earnings yield (and *LTE*), B/P does rank returns, but the differences are not as large. Portfolio B/P (not reported) are again positively correlated with portfolio earnings yield but, in the same tests as in Table 6, B/P ranks returns (unconditionally) on the first ranking but *LTE* (earnings yield) does not produce any significant return differences on the second ranking for a given B/P. The different results cannot be attributed to the different time period, for the results using reported earnings for 1977-2006 were similar to those for 1963-2006. Results using only forecasts of positive earnings were also similar to those here. Noise in the analysts' speculative forecasts could be the reason why the forward earnings yields do not discriminate as effectively on risk and return.

Alternative Forecast of Forward Earnings

The analysis in Tables 4-6 estimated forward earnings as equal to prior-year (trailing) earnings before extraordinary and special items. Panel D of Table 7 presents returns to the joint *LTE*, B/P ranking with forward earnings forecasted as the return on common equity (before extraordinary and special items) in the prior year applied to end of year

book value: $Earnings_{t+1} = ROCE_t \times B_t$. This forecast accommodates expected earnings increases due to growth in book value in the prior year. The results in Panel D are similar to those in Panel A of Table 4. On one point there is a difference however: the returns to B/P for a given *LTE* are less in the extreme, increasing over a wider range of B/P.

Firms with B/P greater than 1

Firms with $STE < 0$ have a preponderance of high B/P firms. However, as the B/P effect in stock returns is often attributed to high B/P firms, we specifically look at the results for $B/P > 1$. Panel E of Table 7 reports returns from first ranking on *LTE* and then on B/P, but now for only three portfolios because of the smaller number of firms with these B/P ratios. Average earnings yields (not reported in the table) are 15. 5% and 6.8% for *LTE* portfolios 1 and 2, respectively, and negative for the highest *LTE* portfolio, but this spread on the earnings yield (and *LTE*) does not produce much of a return spread on the first ranking. B/P orders returns for *LTE* portfolios 1 and 2 but not significantly so for the highest *LTE* portfolio (with negative average earnings yields) where, despite the return differences, these is considerable variation in portfolio returns relative to the means. When ranking on B/P first with these high B/P firms (in the tests following those in Table 6), B/P ranks returns. *LTE* (and the earnings yield) on the second ranking orders returns negatively but not such as to produce significant return differences.

Firms Size and Low Prices

The full analysis was repeated for small, medium, and large firms by market capitalization of their equity. Cut-offs to partition the size ranking were determined from the ranking for the previous year. In the joint *LTE*, B/P ranking (as in Panel A in Table 4) for large firms, *LTE* (and thus E/P) ranked returns significantly, but not B/P on the

second ranking. Indeed, the return spread from ranking firms unconditionally on B/P was not large, with only a 7.2 percent difference between high and low B/P portfolios (t = 2.36). Correspondingly, results were stronger for the second ranking in Table 4 in small and mid-cap firms. These firms are more likely to have growth at risk that differentiates them from the risk in the market as a whole.

The sample excludes firms with per-share prices less than 20 cents that maybe infrequently traded. Results were similar when the cut-off was changed to $1, $2, and $5.

Other Robustness Checks

Other tests were performed with little difference in results. The analysis was run on firms with December 31 fiscal-year ends only, with cutoffs points for the portfolio allocation made with reference to the distribution for the current year rather than the prior year (and still retaining no look-ahead bias). In this replication, firms enter portfolios at the same calendar time and the risk-free rate used to capitalize forward residual earnings (and which varies month-to-month) is the same for each firm. We repeated the analysis (on all firms) with B/P and E/P calculated with prices (from Compustat) at fiscal year end rather than three months after fiscal-year end. In additional tests, we began the return period four months after fiscal-year. We carried out the analysis excluding firms in the financial service industries (SIC codes 6000-6999). We also validated the robustness of the findings over time by looking at years 1963-1984 and 1985-2006 separately. Results were somewhat stronger in the earlier period. Results were also similar working with 8 × 8 portfolio sorts (with fewer firms in portfolios).

Conclusion

The paper confirms results in earlier studies that earnings yields predict stock returns. The result is consistent with the notion that earnings are at risk and higher expected earnings require a higher return in accordance with a risk-return tradeoff. However, investors not only buy short-term earnings but also subsequent earnings (growth), and both are presumably at risk. Identifying the expected return for a given earnings yield is problematical, however: earnings yields are increasing in the required return and decreasing in expected earnings growth, but are also increasing in growth if growth requires a higher return.

The paper shows that book-to-price indicates expected returns associated with growth: for a given earnings yield, book-to-price indicates additional expected returns, and those additional returns can be explained by book-to-price identifying risky growth. Accordingly, the so-called book-to-price effect in stock returns is depicted as rational pricing, but in a way that differs from the typical characterization of low book-to-price indicting "growth" and lower returns. Rather, high book-to-price indicates growth and yields higher returns (for a given earnings yield), consistent with the notion that growth is risky and is priced as such.

