

## SOMETIMES THERE REALLY IS A WOLF: INFLATION AND BOND MARKET HISTORY AND PROSPECTS

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The most important questions for long-term investors are twofold: (1) what is real global economic growth going to be? And, (2) what is the inflation rate going to be?

This question may be rephrased: What are the prospects for stocks, and for bonds? What is the outlook for real output, and what is the outlook for the currency in which financial instruments are denominated? What are the expected cash flows, and what is the (riskless) discount rate? How is the private sector doing, and how is the government doing (because buying a Treasury bond is like buying stock in the government)?<sup>2</sup>

This essay is concerned with inflation and the outlook for the bond market. The two are linked because interest rates on bonds reflect inflation expectations. We think that inflation rates will rise and bond yields will rise with them, producing capital losses for bondholders. We rarely take a tactical view on any asset but we are bond *bears*. The reasons are institutional and structural. The forecast is not for rising rates forever. The bond bear market that began in July 2012 will come to an end when markets reach a new equilibrium reflecting the higher levels of government spending that today's retirees and near-retirees expect.<sup>3</sup> Bonds will then be worth buying again. But we will experience a long adjustment period.

In the second quarter 2013 *Ounavarra Review*, David DeRosa, a Columbia University professor and veteran currency trader, discussed the mechanics of monetary policy and the transmission of inflation. He believes that, under current circumstances, inflation is a remote concern. He makes a careful distinction between increases in government debt, which, he says, are not intrinsically inflationary, and increases in the money supply, which are. Increases in debt were historically inflationary because the debt was "monetized" (added to the money supply) but the current Federal Reserve is not doing that, DeRosa argues.

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<sup>1</sup> Portions of this article appeared in "Forecasting Bond Returns and Evaluating Bond Funds," *Advisor Perspectives*, October 8, 2013, [http://www.advisorperspectives.com/newsletters13/pdfs/Forecasting\\_Bond\\_Returns\\_and\\_Evaluating\\_Bond\\_Funds.pdf](http://www.advisorperspectives.com/newsletters13/pdfs/Forecasting_Bond_Returns_and_Evaluating_Bond_Funds.pdf).

<sup>2</sup> If the government is prospering, with tax revenues running ahead of expenditures, then the government barely needs to borrow at all — it borrows only to refinance the part of its debt that it is not retiring — and interest rates should decline, producing gains for bondholders. If the government is suffering, it must borrow more, causing interest rates to rise.

<sup>3</sup> We expect that tax collections will improve as unemployment rates fall. While some unemployment may be structural, caused by changes in technology and skill mismatches, a substantial fraction of it is cyclical.

Here we focus on history. Reflecting Milton Friedman's dictum that "inflation is, always and everywhere, a monetary phenomenon," we examine how markets have responded to past stresses in the relationship between government revenues and government expenditures.

The main point in our review of inflation and bond-market history is that human nature does not change much. A fiat-money system gives governments the ability, but not the obligation, to depreciate the currency. If a government is heavily indebted, the temptation to depreciate the currency so that it can pay off the debt in cheaper dollars is too great to resist. And we're betting that the government of the U.S. and other major debtors countries will not resist it. Voters, for their part, usually desire more government benefits than they are willing to pay for in taxes, setting up the tension that nudges governments toward inflationary policies.

Anyway, if we're wrong and inflation remains low, the opportunity cost (the return sacrificed by positioning oneself for inflation) is modest. But if inflation takes off, a traditional fixed-income portfolio will be crushed. There's a one-sidedness, an optionality, to this decision that works very much in favor of inflation hedging.

A countervailing, fairly bullish view will be explained by Stephen Sexauer, chief investment officer at Allianz Global Investors, in an interview in the fourth quarter 2013 *Ounavarra Review*. He is cautious but optimistic. We will then give inflation and the bond market a rest, and we will gradually find out whose forecast is right.

## THE DEEP HISTORY OF INFLATION AND INTEREST RATES

Many of today's market participants don't know much about the history of inflation, interest rates, and the bond market. They know that inflation and interest rates were higher in the recent past. They may vaguely remember that these rates were once very high, and a few older investors may even know that before inflation and interest rates were very high, they were low. To remedy this sketchy knowledge, let's take a fairly detailed look at history.

