The Value Trap: Value Buys Risky Growth

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Abstract. So-called value stocks earn higher returns than growth stocks on average. However, an investor buying value stocks in hope of those returns may be trapped into buying earnings that are more volatile, more likely to have extreme "tail" outcomes, and are more sensitive to market-wide shocks. These outcomes are demonstrated in a trading strategy that buys stocks based on their earnings-to-price (E/P) and book-to-price (B/P) ratios. Earnings and book values are accounting numbers, so the paper shows how the risk imbedded in E/P and B/P can be attributed to the way that earnings and book values are measured under accounting principles. A striking finding emerges from the analysis: high B/P ("value") is associated with higher expected earnings growth, but growth that is risky. This contrasts with the standard labeling that nominates low B/P as "growth."

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"Value" and "growth" are prominent labels in the lexicon of finance. They refer to investing styles that buy firms with low multiples ("value") versus high multiples ("growth"), though the labels sometimes simply refer to buying low price-to-book versus high price-to-book. History tells that value outperforms growth on average, but with risk: a value position can turn against the investor. Indeed the experience with value stocks in the last few years has been sobering. Despite the prominence of these styles, it is not clear what one is buying when one buys value or growth, and the labels are not particularly illuminating. The value investor in particular is anxious that he or she might be caught in a value trap. This paper identifies the risk associated with the higher mean return to value stocks.

There has, of course, been substantial research into the question, largely on how the value-growth return spread is due to exposure to common risk factors. A notable contribution is that of Fama and French (1993) who construct a factor model where the higher returns to high versus low book-to-price are attributed to sensitivity to a "book-to-price risk factor" (along with the market factor and a "size factor"). However, as this book-to-price factor was identified largely from data dredging (to find characteristics that predict returns in the data), there is little understanding of why book-to-price might indicate risk and return. Numerous conjectures abound, many of which have been investigated empirically with some support. But it is fair to say that the "book-to-price effect" in stock returns remains somewhat of a mystery. Of course, higher returns to value may reflect mispricing rather than risk. Even so, it would be worthwhile to understand the risks that one is taking on in pursuing alpha.

This paper explains the value-growth return spread in terms of exposure to the underlying fundamentals. When one buys a stock, one buys future earnings. Accordingly, price multiples imbed expectations of earnings growth; indeed, it is well-recognized that the earnings-to-price (E/P) ratio (or the P/E ratio) imbeds the market's expectation of future earnings growth. But growth can be risky, subject to shocks, so understanding the exposure to those shocks is the key to understanding the risk in buying value versus growth. The paper shows that, for a given E/P, book-to-price (B/P) indicates the risk in buying earnings growth: A high B/P indicates a higher likelihood that expected earnings growth will not be realized.

Three points emerge. First, E/P and B/P are multiples to be employed together. Just as earnings and book value—the "bottom line" of the income statement and balance sheet respectively—articulate in accounting sense, so do E/P and B/P in an investment strategy: only in applying these multiples together (rather than as individual screens) does the investor understand the risk exposure and the payoffs to that risk. Second, high B/P—a value stock—buys higher earnings growth. This is surprising, for the standard labeling implies that it is "growth" (a low B/P) that buys growth, not "value." Third, the higher growth associated with value stocks is risky. In particular, high B/P stocks are subject to more extreme shocks to growth: the higher average returns associated with value stocks comes with higher risk.

The paper has a unifying theme: price multiples, like E/P and B/P, are multiples of accounting numbers; given price, they are accounting phenomena. Thus, if these multiples indicate risk, it might have something to do with the how accountants calculate earnings and book value. The paper shows that the returns associated with value versus growth align with an accounting principle for measuring earnings and book value in the presence of risk.

Section 3 develops this theme. But first we document the returns to value versus growth during our sample period.

1. Returns to Value versus Growth

Panel A of Table 1 reports the average annual returns to investing on the basis of E/P and B/P multiples during the years 1963-2012. The sample covers all firms on Compustat at any time during those years, except financial firms (SIC codes 6000-6999), firms with negative book values, and firms with per-share stock prices less the $0.20. Earnings and book value of common equity are from Compustat. Prices for the multiples are those three months after fiscal-year end at which time accounting numbers for the fiscal year should have been reported. Like earnings and book value, prices are per-share, adjusted for stock splits and stock dividends over the three months after fiscal-year end. Annual returns are observed over the 12 months after this date, calculated as buy-and-hold returns from monthly returns on CRSP with an accommodation for firms not surviving the full 12 months. A total of 167,781 firm-year observations are available for the analysis.[1]

Table 1 is constructed as follows. Each year, firms are ranked on their E/P ratios and formed into five portfolios from low to high E/P (along rows in the table). Then, within each E/P portfolio, firms are the ranked on their B/P and formed into five portfolios (down the columns in the table). This nested sort ensures that the B/P sort is for firms with a given level of E/P. Panel A of the table reports the average returns over the subsequent 12 months for these portfolios from replicating the strategy each year in the sample period. Panels B and C report the average E/P and B/P for the portfolios. The low E/P portfolio is all loss firms.[2] Panel D reports the average book rates of return on equity, ROE, for the portfolios.

The first row in Panel A reports returns for E/P portfolios before ranking on B/P. It is clear that E/P ranks returns for positive E/P portfolios 2 – 5, as is well-known (and documented in Basu 1977 and 1983 and Jaffe, Keim, and Westerfield 1989, for example). Further, for a given E/P, B/P ranks returns: the "book-to-price" or "value" effect in stock returns in evident, but now within stocks with a given E/P. The mean return spread between the 2.2% return for the low-E/P and low-B/P portfolio and the 28.8% return for the high-E/P and high-B/P portfolio is impressive. Panel B of the table shows that the second sort on B/P is not a further sort on E/P, except for E/P portfolio 1 where the mean E/P is negative (loss firms) but where E/P is actually negatively correlated with B/P.

