

Myrmikan Research Report

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Stocks for the Very Long Run

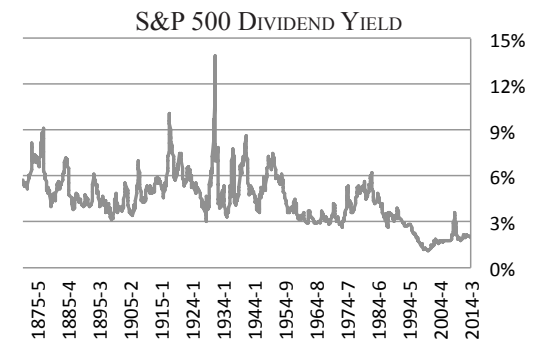
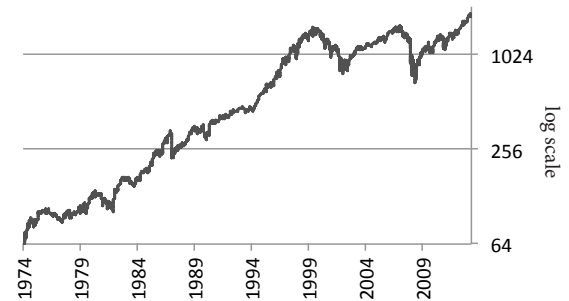
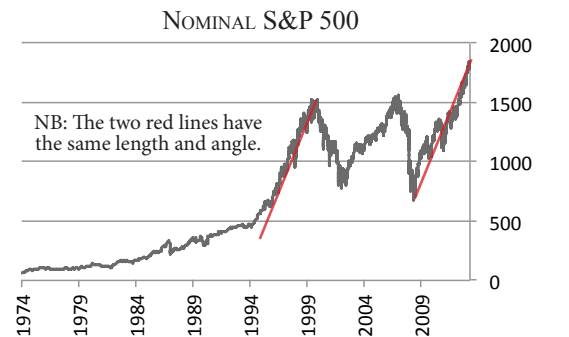
Experience guides decisions. Forty years of market action teaches that markets go up. The top graph is the nominal value of the S&P 500 from the nominal bottom in 1974. There were only two really bad times to be invested, and losses were soon recovered. Even better, the gains accelerate the longer the holding period.

But, investors should care about percentage gains, not nominal gains. The next chart shows the same data, except on a logarithmic scale, which keeps percentage change constant. One immediately noticeable difference is that since 1999 – fifteen years – the market has delivered scary plunges while offering scant percentage upside.

An investor may object to these graphs by pointed out they don't tell the whole story. Stocks, at least the senior stocks in the S&P 500, generate a yield, as shown by the next graph. The dividend yield is currently 1.91%, slightly higher than the average yield since 2000.

On first analysis, it would seem that even if the holders of stocks haven't made much of any capital return since 2000, at least they got some income.

Or did they? The bottom graph illustrates a comparison, since 2000, between nominal performance of the S&P 500 in gray against the return including dividends, but also discounted by CPI inflation. Dividend yields were not even



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sufficient to maintain purchasing power as against CPI inflation, a measure that woefully underestimates the true erosion of the dollar's purchasing power.

And, the chart above does not take into account income taxes, which further reduce the real yield to the investor. Nor have we considered the fees associated with owning stocks. Except for a handful of eccentrics who may hold paper certificates (which have been procedurally outlawed by most brokerage houses), stocks are held at a brokerage account. Brokers charge fees. Keeping up with the changes in the index incurs commissions and capital gains taxes beyond the income taxes.

Of course, no individual investor who wants to track the index does it himself. The easiest way to do it is to buy a stock fund. According to Morningstar, the average fund charges 0.9% per year in management fees,¹ or half the annual yield of stocks (before inflation) since 2000.

Management fees are only the beginning of the story. Transaction costs incurred by funds, in other words the trading commissions funds incur (separate from the transaction costs incurred by the investor when buying or selling these funds), average 1.44% per year according to a recent study.² This is separate from the management fee. Adding the two together yields average annual fees of 2.34% against average dividends since 2000 of 1.86%, making average income negative even before considering taxes and inflation.