## FIVE HUNDRED YEARS OF INFLATION AND DEFLATION

Figure 1 shows five-year rolling inflation rates, averaged across major market economies for which data were available, from 1500 to the present. Why go back so far? Inflation rates, and bond valuations and returns, are about the credit of governments, and we have data as well as anecdotal evidence on this question for much longer than we have stock-market data. The temptation to debase the currency to pay off government debts in cheaper dollars (or pounds or florins) has existed since governments began to issue bonds and establish currencies, so we find it useful to look at data from the Medicis of Florence, the first Queen Elizabeth, the American Revolution, the age of Napoleon, and the age of Victoria. There's a lot of history in that chart!

Figure 1  
Inflation Rates Since 1500

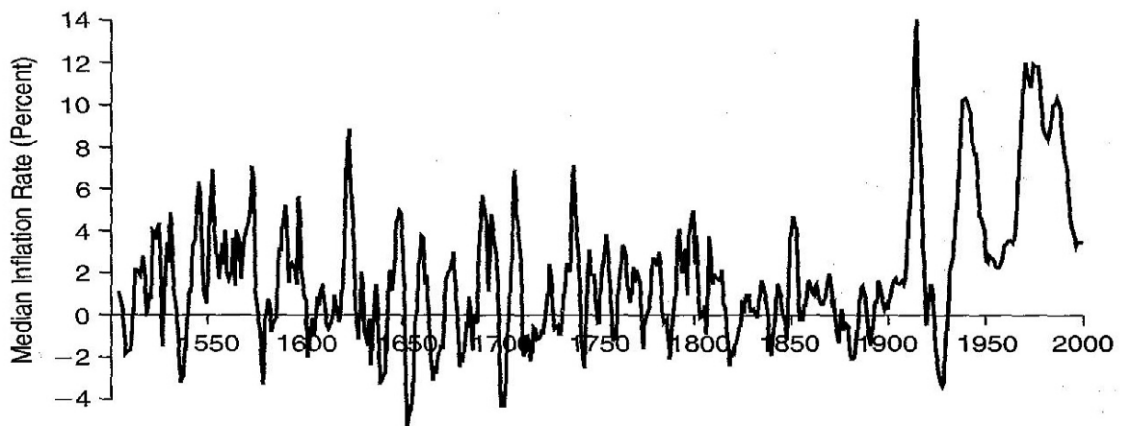


Figure 12.1. The median inflation rate: Five-year moving average for all countries, 1500–2007.

Source: Rogoff, Kenneth S., and Carmen M. Reinhart. 2009. *This Time is Different: Eight Centuries of Financial Folly*. Princeton University Press, Princeton, NJ. Figure 12.1, p. 181.

### THE FIRST REGIME

Until about 1914, inflation rates were all over the place but, importantly, averaged to a low positive number for a very long time: inflation was followed by deflation (not *less inflation*, but *deflation*). The gold standard was partly responsible. When consumer prices rose, the fair-market price of gold also rose, leading to an imbalance between the market price and the official price (the price at which the issuer of the gold-backed currency promised to redeem currency for gold). The deflation that followed every episode of inflation — in cases where the currency survived — was the way this imbalance was corrected.

Why did governments around the world handcuff themselves to gold when they could have benefited from inflation, paying off their debts in cheapened currency? The reason is that no one can force investors to buy government bonds; instead, governments have to be able to issue bonds to voluntary buyers. Thus, they need to have the credibility that comes with good credit in the marketplace. If a government got the reputation of being a chiseler with its bonds, it would have had to pay very high interest rates (which could bankrupt the government) or it might not be able to borrow at all.

Sometimes, desperate governments did create inflation that caused the real value of the bonds they had issued to evaporate. Under the first U.S. government, the Continental Congress, inflation was so severe that the phrase “not worth a Continental” has survived almost to the present day. The Confederate States of America did something similar. But the best-known hyperinflation was that of Weimar Germany, where the price of a loaf of bread came to exceed 3 billion marks. Similar hyperinflations have taken place in dozens of countries, most recently Zimbabwe.<sup>4</sup>

<sup>4</sup> An instructive list, along with stories and summary data, is at <http://en.wikipedia.org/wiki/Hyperinflation>.

Such events never end in the restoration of price stability in the hyperinflating currency, but are resolved when a new currency is introduced.