This strategy has been trawled many times by value-growth investors (though not always with this structure). What explains the spread? In particular, do the return spreads reflect risk differences? To answer this question, we first introduce standard formulas for E/P and B/P ratios that connect the multiples to risk and growth. We then show why risk and growth are connected, the insight that provides the answer to the question and one that is supported by the data.

2. Connecting E/P and B/P to Risk and Growth

A standard formula for pricing earnings involves both risk and growth. For positive earnings,

$$P_0 = \frac{Earnings_1}{r - g} \tag{1}$$

where $Earnings_1$ is forward (year-ahead) earnings, r is the required return for risk borne, and g is the expected earnings growth after the forward year. This formula is strictly correct only for full payout, for then the substitution of earnings for dividends maps directly to the dividend discount model. The formula is often modified to accommodate different payout policies—with a constant payout ratio in the Gordon model, for example. But, for illustrative purposes, simplicity is a virtue and, under Miller and Modigliani (1961) assumptions, payout is irrelevant: while payout reduces expected earnings growth, *g*, it does not affect price.[3]

From (1), the forward E/P ratio is given by

$$\frac{Earnings_1}{P_0} = r - g \qquad (1a)$$

This expression shows that the forward E/P ratio is increasing in the required return and decreasing in expected growth (as is well-recognized). E/P is a yield and (as with any yield) imbeds the required return (and equals the required return with no growth). But growth also affects the E/P ratio. The effect is typically seen as decreasing E/P (and increasing P/E), and indeed equation (1a) shows that this is so for a given required return: more expected growth means a higher price and a lower E/P. But what if buying growth is risky? Then more growth would mean a higher required return, *r*, with an increasing effect on the E/P ratio (and a decreasing effect on the P/E ratio).

The point is demonstrated in the extreme case where all expected growth is risky. The required return is the risk-free rate, r_f, plus a risk premium, r_p: $r = r_f + r_p$. Suppose that added growth expectations just add to the risk premium because they are deemed to be risky—for added growth, the investor adds to the required return, one-to-one. Then, $r_p = g$ and $r - g = r_f$ such that $\frac{Earnings_1}{P_0} = r_f$. In this case, r_p and *g* cancel in equation (1a); the market anticipates the growth but also discounts the expected growth for the risk, to leave price unchanged. Curiously, the average forward historical P/E ratio for the S&P 500 at each December 31 from 1988-2012 is

19.7, implying an E/P of 5.1% which is close to the average 10-year U.S. Treasury yield of 5.3% for the period. In Panel B of Table 1 (covering 1963-2012), the median E/P (in E/P portfolio 3) is 5.6%, a little less than the average Treasury yield since 1962 of 6.6%.

This extreme case is, of course, the Fed Model. Ohlson (2008) constructs a hypothetical accounting system, permanent income accounting, that captures this benchmark case where risky growth adds no value. But U.S. GAAP is of a different design and the standard view that anticipated growth adds value presumably has substance, at least for some, and maybe many, firms. Indeed, the other extreme where growth adds to price with no effect on the required return is the more common view. However the point is made: in the determination of price in equation (1), earnings are capitalized at the rate, $r - g$; it is $r - g$ that bears on the price, not r and g as independent inputs where growth adds to price, holding r constant. If r increases with g, because growth is risky, the capitalization rate is higher with increasing g, yielding a lower price that is appropriate when expected payoffs are risky.[4] So, a given E/P could indicate risk with no expected growth ($g = 0$), high growth with high risk (and a high required return), or low growth with low risk (and a low required return).

Clearly there is some sorting out to do. The value investor buying a high E/P stock could just be loading up on risk: that stock might not be a low growth stock, but rather a stock with high but risky growth. Such a stock is labeled a value stock but may actually be a value trap.

It is not difficult to accept that buying earnings growth might be risky: a firm with high growth prospects is typically considered risky, and basic economics would suggest that a firm cannot invest to generate more earnings (growth) without taking on more risk, at least on average. We observe that stock prices settle up against earnings relative to expectation. This is clear from seeing stock prices move when earnings reports miss analysts' expectations, but more so in formal studies involving earnings and stock returns. Over long (five-year and ten-year) periods that include the realization of long-term growth expectations, the correlation between realized stock returns and realized earnings is very high; see, for example, Easton, Harris, and Ohlson (1992) and Ohlson and Penman (1992). In short, the risk of holding stocks is the risk that earnings will not meet expectations.

The value investor also favors high B/P stocks. Indeed, some define "value" stocks as those with high B/P and "growth" as those with low B/P. Dividing equation (1a) through by $Earnings_1/Book\ value_0$, B/P is given by

$$\frac{Book\ Value_0}{P_0} = \frac{Book\ Value_0}{Earnings_1} \times \frac{Earnings_1}{P_0} = \frac{Book\ Value_0}{Earnings_1} \times (r - g) \qquad (2)$$

This equation expresses B/P as the product of E/P ratio and the (inverse of the) book return on equity, $ROE_1 = \frac{Earnings_1}{B_0}$. It exhibits the well-known property that B/P is decreasing in the expected book rate of return, but is also determined by the required rate of return and expected earnings growth. For a given ROE_1 and a given required return, book-to-price is decreasing in expected growth because growth adds to the price. That is behind the label that nominates a low B/P as a "growth" stock. But, once again, the required return would be higher if that growth were deemed to be risky. In that case, r increases with g in equation (2) to yield a relatively higher B/P: the effect of growth and risk cancel in the price. If so, a high B/P—a value stock—could be a stock where one is buying growth but growth that is risky. It, too, may be a value trap.