While research has shown that both book-to-price and earnings yields predict stock returns, the results here suggest that expected returns are best described in terms of joint book-to-price and earnings yield, for then the expected returns associated with growth are identified. Book-to-price predicts returns unconditionally, but this is explained by the positive correlation between book-to-price and earnings yields in the cross section plus book-to-price identifying risky growth for a given earnings yield.

A key point underlies the interpretation of the returns from the joint E/P, B/P sort: without growth, the earnings yield is a sufficient indicator of expected returns and book-to-price can add no further indication. Further, book-to-price can vary widely in this case (but with no indication of growth or the expected return). Only in the growth case can book-to-price indicate growth and, with this indication, additional risk from growth. The interpretation of returns to buying earnings and book value is further reinforced by reference to the accounting principles that determine these numbers. Accounting defers earnings recognition to the future under uncertainty, reducing book value, and defers relatively more earnings to the long-term future when outcomes are particularly risky. So, earnings deferred to the long run, relative to earnings added to book value in the short run, is indicative of the risk a firm faces. For a given earnings yield, book-to-price captures this feature, simply by the way that earnings yields and book-to-price articulate. In absence of a formal model of how accounting relates to risk and return, there is no imperative that, in doing so, GAAP accounting captures priced risk, but our results suggest so.

Some qualifications apply.

First, we do not claim to have explained the book-to-price effect entirely; others factors associated with high book-to-price that have been conjectured in the literature may also come into play. Book-to-price may happen to be correlated with risk in the cross-section for no reason to do with the accounting. Again, however, the recognition that book-to-price is an accounting construct gives a certain persuasion to the idea that, if book-to-price is to indicate risk and return, it might have something to do with the accounting. Second, the metric for identifying expected returns is average ex post returns

and average returns are sample-specific, with variance around them that is large relative to expected returns. We do, however, cover an extended period and most U.S. listed stocks. Third, the results are not as strong when analysts' consensus forecasts are employed rather than reported accounting numbers. The reason is open to conjecture but does not take away from the observation that reported earnings yields and B/P – the actual numbers coming from the accounting system (rather than analysts' speculation) – predict stock returns. Fourth, there is a puzzling relationship between the documented returns and historical betas. This, of course may just indicate that the unconditional CAPM does not capture the risk associated with earnings and earnings growth. Fifth, the documented returns may not indicate payoff for risk at all, but rather the mispricing of that risk. If so, the paper merely documents enhanced abnormal returns from identifying growth over those from earnings yields or book-to-price alone. However, the paper then suggests the distinction between "value" and "growth" in discovering alpha needs rethinking.

Book-to-price is presumably a blunt instrument for identifying growth that is at risk. A more penetrating financial statement analysis may improve the identification. Indeed Piotroski (2000) and Monhanram (2005), who effectively screen for firms with high E/P for a given B/P, introduce other characteristics such as changes in profit margins and turnovers, earnings and sales volatility, and R&D intensity that are likely to indicate growth.

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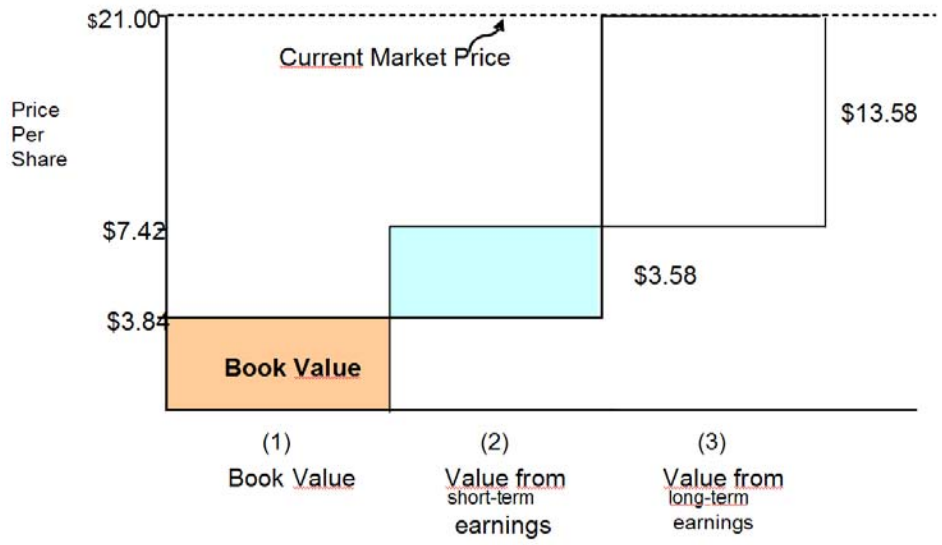

Figure 1. The $21 per share price for Cisco Systems, Inc. in September, 2004 is broken down into three components following equation (6). Component (1) is book value, component (2) is value from forward earnings, and component (3) is value from added growth in earnings after the forward year.

