September 2013

MUCH ADO ABOUT INTEREST RATES

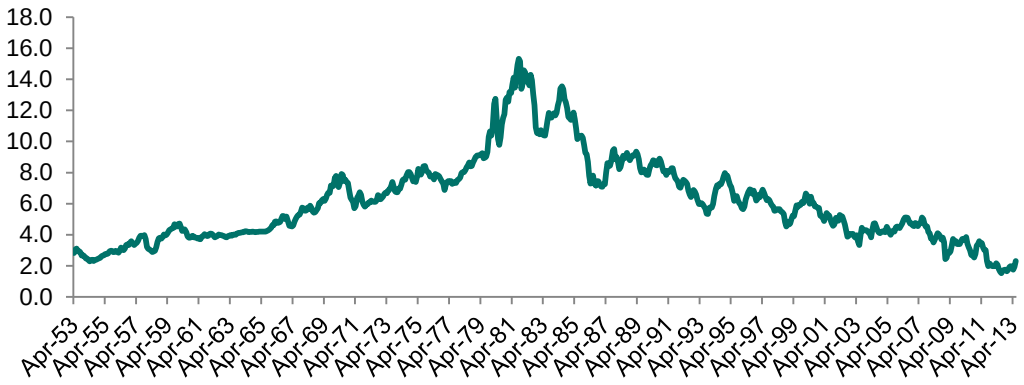
> Now sit we close about this taper here,
> And call in question our necessities.
> *Julius Caesar*, Act 4

Conventional wisdom tells us that rising interest rates are anathema to stocks. In recent weeks, the mere suggestion that the Federal Reserve might begin to taper, or reduce, its purchases of long-term Treasury and mortgage securities has been enough to roil the equity markets in anticipation.

Since yields peaked in 1981, the three subsequent decades have witnessed a remarkable bull market for bonds. The yield of the 10-year Treasury bond fell from more than 15% in 1981 to its current level of less than 3% (see Exhibit 1).

With interest rates at historically low levels, investors might reasonably assume that it's not a matter of *if* but a question of *when* rates will increase. Hence stock market volatility seems to spike with every suggestion of an imminent Federal Reserve action.

Exhibit 1: 10-Year Treasury Yield from 1953 through 2013



Source: Federal Reserve. Data from April 1953 through June, 2013. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

A Theoretical Digression

Why do we assume that rising rates are bad for stocks? A review of basic finance might shed some light on the relevant issues.

One of the strongest arguments in favor of an inverse relationship between bond yields and stock prices comes from the classic Gordon growth model:

$$P = \frac{D}{k - g} \qquad (1)$$

in which

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- P is the fair value of a stock
- D is its current dividend
- k is the appropriate discount rate, and
- g is the projected growth rate of dividends.

We can decompose the discount rate into a risk-free rate and a risk premium:

$$k = Rf + Rp \quad (2)$$

So if the risk-free (e.g., the 10 year Treasury) rate increases, so does the discount rate k, and the fair value of the stock declines. Other things equal, rising rates are bad for stocks, and falling rates are good.[1]

But other things may not be equal. We can expand equation (1) by remembering that dividends are the product of earnings (E) and the payout ratio (PO), and that earnings are a function of return on equity (ROE) and book value (BV):

Other things equal, rising rates are bad for stocks, and falling rates are good.

$$D = PO * E \quad (3)$$

$$E = ROE * BV \quad (4)$$

So that

$$P = \frac{ROE * PO * BV}{(Rf + Rp) - g} \quad (5)$$

Now, imagine a scenario in which the economy, having been in the doldrums, begins to perform better. This might well trigger an increase in government bond rates, which on its own should cause stock prices to fall. But equation (5) helps us to identify some potentially countervailing factors:

- If the resurgent economy causes growth forecasts to increase, the g term in the denominator of equation (5) will increase, which indicates a higher level of stock prices.
- Similarly, if corporate profits rise, the ROE term in equation (5)'s numerator could increase, pushing prices up.
- And if corporate boards and managements feel more confident, they may increase dividend payout ratios, leading to a further increase in the numerator of equation (5).

These countervailing factors might make it possible for interest rates and stock prices to rise at the same time. In this scenario, rather than rates causing stocks to move, it's better to consider that **rates and stock prices can both be driven by the same set of exogenous economic variables**.

[1] N.B. In this formulation it is *rising* interest rates that are bad for stocks, not "high" interest rates. Consider, e.g., a scenario in which high inflation produces high interest rates. Companies which can pass inflation through to their customers may do quite well in such an environment, despite the relatively high level of nominal rates.

A Case for Discounting?

Does the theory play out in practice? Exhibit 2 shows us the interaction of interest rates and the U.S. stock market over the past 22 years. Since 1991, we can easily identify three periods of rising interest rates and four periods when rates fell.

While each of the three rising rate environments was characterized by particular idiosyncrasies, **the S&P 500® rose in all three episodes**, and in three of the four periods when interest rates declined. Since 1991, at least, interest rates seem not to have been a decisive factor in equity performance.