The B/P expression (2) adds an additional insight. E/P in expression (1a) is given by $r - g$ and we have depicted the investor's problem as one of sorting out whether this represents low growth with low risk or high growth and high risk. For a given $r - g$ and thus a given positive E/P, equation (2) shows that B/P is determined by the (inverse of the) *ROE*. So, if a lower *ROE* is associated with a higher g, but $r - g$ does not change, B/P must be higher. And if $r - g$ does not change the higher growth must be risky such that r is also higher. Thus, a higher B/P indicates the higher r. In short, if g varies inversely with ROE_1 holding $r - g$ constant, then B/P is increasing in growth that adds to risk.

Is there a reason why risky growth might be inversely related to *ROE*? Later in the paper, we show that *ROE* and B/P indicate risky growth empirically, but first we show that it follows as a matter of accounting principle.

3. An Accounting Principle Connects Growth to Risk

Earnings and book value are accounting numbers. So, given price, E/P and B/P are accounting phenomena: the ratios are a product of accounting principles that determine how earnings and book value are measured. Accordingly, if B/P has anything to do with risk, it is likely to be a result of the accounting involved.

To illustrate, consider the B/P ratio for a (low risk) mark-to-market fund invested in U.S. government securities: B/P = 1. Consider also the B/P ratio for a (risky) equity fund also marked to market: B/P =1. These two assets, with different risk, have the same B/P, so B/P cannot indicate risk or expected return. Importantly, it is the accounting**—**mark-to-market accounting (or, more generally, fair value accounting)**—**that takes away the ability for B/P to indicate risk and expected return.

For most firms, B/P ≠ 1 and that must be the result of applying accounting principles other than fair value accounting. That accounting is, of course, historical cost accounting. Is there something about historical cost accounting that ties growth to risk and thus helps to understand the extent to which E/P and B/P indicate not only growth but also risky growth? The answer is yes.

Under historical cost accounting, earnings are not booked until certain conditions are satisfied. That accounting produces B/P ≠ 1. Indeed, $P_0 – B_0$ is simply future expected earnings that the market expects in setting the price, P_0, but which the accountants have not yet booked to book value—the earnings are expected to be added to book value in the future. The median price-to-book since 1962 is about 1.6, indicative of this delayed earnings recognition. The guiding accounting principle has to do with how accountants handle risk:

An Accounting Principle: *Under uncertainty, the recognition of earnings is deferred to the future until the uncertainty is resolved.*

This "realization" principle, taught in basic Accounting 101 class, instructs the accountant to book earnings only when the risk of actually "earning" the expected earnings is largely resolved. In terms of asset pricing theory, the accountant does not recognize earnings until the firm can book a relatively low beta asset, usually cash or a near-cash receivable. Deferred earnings recognition means more earnings in the future, that is, earnings growth. So an expectation of future earnings that awaits "realization" is an expectation of earnings growth and, as that realization is tied to risk resolution, the expected growth is risky: it may not be realized. The intuition that expected earnings growth is risky is reinforced by an actual accounting principle for booking earnings.

The principle is the application of what is called conservative accounting, an apt term for dealing with risk. It has its expression in recognizing revenue only when a customer has been "sold," agreeing to a legal contract and, even then, only if "receipt of cash is reasonably certain." So expected revenues from the prospect of future customers, or even customer orders in the order book, are not booked, even though the expectation is (appropriately) incorporated in the stock price. Accountants see value from prospective customers as risky—the value may not be realized—and thus it is not unreasonable to conjecture that the stock market's expectation also be discounted for that risk. Even the receivables from actual sales are discounted (in allowances for credit losses) for the risk of not receiving cash from the sales. The application of conservative accounting is more general, however, and in most cases produces expected earnings growth. Deferred (or "unearned") revenues push revenues to the future, even though a customer has performed, because there is remaining doubt about the firm's performance. Accountants record anticipated losses (via asset write-downs and impairments) but not anticipated gains, leaving the latter to be recognized in the future *if* the gains are "realized." Depreciation is usually deemed to be conservative (high) because of conservative (low) estimates on useful lives for plant.

Conservative accounting is practiced in the extreme when a firm expenses research and development (R&D) investments immediately against earnings (rather than booking them to the balance sheet as investment). This accounting reduces current earnings but increases expected future earnings from the investment, for now there is the prospect of future revenues from new products but no amortization of the cost of the investment against those future revenues. However, R&D may not produce saleable products, so it is risky. Indeed, the accounting standard that requires expensing of R&D (FASB Statement No. 2) justifies the treatment because of "the uncertainty of future benefits." The same treatment applies to investment in brand building through advertising (to gain future revenue); advertising expenditures are expensed immediately, reducing earnings, but they generate the prospect of growth *if* the advertising is successful. And so with the required expensing of organization and store opening costs, investment in employee training, software development, and investments in distribution and supply chains. With lower current earnings and higher future earnings, the accounting is effectively shifting income to the future. Further, as most of the expensing applies to what would otherwise be fixed costs, earnings are so much higher should future revenues be realized: only variable costs have to be covered. The resulting expected earnings growth implies a lower E/P ratio. But the future earnings are risky: the earnings from the R&D and brand building, and that from anticipated future customers and unrealized gains, may not be realized. If so, the investor requires a higher r.