Table 1

Cross-sectional Distribution of Variables in the Analysis

This table reports descriptive statistics from the period 1963-2006 for variables used in the empirical analysis, along with comparative statistics for selected variables for all stocks on the CRSP and Compustat databases. Returns are average monthly returns over the 12 months beginning three months after firms' fiscal-year end. B/P is calculated as the ratio of the per-share book value of common equity (B) to the per-share price of common equity. B is common equity (Compustat data item 60) plus any preferred treasury stock (item 227) less any preferred dividends in arrears (item 242), and is measured on a per-share basis at the end of each fiscal year, adjusted for stock splits and stock dividends over the three months following fiscal-year end. Price per share is the CRSP price at three months after fiscal-year end at which point book value and earnings for that year are presumed to have been reported. Short-term earnings (forward) expectations are estimated by earnings before extraordinary items (Compustat item 18) in the prior year less special items (Compustat item 17) adjusted for taxes, and the earnings yield (E/P) and the forward return on common equity (ROCE) are based on this estimate. The earnings yield is the earnings on a per-share basis, adjusted for stock splits and stock dividends over the three months following fiscal-year end, divided by price per share three months after fiscal-year end. STE is short-term residual earnings, with the required return set equal to the risk-free rate and that forward residual earnings then converted to a no-growth residual earnings forecast by capitalizing one-year ahead residual earnings at the risk-free rate, as indicated by component 2 of equation (8) in the text. It is then divided by price. The risk-free rate is the 10-year Treasury yield at three months after fiscal-year end, obtained from the Federal Reserve website. Long-term earnings (relative to price), LTE = 1 – (B/P + STE), with the understanding that both STE and LTE are price-denominated. The distributions are from data pooled over firms and years. For the calculation of means and standard deviations (but not the percentiles), the top and bottom percentiles of observations of the accounting variables each year are eliminated (but not for the stock returns). The table indicates the number of firms after this trimming.

	All CRSP Stocks	All Compustat Stocks		Stocks in the Sample					
	Monthly Return (%)	B/P	E/P	Monthly Return (%)	B/P	E/P	ROCE	STE	LTE
Mean	1.18	0.759	0.020	1.29	0.744	0.028	0.030	-0.422	0.678
Std. Dev.	18.26	0.594	0.188	17.06	0.555	0.155	0.295	2.788	2.710
Percentiles:									
5	-22.22	0.113	-0.327	-21.28	0.123	-0.276	-0.606	-5.318	-1.391
10	-15.42	0.180	-0.133	-14.79	0.187	-0.115	-0.240	-2.593	-0.935
20	-8.85	0.291	-0.015	-8.49	0.295	-0.009	-0.017	-0.919	-0.496
30	-5.00	0.392	0.022	-4.76	0.395	0.024	0.043	-0.296	-0.222
40	-2.10	0.497	0.04	-1.99	0.497	0.041	0.076	0.020	-0.007
50	0.00	0.609	0.053	0.00	0.606	0.055	0.101	0.219	0.190
60	2.28	0.737	0.066	2.51	0.731	0.067	0.121	0.381	0.395
70	5.29	0.901	0.082	5.47	0.890	0.082	0.142	0.544	0.646
80	9.59	1.139	0.104	9.63	1.118	0.104	0.166	0.739	1.136
90	17.61	1.573	0.146	17.31	1.518	0.143	0.211	1.058	2.738
95	27.15	2.057	0.187	26.32	1.948	0.181	0.262	1.390	5.270
No. of firm/years	216,121	166,416	162,131	153,858					
After trimming		158,065	153,866	145,218					

Table 2

Mean Cross-sectional Correlations Between Variables in the Analysis, with Pearson Correlations on the Upper Diagonal and Spearman Correlations on the Lower Diagonal

This table reports mean cross-sectional correlations over the period 1963-2006. Reported correlations are the average correlation of coefficients calculated each year.

Returns are mean monthly returns over the 12 months beginning three months after firms' fiscal-year end. Betas, estimated from a maximum of 60 months and a minimum of 24 months prior to this date, are from market model regressions using CRSP value-weighted market return inclusive of all distributions. Size is the natural log of the market capitalization of equity (in millions of dollars). All other variables are defined in the notes to Table 1. Spearman correlation coefficients, estimated each year, utilize a total of 153,858 firm-year observations and Pearson correlation coefficients are estimated from the truncated sample of 145,218 firm-year observations after deleting the extreme percentiles for variables other than returns, beta, and size.

	Return	Beta	B/P	STE	LTE	E/P	ROCE	Size
Return		-0.029	0.083	0.021	-0.057	0.061	0.046	-0.040
Beta	-0.064		-0.130	-0.100	0.151	-0.152	-0.101	-0.015
B/P	0.120	-0.156		-0.311	-0.072	0.075	-0.183	-0.315
STE	0.107	-0.120	-0.155		-0.900	0.896	0.717	0.311
LTE	-0.163	0.197	-0.309	-0.815		-0.997	-0.620	-0.204
E/P	0.168	-0.197	0.312	0.808	-0.996		0.620	0.205
ROCE	0.094	-0.076	-0.377	0.852	-0.566	0.566		0.317
Size	0.030	0.013	-0.297	0.307	-0.161	0.162	0.402	

Table 3

Characteristics of Earnings Yield Portfolios

Ten portfolios are formed each year in the period, 1963-2006, by ranking firms three months after fiscal year end on their annual earnings yield (E/P). Cut-off points for the allocation of stocks to the portfolios are those for the prior year data, to avoid look-ahead bias. Numbers reported are means over years of portfolio means for each year. Variables on column headings, except returns, are defined in the notes to Tables 1and 2. Annual returns are buy-and-hold returns observed over the 12 months following the portfolio formation date.

