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Comments Welcome

Does Dividend Policy Foretell Earnings Growth?[1]

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Abstract

Many market observers point to the very high fraction of earnings retained (or low dividend payout ratio) among companies today as a sign that future earnings growth will be well above historical norms. This view is sometimes interpreted as an extension of the work of Miller and Modigliani. They proved that, given certain assumptions about market efficiency, dividend policy should not matter to the value of a firm. Extending this concept intertemporally, and to the market as a whole, as many do, whenever market-wide dividend payout ratios are low, higher reinvestment of earnings should lead to faster future aggregate growth.

However, in the real world, many complications exist that could confound the expected inverse relationship between current payouts and future earnings growth. For instance, dividends might signals managers' private information about future earnings prospects, with low payout ratios indicating fear that the current earnings may not be sustainable. Alternatively, earnings might be retained for the purpose of "empire-building," which itself can negatively impact future earnings growth.

We test whether dividend policy, as we observe in the payout ratio of the market portfolio, forecasts future aggregate earnings growth. This is, in a sense, one test of whether dividend policy "matters." The historical evidence strongly suggests that expected future earnings growth is fastest when current payout ratios are high and slowest when payout ratios are low. This relationship is not subsumed by other factors such as simple mean reversion in earnings. Our evidence contradicts the views of many who believe that substantial reinvestment of retained earnings will fuel faster future earnings growth. Rather, it is fully consistent with anecdotal tales about managers signaling their earnings expectations through dividends, or engaging in inefficient empire building, at times; either of these phenomena will conform with a positive link between payout ratios and subsequent earnings growth.

Our findings offer a challenge to optimistic market observers who see recent low dividend payouts as a sign of high future earnings growth to come. These observers may prove to be correct, but history provides scant support for their thesis. This challenge is potentially all the more serious, as recent stock prices, relative to earnings, dividends and book values, rely heavily upon this expectation of superior future real earnings growth.

Introduction

Since 1995, market-wide dividend payout ratios in the United States have been (and remain) in the lowest decile, by historical measures, reaching unprecedented low levels from late-1999 to early-2001. Alternatively stated, earnings retention rates have recently been at or near all-time highs. Meanwhile, price-to-earnings ratios and price-to-dividend ratios are very high by historical standards, even after the sharp fall in stock prices since early 2000. With recent valuation ratios at unprecedented levels, the only way that future long-term equity returns are likely to rival historical norms is if future earnings growth is considerably faster than historical norms. Some market observers, including some leading Wall Street strategists, forecast exceptional long-term growth, pointing to the low level of dividend payout ratios today as one source for high forthcoming earnings growth.

Dividend policy has long been a controversial puzzle. Which is better for the shareholder, or for management, paying earnings out in dividends, for the shareholders to reinvest wherever they choose, or retaining the earnings, to fund the best internal growth projects that management can identify? Miller and Modigliani [1961] (M&M) posited and proved that dividend policy shouldn't matter in an ideal world, absent tax arbitrage considerations. Why? Because capital is fungible: a company has no reason to care whether it garners capital for projects from bond issuance, from stock issuance or from retained earnings; therefore they should go wherever the risk-adjusted cost of capital is best. Reciprocally, an investor has no reason to care whether an investment pays a dividend, which the investor can reinvest, or whether the company reinvests earnings to fuel earnings growth *equivalent to the foregone dividend yield*. Thus, changes in dividend policy should not affect the value of a firm. Similarly, investment policy and dividend policy should be independent.

Consider the well-known constant growth valuation model from Gordon [1962]:

(1) $R = D/P + G$

Expected returns (R) equal the dividend yield (D/P) plus a constant expected growth (G) term. Now, D/P itself can be thought of as the product of the payout ratio (D/E, the ratio of dividends to earnings) and the earnings yield (E/P), the inverse of the well-known price-to-earnings ratio (P/E).

(2) $R = D/E * E/P + G$

We can apply equations (1) and (2) to a given company or to the market portfolio itself. We focus on the latter. Assuming dividend policy does not affect the expected return on the market portfolio, a low-payout must be offset either by a high E/P (low P/E) or by high expected growth (we assume here that the payout ratio is constant through time so earnings and dividend growth are equal). We will see that, over the past 130 years, market P/Es have not come close to offsetting variation in payout ratios. Thus, the task is left to growth. Put another way, imagine an instantaneous change in dividend policy that altered the market D/E. As earnings do not change (and, according to M&M, price should not change), the task of keeping expected return constant is again left to growth.[2]

[2] It bears mention that Miller and Modigliani focused on cross-sectional comparisons, rather than intertemporal comparisons at an aggregate level. In other words, if one company has a higher payout ratio, then it ought to have

Thus, many market observers would accordingly expect a strong and reliably negative relationship between payout ratios and future earnings growth.[3] As of today, this view, if true, would offer support for the optimistic case for future earnings growth.

Implicit in this view is a world of perfect capital markets. When we relax this assumption, a host of behavioral or information-based hypotheses arise as potential explanations for how the market's payout ratio might relate to expected future earnings growth. Thus this becomes an empirical question, and we turn to the historical data to answer the question of how market-wide payout ratios have related to future earnings growth. We find that low payout ratios precede low earnings growth, while high payout ratios precede high earnings growth, a relationship observed also by Lamont [1998] and Bernstein [May 1, 2001].

While other reasons may exist, this finding is consistent with a world in which managers have private information that they signal through dividend policy (i.e., they will pay out more when they know that future growth is bright, and less when it is dim). These findings may also conform to a world where managers may retain excess cash while engaging in inefficient empire building that hurts future earnings growth, in the absence of the disciplining process of paying dividends and raising new capital. Any such explanation of this phenomenon must be considered conjecture. Accordingly, our primary purpose is to explore the facts about market-wide dividend policy, and not to speculate on the reasons behind the relationships we document, a task we only begin and leave to future research.

Applying our results to today's markets, we find little historical support for the optimists' contention that future earnings growth will be exceptionally high. Rather, historical evidence on the linkage between payout ratios and subsequent earnings growth bolsters the view that future earnings growth is likely to be well below the long-term average, which is worrisome with valuation multiples above historical norms.

Our Data

We used three sources of dividend yield and stock total return data, drawn from Professors Schwert, Shiller and Ibbotson.[4] Earnings were from Shiller's data, which is drawn from Standard and Poors from 1926 to date, and from Cowles and associates from 1871-1925. In calculating real earnings growth, we begin with a calculation of real earnings for an index portfolio. We do so by:

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lower earnings growth, ceteris paribus. The oft-cited intertemporal argument is an extrapolation of M&M, suggested by many analysts and strategists to justify rapid future earnings growth for the broad stock market.

[3] Ibbotson and Chen [2001] sum up this viewpoint well when they say "Furthermore, our forecasts are consistent with Miller and Modigliani (1961) theory so that dividend payout ratios do not affect P/E ratios and high earnings retention rates (usual associated with low yields) imply higher per share future growth."

[4] G. William Schwert, Jan, 1802 to December, 1925; Robert Shiller, Feb, 1871 to Mar, 2001; Ibbotson Associates, Jan, 1926 to Dec, 2000. Each source provides broad capitalization-weighted stock market yields and total returns; Shiller's data also provides earnings. With regard to Shiller's data, monthly dividend and earnings data are computed from the S&P 500 four-quarter tools for the quarters since 1926, with linear interpolation to monthly figures. Dividend and earnings data before 1926 are from Cowles and associates (*Common Stock Indexes*, 2nd ed. [Bloomington, Ind.: Principia Press, 1939]), interpolated from annual data.

(1) constructing a total return index for stocks,

(2) subtracting out the monthly dividend income on stocks, based on the data from Schwert, Shiller and Ibbotson.

(3) This gives us a stock *price* index from 1871 to date.

(4) We then divide through by the CPI to impute a real stock price series.

(5) And, finally, we multiply the real stock series by the earnings yield data from Shiller.[5] This gives us a reasonable history of the internal growth of earnings of the S&P 500.

As earnings and the forecasting of earnings growth is the crux of our paper, some more discussion is in order. Almost all studies of market earnings use the aggregate earnings on the S&P 500, as do we. We will be conducting tests of whether certain variables, notably the payout ratio, can be used to forecast the growth in this aggregate earnings number (analogous, though over a longer forecasting horizon, to tests in Fama and French [2000] on similarly constructed data).

This aggregate earnings growth series is not the same as the earnings growth on a static portfolio of stocks. The economy at large is dynamic. A "market" portfolio must adjust to acknowledge this fact. By focusing on a portfolio that an investor might choose as a "market" portfolio, we are tacitly selling the companies that are no longer an important factor in the market or economy, in order to make room for those that have become an important factor in the market and economy. Standard and Poors does exactly this, by adding "new-economy" stocks (whatever the "new-economy" is at each point in time), dropping "old-economy" stocks, and changing the divisor for the index; by changing the divisor each time the index composition is changed, this is equivalent to selling existing holdings to rebalance into new holdings. So, when we're looking at ten-year real earnings growth (the forecasting horizon we primarily focus upon), we are not looking at the growth of earnings on a fixed set of stocks bought at the outset. It is more analogous to the growth an investor might have seen on the earnings per share of an index fund portfolio, holding the assets that were selected by Standard and Poors since 1926 and by Cowles, retrospectively, from 1871 to 1925.