If such risk implies a higher required return to price the expected growth, the E/P ratio is higher, by equation (1a).[5] However, it also results in a lower *ROE*. Accrual accounting simply (!) involves an allocation of earnings to periods: life-time earnings are always equal to life-time cash flows and accounting principles just allocate the total earnings over time. Thus, for the given total life-time earnings expected in the current price, P_0, more earnings deferred to the (long-term) future means lower short-term earnings, $Earnings_1$ and thus a lower ROE_1. That ties ROE_1 to growth. The case of R&D is illustrative: increased R&D investments reduce earnings and *ROE* (because of the immediate expensing) but the risky investment increases (risky) expected earnings growth. As so with all applications of conservative accounting—expensing advertising expenses, expensing start-up costs, expensing training costs, expensing customer development and distribution and supply-chain development, accelerated depreciation, and so on. All reduce short-term *ROE* with the risky investing but with the effect of generating earnings growth if the investment is successful. For a given E/P, tying *ROE* to risky growth also ties B/P to risky growth, by equation (2), a point we will explore later in the paper.[6]

Some case studies illustrate the point:

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

Twitter, Inc. went to IPO in November 2013, closing on its first trading day priced at 26 times estimated 2014 sales, a price imbedding significant growth expectations. The firm was reporting losses (and a negative ROE) due largely to the expensing of R&D, advertising and promotion that amounted to 80 percent of revenue. These expenditures were made to generate revenue and earnings growth, but there was uncertainty about whether the expected revenues and earnings would be realized.

Amazon.com, Inc. reported a loss for the third quarter of 2013, as it had done for the full year, 2012. Both losses were on rising sales. The losses were attributed to "spending on technology and content, such as video streaming and grocery delivery to mobile devices" and the firm's "willingness to win customers by losing money." These investments were being expensed directly to the income statement, yielding a negative ROE. While high expectations were built into the share price, the results of these investments are uncertain; the added customers have yet to be realized.[7]

During the 1990s, Starbucks Corporation was trading with considerable growth expectations built into its market price. However, it was reporting a book rate of return on its operations of less than 10 percent. Starbucks was expanding stores aggressively, expensing start-up costs, advertising, employee training, and supply chain development. This expensing depressed the book return, an indication that the growth strategy was risky. As it happened, the strategy paid off, with the book rate of return rising to over 20 percent by 2005. But the strategy was risky; it could have gone the other way.[8]

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

Of course, one must question whether the risk recognized by conservative accounting is priced risk. Asset pricing theory says that this would be so only if the risk is non-diversifiable.

To investigate, Penman and Reggiani (2013) construct portfolios which differ in the degree to which anticipated earnings are expected to be realized in the short term (one year ahead) versus the long term. They find that subsequent average returns are related to the degree of earnings deferral to the long term, indicating the market prices in the risk. Significantly, the portfolio construction that captures the earnings deferral amounts to the same E/P, B/P double sort in Table 1.

One can readily imagine expected growth that adds to price rather than the required return. A firm with a competitive advantage is an example. In this case, *g* increases without any effect on *r*, resulting in a higher price and a lower E/P ratio. That leaves an open question: for a given E/P, how does the investor sort out whether he or she is buying growth that is risky or growth that adds value? The "value" investor asks the question: in buying high E/P, am I buying a cheap stock or am I buying risky growth? If the latter, my value position will turn against me if the expected growth is not realized. The "growth" investor also has a question: in buying a low E/P, am I just buying growth with little risk so I must expect a low return?

The pieces are now in place to provide the answers to these questions and to interpret the return spreads in Table 1.

4. Identifying Risky Growth via the B/P Ratio

The returns in Table1are generated by sorting firms first on E/P and then, within E/P portfolios, on B/P. The E/P in Table 1 is the trailing E/P, as in most E/P screens. With equation (1) in mind, the trailing earnings (purged of one-time extraordinary and special items) can be viewed as a forecast of the forward earnings in equation (1) (which, of course, are not observable).[9] The results in the table pose two questions:

1. Why are returns increasing in E/P when E/P is positive?
2. Why, for a given E/P, are returns increasing in B/P?

The answer to the first question is immediate. By equation (1a), E/P is increasing in the required return, so a sort on E/P (across rows) is likely to pick up the required return and the corresponding average realized returns. Indeed, when g = 0 in equation (1a), $r = \frac{Earnings_1}{P_0}$.

However, E/P is clearly not a clean measure of risk and return for equities because E/P is also affected by expected earnings growth. E/P = $r - g$, by equation (1a), so something must be added to assess the extent to which a given E/P indicates the required return or growth, or both. That "something" is B/P, applied in the second sort in Table 1.

The answer to the second question—and to the investor's question about buying risky growth—is supplied by the B/P equation (2) combined with the accounting principle for recognizing earnings under uncertainty. The sort on B/P (within E/P portfolios) holds E/P constant and thus holds $r - g$ constant for positive E/P. Holding $r - g$ constant, equation (2) informs that the sort on B/P is an inverse sort on *ROE*. If *ROE* varies inversely with g, then the only way $r - g$ can be constant is for a higher g to be associated with a higher r, that is, if the expected growth is deemed to be risky. The deferral principle of accounting yields the inverse relation, reducing *ROE* but increasing expected growth. The principle is tied to risk, so the higher growth requires a higher r. There is no necessity that the accounting principle captures priced risk, but Table 1 suggests so: for a given $r - g$, B/P ranks average returns.[10]

Some elaboration that focuses less on the math and more on the accounting may be helpful. Panel D of Table 1 confirms that (for a given positive E/P) ranking on B/P is a reverse ranking on *ROE*, as in equation (2).[11] Earnings add to book value so, for a given price that is based on life-long expected earnings, earnings deferral means lower earnings added to book value in the short term and thus a lower ROE_1 and higher earnings to be added in the future, that is, earnings growth. If the associated growth is risky, requiring a higher return, the stock is priced lower, yielding a higher B/P, that is, a lower pricing of the book value that generates the ROE_1 and subsequent growth. Correspondingly, a stock with a higher ROE_1 and lower expected growth can have the same E/P = $r - g$, but with lower risk such that the lower risk results in a higher price and a lower B/P. The ranking on B/P sorts out, for a given E/P, growth that adds to price from growth that does not (because that growth is risky). Of course, the accounting that allocates earnings to the short term versus the long term could be pure noise (it's just accounting!), but the accounting principle that connects the allocation to risk suggests not, as do the average returns in Table 1.