E/P Portfolio	E/P (%)	B/P	STE	LTE	Beta	Size	Annual Returns (%)
1 (Low)	-32.5	0.98	-6.15	6.16	1.38	2.87	16.0
2	-3.3	0.61	-1.21	1.60	1.32	4.03	10.3
3	2.0	0.59	-0.35	0.75	1.28	4.43	11.4
4	4.5	0.61	0.02	0.37	1.22	4.70	12.8
5	6.1	0.64	0.22	0,14	1.14	4.93	14.8
6	7.4	0.70	0.35	-0.05	1.06	4.92	15.2
7	8.6	0.77	0.46	-0.23	1.01	4,82	17.9
8	10.0	0.84	0.58	-0.42	0.97	4.69	18.1
9	11.8	0.93	0.75	-0.68	0.96	4.49	20.8
10 (High)	16.3	1.16	1.19	-1.35	0.99	4.11	25.3

Table 4

Mean Annual Returns and Other Characteristic for Portfolios Formed from Long-term Earnings Expectations (LTE) and Book-to-Price

Five portfolios are formed each year in the period, 1963-2006, by ranking observations three months after fiscal year end on the long-term earnings component of price, LTE (that is price-deflated). Then, within each LTE portfolio, five portfolios are formed by ranking on book-to-price (B/P). Cut-off points for the allocation of stocks to the portfolios are those for the prior year data, to avoid look-ahead bias. Buy-and-hold returns are then observed over the 12 months following the portfolio formation date. Portfolio returns reported in Panel A are mean returns from forming portfolios each year. The reported t-statistics are the mean return differences between returns for the high and low portfolios indicated relative to the standard error of that mean estimated from the time series of return differences.

Panels B - G report means of portfolio characteristics. Most characteristics are defined in the notes to Table 1. Betas, estimated from a maximum of 60 months and a minimum of 24 months prior to this date, are from market model regressions using CRSP value-weighted market return inclusive of all distributions. Size is the natural log of the market capitalization of equity (in millions of dollars).

Panel H reports intercepts (with t-statistics in parenthesis) from regressing portfolio monthly excess returns (over the ten-year risk-free rate) in the time-series regressions on excess returns associated with market (MKT), size (SMB), book-to-price (HML), and momentum (UMD) factors. The factor returns for MKT, SMB, HML and UMD factors were obtained from Kenneth French's website at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html.

Panel A **Mean Annual Returns (%)**

		Low	*2*	*3*	*4*	*High*	*H-L*	t-stat
Ranking on LTE alone		23.2	18.1	14.9	12.1	13.5	-9.7	-2.47
				LTE				
B/P	***Low***	19.7	17.1	14.2	10.9	4.3	-15.5	
	2	22.1	16.0	13.0	9.1	8.8	-13.3	
	3	21.6	17.0	12.1	8.5	14.4	-7.2	
	4	24.3	18.0	14.7	13.4	15.5	-8.7	
	High	30.0	22.6	20.2	20.1	26.4	-3.6	
	H-L	10.3	5.5	6.1	9.2	22.2		
	t-stat	3.92	2.92	2.78	2.62	5.67		

Panel B **Average B/P**

		Low	*2*	*3*	*4*	*High*	*H-L*
Ranking on LTE alone		1.05	0.80	0.67	0.60	0.80	-0.25
				LTE			
B/P	***Low***	0.55	0.40	0.28	0.17	0.14	-0.41
	2	0.79	0.59	0.42	0.30	0.32	-0.47
	3	0.96	0.73	0.55	0.45	0.60	-0.37
	4	1.18	0.90	0.74	0.68	1.04	-0.14
	High	1.77	1.39	1.29	1.33	1.99	0.22
	H-L	1.23	0.99	1.01	1.16	1.85	

Panel C **Average STE**

		Low	2	3	4	High	H-L
Ranking on LTE alone		0.99	0.52	0.28	-0.17	-3.75	-4.73
				LTE			
B/P	***Low***	1.33	0.89	0.64	0.22	-2.00	-3.33
	2	1.13	0.72	0.53	0.14	-2.48	-3.61
	3	1.01	0.60	0.42	0.01	-3.19	-4.20
	4	0.90	0.44	0.23	-0.23	-4.30	-5.20
	High	0.56	-0.05	-0.33	-0.92	-6.84	-7.40
	H-L	-0.77	-0.94	-0.97	-1.13	-4.84	