But wait, there's more. Next there are spread costs, which don't concern small investors, but can have a dramatic impact on large funds. These costs appear when a fund gets an influx of money and must go into the market to deploy it. As a fund buys its positions, it pushes prices higher making the position more expensive to acquire. The opposite occurs when the fund has withdrawals. Worse, these capital flows tend to correlate with market movements, exacerbating the effect. Moreover, when a fund buys and sells to manage liquidity, it incurs its own capital gains liabilities, which it passes onto the investor. Finally, we mustn't forget the cash drag cost: fund managers need to keep some cash on hand to manage liquidity as funds flow in and out, cash which is eroded away by inflation.

More sophisticated investors can avoid these fees by hiring an asset manager. The normal fee for this kind of service is 2% per year again making it very difficult for managers in conventional stocks to produce positive income, even assuming they don't make the easy choice to put the money into stock funds. Though impossible to add up all these fees, taxes, and inflation expenses precisely, it's a safe bet that for most participants being in the market has eroded purchasing power over the past fifteen years.

NB: given market efficiency, if a money manager is providing income that greatly exceeds the market's yield of 1.9%, there is almost surely embedded risk correlating in magnitude to the excess return, or else the income is actually surreptitious return of capital, which will reduce future returns.

Given that yields are so low, most participants would probably cite capital gains as the reason to be in the stock market. Sadly, the potential capital gain and the dividend are mathematically inseparable.

To illustrate simply, imagine a perfectly safe investment that costs \$100 and yields \$2 per year forever. The yield on this investment is 2%. Now imagine that market yields double, such that the required return on such an investment jumps to 4%. It is a mathematical identity that value of the asset will drop to \$50: the \$2 yield is 4% of \$50.

1 <http://www.morningstar.com/advisor/t/42990307/mutual-fund-expense-ratios-see-biggest-spike-since-2000.htm>
2 http://www.frontadv.com/files/1267653327_The%20Role%20of%20Trading%20Costs%20in%20MFs.pdf

Even though this hypothetical investment continues forever and has no default risk at all, nevertheless the investor who holds it loses half his money when rates double.

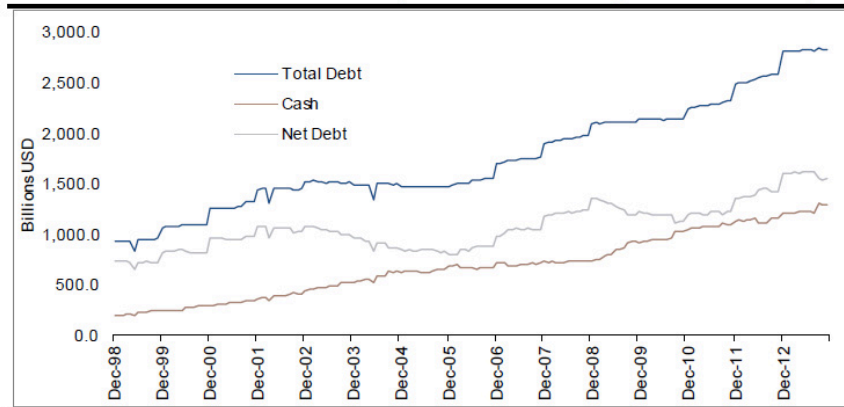
Reexamining the third chart on the previous page shows that the dividend rate on the S&P 500 since 1871 has vacillated, in general, from 3% on the bottom to roughly 7.5% on the top with an average reading of 4.4%. This yield has nothing to do with the levels of earnings or growth. It is simply a measure of the multiple the market is willing to pay for an income stream.

The S&P 500 currently yields 1.91%. Assuming cash dividends remain constant and that the required yield on stocks returns to the average experienced between 1874 and today, stocks would have to drop 57% in price.