The results for E/P portfolio 3 in Table 1 provide further calibration and a benchmark. Here, the average E/P ratio of 5.6 % (in Panel B) approximates the average 10-year risk free rate of since 1962. These stocks look like they are priced (approximately) according to the Fed Model where r – g = r_f (and thus E/P = r_f, as earlier). If they were bonds (whose yield is often a benchmark to evaluate the pricing of stocks with the Fed Model), g = 0 and this level of E/P would indicate an expected return of 5.6%, by equation (1a). However, stocks can have growth, so the 5.6% represents $r - g$. Accordingly, the average return for this E/P portfolio is 13.9% (in Panel A), implying a risk premium over the risk free rate, but with the risk premium and growth rate canceling such that r – g = r_f and E/P equal to the bond yield.

For this central E/P portfolio, r – g = r_f is constant over all portfolios down the column for portfolio 3 in Table 1. The r – g could be low r with low g or high r with high g, but with r – g always equal to r_f .The rank on B/P that sorts these portfolios ranks returns but also sorts this out such that the high B/P portfolio 5, with a higher average return of 18.8%, indicates higher expected growth but higher risk (and thus higher r). The median B/P portfolio 3 (for E/P portfolio 3) is the "average" case and, indeed, the portfolio reports an average return of 11.8% in Panel A and an average *ROE* of also about 11.6% in Panel D. This is approximately the average historical return to equities typically reported. Setting $ROE_1 = r$ in equation (2) and setting $r - g = r_f$, B/P $= \frac{r_f}{r}$. Thus, with the average risk-free rate of 6.6% since 1962 and an $ROE_1 = r =$ 11.6%, B/P $= \frac{6.6\%}{11.6\%} = 0.57$ which is approximately the median B/P of 0.58 in our sample (that begins in 1963) and also close to the mean B/P of 0.51 in the central E/P portfolio 3 in Panel C.[12] The numbers line up quite nicely. In this central cell of the Table1 spread, stocks are priced according to the Fed Model: at the core, growth and risk cancel which is what one might expect on average. But, moving away from this core across the whole spread of portfolios, growth is priced variably in the cross section, with some growth priced as risky but with some growth adding value. B/P sorts it out. (As an aside, this discussion shows that the application of the Fed Model involves some important subtleties.)[13]

A value investor might be more interested in the high E/P portfolio 5, but the same logic applies, and the spread between the returns for B/P portfolio 5 and 1 within that portfolio indicates a premium for buying risky growth. A growth investor might buy growth by taking positions in low E/P stocks in portfolios 1 and 2, but might be concerned if the purchased growth is risky. While the average return for these portfolios is not much different from the central E/P portfolio 3, the significant spread across B/P portfolios within the portfolios underlies that concern. Of course, these returns could partly be due to the market mispricing rather than reward for risk, but our analysis stresses *caveat emptor*. The "value" investor betting on a high B/P stock, or a stock with both a high E/P and a high B/P might be buying into the value trap of buying risky growth. The "growth" investor betting on low E/P could be loading up on risk if he or she buys a high B/P stock, but avoiding these stocks by buying low B/P yields lower returns.

One might suggest that the return spreads in Table 1 are just too large to be explained by risk. But the period covered, 1963-2012, was one of significant corporate earnings growth and a bull market in stocks. Buying growth is risky, but in this happy period, the bet paid off handsomely. It was, after all, "The American Century."

5. B/P, Growth, and Risk: Empirical Results

This section documents that B/P is indeed associated with risky outcomes.

Table 2 is constructed in the same way as Table 1, but now reports the standard deviation of *realized* earnings (relative to price) one year ahead for the portfolios and also the interdecile range (IDR). The IDR, the 90th percentile minus the 10th percentile of realizations, focuses on extreme (tail) realizations. Both the standard deviation and IDR are calculated from the time series of earnings outcomes for portfolios over the sample period. There is some variation in the volatility of earnings outcomes across E/P portfolios (across the top row in the panels), due mainly to significantly high volatility in the negative E/P portfolio, Portfolio 1. However, to the main issue, both the standard deviation and IDR increase over B/P for a given E/P: B/P indicates that one is buying riskier forward earnings.

More importantly, Table 3 reports that B/P is associated with risky growth expectations. This table reports mean realized growth rates two years ahead (Panel A) and the variation of growth rates (Panels B and C). The mean growth rates are the mean of growth rates for each portfolio over the years, and the Panel B and C measures are the volatility of growth rates around this mean. The calculation of earnings growth rates, described in the footnote to the table, accommodates negative and small denominators.[14]

Earnings growth is decreasing in E/P (across rows) in Panel A, consistent with the standard interpretation of the P/E ratio. But, for a given E/P, B/P also predicts future growth (down columns). This is so for all levels of E/P, including high E/P ("value") and low E/P ("growth"). Further, B/P also indicates that the forecasted growth is risky: both the standard deviation of growth rates in Panel B and the interdecile range in Panel C are increasing in B/P. In short, given E/P, B/P indicates *risky* expected earnings growth. The interdecile range is particularly pertinent, for it captures outcomes in the extremes and those are outcomes which the investor is most concerned: B/P indicates a higher chance of a high-growth outcome but also a higher chance of growth falling in the lower tail.