Panel D **Average LTE**

		Low	2	3	4	High	H-L
Ranking on LTE alone		-1.04	-0.32	0.05	0.57	3.94	4.98
				LTE			
B/P	***Low***	-0.88	-0.29	0.08	0.61	2.86	3.74
	2	-0.92	-0.31	0.05	0.56	3.16	4.08
	3	-0.97	-0.33	0.03	0.55	3.60	4.57
	4	-1.08	-0.34	0.03	0.55	4.27	5.35
	High	-1.33	-0.34	0.04	0.58	5.85	7.18
	H-L	-0.45	-0.04	-0.04	-0.03	2.99	

Panel E **Average Beta**

		Low	2	3	4	High	H-L
Ranking on LTE alone		0.98	0.99	1.10	1.25	1.35	0.38
				LTE			
B/P	***Low***	1.10	1.13	1.20	1.39	1.44	0.35
	2	1.00	1.03	1.17	1.35	1.42	0.42
	3	0.93	0.96	1.11	1.27	1.40	0.47
	4	0.94	0.92	1.06	1.21	1.31	0.37
	High	0.94	0.94	1.01	1.09	1.17	0.23
	H-L	-0.15	-0.19	-0.19	-0.30	-0.27	

Panel F **Average Size**

		Low	2	3	4	High	H-L
Ranking on LTE alone		4.28	4.76	4.93	4.56	3.44	-0.84
				LTE			
B/P	***Low***	4.56	5.15	5.47	5.13	4.17	-0.39
	2	4.65	5.12	5.44	5.05	3.88	-0.77
	3	4.46	4.97	5.16	4.80	3.50	-0.96
	4	4.10	4.64	4.74	4.38	3.08	-1.02
	High	3.43	3.77	3.75	3.46	2.45	-0.98
	H-L	-1.13	-1.38	-1.72	-1.67	-1.72	

Panel G **Average E/P (%)**

		Low	*2*	*3*	*4*	*High*	*H-L*
Ranking on LTE alone		14.1	9.3	6.7	3.2	-18.4	-32.5
				LTE			
B/P	***Low***	12.9	9.0	6.4	2.8	-11.4	-24.3
	2	13.2	9.1	6.7	3.2	-13.3	-26.5
	3	13.7	9.3	6.8	3.4	-16.1	-29.8
	4	14.4	9.5	6.9	3.4	-20.6	-35.0
	High	16.2	9.5	6.8	3.1	-30.7	-46.9
	H-L	3.4	0.5	0.5	0.3	-19.3	

Panel H **Intercepts (% Returns) and *t statistics* from Four-factor Model Time-series Regressions**

					LTE		
		Low	***2***	***3***	***4***	***High***	***H-L***
B/P	***Low***	0.27	0.66	0.67	0.33	-0,19	-0.45
		(2.52)	*(2.47)*	*(2.40)*	*(0.93)*	*(-0.48)*	
	2	0.95	0.62	0.55	0.24	0.19	-0.76
		(4.05)	*(2.67)*	*(2.08)*	*(0.74)*	*(0.48)*	
	3	0.93	0.78	0.51	0.24	0.66	-0.26
		(3.91)	*(3.65)*	*(2.01)*	*(0.78)*	*(1.75)*	
	4	1.04	0.73	0.58	0.54	0.57	-0.47
		(4.01)	*(3.50)*	*(2.49)*	*(1.95)*	*(1.53)*	
	High	1.28	1.06	0.87	0.80	1.27	-0.01
		(5.04)	*(4.50)*	*(3.44)*	*(2.98)*	*(3.45)*	
	H-L	1.01	0.40	0.21	0.47	1.45	

Table 5

Mean Annual Returns and Other Characteristic for Portfolios Formed from Expected Short-term Earnings Added to Book Value (STE) and Long-term Earnings Expectations (LTE)

Portfolios are formed as in Table 4 except firms are first ranked on expected short-term earnings relative to book value (STE) and then, within STE portfolios, on long-term earnings expectations (LTE). All other aspects of the table are constructed in the same way as Table 4. See the notes to Table 4.

Panel A **Mean Annual Returns (%)**

		Low	*2*	*3*	*4*	*High*	*H-L*	t-stat
Ranking on STE alone		17.0	13.0	14.3	16.1	20.5	3.5	1.00
				STE				
LTE	***Low***	22.5	24.0	23.9	20.5	26.5	4.0	
	2	15.8	17.4	14.7	17.4	22.7	7.0	
	3	12.8	11.4	12.8	15.4	20.0	7.2	
	4	15.3	9.7	12.2	13.1	16.9	1.6	
	High	19.0	5.7	9.7	13.6	16.3	-2.7	
	H-L	-3.5	-18.2	-14.1	-6.9	-10.2		
	t-stat	-0.89	-5.31	-3.80	-2.92	-3.32		