Another way to think about our work is to recognize the distinction between the market and a market index portfolio. The market, in aggregate, shows earnings and dividend growth which is wholly consistent with growth in the overall economy [Bernstein, December 15, 2001]. But, if one were to unitize that market portfolio, the unit values do not grow as fast as the total capitalization. Similarly, the earnings and dividends per unit (per "share" of the unitized index fund) will not keep pace with the growth in the aggregate dollar earnings and dividends of the companies that comprise the market. Why so? When one stock is dropped and another added, typically the added stock is larger than the deletion, which increases the divisor for constructing the index.

Precisely the same thing would happen in the management of an actual index fund. When a stock is replaced, the proceeds from the deleted stock rarely will suffice to fund the purchase of the added stock. Accordingly, all stocks are trimmed slightly to fund that

[5] This data in turn comes from Standard and Poors from 1926 to date, and from Cowles before 1926.

purchase; this is implied consequence of the change in the divisor for an index. It is this mechanism that drives a wedge between the growth of the aggregate dollar earnings and dividends for the market portfolio (which will keep pace with GDP growth over time), and the "per share" growth of earnings and dividends for the market *index* (which will *not* keep pace with GDP growth – see Arnott, Bernstein [2002]). Entrepreneurial capitalism creates the companies that we must add to the market portfolio, changing our divisor and driving a wedge between (1) the growth in market capitalization, earnings and dividends and (2) the growth in index fund unit values, and the earnings and dividends per share of the market index fund.

For some of our robustness tests we employ both bond yields and the CPI. We used two sources of bond yields. Our data was drawn from the National Bureau of Economic Research and Ibbotson Associates.[6] In cases of differences, we averaged the yield data. We used two sources of CPI data, again the National Bureau of Economic Research and Ibbotson Associates.[7] GDP data was drawn from the National Bureau of Economic Research.[8]

Using the Payout Ratio To Forecast Future Earnings Growth

We define the payout ratio in this research as simply last year's trailing dividends, divided by last year's trailing earnings. Dividends are "sticky": they tend not to fall in notional terms, though they can fall during severe earnings downturns; they can also fall in real terms during periods of high inflation. Because earnings are more volatile than dividends, payout ratios are relatively volatile, though far less so after 1950 than before. Exhibit 1 presents the payout ratio of the S&P 500 from 1950-2001. This shows the payout ratio falling to the lowest levels ever seen, near the end of our sample (before a sharp recovery in 2001, due to fast-falling earnings).

If the intertemporal market-wide interpretation of Miller and Modigliani holds, there should be a strong negative relationship between payout ratios and future earnings growth. When payout ratios are high, and companies are retaining a small share of their earnings, the subsequent earnings growth should be slower. Conversely, if payout ratios are low, and companies are retaining a large share of their earnings for reinvestment purposes, the subsequent earnings growth should be more rapid. Exhibit 2a puts the test to this elegant, but empirically flawed, thesis. Here, we simply plot payout ratios against subsequent ten-year real earnings growth, as a scatter plot. Exhibit 2b shows the monthly regression of the rolling forward ten-year real earnings growth of the S&P 500 on the

[6] National Bureau of Economic Research, Jan, 1800 to May, 2001, ten-year government bond yields. Note: Annual until 1843; interpolated for monthly estimates. Ibbotson Associates, Jan, 1926 to Dec, 2000, Long-Term Government Bond Yields and returns.

[7] National Bureau of Economic Research , Jan, 1801 to May, 2001. Note: Annual until 1950; interpolated for monthly estimates. Ibbotson Associates, Jan, 1926 to Dec, 2000. Ibbotson data was given primary (two-thirds) weighting from 1926 to 1950, since our NBER data was annual through 1950.

[8] National Bureau of Economic Research, Jan, 1800 to March, 2001. Note that the NBER data is Gross National Product, annually through 1920 (which we interpolated July-to-July for our monthly data), and Gross Domestic Product, quarterly from 1921-2001.

starting payout ratio over the past 50, 75 and 130 years.[9] The linkage is compelling, particularly since it has the "wrong" sign![10]

Viewed another way, and examining our main 1950-2001 period, Exhibit 3 divides all rolling ten-year periods starting in 1/1950 to 5/1991 into four quartiles by starting payout ratio (quartile 1 being the low payout ratio and 4 the high). We report the average ten-year earnings growth and the worst and best ten-year earnings growth achieved when starting in each respective payout ratio quartile. The average earnings growth obviously increases (corresponding to the prior regression and scatterplot) with a rising payout ratio. Many will find it surprising that, in the bottom quartile of payout ratios, the average subsequent real earnings growth is actually *negative*. Needless to say, negative real earnings growth for a ten-year span falls far below what most investors would find acceptable, let alone expect ex ante.

The worst and best ten-year spans also show the same monotonic relationship with the starting payout ratio: the higher the payout ratio, the better the average subsequent ten-year earnings growth and the better the best and the worst outcome, over the past fifty years. To give an extreme example, the *worst* ten-year growth, when starting in the *highest* payout ratio quartile, is considerably better than the *average* earnings growth, when starting in the *lowest* payout ratio quartile. Likewise, the *best* ten-year growth, starting in the *lowest* payout quartile, is not as good as the *average* growth, when starting in the *highest* quartile.

In general, starting with very low payout ratios, the equity market has delivered dismal real earnings growth over the next decade, actually *falling* 0.7% per annum on average, ranging from a worst case, a truly terrible –3.4% compounded annual real earnings decline for the next ten years, to a best case of only 2.6% real growth per year over the next decade. Starting with very high payout ratios we see the opposite: strong average real growth (3.2%), a worst case that is only barely negative (-0.1%), and a maximum that is spectacular (7.0% real growth, per annum, for ten years). Indeed, the very early evidence from the last few quarters would suggest that the recent record-low payout ratios are falling into the classic pattern. Contrary to the arguments of the "new paradigm" advocates, earnings have been tumbling, not soaring, after earnings retention for reinvestment within companies reached record levels. Of course, the most recent ten-year observations remains to be seen!

[9] All t-statistics in this paper are adjusted for overlapping observations (Newey-West correction).

[10] Benazartzi, Michaely, and Thaler [1997] find a different result for the cross-section of companies, that dividend changes across stocks are not strong forecasters of cross-sectional differences in future earnings growth. Our results differ in two important ways. Fist, our tests are on the level of payout policy and not dividend changes. Second, our results are for the aggregate market, not for the cross-section of differential company growth. Reconciling how these design differences drive our different results is an interesting subject for future work.

Potential Explanations

There are many alternative hypotheses which may explain the positive relationship between current payout ratio and future real earnings growth. While this list is clearly incomplete, it perhaps represents a beginning effort to explain this phenomenon.

(1) Management is known to be loathe to cut dividends (Lintner [1956]). Perhaps a high payout ratio indicates management's confidence in the stability and growth of future earnings, and a low payout ratio suggests the opposite. This confidence (or lack of same) may be based on public information, but may also be based on private information (e.g., Miller and Rock [1985]). If the latter, the high payout ratio is a reliable signal from management about their confidence in the sustainability of earnings, and low payout ratios signal concern. In this case, the payout ratio would be positively related to future earnings growth.

(2) Another possible explanation would be that, in any year, there are only a few truly compelling internal reinvestment opportunities in most companies. The first dollar of retained earnings will presumably be invested carefully and wisely for future growth. Each subsequent dollar will, of necessity, pursue a successively less-compelling internal project or investment, until the return on those projects falls off a cliff. In essence, when most of the earnings are retained instead of paid out, resources are available to fund marginally less attractive projects (the late 1990s Telecom overindulgence springs to mind as a canonical example of this behavior). Low payout ratios, or more specifically the behavior that accompanies them, can *cause* poor earnings growth, and high payout ratios forecast good earnings to come, as they are associated with times of efficiency and reinvestment selectivity.

(3) Another hypothesis, consistent with our empirically observed relationship, is that firms sometimes retain too much of their earnings based on the managers' own desires to build "empires".[11] It is also possible that a benign coincidental policy of earnings retention itself ends up encouraging empire building by the presence of an irresistible cash hoard (burning a hole in the corporate pocket, if you will). Conversely, financing through share issuance, despite substantial dividend payments, while perhaps tax inefficient, may subject management to more scrutiny, reduce conflicts of interest, and thus perhaps curtail empire building.

(4) Perhaps the positive relationship is driven by sticky dividends (again, Lintner [1956]) combined with mean reversion in earnings. Temporary peaks and troughs in earnings, which are subsequently reversed, could lead the payout ratio to be positively correlated to future earnings growth (i.e., temporarily low earnings today cause a high payout ratio, thus forecasting the earnings snapback tomorrow). The difference between this hypothesis and (1) - (3) is that dividend

[11] Brealey and Myers [2000] define and describe empire building as "Other things equal, managers prefer to run large businesses rather than small ones. Getting from small to large may not be a positive-NPV undertaking." They go on to quote Jensen [1986], "The problem is how to motivate mangers to disgorge the cash rather than investing it below the cost of capital or wasting it in organizational inefficiencies." See for instance Jensen [1986] or Jensen and Meckling [1976] for original discussion of this and related phenomenon.

policy has no special standing; in this context, any reasonable measure of mean reversion in earnings should work.