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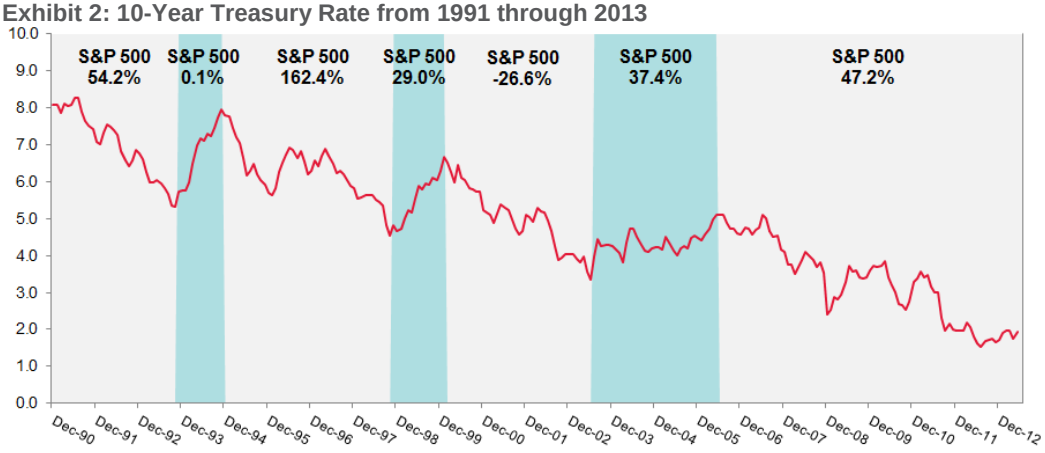
Exhibit 2: 10-Year Treasury Rate from 1991 through 2013



Source: S&P Dow Jones Indices and Federal Reserve. Data from December 1990 through June 2013. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

Worse yet for the theoretical argument: Between January 1991 and June 2013, the average monthly return for the S&P 500 was 0.85%. Paradoxically, in the three periods of rising rates, the average monthly return was 0.96%, compared to an average monthly return of 0.82% for the periods of declining rates. **Rising rates have clearly not been bad for stocks over the past two decades.**

Conventional Wisdom Corroborated

We can extend Exhibit 2's analysis back in time. This may be particularly useful because, although we're able to identify periods of rising interest rates in the past 20 years, they pale in comparison to the rising rates of the pre-1981 bond market.[2]

Exhibit 3 shows that since April 1953,[3] the average monthly return of the S&P 500 was 0.94%. Of the 722 months within this period, there were 347 months when the 10-year Treasury declined and 358 months when it rose.[4] In months when the 10-year Treasury declined, the average monthly return for the S&P 500 was 1.38%. This compares to an average monthly return of just 0.63% in months when the 10-year Treasury rose, less than half the return of the declining months. Consequently, measured over the last 60 years, rising rates have indeed been bad for the stock market.

[2] See Fei Mei Chan and Craig Lazzara, "Income Beyond Bonds," S&P Dow Jones Indices, March 2013, http://us.spindices.com/documents/research/research-income-beyond-bonds.pdf.

[3] The data start in 1953 since the Federal Reserve ended its control of government debt markets in mid-1951. (Controls had been instituted as a wartime measure in April 1942.) See Robert L. Hetzel and Ralph F. Leach, "The Treasury-Fed Accord: A New Narrative Account," Federal Reserve Bank of Richmond Economic Quarterly Volume 87/1 Winter 2001.

[4] Of the total 722 months, there were 17 when the 10-year Treasury did not change.

Exhibit 3a: Stock Performance in Rising and Declining Interest Rate Environments

	No. of Months	Average Monthly S&P 500 Return (%)
10-Year Down	347	1.38
10-Year Up	358	0.63
All	722	0.94

Source: S&P Dow Jones Indices and Federal Reserve. Data from April 1953 through June 2013. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

Going further, Exhibit 3b breaks the data into modified "quartiles." When 10-year Treasury rates rose, the median increase was 14 bps, so we can use this breakpoint to refine our data sample into "large" increases and "small" increases. We can do the same for periods of falling rates. (Coincidentally, the median monthly change when rates fell happened to be -14 bps.) This lets us look at "large" and "small" rate declines separately.

In the months when 10-year Treasury rates increased the most, the S&P 500 *fell* by an average of -0.12%. This quartile–with relatively large interest rate increases–is the *only* quartile in which the S&P 500 declined on average. Contrariwise, in the 173 months when interest rates declined the most, the S&P 500 experienced the best monthly performance (1.50% on average). **Both results are consistent with the view that rising rates are bad for the stock market.**

Exhibit 3b: Interest Rate Quartiles and Stock Performance

	No. of Months	Average Monthly Change in 10-Year Treasury (bps)	Average Monthly S&P 500 Return (%)
Biggest Declines	173	-33	1.50
Moderate Declines	174	-7	1.27
Moderate Increases	180	6	1.37
Biggest Increases	178	32	-0.12

Source: S&P Dow Jones Indices and Federal Reserve. Data from April 1953 through June 2013. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

Data for the last 20 years pose a challenge to convention.