Panel B **Average B/P**

		Low	*2*	*3*	*4*	*High*	*H-L*
Ranking on STE alone		1.14	0.75	0.62	0.63	0.73	-0.41
				STE			
LTE	***Low***	1.65	1.45	1.20	1.13	1.15	-0.50
	2	1.05	0.94	0.79	0.75	0.86	-0.20
	3	0.91	0.68	0.57	0.57	0.70	-0.21
	4	0.89	0.46	0.38	0.42	0.56	-0.33
	High	1.20	0.27	0.22	0.26	0.36	-0.84
	H-L	-0.44	-1.18	-0.99	-0.87	-0.78	

Panel C **Average STE**

		Low	*2*	*3*	*4*	*High*	*H-L*
Ranking on STE alone		-3.91	-0.23	0.31	0.61	1.14	5.05
				STE			
LTE	***Low***	-1.26	-0.11	0.33	0.64	1.62	2.88
	2	-1.56	-0.13	0.33	0.63	1.18	2.74
	3	-2.30	-0.17	0.33	0.62	1.04	3.34
	4	-3.85	-0.25	0.31	0.60	0.94	4.79
	High	-10.27	-0.46	0.25	0.56	0.87	11.13
	H-L	-9.01	-0.35	-0.08	-0.08	-0.76	

Panel D **Average LTE**

		Low	2	3	4	High	H-L
Ranking on STE alone		3.78	0.48	0.06	-0.23	-0.86	-4.64
				STE			
LTE	***Low***	0.61	-0.34	-0.54	-0.76	-1.77	-2.38
	2	1.51	0.19	-0.12	-0.37	-1.04	-2.55
	3	2.39	0.49	0.10	-0.19	-0.74	-3.13
	4	3.96	0.78	0.30	-0.02	-0.51	-4.47
	High	10.06	1.20	0.53	0.18	-0.23	-10.29
	H-L	9.45	1.53	1.07	0.94	1.54	

Panel E **Average Beta**

		Low	2	3	4	High	H-L
Ranking on STE alone		1.30	1.19	1.11	1.04	1.05	-0.25
				STE			
LTE	***Low***	1.11	0.96	0.93	0.89	1.06	-0.05
	2	1.26	1.07	0.99	0.95	0.97	-0.29
	3	1.34	1.23	1.13	1.03	1.03	-0.31
	4	1.38	1.31	1.22	1.12	1.04	-0.33
	High	1.39	1.40	1.35	1.20	1.14	-0.25
	H-L	0.27	0.44	0.42	0.32	0.07	

Panel F **Average Size**

		Low	2	3	4	High	H-L
Ranking on STE alone		3.10	4.31	4.88	5.04	4.62	1.52
				STE			
LTE	***Low***	3.32	3.65	4.07	4.27	3.98	0.66
	2	3.42	4.27	4.70	4.85	4.47	1.05
	3	3.32	4.51	5.10	5.17	4.65	1.33
	4	3.04	4.61	5.23	5.37	4.92	1.89
	High	2.35	4.49	5.23	5.47	5.18	2.83
	H-L	-0.97	0.84	1.16	1.20	1.20	

Panel G **Average E/P (%)**

		Low	2	3	4	High	H-L
Ranking on STE alone		-17.1	3.9	6.6	8.5	12.6	29.7
				STE			
LTE	***Low***	3.9	9.9	11.1	12.5	19.0	15.1
	2	-2.3	6.1	8.0	9.6	14.0	16.3
	3	-8.0	3.9	6.3	8.2	11.9	19.8
	4	-18.0	1.7	4.8	6.9	10.2	28.3
	High	-58.0	-1.2	3.1	5.4	8.2	66.2
	H-L	-61.9	-11.1	-8.0	-7.0	-10.7	

Panel H **Intercepts (% Returns) and *t statistics* from Four-factor Model Time-series Regressions**

		STE					
		Low	***2***	***3***	***4***	***High***	***H-L***
LTE	***Low***	0.59	1.02	1.04	0.81	1.15	0.55
		(4.34)	*(4.36)*	*(4.72)*	*(3.73)*	*(3.28)*	
	2	0.52	0.73	0.66	0.70	0.89	0.36
		(1.57)	*(2.93)*	*(2.94)*	*(3.23)*	*(3.60)*	
	3	0.42	0.47	0.49	0.65	0.80	0.37
		(1.10)	*(1.65)*	*(1.98)*	*(2.73)*	*(3.31)*	
	4	0.55	0.36	0.34	0.56	0.69	0.14
		(1.37)	*(1.08)*	*(1.21)*	*(2.16)*	*(2.76)*	
	High	0.92	-0.03	0.33	0.63	0.66	-0.26
		(2.03)	*(-0.09)*	*(1.05)*	*(2.24)*	*(2.51)*	
	H-L	0.33	-1.05	-0.71	-0.19	-0.49	

Table 6

Mean Annual Returns and Other Characteristic for Portfolios Formed from Book-to-price and Long-term Earnings Expectations (LTE)

Portfolios are formed as in Tables 4 and 5 except firms are first ranked on book-to-price (B/P) and then, within B/P portfolios, on long-term earnings expectations (LTE). All other aspects of the table are constructed in the same way as Tables 4 and 5. See the notes to Table 4.