(5) Perhaps it is our data or experimental design that is in error. For instance, perhaps our results are time period specific (either as to the years covered by our study, or the length of our forecasting period). Or, our results merely proxy for other, more fundamental, variables which forecast economic activity. Or, perhaps our results are driven by the recent dramatic change in the level of share repurchase activity.

Explicitly distinguishing hypotheses (1) - (3) from each other is beyond the scope of this paper. We simply note that each of these stories is consistent with the data, and leave a more precise test, or the introduction of new explanations, to future work. However, explanations (4) and (5) can be tested; in our next section, we examine these hypotheses.

Robustness Tests

One can justly be skeptical of a relationship that consists of forecasting overlapping ten-year earnings growth over a 50-year span, with strongly serially-correlated payout ratios. Arguably we have only five independent observations, perhaps less if serial correlation in payouts is truly extreme. While statistical tools can adjust regression t-statistics for this phenomenon and R^2 measures remain legitimate, relationships of this type may seem statistically significant even when they are not. A diligent mining of the available data without economic intuition, or results that spuriously proxy for some other more basic relationship, could deliver our findings without the causality that we suggest. Because this possibility can never be completely dismissed, and because we know our results are the opposite of what so many would intuitively expect, robustness checks are in order.

Are Our Results Period Specific or Driven by a Few Extremes?

The simplest robustness check is an out-of-sample test. While we favor the latest 1950-2001 period because of our confidence in the data quality, and its increased relevance to today's world, we have data back to 1871. Accordingly, Exhibit 2b also shows this same regression examined earlier repeated over the prior, *entirely separate,* 1871-1949 period. The coefficients are smaller, which might make sense given more volatile earnings before 1950, but the t-statistics are almost as strong as the latest 50-year results. The relationship still explains 21.1% of the variance of earnings, suggesting a correlation approaching 50%. Of course, the coefficient still has the same counter-intuitive positive sign. This regression, over an entirely non-overlapping and longer period, supports the more recent 1950-2001 results quite strongly.

Also, as is evident in the scatter plot, eliminating the most extreme highest and lowest 10% of payout ratios from our data (i.e., dropping these observations from the regression) has very little effect on the regressions.

Is the Payout Ratio Proxying for Mean Reversion In Earnings?

Could the payout ratio be proxying for a different effect, such as mean reversion in earnings? Mean reversion in earnings might be caused either by true mean reversion, or by transient errors in reported earnings that would induce mean reversion in the contiguously measured changes. After all, if earnings drop temporarily, this could raise the future compound earnings growth from this lower base; a temporary earnings drop would simultaneously raise the current payout ratio (D/E), as dividends, which are "sticky," do not fall as much as the earnings. If so, this kind of mean reversion would still be interesting, but dividend policy would have no special standing as a predictor.

First, we test this by adding prior ten-year real earnings growth to our regression ("LEG," or lagged earnings growth). If this mean reversion hypothesis is true, then adding prior earnings growth as an additional independent variable should explicitly show the mean reversion we are looking for (through a negative coefficient), and should cause the payout ratio to lose much of its predictive importance for future earnings growth in a bivariate context, if reversals in earnings growth are the cleaner measure of mean reversion. Exhibit 4a shows that simple mean reversion in ten-year earnings growth fails as a predictive variable: while having the hypothesized negative sign, it doesn't approach the efficacy of the payout ratio over any time period, particularly over the more recent 1950-2001 period.

We next construct a second proxy for mean reversion in earnings. We divide the prior one-year real earnings (used to construct our payout ratio variable) by the average of real earnings over the last 20 years (call this variable "MA_{20}"). When this variable is high we hypothesize that the temporary component of earnings is high, and look to this variable to forecast future real earnings growth with a negative coefficient. Both payout ratio and MA_{20} are scaled versions of current earnings, so our test is whether scaling by average historical earnings or dividends is the more effective forecaster. Exhibit 4b shows the results.

Over the most recent 1950-2001 period we see a clear victory for the payout ratio. MA_{20} has the anticipated negative sign (meaning that when earnings are below their long-term average we forecast better growth over the next ten years), but the relationship is weak and does not ameliorate the power of payout ratio at all. In fact, the t-statistic for the payout ratio actually rises slightly. Including periods prior to 1950 in long-period regressions shows more mixed results, where both variables enter with similar power (and at least the MA_{20} variable has the right sign). Multi-colinearity makes the t-statistics, and the relative contribution of each variable, difficult to determine (correlations between payout and MA_{20} are –0.39 from 1950-2001, -0.65 from 1926-2001, -0.64 from 1871-2001, and –0.70 from 1871-1949). Finally, looking at the completely separate earlier 1871-1949 period, we see another clear victory for payout ratio (although MA_{20} still has the expected negative sign).

It is interesting that payout is the clear victor over both the earlier and latter 50-80 year spans, but the results are closer over the spans which "bridge" meaningfully different market regimes (pre-SEC vs post-SEC, pre-Depression vs post-Depression, pre-WW II vs post-WW II, classic markets vs modern markets). Still, over the "bridge" periods of 1926-2001 and 1871-2001, adding payout to a regression containing only MA_{20} always materially increases the adjusted R-squared values (i.e., dividend policy, even over this earlier period, contains material additional information). Perhaps MA_{20}, as a comparison

of earnings with earnings, is more robust over *very* long periods, while a variable like payout ratio can change in character with manager or investor tastes, tax laws, and so forth. Either way, we see that payout ratio completely dominates MA_{20} over our focus 1950-2001 period and the earlier 1871-1949 period, and is neck and neck over the longer 1926-2001 and 1871-2001 periods.

Payout ratio's power admirably survives head-to-head competition with two reasonable proxies for simple mean reversion in earnings (though MA_{20} in particular showed some forecasting power over very long sample periods). While payout ratio is, and intuitively should be, highly correlated with measures of simple mean reversion in real earnings, the data shows that there is important marginal information contained in dividend policy, indeed more information than earnings mean reversion over most spans, and much more over the most relevant modern time period.[12]

How Sensitive Are Our Results to the Ten-year Forecasting Horizon?

We focus on ten-year periods because we are ultimately interested in the impact of real growth on "fair valuation." Transient short-term peak and trough earnings should have little impact on the proper price to pay for stocks – only long-term earnings prospects should really matter. We arbitrarily chose ten-year spans to balance two conflicting goals: a span long enough to be of economic significance (e.g., one-year earnings growth should hardly matter to the *fair* price for stocks), yet a short enough span to have a reasonable number of independent periods and to have some relevance to an investor's career horizon.

In Exhibit 5, we repeat our tests on five-year real earnings growth. In so doing, we are probably sacrificing some economic relevance, since strong statements about ten-year earnings growth are more important to fair value than statements about five-year growth. But, we are doubling the number of non-overlapping periods. Exhibit 5A demonstrates that the linkage we identify holds up quite nicely for shorter earnings growth periods, albeit with a bit less statistical significance.

Do Stock Repurchases Alter the Picture?

Share buybacks were a far smaller part of the market prior to 1980 (see, for instance, Bagwell and Shoven [1989] and Fama and French [2000]). The increase of share buybacks over recent years is one potential pitfall for our study. If buybacks substitute for regular dividends, then our measure of the payout ratio may be effectively understated when buyback activity is high. Buybacks can also raise EPS growth, as long as a

[12] For more completeness we also ran two more tests of whether mean reversion is driving the strong 1950-2001 results. First, instead of using last year's E to calculate the payout ratio, we instead tried a three year average of real earnings. If transitory components in E drive payout ratio's predictive power then using a longer, more stable version of E might drive out this power. Second, in a draconian test, we simply lagged the payout ratio by one full year, greatly reducing the chance of highly transitory components of E driving our results. In both cases, we can report that the payout ratio's power survives these changes. Of course, averaging in older E, or arbitrarily skipping a year, somewhat reduces the statistical significance of our tests, but t-statistics on payout defined in these ways are still quite striking (always over 3.0).

company's profit margins exceed the income that could be earned on the money that is used to pay for the stock repurchases. If stock buybacks are substituting for dividends, then changes in buyback activity should weaken our results: falling payout ratios over the more recent 1980-2001 span, if attributable to share buybacks, chould correspond to increases in subsequent earnings growth.

At this point we can only test for the influence of a changing buyback atmosphere indirectly. If the relationship between payout ratio and future earnings growth is similar pre-1980, we feel more comfortable that that the relatively new phenomenon of large-scale share buybacks are not driving or unduly influencing our results. In Exhibit 5B, we recomputed results over only 1950-1979 (using the shorter five-year periods, as we have even less data), and over each earlier start date to 1979. Over the earlier periods, with far less share buybacks than 1980-2001, the linkage between payout ratios and real earnings growth works almost exactly as well as over the longer span. Indeed, the relationship from 1950-2001 is actually stronger, not weaker, than the 1950-1979 results, making it unlikely that a bias due to recent share buybacks is driving our results.[13] Results should have weakened if recent share buybacks had depressed payout ratios and increased subsequent earnings growth.