A Challenge to Convention

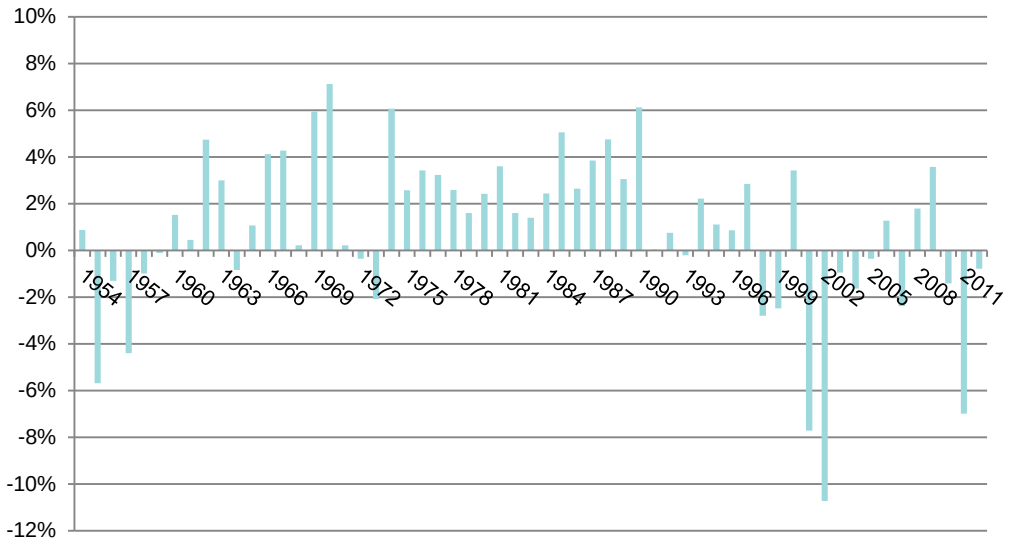
The data for the past two decades are not consistent with the entire history of the past 60 years. The longer data set tells us that stocks do best when rates fall the most, and vice versa. But this does not seem to be reflected in recent years.

To get a better sense of the timing of this apparent paradigm shift, we looked at the difference in average monthly stock market returns contingent on interest rate behavior. For example, in 1970, the 10-year Treasury yield rose in four months and fell in eight months. In the four months when bond yields rose, the average return of the S&P 500 was -4.27%; in the eight months when bond yields fell, the average return of the S&P 500 was 2.86%. The "payoff" of falling rates in the stock market was therefore 7.12% in 1970, and that's the value plotted in Exhibit 4.

If the conventional wisdom is correct, all the values in Exhibit 4 would be positive – i.e., stocks would always do better in months when rates fell compared to months in which rates rose. For most of the 59 years plotted, that's exactly what happened. Thirty-nine of the bars in Exhibit 4 point upward, meaning that falling rates were good for stocks 66% of the time.

Interestingly, we begin to see far more exceptions to the conventional wisdom in the past 15 years. Between 1954 and 1997, falling rates accompanied rising stock markets 80% of the time. Between 1998 and 2012, falling rates were associated with rising stocks only 27% of the time.

Exhibit 4: Average Monthly Spreads Between Declining and Increasing Interest Rates



Source: S&P Dow Jones Indices. Data from 1954 through 2012. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

Conventional wisdom is that rising interest rates are bad for stocks. Recent history shows that's not a forgone conclusion.

The post-1997 data are almost a mirror image of the full 60-year period. In the last 15 years, the months when interest rates declined were also months when the S&P 500 declined. Exhibit 5 shows the performance of the S&P 500 in declining and rising interest rate environments–this time juxtaposing the data for the two different periods (1953-1997 and 1998-2013). **The behavior of equities in the most recent history is starkly different from that of both the more distant history and the period as a whole.**

Exhibit 5: Interest Rates and Stock Performance

	Average Monthly S&P 500 Return		
	April 1953-Dec 1997 (%)	**Jan 1998-June 2013 (%)**	**April 1953-June 2013 (%)**
10-Year Down	2.15	-0.38	1.38
10-Year Up	0.30	1.81	0.63

Source: S&P Dow Jones Indices. Data from April 1953 through June 2013. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

A Call for Circumspection

> O! that a man might know
> The end of this day's business, ere it come;
> But it sufficeth that the day will end,
> And then the end is known.
> *Julius Caesar,* Act 5

To what degree should the prospect of Federal Reserve tapering unsettle equity investors? The evidence does not allow a definitive answer. There are good reasons to believe that the prospective increase in interest rates will be bad for the stock market, and there are good reasons to believe the opposite. If it is true that interest rates and stock prices can both be driven by the same set of exogenous economic variables**, it's arguable that the variables that will lead the Fed to increase rates will also support higher equity prices**.

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