The pre-1914 inflation “regime” can thus be characterized as follows:

- Gold standard, for the most part
- Alternating inflation and deflation
- Very low long-term average inflation rate
- Hyperinflation and disappearance of the currency when the issuer becomes desperate

### THE SECOND OR MODERN REGIME

This all changed around 1914, as the U.S. partly decoupled from gold with the Federal Reserve Act of 1913 and as many governments took on massive debt to finance World War I. Five-year inflation rates, averaged across the countries in the data sample, reached their all-time high during World War I, setting an unenviable record that still has not been broken.

The Great Depression was associated with a sharp deflation, and for a while it looked as though the ancient pattern of inflation followed by deflation back to (or near) the original price level would hold. However, the remaining steps away from gold and toward a fiat-money standard were taken by the major industrial nations in an attempt to combat the Depression. By the time World War II began, prices were rising once again. The rise never stopped, and inflation, either fast or slow, has been a fixture ever since. We’ll look at postwar inflation and interest rates in greater detail later.

The post-1941, or possibly post-1914, “regime” is thus:

- Fiat money standard
- Alternating accelerating inflation and decelerating (but still positive) inflation
- High long-term average inflation rate

### WHICH REGIME ARE WE IN NOW?

To sum up, in the first, pre-1914 regime, inflation rates always shot past zero to deflation, with low average inflation rates; but, in the modern regime, inflation persists and only falls to low *positive* levels, averaging, over time, to high rates. Going forward, which regime are we in?

The easy answer is “the modern regime,” since we have not returned to a gold or other commodity-money standard. That is our working answer. However, something appears to have changed. Despite massive issuance of government debt in the developed world, and particularly in the U.S., inflation rates are very low. Is it possible we’re in a third regime – low inflation and low interest rates with no gold standard, like Japan? Here are some reasons why we (in the United States) are not like Japan:

- Japan suffered from 20 years of unanticipated competition with China. The U.S., through low consumer prices, has mostly benefited from it.
- Japan has a much more severe aging problem than the U.S., which benefits from immigration by the young
- The Japanese stock market and real estate bubbles were much bigger than in the U.S.

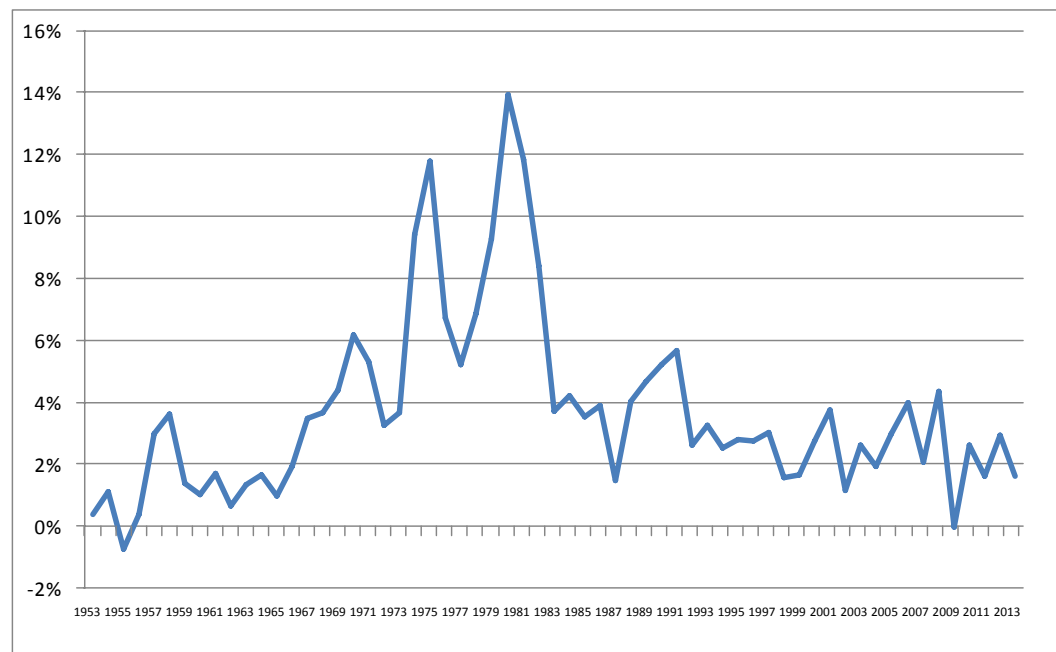
A serious consideration of the possibility that we're in the third regime is beyond the scope of this article. We believe it's conceivable but very unlikely.