The connection between growth and the required return is driven home again in the case of the central E/P portfolio 3 where the Fed Model roughly pertains. Risk and growth cancel exactly in this case, such that the risk premium, r_p equals the growth rate, g, and thus E/P = r_f. The central B/P cell (portfolio 3) yields an average return of 11.8% in Table 1while the high B/P portfolio yields an average return of 18.8%. For both these portfolios (priced according to the Fed Model), $r_p = g$. So, if the return difference reflects risk, the only way for r_p to be equal to g is if growth is also increasing. Table 3 shows that this is so. More, it shows that the variation in growth rates also increase with the increase in average growth rates.[15]

In asset pricing, risk is priced only if it pertains to sensitivity to common factor risk that cannot be diversified away. So, risk to earnings is associated with shocks to market-wide earnings. Accordingly, Table 4 reports earnings betas from estimating the following regression for each portfolio:

$$\text{Portfolio}\,\frac{Earnings_1}{P_0}(t) = \alpha + \beta.\text{Market-wide}\,\frac{Earnings_1}{P_0}(t) + \varepsilon_t$$

The regression is estimated in time series over all years, t, in the sample period. The earnings realizations are for the forward year, that is, the same year during which portfolio returns are observed in Table 1, so the betas are those actually experienced during the holding period, not historical betas. To align realizations in calendar time, the regression is estimated for firms with December 31 fiscal-years only. The portfolio earnings yield is the mean for the portfolio in a given year and the market-wide earnings yield is the mean for all firms in the sample in that year.[16]

The earnings betas in Panel A of Table 4 are increasing in B/P for a given E/P portfolio.[17] Separating years in which the market-wide earnings yield was up from the previous year (up-markets) from years when it was down (down-markets), the conditional betas in Panels B and C indicate that higher B/P have higher up-market betas, delivering higher earnings in good times, but also have higher down-market betas. Higher upside potential comes with downside risk. Correspondingly, low B/P portfolios have considerably lower betas in down-markets, but their upside beta is also lower. In sum, the variation in earnings outcomes across B/P portfolios in Tables 2 and 3 is due, in part, to economy-wide shocks.[18]

The accounting discussion in section 3 provides an explanation for the findings in Tables 1 – 4. However, the empirical analysis stands irrespective of the explanation: the data indicate that "value" buys risky growth. These results are quite robust across sub-periods, including years that exclude those during the recent financial crisis.

6. Value and Growth

The analysis here challenges the standard labels, "value" versus "growth." Truth in advertising would demand that "growth" indicates higher expected earnings growth. That is so with the E/P ratio, as Table 3 indicates, but not necessarily so for a B/P ratio.

Equation (2) indicates that, for a given ROE_1 and required return, B/P is decreasing in expected growth, in which case a low B/P indicates growth, as often presumed. But ROE_1 and the required return also enter. Indeed, Panel D of Table 1 shows that low B/P firms in the upper right-hand quadrant have high *ROE.* Those same firms have low growth rates in the upper right-hand quadrant of Panel A of Table 3. In contrast, high B/P firms have lower ROE in Panel D in Table 1 but high growth rates in Table 3. These numbers just confirm that (in equation (2)) $\frac{Book\ Value_0}{P_0} = \frac{1}{ROE_1} \times \frac{E}{P}$ so, for a given E/P (which may indicate no growth or even negative growth), B/P just reflects the *ROE*, and ROE is negatively related to earnings growth for reasons explained in our accounting discussion.

The confusion in labeling increases when it is said that "growth" yields lower returns, a common attribution. That seems odd, on the face of it, as one typically sees growth as risky, requiring a higher return. This paper identifies growth with risk and shows that is associated with a higher B/P. And it shows that the growth so identified yields higher returns, not lower returns.

Labeling presumably is supposed to convey meaning. The labels, "value" and "growth" confound.

7. Conclusion

This paper exposes a value trap: in buying firms with low multiples, the investor may be taking on risk of buying earnings growth that may not materialize. A relatively high E/P stock, a so-called "value" stock, is typically viewed as one with low growth expectations but in fact can be one with high growth expectations but growth that is risky. High B/P, also a "value" stock, is also associated with risky growth, and the combination of a high E/P and a high B/P more so. That combination yields a higher average return, but the higher expected return comes with risk that expected earnings growth will not be realized.

Value investors screen on high E/P and B/P with the idea that low prices relative to earnings and book value indicate mispricing. But the analysis here provides a warning: buying "value" may be buying risky earnings growth.

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[1] Earnings are before extraordinary items and special items, with an allocation of taxes to special items at the prevailing statutory tax rate for the year. The findings in Table 1 are similar when the return period begins four months after fiscal year and when we eliminate firms with stock prices less than $1.00. For firms that are delisted during the 12 month holding period, we calculate the return for the remaining months by first applying the CRSP delisting return and then reinvesting any remaining proceeds at the risk-free rate. This mitigates concerns about potential survivorship bias. Firms that are delisted for poor performance (delisting codes 500 and 520-584) frequently have missing delisting returns. We apply delisting returns of -100% in such cases, but the results are qualitatively similar when we make no such adjustment.

[2] There are also a small number of loss firms in E/P portfolio 2. Results are similar when we form six E/P portfolios, one with all loss firms, and five from a ranking of firms with positive E/P.

[3] By excluding growth that comes only from retention (with no value added), we accordingly focus on growth that comes from the success of investments. Ohlson and Juettner-Nauroth (2005) develop a pricing model based on expected forward earnings and subsequent earnings growth that generalizes to all payout policies yet is dividend irrelevant.

[4] The point applies to all valuation models that build in a growth rate, whether based on dividends, free cash flow, or earnings. In "terminal value" calculations in these models, the valuation attribute is capitalized at the rate, $r - g$, and r may be related to g.

[5] In Equation (1a), earnings growth is at a constant rate, g. However, a constant growth rate is not necessary for the analysis in this paper: view g as a summary of all earnings expected in the future relative to $Earnings_1$.

[6] The effect of conservative accounting on ROE_1 and expected growth is an accounting property—it is simply by the construction of the accounting. This is modeled in Feltham and Ohlson (1995) and Zhang (2000). However these papers model the accounting effects assuming no affect on risk and the required return.