Panel A **Mean Annual Returns (%)**

		Low	*2*	*3*	*4*	*High*	*H-L*	t-stat
Ranking on B/P alone		9.3	12.6	15.4	18.4	24.3	15.1	5.57
				B/P				
LTE	***Low***	17.0	17.6	20.8	22.4	29.6	12.6	
	2	11.6	14.2	16.7	18.9	25.2	13.6	
	3	9.5	12.5	14.2	19.4	23.4	13.9	
	4	4.6	10.7	13.5	18.3	22.8	18.2	
	High	5.6	9.6	13.7	16.9	24.2	18.5	
	H-L	-11.3	-7.9	-7.1	-5.5	-5.4		
	t-stat	-2.74	-2.22	-1.82	-1.43	-1.26		

Panel B **Average B/P**

		Low	*2*	*3*	*4*	*High*	*H-L*
Ranking on B/P alone		0.22	0.45	0.67	0.94	1.62	1.40
				B/P			
LTE	***Low***	0.27	0.48	0.69	0.96	1.61	1.35
	2	0.25	0.46	0.68	0.94	1.49	1.24
	3	0.22	0.45	0.67	0.93	1.53	1.31
	4	0.19	0.45	0.67	0.93	1.62	1.43
	High	0.19	0.45	0.67	0.94	1.84	1.65
	H-L	-0.08	-0.03	-0.02	-0.02	0.22	

Panel C **Average STE**

		Low	*2*	*3*	*4*	*High*	*H-L*
Ranking on B/P alone		-0.23	0.04	0.04	-0.21	-2.01	-1.78
				B/P			
LTE	***Low***	0.89	1.10	1.21	1.23	0.94	0.05
	2	0.48	0.67	0.72	0.67	0.11	-0.37
	3	0.26	0.47	0.50	0.36	-0.57	-0.84
	4	-0.16	0.16	0.17	-0.08	-1.90	-1.74
	High	-2.51	-2.11	-2.17	-3.01	-8.04	-5.53
	H-L	-3.40	-3.21	-3.38	-4.24	-8.98	

Panel D **Average LTE**

		Low	2	3	4	High	H-L
Ranking on B/P alone		1.01	0.50	0.29	0.27	1.39	0.38
				B/P			
LTE	Low	-0.16	-0.57	-0.90	-1.19	-1.55	-1.39
	2	0.27	-0.13	-0.40	-0.61	-0.60	-0.87
	3	0.52	0.08	-0.16	-0.30	0.04	-0.48
	4	0.97	0.40	0.16	0.15	1.29	0.31
	High	3.32	2.67	2.50	3.06	7.20	3.88
	H-L	3.48	3.24	3.40	4.25	8.76	

Panel E **Average Beta**

		Low	2	3	4	High	H-L
Ranking on B/P alone		1.32	1.19	1.09	1.02	1.04	-0.28
				B/P			
LTE	Low	1.17	1.12	1.03	0.96	0.97	-0.20
	2	1.25	1.09	0.97	0.90	0.93	-0.32
	3	1.35	1.15	1.00	0.94	0.97	-0.38
	4	1.42	1.26	1.14	1.06	1.07	-0.35
	High	1.46	1.40	1.35	1.31	1.23	-0.23
	H-L	0.29	0.28	0.32	0.34	0.26	

Panel F **Average Size**

		Low	2	3	4	High	H-L
Ranking on B/P alone		4.98	4.84	4.63	4.22	3.28	-1.70
				B/P			
LTE	Low	5.28	4.81	4.66	4.38	3.62	-1.66
	2	5.63	5.34	4.98	4.56	3.66	-1.98
	3	5.39	5.25	4.95	4.47	3.49	-1.90
	4	4.81	4.94	4.81	4.27	3.15	-1.66
	High	3.67	3.74	3.68	3.36	2.46	-1.21
	H-L	-1.61	-1.07	-0.98	-1.02	-1.16	

Panel G **Average E/P (%)**

		Low	2	3	4	High	H-L
Ranking on B/P alone		0.0	3.6	5.1	5.5	-1.6	-1.6
				B/P			
LTE	Low	7.8	10.7	13.0	15,2	17.8	10.1
	2	5.0	7.8	9.7	11.3	11.4	6.5
	3	3.3	6.4	8.2	9.3	7.2	4.0
	4	0.3	4.3	6.0	6.3	-0.6	-0.9
	High	-15.0	-10.3	-9.2	-12.4	-38.8	-23.8
	H-L	-22.7	-21.1	-22.2	-27.6	-56.6	

Panel H **Intercepts (% Returns) and *t statistics* from Four-factor Model Time-series Regressions**