Conversely, exhibit 5B also presents our results over the relatively short period associated with a large amount of buybacks, 1980-2001. Here, again, we find very strong results. In fact, running our basic test from 1950-2001, with a dummy variable added to allow the coefficient on payout ratio to differ over 1980-2001 (not shown), shows no meaningful change in the relationship between payout and future growth.

To be fair, we cannot know the impact of the increase in buybacks until we have far more data than this recent 20-year history, assuming this increase is permanent. So, this is a question we cannot definitively answer for many years. However, what we can infer from our indirect tests is consistent with our longer-term results. It would appear that, at least with regard to stock buybacks, things are probably *not* "different this time."[14]

How Consistently Does the Payout Ratio Predict Real Earnings Growth?

Again, we turn to the five-year results, in order to consider more independent data points. We perform our regression of five-year real S&P 500 earnings growth versus starting payout ratio on a rolling 30-year basis, monthly, for every thirty year span from 1871 (i.e., the first period ends in 1901) through 2001.[15] Exhibit 6a and 6b trace the R^2 and the t-statistics on the coefficient for the Payout Ratio, respectively, from each of these rolling regressions over the past 100 years. Results vary substantially over time, as one would expect: the statistical noise in the relationship should cause some variability, and the fundamental relationship may strengthen or weaken with changes in the economic, tax or

[13] Also recall from Exhibit 2 that our ten-year results held up well over 1871-1949.

[14] Further study of this issue and related issues, perhaps focusing on how corporate finance activity (ex-dividend policy) of all types (mergers, secondary offerings, etc.) covaries with other variables (valuation measures, dividend payout ratios, future and past earnings growth, etc.) would be a potentially useful topic for future research.

[15] We start in 1901 as the 30-year window goes back to our data beginning in 1871. The first sample period is 1871-1901, and the most recent is 1971-2001, for 100 years of rolling 30-year spans.

political environment. But, there is considerable stability in the basic message: when payout ratios are low, future earnings growth tends to be slow, and high payout ratios go hand-in-hand with rapid subsequent earnings growth. The lowest t-statistic ever observed was a respectable 1.65; similarly, the R^2, while variable, has always been economically meaningful. *Importantly, the sign never changes, in any thirty-year span in the past 130 years.*

Putting the Payout Ratio in Competition With the Slope of the Yield Curve

Other research has shown that the slope of the government yield curve is a strong positive forecaster of economic growth (e.g., Harvey [1991]).[16] This invites two questions relating to our own research. If yield curve slope forecasts economic growth, does it also forecast earnings growth? If so, does yield curve slope augment or subsume the power of payout ratios for forecasting earnings growth? The latter could happen if, for example, the curve is very steep during recessions, precisely when the payout ratio is larger than average (due to depressed earnings and sticky dividends): both variables are forecasting an economic and earnings rebound.

We seek to answer these two questions in Exhibit 7 based on results from 1950 to 2001 (interest rates were not always freely floating pre-1950 and thus we focus on this modern period - though we present results over the other time periods which are still supportive of payout ratios forecasting power in the presence of yield curve slope). To explore these questions, we define yield curve slope as the difference between the ten-year Treasury Bond yield and the three-month Treasury Bill yield at the start of any period. We test the forecasting power of yield curve slope (YCS) for both five-year and ten-year real earnings growth.

Exhibit 7A shows that, when used alone, yield curve slope has the anticipated sign in all cases. Not only does a steeper yield curve suggest a stronger future economy, as found by other authors, but it also suggests faster real earnings growth, albeit with much more power for forecasting five-year growth than ten-year growth. This conforms with the work of Fama and French [1989], who note that the yield curve slope seems correlated to relatively high frequency elements of the business cycle. Moreover, as Exhibit 7B makes clear, the yield curve's power is largely orthogonal to the much stronger power present in the payout ratio. The bottom line: yield curve slope has the right sign from 1950-2001 (and most other periods), but is a relatively weak predictor of earnings growth. Yield curve slope doesn't approach the forecasting power of the payout ratio, nor does it erode the efficacy of the payout ratio, in forecasting earnings growth.

Putting the Payout Ratio in Competition With Stock Market Valuation Levels

Instead of payout ratio, let's consider whether the market's earnings yield should predict earnings growth, and then test whether it does. If future real earnings growth is going to be faster than normal, investors should perhaps pay a higher P/E ratio than normal, and

[16] Quoting from Harvey [1991], "…the term structure of interest rates can account for over half of the variation in GNP growth in many G-7 countries. This is sharply higher than the explanatory power offered by a model based on past GNP growth rates. The term structure forecasts also compare favorably to alternative forecasts."

hence accept a lower earnings yield on their investment.[17] Thus, in an efficient market, with constant expected equity returns, a low earnings yield may be a very good predictor of higher future real earnings growth. Exhibit 8A, shows the results from a regression from 1950-2001 (and other periods). The relationship is as expected: we find that a low earnings yield (high P/E) signals higher future ten-year real earnings growth, with a t-statistic of 2.4. This supports the idea that the market correctly anticipates faster future earnings growth, and pays up for it. Other (earlier) time periods offer more support for this finding.

However, this relationship is far weaker than the linkage we find between the starting payout ratio and future earnings growth. Panel B forecasts ten-year earnings growth using both the starting payout ratio and the earnings yield. The payout ratio almost completely drives out E/P (E/P is always less powerful than payout ratio, sharply less so over our main 1950-2001 period, and only seriously competes with the payout ratio over the very earliest part of our sample, when earnings were *very* volatile).

We find this to be a very interesting result. Suppose real earnings growth is strong, and the market extrapolates that to continue. Investors might then be willing to pay a premium multiple of these strong earnings, resulting in a lower earnings yield (high P/E). Now suppose, at this same time, that many firms are unwilling to pay out high dividends, possibly to optimize the tax treatment for their shareholders, but perhaps instead because management knows the good times won't last, or are caught up in the "irrational exuberance" of the good times and are spending those retained earnings on inefficient empire building. In this case P/E is optimistic about the future but D/E (the payout ratio) is not. Which should we believe, the P/E ratio or the D/E ratio? The regression results in Exhibit 8 suggest that, in forecasting future real earnings growth, it is far better to look at what the managers do with their dividend policy than to look at what the market will pay for each dollar of earnings. A higher payout ratio would seem to imply higher confidence, or perhaps the avoidance of inefficient empire building.

Another way to think of both P/E and D/E is as scaled versions of earnings. In the first case (P/E) we are scaling earnings by what the market will pay, i.e., how optimistic are investors. In the second case (D/E) we are scaling by how much of current earnings managers are willing to pay out; again, this may be a statement about management's own optimism or disciplined restraint. One way to view our finding is that if you have to choose between listening to what the market is paying (P/E) or to what managers are doing (D/E), historically you should pay far more attention to the managers than the market.

Finally, note that we can interpret this as yet another test of the hypothesis that payout ratios forecasting power comes from simple mean reversion in earnings. As said above, P/E can be viewed as yet another scaled version of earnings that might simply pick up the

[17] Earnings yield is the reciprocal of a P/E ratio: if the P/E ratio is 25, then stocks are delivering $1 of earnings for each $25 of stock valuation, or a 4% earnings yield. We prefer to use earnings yield, as it is more directly comparable with bond or cash yields, is more stable over time, and has more sensible behavior during times of deeply depressed earnings. If the earnings of a $100 stock falls from $5 per share to $1 per share, P/E is a relatively meaningless 100x ratio; if earnings fall further to a $1 loss per share, the P/E ratio is completely meaningless. In contrast, the Earnings Yield falls from 5% to 1% to –1%, in our example, all of which have a simple economic meaning: the earnings yield tells us how much in earnings we can expect on each $100 that we invest.

forecastability of transient components of E. In other words, in the competition to scale earnings in the best manner to pick up mean reversion, D/E and P/E can be seen as direct alternatives. In this competition, payout ratio is again superior. We interpret this as yet more evidence that dividend policy matters, perhaps in conjunction with mean reversion in earnings, but not simply proxying for it.[18]

Implications of our Results for Current Markets

Where Do We Stand Today?

After a painful eighteen-month bear market from March, 2000 to September, 2001, some might judge equities cheap, by comparing their prices to the unprecedented levels of late 1999 and early 2000. Noting the dramatic fall, one might now favor the purchase of equities as a "contrarian" recommendation. However, compared to history, stocks are anything but cheap, as is evident in Exhibit 9. Looking at other metrics like P/E based on ten-year real earnings, as does Shiller [2000], leads to similar conclusions. One stark comparison is that, as of October of 2001, P/E ratios based on ten-year average real earnings have fallen "all the way back" to values equal to those prevailing just *before* the crash of 1929, and are equal or higher than any time in history prior to 1998-2000.