Again, the math is simple: if the S&P 500 were trading at \$100, the 1.9% dividend rate would mean owners of one unit of the index would be receiving \$1.90 per year. If we assume a required yield of 4.4%, then the index would drop 57% to \$43 because \$1.90 is 4.4% of \$43. If yields reached – not panic levels – but merely the upper band of normal since 1871 at 7.5%, stocks would have to drop 75%. Again, this assumes no underlying changes in business performance of the companies in this index.

This assumption a bad one. For the past few years, corporate managers have exploited low interest rates by issuing debt to buy back shares. According to a recent study, 80% of corporations in the S&P 500 bought back shares over the past year. Share buybacks have had the effect of magnifying the gains from the bottom in 2009 from the 80% it would have been without the buybacks to 178%.³ Most of these buybacks didn't come from cash flow, but instead from additional debt. As long as the return on equity exceeds the cost of debt, this manoeuvre boosts earnings, dividends, and the value of management stock options. But, it leaves the company very exposed to rising interest rates. As the following graph shows, U.S. corporations now have record net debt.

Debt and cash levels are both at historical highs: Total debt is 35% higher than the 2008/09 peak



Source: SG Cross Asset Research

Rising interest rates would affect the total debt figure, meaning that if rates rise, cash flow currently going to dividends would have to be redirected to bond holders. It gets worse. Corporations sell products to customers who, on average, are awash in mortgage debt, credit card debt, margin loans, auto loans, and student loans. When rates rise, the purchasing power of the consumer on the margin will plummet just as corporate debt servicing costs shoot higher.

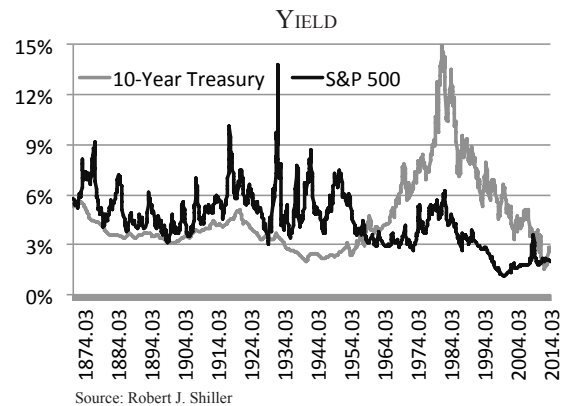
3 http://m.washingtonpost.com/business/corporations-cant-stop-gobbling-up-their-own-stock/2014/05/09/83c8ddb0-d6e6-11e3-aae8-c2d44bd79778_story.html

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Interest rates at 7.5% – completely predecated – would result in stocks falling not 75%, which assumes uninterrupted cash flows, but far lower as cash flow available to equity disappears. The 7.5% yield would apply to whatever is left. This is the risk most investors in stocks don't even know they have.

What would make the dividend yield of the market rise from its current value? It is a basic tenet of finance (and common sense) that given two investments with similar expected rates of return, investors will pick the less risky one. For example, if a stock is offering an expected total return of 5% and a U.S. government bond is offering the same return, presumably investors will sell the stock and buy the bond until prices have moved such that the yield on the bond is lower than that of the stock (this assumes that the market continues to assume that Congress will never allow a hard default, always preferring the printing press option).

It should not surprise, then, that from at least 1871 to 1960, the market required that the dividend yield from stocks be greater than the interest yield on the 10-year treasury bond to compensate for the extra risk. However, as the chart shows, beginning with the age of inflation in 1960, when Keynesians wrested control of the economy, yields on government bond soared above yields on stocks. The reason for this is that bonds offer only a nominal return, whereas companies can raise their prices to adjust for inflation.



Source: Robert J. Shiller

The protection companies offer from inflation may explain why equity yields can be persistently lower than bond yields, but it does not explain why they are so low to begin with. For that we must turn back to substitution effects.