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

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

[9] The mean rank correlation between trailing earnings-to-price and realized forward earnings-to-price is 0.63. Of course, equation (1) can also be expressed in terms of trailing earnings, $Earnings_0$, with earnings growth, g, forecasted from the current year onwards rather than after the forward year. This recasts the analysis as investing on the basis of trailing E/P and B/P, with no loss of insight.

[10] Equations (1a) and (2) are predicated on positive earnings. So the math underlying our analysis applies only to positive E/P ratios. However, negative earnings (and thus negative *ROE*) can be case where the earnings is (severely) reduced because of earnings deferral—the case of a firm reporting losses because of expensing of R&D, but with positive earnings expected from the R&D in the future, is an example. The math aside, the accounting logic thus applies to loss firms also and the pattern of returns over B/P for the negative E/P portfolio (portfolio 1) is similar to that for other portfolios, indeed more so. As indicated earlier, results are similar when we put all loss firms in one portfolio.

[11] The ROE ranking is reversed in E/P portfolio1 in Panel D which are loss firms, but this is also implied by equation (2) when earnings are negative.

[12] In a model where growth and risk cancel and the Fed Model applies, Ohlson (2008) shows that $ROE_1 = r$, as in the calibration here.

[13] The Fed model has been the subject of considerable debate. See Lander, Orphanides, and Douvogiannis (1997), Asness (2003), Salomons (2006), Estrada (2007), and Thomas and Zhang (2007), for example.

[14] The mean growth rates are means over years of median growth rates for portfolios in each year. Because added investment from retention in the first year ahead adds to earnings growth two years ahead, we also calculated the residual earnings growth rate two years ahead to subtract for the added investment. Residual earnings was calculated as earnings with a charge against beginning-of-period book value at the prevailing yield on the ten-year U.S government note. Results were similar.

[15] Two-year-ahead growth is not sufficient to document ex post growth over the long term. However, firms disappear over time so extension of the analysis to subsequent years faces a serious problem of survivor bias. That, of course, raises the question as to whether the results are affected by such bias, for firms do disappear within two years. The returns in Table 1 include delisting returns, but there is no accommodation for the growth findings here. So we ascertained the fraction of firms that ceased to exist in the second year for performance-related reasons indicated by CRSP delisting codes. The delisting rate was higher for high B/P firms, an average of 8.9 percent over all high B/P portfolios in the first year ahead versus 7.7 percent for low B/P portfolios. The corresponding delisting rates over the next two years were 20.8 percent versus and 16.9 percent. This reinforces our inferences rather than qualifying them: delisted firms are those that either had low payoffs with firm failure or high payoffs in being acquired.

[16] The means are arithmetic means. Similar results were obtained with weighted means, that is, with portfolio earnings calculated as the total earnings for the portfolio and the market relative to price.

[17] The average R-square for the regressions is quite high—62.4% for the unconditional betas. This indicates that market-wide earnings explain a significant part of portfolio earnings.

[18] The earnings betas here are consistent with Campbell and Vuolteenaho (2004) who attribute the higher returns to value stocks to higher "cash flow betas," that is, the sensitivity to news about future cash flows.

Table 1. Mean Annual Returns for Portfolios Formed by Ranking Firms Each Year on E/P and B/P, along with E/P, B/P, and ROE for the Portfolios; 1963-2012

A. Mean Annual Returns %

		Low	***2***	***3***	***4***	***High***	***H-L***	***t-stat***
Ranking on EP alone		14.1	10.1	13.9	16.4	22.5	8.4	*2.18*
				EP				
		Low	***2***	***3***	***4***	***High***		
BP	***Low***	2.2	6.3	14.2	15.8	19.5		
	2	8.6	6.6	11.0	14.6	19.3		
	3	12.7	6.7	11.8	13.3	21.6		
	4	18.0	11.7	12.7	16.6	23.1		
	High	28.2	19.1	18.8	21.4	28.8		
	H-L	26.0	12.8	4.6	5.6	9.3		
	t-stat	*5.47*	*3.80*	*2.07*	*3.00*	*3.90*		

B. Mean EP %

		Low	***2***	***3***	***4***	***High***	***H-L***
Ranking on EP alone		-17.5	1.3	5.6	8.3	14.3	31.8
				EP			
		Low	***2***	***3***	***4***	***High***	
BP	***Low***	-13.4	1.0	5.4	8.0	12.8	
	2	-14.6	1.5	5.7	8.2	12.9	
	3	-17.0	1.5	5.7	8.3	13.1	
	4	-19.1	1.4	5.7	8.4	14.0	
	High	-24.1	1.1	5.6	8.4	13.4	
	H-L	-10.7	0.1	0.2	0.4	0.6	

C. Mean BP

		Low	***2***	***3***	***4***	***High***	***H-L***
Ranking on EP alone		0.93	0.59	0.62	0.74	1.04	0.11
				EP			
		Low	***2***	***3***	***4***	***High***	
BP	***Low***	0.13	0.16	0.25	0.36	0.48	
	2	0.34	0.29	0.39	0.53	0.73	
	3	0.63	0.45	0.51	0.67	0.91	
	4	1.10	0.69	0.70	0.84	1.14	
	High	2.44	1.40	1.27	1.37	1.96	
	H-L	2.31	1.24	1.02	1.01	1.48	

D. Mean Return on Equity (ROE%)

	Low	*2*	*3*	*4*	*High*	*H-L*
Ranking on EP alone	-16.4	1.8	12.2	13.2	12.0	28.4

		EP				
		Low	*2*	*3*	*4*	*High*
BP	*Low*	-29.0	0.3	23.3	22.6	20.4
	2	-20.3	3.2	16.0	15.9	14.6
	3	-15.5	2.7	11.6	12.5	11.9
	4	-12.4	2.1	8.0	9.8	9.0
	High	-12.5	-0.4	3.1	5.0	4.5
	H-L	16.5	-0.7	-20.2	-17.6	-15.9