Some observers, notably Ibbotson and Chen [2001], take a stance based on efficient markets. In effect, they combine (1) the assumption of market efficiency, (2) the assumption that the Miller and Modigliani propositions hold intertemporally (in other words, that high retention rates imply high future growth rates), and (3) the assumption that expected market returns don't vary through time[19], so that lower earnings yields are identically offset by higher market expectations for growth. Based on these three assumptions, today's high P/E ratios have the direct implication that the market expects high enough future earnings growth to compensate for today's lower yields, and deliver future expected returns roughly comparable to history. They argue that the best estimate for the future is past returns, less the portion of past returns that stems from changes in P/E ratios, which should not be extrapolated into the future. In other words, as long as we assume that capital markets are perfect, and that they're trying to set a constant expected return on equities, then the expected market return is unaffected by P/E ratios and payouts, as omniscient invisible hands adjust these to provide a constant expected return!

Stripping out the portion of historical real returns that stems from rising valuation levels leads to a an expected real return predicted by Ibbotson and Chen of around 6% today. With current dividend yields of around 1.5%, this would imply that the market is expecting *long-term* real growth in earnings of about 4.5%.[20] This is troubling for several reasons:

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[18] As yet one more test we tried real earnings divided by real GDP as another proxy for whether earnings were high or low and likely to reverse. The results for this measure were very similar as others reported in the text, it worked alone, but not nearly as well as the payout ratio, and didn't significantly reduce payout ratio's power.

[19] This common argument seems rather circular to us!

[20] Some dispute this calculation arguing that the 1.5% dividend yield is understated based on the dividends that firms *could* pay out (of course, the difference between what they *could* do and what they *actually* do gets to the heart of

- A 4.5% real earnings growth rate would be almost triple the historical average.[21]
- A 4.5% real earnings growth rate would exceed virtually any economist's forecast for long-term real GDP growth; but, history has seen real earnings growth persistently *slower* than long-term GDP growth, by a surprisingly wide margin. This shortfall relative to GDP growth is so very strong that, apart from the recovery from the near-zero earnings at the bottom of the great depression, real earnings growth has never exceeded GDP growth over any 40-year span. Even those disagreeing with this empirical evidence would generally agree that long-term GDP growth is a natural upper bound for long-term earnings growth. Again, this seems to rule out sustainable real earnings growth of 4.5% per year.
- In particular, this reasoning, set of assumptions, and forecast is clearly rejected by our empirical work. Ibbotson and Chen, via the intertemporal interpretation of M&M, would forecast *higher* than normal real earnings growth as a direct result of *lower* than normal dividend payouts. A 4.5% real earnings growth would exceed the fastest growth ever seen after a period of low payout ratios (Exhibit 3), even over a relatively short 10-year period.[22] A high P/E, contrary to the assumptions of Ibbotson and Chen, has weak explanatory power alone, and almost no power to forecast future earnings growth in the presence of the payout ratio. Based on 130 years of empirical data, the payout ratio is predicting far *lower* than "normal" earnings growth as of today, with "normal" itself being dramatically lower than 4.5%!

In contrast, many authors and observers (Shiller [1999], Arnott and Ryan [2001], Arnott and Bernstein [2002], Asness [2000]) have noted that high prices of equities today, coupled with a less aggressive estimate of future earnings growth, lead to low estimates of future real returns and of the future equity risk premium. Quite simply, Ibbotson and Chen do an excellent job of presenting several very interesting ways to decompose historical equity returns, and of explaining what combination of assumptions would lead to the same equity risk premium today as in the past. Unfortunately, these assumptions are not supported by history.

Stress-Testing Current Market Valuations

Equity markets have compounded at a bit over 10% per annum over the past 75 years. Let's consider what are the chances of seeing historically "normal" equity returns going forward. This question is more than just academic: Pension plans, nationwide, are assuming future fund returns of 9.3%, on average; with bonds yielding just 5-6%, stocks *must* deliver *at least* 10% in order for these funds to meet their actuarial objectives. Similarly, anecdotally, the small investor has completely bought into the "fact" that equity markets go up at least 10% per year on average. Accordingly, suppose we actually expect nominal returns for stocks to average 10% over the coming 20 years. This is a

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empire building). While we can and would argue with this, doubters should feel free to imagine we said 3.5% instead of 4.5%; as our discussion and the substance of our conclusion would be unchanged!

[21] See Arnott and Bernstein [2002] for a review of historical earnings growth.

[22] A 10-year period is very short compared to the implied unconditional 4.5% growth forecast

number that many observers would consider reasonable, many (even most) investors expect, and is certainly at or below the forecasts of many reputable brokerage houses. Note that 10% is an even more aggressive forecast than the Ibbotson and Chen forecast we challenge above; our refutation below is thus even stronger.

- As of October of 2001, with dividend yields a bit below 1.5%, we need about 8.5% nominal earnings growth per year for the next twenty years (barring further ongoing equity revaluation upwards, from current record price/earnings and near-record price/dividend levels), in order to achieve our 10% return objective.
- Suppose inflation stays at it's current levels of about 2.5%. Keep in mind that this is *not* an assumption the bulls want to increase! This implies real earnings growth of about 6% per annum.
- History is very discouraging. Earnings growth of 6% per annum has only occurred a few times in history for ten-year periods (less than 10% of the time from 1871-2001, and approximately 2% of the time after 1950). This has typically only happened off a base of very high payout ratios, and deeply depressed earnings, the opposite of recent conditions. Real earnings growth above 6% has been sustained for a 20-year span very rarely indeed, only 1.6% of the time from 1871-2001 (again springing from very high payout ratios), and *never* for a twenty-year period in the modern era (since 1950).

Those still blithely plugging in estimates of 10% long-term equity returns into their asset allocation calculations, retirement planning, and so forth, perhaps should consider these sobering facts.[23] Or, perhaps, for mental health reasons, they should not. Wall Street "strategists" forecasting "price targets" that amount to 20-30% returns on the S&P 500 over the next year should realize (or more accurately their customers should realize) that they are merely forecasting a bigger bubble.

Let's consider returns from a different perspective, namely cash flows. Suppose inflation stays at 2.5% per annum, and that real GDP growth is 3% per annum, for a nominal growth rate of 5.5% per annum. Suppose, contrary to historical evidence, that earnings and dividends fully keep pace with this 5.5% economic growth. At this writing (near year end-2001), long-term government bonds offer a 6% yield and the S&P 500 offers a dividend yield of 1.5%. How many years of 5.5% growth is needed in order for the dividend income earned on a stock portfolio to surpass the income on a bond portfolio? Twenty-seven years. How many years of 5.5% growth is needed for the cumulative income on a stock portfolio to match the cumulative income on the bond portfolio? Forty-five years. That's a long time.[24]

A Current Forecast For Earnings Growth

[23] Of course, part of the issue is that investors assuming 10% nominal returns have not adjusted to a world of lower inflation (7.5% real returns would be wonderful), but much of the issue is clearly a near complete lack of grasp of what constitutes reasonable long-term real earnings growth (again, see Arnott and Bernstein [2001]).

[24] We are indebted to Peter Bernstein [December 15, 2001] for this perspective.

The above discussion is indirect. This does not have to be the case. We can apply our findings directly to forecasting future earnings growth, and then directly consider the valuation implications of this forecast. We include yield curve slope and E/P along with payout ratio in a three-variable forecasting model. We include E/P and yield curve slope, even though they are weak predictors, because they come in with the "right" sign and are intuitively plausible. As Exhibit 10A shows, both the yield curve slope and the E/P has the anticipated sign; again, the payout ratio does not, as it remains significantly opposite the sign that most observers would expect. Exhibit 10B then shows both the fitted forecast of the next ten-years earnings growth and the actual earnings growth (though, of course, we do not have actual future ten-year realized earnings growth for any spans after 1991). Obviously, the historical fit of the model is good. The implied forecast for future earnings growth today is very low (though it has recently recovered from it's end-of-bubble lows, based largely on a steepening in the U.S. yield curve and a modest increase in the payout ratio).

This model suggests real earnings "growth" over the coming ten years of roughly *negative* 2% per annum. It is important to pause and consider this figure. Again, if expected future earnings growth for the S&P 500 is well above average (e.g., 8.5% per annum or around 6% real growth per annum), we *might* achieve the historically "normal" return of 10% that is expected by so many. If real earnings growth is only average (say, around 1% to 2%), we already have a slightly negative risk premium, relative to bonds. If, as our model would suggest, real earnings growth could be well below average over the next ten years, shrinking by 2% per year, we have a very big problem indeed. Note from the dashed line in Exhibit 10b that such ten-year periods, and worse, do occur from cyclical earnings peaks from time to time.

If valuation levels do not change, then the dividend yield would not quite match the decline in real earnings, so that real returns for stocks over the next ten years would be zero to slightly negative (leading to a very negative risk premium relative to bonds). However, if earnings do grow at or below historical norms for a sustained period of time, it is difficult to imagine that valuation levels would react in a benign manner, staying at today's lofty levels. Suppose real earnings *decline* by 2% per year, *and* we see a revaluation of equity prices (P/Es) to historical norms; the implications for ten-year stock returns would be rather serious. To put it more prosaically, buying stocks at historically very high P/Es, ahead of a period of historically very low real earnings growth, is not good.

Does Our Earnings Forecast Really Apply to Today's Market?