## MODERN TIMES: INFLATION, FAST AND SLOW

### UP AND DOWN THE INFLATION MOUNTAIN

Let's home in on the post-World War II period, after stability was restored to the international monetary system. Figure 2 shows United States inflation (not an average across countries) starting in 1953, and instead of five-year rolling averages, we show yearly rates. The graph looks like a trip up and down a mountain, with inflation rising to almost 14%, a rate unprecedented in the U.S. in peacetime, and then — instead of spiraling into hyperinflation — declining to the current rate of about 2%.

Figure 2  
The Inflation Mountain: U.S. Inflation Rates from 1953 to 2013

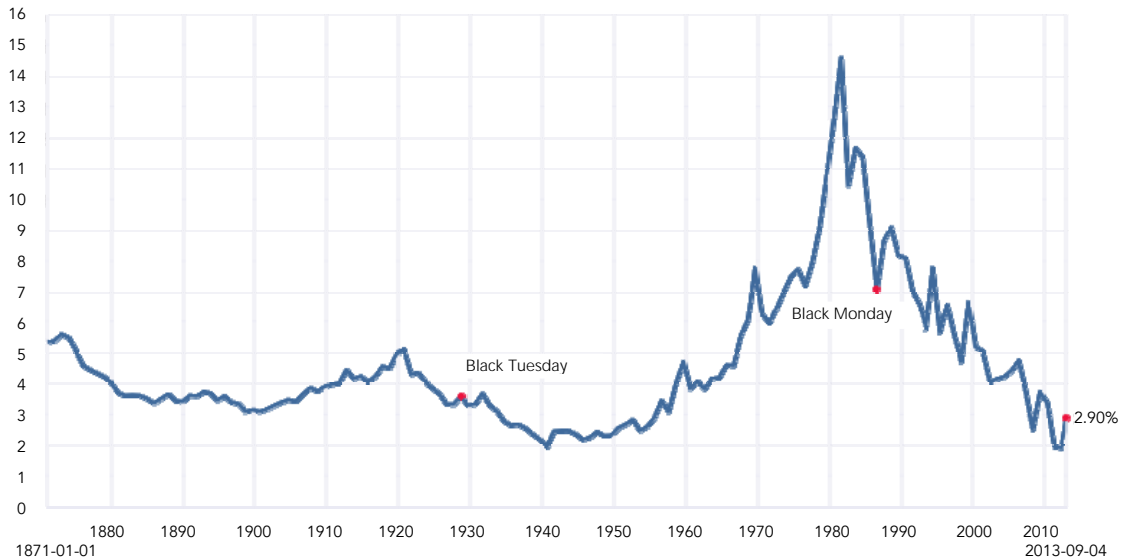


Source: Robert Shiller

## THE BOND MOUNTAIN

Because inflation expectations are (sooner or later) impounded in nominal bond yields, as investors price bonds to protect themselves from being repaid in cheaper currency, there is a close correspondence between the inflation mountain and the “bond mountain” shown in Figure 3. Long-term U.S. government bond yields rose from less than 5% to almost 15% between the mid-1960s and the 1981 peak, followed by the even larger decrease from 1981 to 2012. Since 2012, bond yields have been rising, although inflation has remained low.

Figure 3  
The Bond Mountain: Long-Term U.S. Treasury Bond Yields from 1871 to 2013



Source: U.S. Treasury and Robert J. Shiller. Accessed at <http://www.multpl.com> on September 4, 2013.

The two charts are so similar, post-1953, that they look like two different profile views of the same mountain. The major differences are: (1) the brief respite from accelerating inflation in the mid-1970s, and (2) the generally smoother nature of the bond chart.

## REAL INTEREST RATES

I'll resist the temptation to calculate the difference between the two series and call that number “the real interest rate.” Until TIPS were issued in 1997 there was no way to observe the real interest rate directly in the market. The numerical difference between the inflation series and the interest rate series is due to (1) the real interest rate, and (2) the fact that the interest rate series, consisting as it does of long-term bond yields, reflects inflation expectations over a roughly 20-year period — while the inflation series reflects year-to-year changes in consumer prices (thus the bond line is smoother than the inflation line). The timing mismatch means that the difference between the two series is *not* the real interest rate, but a mishmash (Yiddish for mismatch?) with no obvious interpretation.