		B/P					
		Low	***2***	***3***	***4***	***High***	***H-L***
LTE	***Low***	0.33	0.62	0.80	0.92	1.28	0.96
		(3.13)	*(2.28)*	*(3.29)*	*(3.81)*	*(4.41)*	
	2	0.44	0.53	0.73	0.80	1.12	0.67
		(1.55)	*(2.10)*	*(3,23)*	*(3,71)*	*(4,83)*	
	3	0,37	0,58	0.62	0.83	1.05	0.69
		(1.15)	*(2.18)*	*(2.72)*	*(3.86)*	*(4.24)*	
	4	-0.05	0.30	0.59	0.79	0.97	1.02
		(-0.14)	*(1.05)*	*(2.41)*	*(3.25)*	*(3.46)*	
	High	-0.13	0.25	0.64	0.67	1.15	1.29
		(-0.33)	*(0.62)*	*(1.88)*	*(1.95)*	*(2.99)*	
	H-L	-0.46	-0.37	-0.17	-0.25	-0.13	

Table 7

Mean Annual Returns in Subsamples for Portfolios Formed from Long-term Expectations (LTE) and Book-to-Price

This table presents mean annual buy-and-hold portfolio returns, in percent, for portfolios formed in the same way as in Table 4 but under conditions indicated at the head of each panel. To form portfolios, stocks are first ranked on the long-term earnings component of price (LTE) then, within each LTE portfolio, by ranking on book-to-price. See notes to Table 4.

Panel A **Firms with Positive Earnings**

		Low	*2*	*3*	*4*	*High*	H-L	t-stat
Ranking on LTE		24.0	19.0	16.2	13.9	12.2	-11.8	-4.33
				LTE				
	Low	19.5	18.1	14.9	13.3	9.7	-9.8	
	2	23.1	17.3	14.6	11.9	8.0	-15.0	
	3	22.4	18.4	13.7	12.1	9.6	-12.9	
	4	23.6	18.5	15.4	13.7	13.6	-10.0	
	High	31.3	22.7	22.6	18.7	20.0	-11.3	
	H-L	11.7	4.6	7.7	5.4	10.3		
	t-stat	4.09	2.32	3.56	2.23	2.72		

Panel B **Firms with $STE < 0$ ($ROCE_{t+1} < r_f$)**

		Low	*2*	*3*	*4*	*High*	H-L	t-stat
Ranking on LTE		24.5%	18.2%	12.0%	15.8%	17.8%	-6.7%	-1.80
				LTE				
		Low	***2***	***3***	***4***	***High***		
	Low	18.9%	9.8%	5.6%	2.8%	11.5%	-7.4%	
B/P	***2***	27.3%	16.1%	7.8%	6.4%	13.5%	-13.8%	
	3	23.9%	21.2%	7.6%	13.0%	14.5%	-9.4%	
	4	25.7%	20.6%	16.9%	36.0%	21.8%	-3.9%	
	High	26.5%	23.7%	22.0%	21.7%	27.9%	1.4%	
	H-L	7.5%	13.9%	16.4%	19.0%	16.3%		
	t-stat	2.36	3.30	5.29	6.10	2.60		

Panel C **Using Analysts' Consensus Forecasts of Forward Earnings; 1977-2006**

		Low	*2*	*3*	*4*	*High*	H-L	t-stat
Ranking on LTE		22.8%	22.8%	17.8%	15.2%	17.1%	-5.7%	-0.89
				LTE				
	Low	18.1%	21.7%	15.1%	14.9%	14.9%	-3.2%	
	2	20.5%	20.2%	18.8%	12.5%	12.3%	-8.2%	
	3	25.4%	21.6%	16.1%	14.8%	16.4%	-9.0%	
	4	22.4%	24.4%	18.2%	14.8%	18.2%	-4.2%	
	High	27.4%	26.2%	21.0%	19.0%	23.6%	-3.8%	
	H-L	9.3%	4.5%	5.9%	4.1%	8.7%		
	t-stat	2.57	1.34	2.20	1.18	1.95		

Panel D **Forecast of Forward Earnings: $Earnings_{t+1} = ROCE_t \times B_t$**

		Low	*2*	*3*	*4*	*High*	*H-L*	t-stat
Ranking on LTE		21.1%	17.4%	15.3%	13.3%	14.6%	-6.5%	-1.67
				LTE				
B/P	***Low***	15.5%	14.7%	14.2%	10.9%	4.7%	-10.8%	
	2	19.6%	15.9%	13.9%	9.1%	10.3%	-9.2%	
	3	21.2%	18.0%	12.6%	12.1%	15.4%	-5.7%	
	4	22.7%	19.2%	15.0%	15.5%	18.6%	-4.1%	
	High	28.4%	20.9%	21.5%	21.5%	25.6%	-2.8%	
	H-L	12.8%	6.2%	7.4%	10.6%	20.9%		
	t-stat	4.53	3.21	3.72	2.91	5.69		

Panel E **B/P > 1**

		Low	*2*	*High*	H-L	t-stat
Ranking on LTE		26.9%	23.2%	23.5%	-3.4%	-1.33
			LTE			
		Low	***2***	***High***		
BP	***Low***	22.5%	20.9%	20.1%	-2.4%	
	2	26.5%	22.5%	24.0%	-2.6%	
	High	31.8%	26.3%	26.6%	-5.2%	
	H-L	9.4%	5.3%	6.5%		
	t-stat	3.47	3.01	1.63		