There is a very good chance that the current earnings growth forecast from the model in Exhibit 10B is unduly pessimistic. It is certainly possible that the recent plunge in payout ratios has been "different" from the past. After all, it is true that, over the past fifteen to twenty years, stock buybacks have partly supplanted dividends as a more tax-efficient means of returning wealth to the shareholders. Perhaps, this time, dividends have been reduced in the name of tax efficiency, not as an expression of managers inside information or desire to build empires (as we hypothesize has been the case in other historical instances of very low payout ratios – though we remind the reader that

managers initial intentions might not cause empire building, rather it might be the presence of the cash hoard itself; if so, then things might not be different this time regardless of whether the cash hoard was created out of laudable desire for tax efficiency).

There are many cautionary, and contradictory, notes to consider here. Firstly, as observed in Fama and French [2000], the companies that are engaged in stock buybacks are *not* the companies with the lowest payout ratios. The companies that pay no dividends typically also pay no hidden dividends in the form of stock buybacks; they just spend the cash. Secondly, buybacks are much more volatile than dividends. Cutting a dividend is a highly visible "statement" of management's lack of confidence in future earnings. Discontinuing a stock buyback program goes virtually unnoticed[25] – perhaps indicating that the substitution of buybacks for dividends itself is consistent with pessimism among managers and their desire to avoid dividend cuts. While we can depend, with high probability, on a dividend payment to continue next year, we can have no confidence whatsoever in the continuity of a buyback program.

More generally though, Fama and French do offer evidence that today's dividend policy is different than that of the past. They find that even considering all relevant characteristics of a firm, the propensity to pay a dividend at all is lower today than in the past, indicating indeed that today's dividend payouts may be lower than at otherwise similar times. Finally, they suggest another twist in the evidence, as firms actually paying dividends are doing so at similar rates to the past, and the aggregate payout ratio "shows no tendency to decline through time."

On balance, we should recognize the fact that the world really does change over time; today's dividend policy will not necessarily mean the same thing as it has in the past. In short, perhaps the low payout ratio today stems from a smarter policy on tax-optimized maximization of shareholder wealth than history would suggest, and not from the forces that led the payout ratio to have such strong forecasting power for earnings as it has through the 130-year history of the U.S. capital market. But, this thesis stems from conjecture. History does not provide support for this view.

It is important to realize that we did not start out trying to forecast gloom and doom. We started out by looking at the optimists' assertion that low payouts were a strong positive signal for the future. Unfortunately, *this view is emphatically inconsistent with the historical evidence*. We cannot confidently forecast negative real growth to come, because of doubts about the meaning of *today's* low payout ratio; but, our research strongly suggests that the optimists who point to a low payout ratio as a *source* for rapid future earnings growth face the unfortunate reality that the opposite has been true for 130 years. These optimists need to persuasively explain why the world should be so radically different from a consistent 130-year history. At worst, the optimists are diametrically wrong, the 130-year relationship we've uncovered still applies, and the rational forecast is for negative real earnings growth going forward. At current equity prices, this would not be good. At best, there's no cause for optimism…

[25] Indeed, there have been many cases in which a buyback was announced, the stock price jumped on the news, and the buyback was cancelled because of the higher price!

Conclusion

Unlike the implications of the intertemporal interpretation of the Miller and Modigliani model, and unlike optimistic "new paradigm" advocates, we find that low payout ratios (high retention rates) historically precede low earnings growth. Furthermore, this relationship is statistically strong and seems quite robust. We find the empirical facts conform to a world in which managers possess private information that causes them to pay out a large share of the earnings when they are optimistic, and a small share when they are pessimistic, so that they can be confident that they can maintain these payouts. Alternatively, the facts also fit a world in which low payout ratios lead to inefficient empire building, the funding of less-than-ideal projects and investments, leading to poor subsequent growth, while high payout ratios lead to more carefully chosen projects with relatively high returns.

At this point, these explanations are conjecture, and more work on discriminating among competing explanations is appropriate. But, the positive link between payout ratios and subsequent earnings growth appears to be empirical fact, not conjecture. Our results ought to be sobering to investors, including advocates of the compound belief in efficient markets and a constant equity risk premium. To these market observers, today's high market P/E and low payout ratio combine to be a strong indicator of high future earnings growth, faster even than sustainable economic growth. The historical evidence is strikingly contrary to this view. While the exact meaning of today's low payouts might differ from history, long-term investors should carefully consider our findings. In order for today's low payout ratios to lead to *higher* than normal future earnings growth, one must not only reject the evidence of the past, but also assert that the future relationship between payout ratio and future growth will be strongly *opposite* to 130 years of history.

Let's reflect on this for one moment. Investors would never spend trillions of dollars betting on a "new paradigm" without historical support or evidence for that decision, other than the cheerleading of Wall Street. Would they?

Exhibit 1. S&P 500 Payout Ratio, 1950-2001

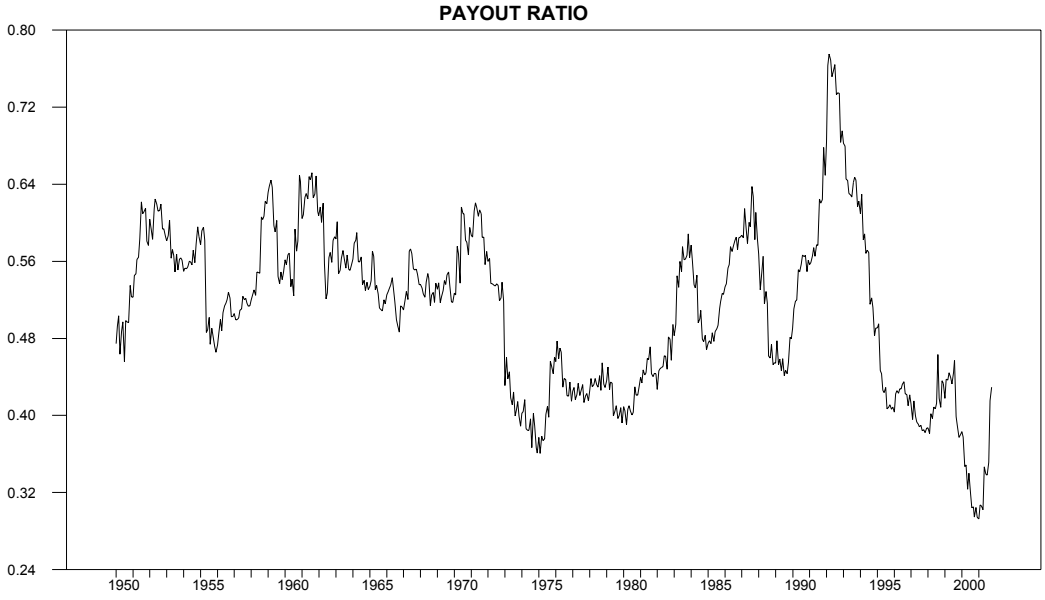


Exhibit 2a. Payout Ratios and Subsequent ten-year Earnings Growth, 1950-1991

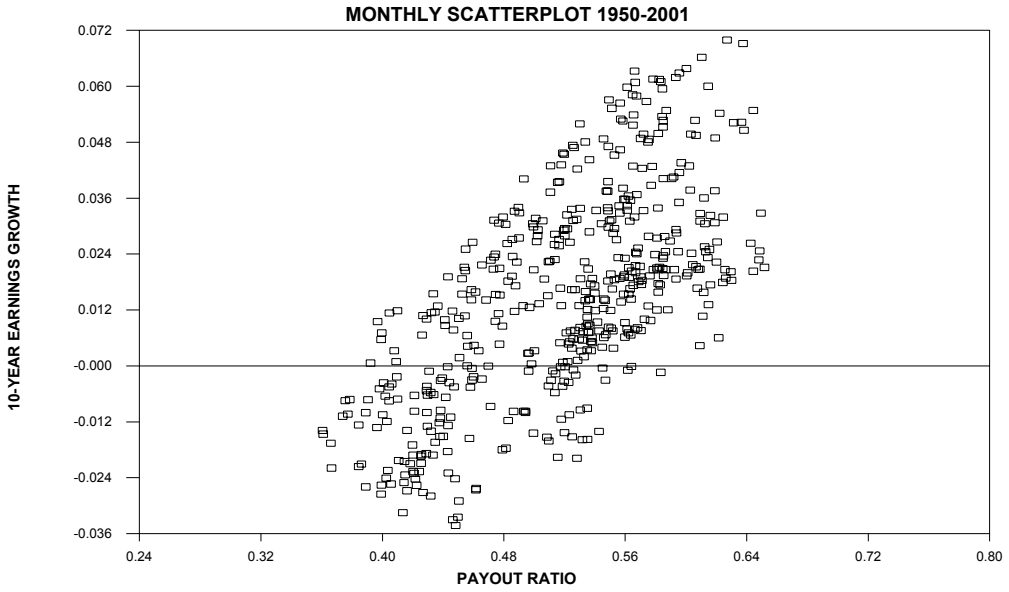


Exhibit 2b. Ten-year Earnings Growth, as function of Payout Ratios Regression Coefficients (t-statistics)

10-Yr Earnings Growth [EG_{10}] = Constant Term [a] + [b] * Preceding Payout Ratio [PR]