The closest that one can come to estimating real interest rates, pre-1997, is to compare nominal interest rates with the inflation rate that investors *say* they were expecting over the life of the bond. Based on this definition, real interest rates were positive in most periods, but negative in the 1970s, when investors were repeatedly surprised by accelerating inflation, and very recently, due to the Zero Interest Rate Policy.

### THE BEAR WENT OVER THE MOUNTAIN

Since bond prices — and, consequently, returns — move the opposite direction from interest rates, the climb up the bond mountain represented a massive bear market, in which much of U.S. bondholders' and savers' wealth was destroyed in real (inflation-adjusted) terms. The bond bull market that began in 1981 provided very robust returns to a new generation of investors.

It is extremely likely that the great disinflation and the associated bond bull market is over. Inflation will rise and bond yields will continue to rise, and bonds will do poorly, with funds having a long duration underperforming those with shorter durations.

Figure 4 shows how changes in bond yields affected the performance of bond portfolios. Annual total returns and price returns, in both nominal and real terms, are shown over two time periods for a hypothetical long-term U.S. Treasury bond portfolio.<sup>5</sup> The first subperiod surrounds the peak of the bond mountain and covers 1976-1985, and the second, shorter period surrounds the more recent "valley" and covers 2008-2013. (The 2013 data, obviously, cover a partial year.)

Note how sharp the annual moves are — in the 1977-1986 period, they were often larger than moves in the stock market. Also, note the big differences, in times of high inflation and high yields, between the total nominal returns and the real price returns. Finally, observe the size of the cumulative losses in real terms over 1977-1981; now *that's* wealth destruction.

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<sup>5</sup> The price return, sometimes called return-in-excess-of-yield, is calculated as the total return for a year minus the bond's yield-to-maturity at the beginning of the year, and represents the "surprise" or unexpected component of return, which comes from changes in interest rates. This surprise term is roughly equivalent to the price return or capital gain in a stock index.

Figure 4  
 Year-by-Year Long-Term U.S. Treasury Total and Price Returns,  
 in Nominal and Real Terms, 1976-1985 and 2004-2013<sup>6</sup>

| Year | Bond yield "peak" (return "valley") |                     |                     |                     | End-of-year<br>yield |
|------|-------------------------------------|---------------------|---------------------|---------------------|----------------------|
|      | Nominal                             |                     | Real                |                     |                      |
|      | <u>Total return</u>                 | <u>Price return</u> | <u>Total return</u> | <u>Price return</u> |                      |
| 1977 | -0.69                               | -7.86               | -7.46               | -14.63              | 8.03                 |
| 1978 | -1.18                               | -9.05               | -10.20              | -18.08              | 8.98                 |
| 1979 | -1.23                               | -9.84               | -14.54              | -23.15              | 10.12                |
| 1980 | -3.95                               | -14.00              | -16.34              | -26.40              | 11.99                |
| 1981 | 1.86                                | -10.33              | -7.08               | -19.27              | 13.34                |
| 1982 | 40.36                               | 23.95               | 36.49               | 20.08               | 10.95                |
| 1983 | 0.65                                | -9.82               | -3.14               | -13.62              | 11.97                |
| 1984 | 15.48                               | 2.32                | 11.52               | -1.63               | 11.70                |
| 1985 | 30.97                               | 17.84               | 27.20               | 14.07               | 9.56                 |
| 1986 | 24.53                               | 14.99               | 23.40               | 13.86               | 7.89                 |

| Year  | Bond yield "valley" (return "peak") |                     |                     |                     | End-of-year<br>yield |
|-------|-------------------------------------|---------------------|---------------------|---------------------|----------------------|
|       | Nominal                             |                     | Real                |                     |                      |
|       | <u>Total return</u>                 | <u>Price return</u> | <u>Total return</u> | <u>Price return</u> |                      |
| 2008  | 25.87                               | 20.50               | 25.76               | 20.39               | 3.03                 |
| 2009  | -14.90                              | -18.25              | -17.16              | -20.51              | 4.58                 |
| 2010  | 10.14                               | 5.89                | 8.52                | 4.27                | 4.14                 |
| 2011  | 28.23                               | 23.74               | 24.54               | 20.05               | 2.48                 |
| 2012  | 3.31                                | 0.88                | 1.54                | -0.89               | 2.41                 |
| 2013* | -10.22                              | na                  | -10.78              | na                  | 3.56                 |