The Fed tells us there is no inflation. This is the reason, presumably, that bonds yield so little. If there is no inflation, then the inflation protection offered by companies has little value. And that implies that income from stocks and government bonds are fairly good substitutes for each other. If that is the case, then the fact that the Fed has hammered Treasury yields lower by buying \$3 trillion of bonds should also translate into falling stock yields / a rising stock market. However, if government bond yields rise in the absence of inflation, then dividend yields on stocks must rise as well given the opportunity to substitute one investment for another.

The most recent economic numbers were terrible. GDP growth in the first quarter was estimated to be 0.1%, and the most recent employment data shows that another million people left the workforce, reducing the labor participation rate to the lowest since 1978.

What would happen if the economy, suffering under Obama's rising taxes and the taper, were to enter a new recession? The Fed can't lower rates, and, given its balance sheet, it will think twice before reentering the Treasury market. Meanwhile, the Keynesian "automatic stabilizers" would deploy blowing out anew Federal expenditures as against falling tax revenue. A flood of new Treasuries would enter the market, which is unlikely to raise their price (lower their yield).

If, in the absence of inflation, Treasury yields spike, then so will dividend yields on stocks given the inclination to substitute a more sure investment for a less sure. If, instead, inflation does appear, then the market will demand that all yields rise – a lot. Thus, stocks and bonds are the same trade. No one would buy and hold thirty-year Treasuries bonds yielding 3.5% to maturity, yet equities have the same risk. Most investors holding stocks for the long run don't realize it, but they are in a levered spread-trade to the government bond market, with Obama at its helm.

There is only one investment that is sure to do well when inflation strikes, and that is gold. Having been hammered down for nearly three years in the face of generally rising markets, all the froth is gone. Gold has no yield, so it is immune to the effects that rising yields will have on bonds, stocks, real estate, and any other economic investment. Most investors remain fully invested in the broader capital markets because that strategy has served them well over the past forty years. Buying any material amount of gold seems too risky – the opportunity cost too high. But, the real risk is having undiversified exposure to total wipeout in capital markets wholly dependent on the U.S. Treasury bond.

There is, in fact, only one way out of the math that threatens wholesale destruction of wealth: growth. For simplicity, the figures above assume that interest rates change overnight, giving companies no opportunity to grow into their currently extended valuations.

If, however, companies can grow fast enough to boost their dividends as rates rise, then market wipeout can be avoided. This was the same argument advanced by real estate investors in 2006: prices would stabilize as valuations caught up. The argument was wrong then and even more so now: the amount of growth needed is extraordinary, and unlikely to occur in the context of a metastasizing state.

The math required to analyze the magnitude of growth necessary to forestall disaster is somewhat complex, saved here for extra credit. This explanation is a summary from a 1998 letter by John P. Hussman,⁴ who runs the Hussman Funds. For those intrigued by this perspective, it is also worth studying his letter on duration risk, where he mathematically quantifies the idea that if one just hold stocks long enough, any losses will be recovered, as they were, eventually, after 1929. He concludes the math supports this dynamic, but the holding time needed to rely on this outcome for stocks is currently 50 years.⁵

To the math! The return on any security is a combination of capital gain and income from dividends or interest payments. But, capital gain and income are mathematically related by the interest rate.

For example, imagine buying a 30-year zero-coupon bond with a face value of \$100. This is a bond that pays no income while it is outstanding, and pays \$100 cash thirty years after issuance. If the bond is priced such that it has a yield-to-maturity of 10%, the price of the bond at issuance will be \$5.73. Every year, the bond's value will increase by 10% until it matures for \$100.