Regression Span:			[a]	[b]	Adj. R^2
1950-2001	EG_{10}	=	-9.8% + (-8.1)	0.21 * PR (7.9)	44.3%
1926-2001	EG_{10}	=	-2.5% + (-2.3)	0.08 * PR (3.7)	20.6%
1871-2001	EG_{10}	=	-2.8% + (-2.6)	0.07 * PR (3.9)	11.4%
1871-1949	EG_{10}	=	-5.9% + (-4.9)	0.09 * PR (6.7)	21.1%

Exhibit 3. Payout Ratios and Subsequent ten-year Earnings Growth, 1950-1991 Quartile Comparisons

Starting Payout Quartile	**Average** Subsequent Ten-year Earnings Growth	**Worst** Subsequent Ten-Year Earnings Growth	**Best** Subsequent Ten-Year Earnings Growth
One (low)	-0.7%	-3.4%	+2.6%
Two	+1.3%	-2.7%	+4.7%
Three	+2.1%	-1.6%	+6.3%
Four (high)	+3.2%	-0.1%	+7.0%

Exhibit 4a. Ten-Year Earnings Growth, as function of Payout Ratios and Prior Ten-Year Earnings Growth, Regression Coefficients (t-statistics)

10-Yr Earnings Growth [EG_{10}] = Constant Term [a] +
[b1] * Preceding Payout Ratio [PR]
[b2] * Lagged 10-Yr Earnings Growth [LEG_{10}]

Regression Span:			[a]	[b1]	[b2]	Adj. R^2
1950-2001	EG_{10}	=	-9.7% + (-8.7)	0.22 * PR + (7.8)	-0.03 * LEG_{10} (-0.2)	44.1%
1926-2001	EG_{10}	=	-2.2% + (-1.7)	0.07 * PR + (3.5)	-0.09 * LEG_{10} (-0.9)	21.3%
1871-2001	EG_{10}	=	-2.1% + (-1.5)	0.06 * PR + (2.9)	-0.11 * LEG_{10} (-1.3)	12.1%
1871-1949	EG_{10}	=	-5.1% + (-3.2)	0.08 * PR + (5.0)	-0.16 * LEG_{10} (-1.3)	22.6%

Exhibit 4b. Ten-Year Earnings Growth, as function of Payout Ratios and Current Earnings Divided by 20-Year Average, Regression Coefficients (t-statistics)

10-Yr Earnings Growth [EG_{10}] = Constant Term [a] +
[b1] * Preceding Payout Ratio [PR]
[b2] * Earnings over 20-year Average [MA_{20}]

Regression Span:			[a]	[b1]	[b2]	Adj. R^2
1950-2001	EG_{10}	=	-8.1% + (-3.3)	0.22 * PR + (8.3)	-0.01 * MA_{20} (-0.9)	46.3%
1926-2001	EG_{10}	=	3.0% + (0.7)	0.05 * PR + (1.4)	-0.03 * MA_{20} (-1.5)	25.5%
1871-2001	EG_{10}	=	2.0% + (0.5)	0.05 * PR + (1.7)	-0.03 * MA_{20} (-1.6)	18.4%
1871-1949	EG_{10}	=	-1.7% + (-0.5)	0.08 * PR + (3.2)	-0.03 * MA_{20} (-1.1)	26.4%

Exhibit 5. Five-Year Earnings Growth, as function of Payout Ratios, Regression Coefficients (t-statistics)

Panel A – Data Ending 2001

5-Yr Earnings Growth [EG_5] = Constant Term [a] + [b] * Preceding Payout Ratio [PR]

Regression Span:			[a]	[b]	Adj. R^2
1950-2001	EG_5	=	-18.8% + (-3.7)	0.40 * PR (4.2)	41.1%
1926-2001	EG_5	=	-7.3% + (-5.4)	0.15 * PR (5.7)	15.2%
1871-2001	EG_5	=	-10.7% + (-3.9)	0.19 * PR (5.0)	20.3%
1871-1949	EG_5	=	-18.5% + (-3.8)	0.27 * PR (4.7)	33.8%

Panel B – Data Ending 1979

1950-1979	EG_5	=	-15.3% + (-2.3)	0.32 * PR (2.6)	33.8%
1926-1979	EG_5	=	-7.7% + (-4.6)	0.15 * PR (6.7)	15.6%
1871-1979	EG_5	=	-11.9% + (-3.7)	0.20 * PR (4.8)	22.4%
1980-2001	EG_5	=	-21.7% + (-4.0)	0.46 * PR (4.8)	50.0%

Exhibit 6a. Consistency of Adjusted R^2 for Regression, $EG_5 = a + b * PR$

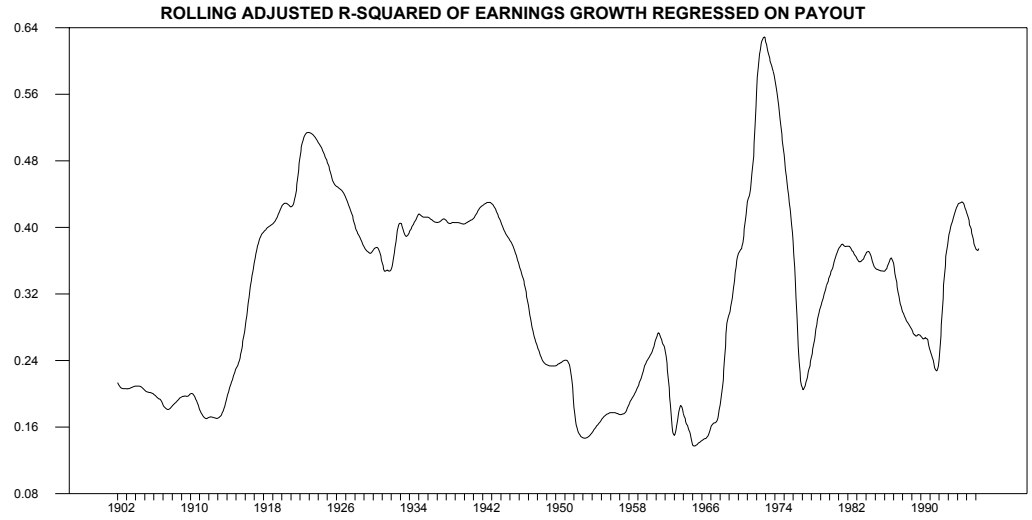


Exhibit 6b. Consistency of t-Statistic for Regression, $EG_5 = a + b * PR$

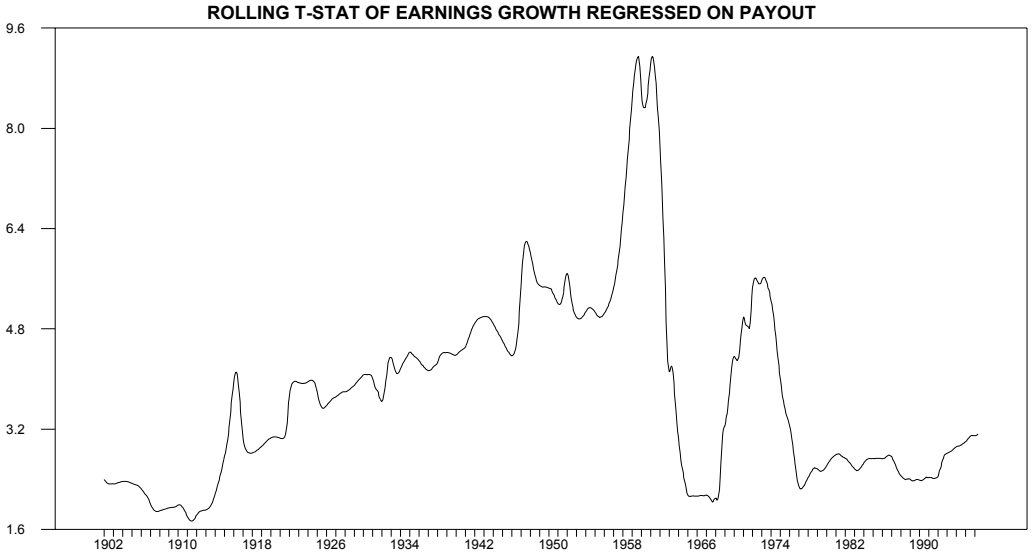


Exhibit 7. Earnings Growth, as function of Yield Curve Slope and Payout Ratio, Regression Coefficients (t-statistics)

Panel A.

Earnings Growth [EG_{10}, EG_5] = Constant Term [a] + [b] * Yield Curve Slope [YCS]

10-Year Earnings Growth:

Time Span:			[a]	[b]	Adj. R^2
1950-2001	EG_{10}	=	1.2% + (2.2)	0.37 * YCS (1.1)	2.9%
1926-2001	EG_{10}	=	1.1% + (1.6)	0.88 * YCS (1.8)	2.9%
1871-2001	EG_{10}	=	1.3% + (2.4)	0.21 * YCS (0.8)	0.6%
1871-1949	EG_{10}	=	0.9% + (1.1)	0.02 * YCS (0.1)	0.0%

5-Year Earnings Growth:

Time Span:			[a]	[b]	Adj. R^2
1950-2001	EG_5	=	0.0% + (0.0)	1.84 * YCS (2.6)	19.8%
1926-2001	EG_5	=	-1.8% + (-1.1)	3.26 * YCS (3.02)	24.1%
1871-2001	EG_5	=	0.6% + (0.6)	1.51 * YCS (3.07)	7.4%
1871-1949	EG_5	=	0.5% + (0.3)	1.35 * YCS (2.1)	5.3%

Panel B.