Table 2. Standard Deviation and Interdecile Range (IDR) of Realized Earnings-to-Price One Year Ahead for Portfolios Formed by Ranking Firms on E/P and B/P; 1963-2012

A. Standard Deviation of Portfolio *$Earnings_1/P_0$* (%)

	Low	***2***	***3***	***4***	***High***	***H-L***
Ranking on EP alone	13.9	5.1	3.8	4.2	6.3	-7.6

		EP				
		Low	***2***	***3***	***4***	***High***
BP	***Low***	8.8	4.3	3.3	3.7	4.8
	2	9.7	4.4	3.4	4.0	4.8
	3	11.5	4.7	3.6	4.0	4.9
	4	13.4	5.2	3.9	4.5	5.7
	High	33.5	6.9	5.4	5.3	15.2
	H-L	24.7	2.6	2.1	1.6	10.4

B. Interdecile Range (IDR) of Portfolio *$Earnings_1/P_0$* (%)

	Low	***2***	***3***	***4***	***High***	***H-L***
Ranking on EP alone	34.4	13.0	10.4	10.8	14.6	-19.8

		EP				
		Low	***2***	***3***	***4***	***High***
BP	***Low***	22.0	11.0	9.4	10.3	13.5
	2	23.4	11.0	9.2	11.0	13.2
	3	30.7	13.0	10.3	10.3	12.9
	4	32.5	13.5	11.2	11.7	16.2
	High	91.3	17.5	14.1	12.3	20.1
	H-L	69.3	6.5	4.7	2.0	6.6

Table 3. Average Earnings Growth Rates Two Years Ahead and Variation in Growth Rates for Portfolios Formed by Ranking Firms on E/P and B/P; 1963-2012

A. Mean Earnings Growth Rates Two Years Ahead %

		Low	*2*	*3*	*4*	*High*	*H-L*	*t-stat*
Ranking on EP alone		30.3	13.2	10.4	7.6	3.4	-26.9	*-10.97*

		EP				
		Low	*2*	*3*	*4*	*High*
BP	*Low*	18.9	7.1	10.8	6.6	0.6
	2	27.8	7.9	8.2	7.2	2.4
	3	28.0	11.8	9.3	7.6	3.1
	4	36.7	15.4	5.6	8.0	3.0
	High	48.5	29.1	18.2	10.6	4.6
	H-L	29.6	22.0	7.4	4.0	4.0
	t-stat	*6.71*	*5.08*	*3.11*	*2.01*	*1.2*

B. Standard Deviation of Earnings Growth Rates Two Years Ahead %

		Low	*2*	*3*	*4*	*High*	*H-L*
Ranking on EP alone		18.8	17.7	14.3	11.9	13.8	-5.0

		EP				
		Low	*2*	*3*	*4*	*High*
BP	*Low*	19.3	15.4	12.9	11.8	14.4
	2	25.8	18.7	14.7	12.8	13.5
	3	22.4	19.2	13.6	12.5	17.5
	4	25.3	21.6	25.0	12.5	18.0
	High	26.7	33.1	23.2	22.9	24.1
	H-L	7.4	17.7	10.3	11.1	9.7

C. Interdecile Range (IDR) of Earnings Growth Rates Two Years Ahead %

		Low	*2*	*3*	*4*	*High*	*H-L*
Ranking on EP alone		45.4	48.5	37.1	33.4	38.0	-7.4

		EP				
		Low	*2*	*3*	*4*	*High*
BP	*Low*	49.7	35.5	33.9	32.0	42.0
	2	54.7	49.8	35.4	32.9	33.7
	3	58.7	47.1	39.0	35.3	54.9
	4	64.2	58.4	46.8	34.3	43.9
	High	76.4	76.2	59.4	61.4	65.1
	H-L	26.7	40.7	25.5	29.4	23.1

Note: Earnings growth rates are calculated as $\frac{Earnings_{t+2} - Earnings_{t+1}}{(|Earnings_{t+2}| + |Earnings_{t+1}|)/2}$. This growth rate accommodates small and negative denominators, and ranges between 2 and -2.

Table 4. Unconditional Earnings Betas and Up-market and Down-market Earnings Betas for Portfolios Formed by Ranking Firms on E/P and B/P; 1963-2012

A. Unconditional Betas

		EP				
		Low	***2***	***3***	***4***	***High***
BP	***Low***	1.17	0.56	0.41	0.44	0.58
	2	1.41	0.59	0.41	0.48	0.58
	3	1.67	0.66	0.46	0.46	0.48
	4	1.59	0.73	0.49	0.56	0.75
	High	3.86	1.01	0.77	0.75	1.52
	H-L	2.69	0.45	0.35	0.31	0.95

B. Up-market Betas

		EP				
		Low	***2***	***3***	***4***	***High***
BP	***Low***	1.31	0.81	0.63	0.68	1.00
	2	1.63	0.89	0.64	0.74	0.91
	3	1.68	0.91	0.70	0.70	0.81
	4	1.83	1.04	0.73	0.81	1.14
	High	3.75	1.15	0.94	0.90	1.14
	H-L	2.44	0.34	0.31	0.22	0.14

C. Down-market Betas

		EP				
		Low	***2***	***3***	***4***	***High***
BP	***Low***	0.78	0.30	0.18	0.16	0.27
	2	1.07	0.28	0.19	0.22	0.31
	3	1.41	0.40	0.22	0.20	0.24
	4	1.24	0.34	0.23	0.29	0.43
	High	3.11	0.68	0.47	0.52	1.34
	H-L	2.32	0.38	0.28	0.36	1.07