Or, at least, that is how it will behave if interest rates stay constant at 10% for the 30-year period. But, what happens if, during the first 10 years, prevailing interest rates decline to only 7%? This means that at year 10, when there are 20 years left to the bond, it must be priced such that it will return 7% per year for the next 20 years. The value of a 20-year zero coupon bond with a yield-to-maturity of 7% is \$25.85. This means that 10

4 <http://www.hussmanfunds.com/html/longterm.htm>

5 <http://www.hussmanfunds.com/wmc/wmc040223.htm>

years after issuance of the 30-year zero coupon bond at \$5.73, it would be worth \$25.85. This annual rate of increase is not 10%, but 16.26%. In Hussman's words:

By holding the security during a period when the yield-to-maturity is falling, you not only earn a return that is higher than the original yield to maturity, you earn a return that is dramatically higher than the future yield-to-maturity! [bold in original]

The average yield for this bond for the next 20 years can only be 7%, since the payoff is fixed at \$100. If the original holder hangs on to the bond, that 7% return will gradually reduce his overall return from the 16.26% he had made after the first 10 years, back to the 10% gain for which the bond was originally priced. The faster gain in the first 10 years has to be returned over the next twenty years.

This same dynamic applies to normal bonds and stocks. As discussed above, the average dividend yield on the S&P 500 since 1871 has been 4.4%. And, because of growth, dividend payouts have increased by 4.1% per year since 1871 (versus earnings growth of 6.6%). If we assume that the dividend yield of stocks must stay constant, then 4% growth in the dividend must translated into a 4% increase in price.⁶ Total return, as stipulated at the beginning, is the sum of the capital gain and the dividend. The average total return for stocks over nearly a century, therefore, has been 4.4% in dividend yield plus 4.1% in growth, or 8.5% per year.

But, what happens to the valuations of stocks when interest rates fall? Back to Hussman:

at the 1982 bear market low, the dividend yield on the S&P 500 Index reached a rich 6.7%. Over the following 16 years, the dividend yield has declined to just 1.4%, while dividends have grown at an average annual rate of 5.4%. Over those 16 years, the total return on the S&P 500 has been breathtakingly high, at over 20% annualized.

Just like the lucky holder of the 30 year zero coupon bond, the holders of stocks in 1982 benefited not because of extraordinary growth, but because the dividend yield plummeted. The precise formula for calculating annualized total returns for stocks is:

$(1+g)(\text{Original Yield}/\text{Terminal Yield})^{1/N} - 1 + (\text{Original} + \text{Terminal})/2$

Where Original Yield is the original dividend yield (in decimal form), Terminal Yield is the dividend yield expected at the end of the holding period, N is the holding period in years, and g is the growth rate of dividends over the holding period.

Solving for the S&P 500 from 1982 to 1998:

$(1.054)(.067/.014)^{1/16} - 1 + (.067 + .014)/2 = .203 = 20.3\%$ annually

Hussman warned in 1998 that investors faced the opposite dynamic, like the man who has made a killing on the zero coupon bond for the first ten years and decides to try his luck by holding to maturity. With dividend yields at only 1.4%, even small increases in dividend yields would more than negate the effects of dividend growth.

In fact, over the past 16 years, the dividend yield of the S&P 500 has increased only to 1.91%. Hussman could not have foreseen to what absurd lengths the Federal Reserve would reach to keep rates falling to save reckless bankers, profligate politicians, and encumbered consumers.

⁶ To see why, imagine a stock with a \$1 dividend at a 4% yield. The price of the stock must be \$25. Now imagine the dividend grows 4% to \$1.04. Holding the 4% yield constant, the price must also rise 4% to \$26.00.

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When the next recession strikes, and it may have already begun, the Fed will face an existential moment. Do they, after thirty years, allow the epic bond bubble to burst, sending rates rocketing higher? Or, do they take QE to the next level, whatever that would be? And at what point does continuously accelerating QE risk hyperinflation?