Earnings Growth [EG_{10}, EG_5] = Constant Term [a] +
[b1] * Yield Curve Slope [YCS]
[b2] * Preceding Payout Ratio [PR]

10-Year Earnings Growth:

Time Span:			[a]	[b1]	[b2]	Adj. R^2
1950-2001	EG_{10}	=	-9.9% +	0.18 * YCS +	0.22 * PR	45.2%
			(-8.3)	(0.6)	(7.8)	
1926-2001	EG_{10}	=	-2.5% +	0.46 * YCS +	0.07 * PR	22.6%
			(-2.0)	(0.9)	(2.4)	
1871-2001	EG_{10}	=	-2.7% +	0.03 * YCS +	0.07 * PR	11.3%
			(-2.5)	(0.1)	(3.7)	
1871-1949	EG_{10}	=	-7.2% +	-0.60 * YCS +	0.12 * PR	25.4%
			(-5.5)	(-2.2)	(8.0)	

5-Year Earnings Growth:

Time Span:			[a]	[b1]	[b2]	Adj. R^2
1950-2001	EG_5	=	-17.1% +	1.12 * YCS +	0.34 * PR	47.8%
			(-3.9)	(2.5)	(4.2)	
1926-2001	EG_5	=	-7.2% +	2.69 * YCS +	0.10 * PR	29.9%
			(-5.5)	(2.2)	(2.5)	
1871-2001	EG_5	=	-10.3% +	1.08 * YCS +	0.18 * PR	24.0%
			(-3.7)	(2.3)	(4.1)	
1871-1949	EG_5	=	-18.7% +	-0.12 * YCS +	0.27 * PR	33.8%
			(-3.1)	(-0.2)	(3.6)	

Exhibit 8. Ten-Year Earnings Growth, as function of Earnings Yield and Payout Ratios, Regression Coefficients (t-statistics)

Ten-Year Earnings Growth [EG_{10}] = Constant Term [a] +
[b1] * Earnings Yield [E/P] +
[b2] * Preceding Payout Ratio [PR]

Panel A

Regression Span:			[a]	[b1]	Adj. R^2
1950-2001	EG_{10}	=	4.5% +	-0.37 * E/P	19.3%
			(2.9)	(-2.4)	
1926-2001	EG_{10}	=	4.3% +	-0.29 * E/P	6.2%
			(3.2)	(-2.2)	
1871-2001	EG_{10}	=	4.7% +	-0.40 * E/P	8.2%
			(3.6)	(-3.2)	
1871-1949	EG_{10}	=	5.4% +	-0.59 * E/P	10.9%
			(2.5)	(-2.6)	

Panel B

Regression Span:			[a]	[b1]	[b2]	Adj. R^2
1950-2001	EG_{10}	=	-8.7% +	-0.06 * E/P +	0.20 * PR	44.3%
			(-2.8)	(-0.4)	(6.2)	
1926-2001	EG_{10}	=	-1.6% +	-0.08 * E/P +	0.07 * PR	20.1%
			(-0.8)	(-0.6)	(3.8)	
1871-2001	EG_{10}	=	0.0% +	-0.24 * E/P +	0.05 * PR	13.7%
			(0.0)	(-2.0)	(2.9)	
1871-1949	EG_{10}	=	-3.0% +	-0.25 * E/P +	0.08 * PR	22.4%
			(-0.9)	(-1.0)	(4.4)	

Exhibit 9. The P/E Ratio for the S&P 500 – Price / Trailing 12-Month Earnings

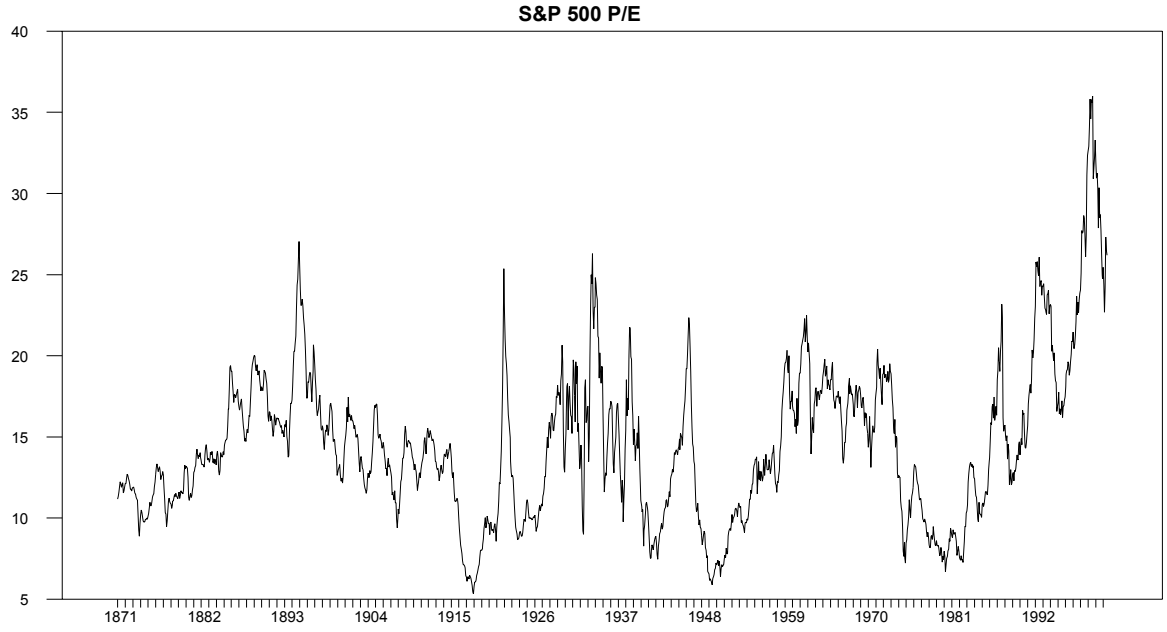


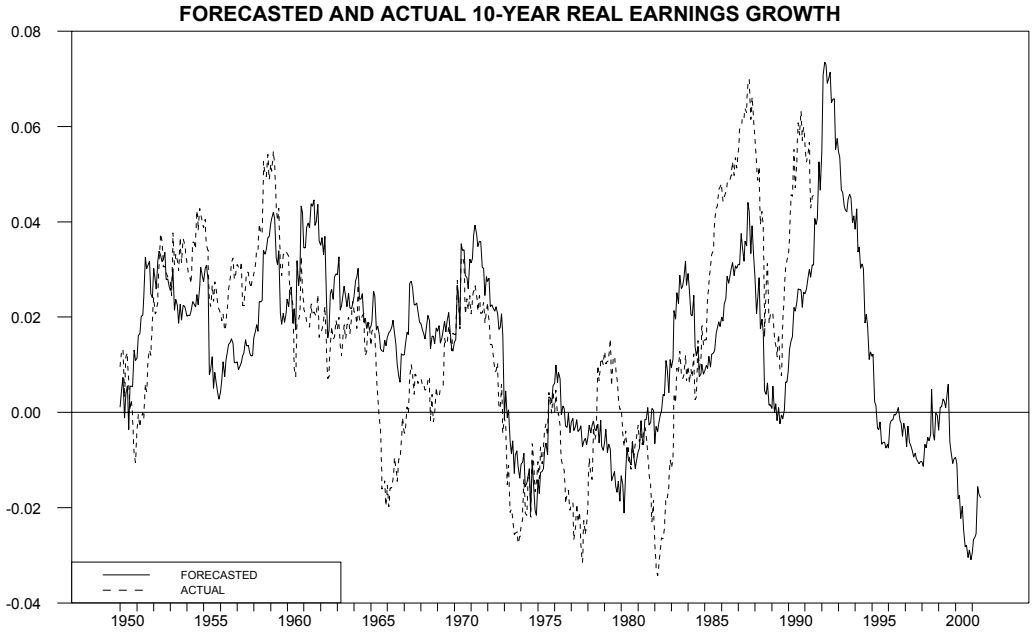
Exhibit 10a. Ten-Year Earnings Growth, as function of Earnings Yield, Yield Curve Slope and Payout Ratios, Regression Coefficients (t-statistics)

Ten-Year Earnings Growth [EG_{10}] = Constant Term [a] +
[b1] * Preceding Payout Ratio [PR] +
[b2] * Yield Curve Slope [YCS] +
[b3] * Earnings Yield [E/P]

Regression Span: 1950-2001

		[a]	[b1]	[b2]	[b3]	Adj. R^2
EG_{10}	=	-8.6% +	0.20 * PR +	0.17 * YCS +	-0.06 * E/P	44.9%
		(-2.8)	(6.2)	(0.6)	(-0.4)	

Exhibit 10b. Resulting Forecast for Ten-Year Earnings Growth



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