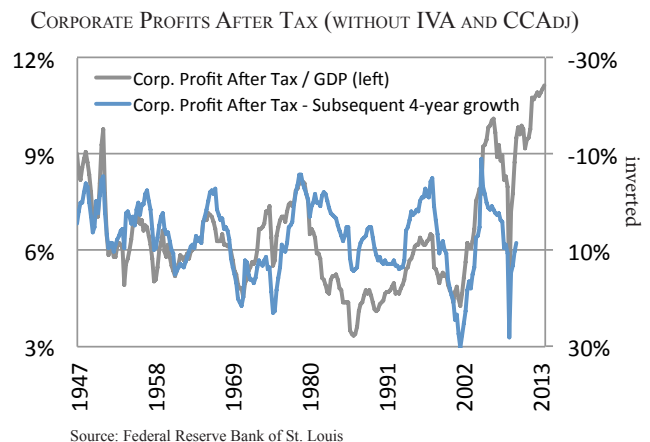
Using Hussman’s formula, we can be more precise about the effects of rising yields on stock prices over time. Given a current dividend yield of 1.91%, if the yield returns just to its historical average of 4.43%, then, even if dividends increase by 6% per year for the next 9 years, the total return of the S&P 500 will be **zero in nominal terms**. The table below shows what the total return of the S&P 500 would be assuming various average growth rates if the yield returns to its historical average over varying periods of time.

S&P 500 TOTAL RETURN AT DIFFERENT DIVIDEND GROWTH RATES
 ASSUMING YIELDS REVERT TO 4.43% FROM 1.91%

	-10%	-5%	0%	5%	10%	
years for adjustment	1	-58%	-56%	-54%	-52%	total return - non-annualized
	2	-61%	-57%	-53%	-48%	
	3	-64%	-58%	-51%	-44%	
	4	-66%	-59%	-50%	-39%	
	5	-69%	-60%	-48%	-34%	
	6	-71%	-60%	-47%	-29%	
	7	-73%	-61%	-45%	-23%	
	8	-75%	-62%	-43%	-17%	
	9	-76%	-62%	-41%	-10%	
	10	-78%	-63%	-39%	-3%	

These are nominal returns for the entire period. The only scenario in which it is likely that large companies will be able to support 10% increases in their dividends over a series of years is one that involves a high dose of inflation (indeed, the only time 10% dividend growth has been achieved over a 10-year period since 1871 was in the mid-1950s). But, if inflation kicks up, the market will demand a far higher yield than 4.4% (which is the normal rate for normal times). If we imagine yields having to reach 7.5%, experienced regularly in the pre-inflation / pre-managed economy era, then 10 years of 10% dividend growth will result in a total return of less than 1% per year on a *nominal* basis. During that whole decade, rampant inflation will be eating away at the capital value of the market, as it did in the 1970s. And, as discussed above, when rates rise, debt obligations will eat up free cash flow of both businesses and their customers: dividends will almost certainly fall substantially.

The above discussion is not opinion or forecast, but inescapable math. Let us not mention that margin debt, corporate debt, and government debt are all near record highs; let us ignore that after-tax corporate profits per GDP – the driver of dividends – is unsustainably high; let us discount the increasing tax and regulatory burdens on American corporations: all of which are reasons to be wary of the market. Let us focus instead on

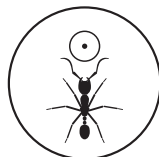


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the devastating consequences to stock values when rates eventually rise merely back to historical normal levels; and consider what would happen if rates went temporarily to panic levels. The math allows for only one escape: impossibly high real growth. Owning stocks at these levels is a reckless gamble.

Investors hold stocks currently not because they like them, but because they know cash is dangerous, and there are few alternatives that offer immediate liquidity. Yet what Hussman's numbers tell us is that stocks have *already* adjusted to the coming inflation. Stocks require truly extraordinary nominal cash flow growth to earn enough money to raise dividends high enough to justify current valuations assuming normal dividend yields. Stocks will not rise again when the inflation hits – investors will simply be devoured as they were in the 1970s (except in the case of hyperinflation, in which case stocks will, of course, rise in nominal terms, but fall in purchasing power terms).

Meanwhile, gold, which benefits from increasing interest rates, persists near multi-hundred year lows in terms of various monetary metrics. Failing to hold a large position at this point is irresponsible. Bullion is, of course, the safest method to hold gold and should compose a large part of any portfolio. The operational leverage inherent in junior mining stocks joined with current distressed pricing suggests a small allocation should protect a large portfolio.



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