Bond yields began to rise at an accelerating rate in the mid-1960s because inflation was increasing. But why was inflation increasing? Monetary economists generally blame the desire of the Federal Reserve to accommodate Presidents Johnson and Nixon's desire for easy money during their reelection campaigns; at the same time there was fiscal pressure from simultaneous spending on the Vietnam War and the so-called war on poverty. But the government received another, more subtle benefit from inflation: as we've seen earlier, it could pay back its debt, including remaining World War II debt, with much cheaper dollars.

Bonds continued their climb up the mountain until September 1981, when the yield on the 10-year U.S. Treasury issue reached the stunning level of 15.32%. (Calendar-year inflation had reached its high of 13.3% earlier, in 1979.) The wealth destruction suffered by savers was spectacular: a dollar invested in Ibbotson Associates' hypothetical long-term bond portfolio in 1941 (when interest rates reached their low point, setting aside the current decade) shrank to \$0.33 in real terms, *with coupon*

<sup>6</sup> Source: Ibbotson Associates *2013 Classic Yearbook*, used by permission. Bond returns for 2013 are for the Barclays US Aggregate Government – Treasury Long, inflation for 2013 is from the Bureau of Labor Statistics, and the August 2013 yield is from Figure 3 of this article (20-year bond).



*income included*, by September 1981. So much for long-term investing always being fruitful.

## THE GREAT DISINFLATION AND THE BOND BULL MARKET

By 1979 the American saver-investor had had enough. In addition, the broader economy was suffering terribly from high interest rates, which were driving many long-established small businesses into bankruptcy and putting people out of work. The sense of dejection was so intense that Jimmy Carter's July 15, 1979 speech became known as the Malaise Speech although he did not use the word.

Shortly thereafter, Carter appointed Paul Volcker, a strong monetarist, to the chairmanship of the Federal Reserve. Volcker raised short-term interest rates to unprecedented levels, above 20%, and pursued other hard-money policies. The election of Ronald Reagan further energized Volcker, who strongly supported his monetarist approach. While Volcker's actions precipitated two sharp recessions in three years, inflation fell from more than 13% to a historically comfortable level of 4%, and confidence returned to the U.S. economy. By 1984 the inflation and interest rate crisis was, suddenly, over.

But what would happen in the ensuing decades? Would inflation accelerate again? Would investors, fearful of another inflation episode, price bonds to include a large yield premium to cover that risk?

At first they did. Inflation fell very fast, and nominal interest rates fell more slowly, leaving real interest rates (that is, nominal interest rates minus inflation) at historic highs. As the late 1980s, the 1990s, and the new millennium unfolded, however, interest rates continued to fall, reaching an all-time low of 1.53% (again on the 10-year note) in July 2012.

This fall in yields produced tremendous gains for bondholders, and the longer the duration of the bond portfolio, the bigger the gain. A dollar invested in the hypothetical Ibbotson Associates long-term bond portfolio at the yield peak in September 1981 grew, in real terms, to \$11.54 by July 2012 — an astonishing compound annual real return of 8.16%. In riskless bonds! This exceeded even the real return on the S&P 500, which was 8.00% compounded annually over the same period.

But most savers do not roll over a portfolio of long bonds in this way. They hold a portfolio that is diversified across maturities, so their returns are moderated: they're higher in a bear market and lower in a bull market. The performance of a long-term bond portfolio, however, is the best way to illustrate the direction and magnitude of bond market trends — and some investors, particularly pension funds, do invest principally in long-term bonds. Some observers argue that savers should structure their portfolios more like pension fund managers do, matching liabilities with assets based on the duration of each.<sup>7</sup>

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<sup>7</sup> See, for example, Sexauer, Stephen C., and Laurence B. Siegel. 2013. "A Pension Promise to Oneself." *Financial Analysts Journal* (November/December). Most of the "liability-driven investing for individuals" crowd would agree that real interest rates are currently too low for individual investors to lock in, even if liability-driven investing is a good general principle.

## INFLATION WILL RISE, AND THE BOND BULL MARKET IS OVER

No one can predict the future — I would have guessed that inflation and interest rates would bottom at a much higher level. But mean reversion is a powerful force and it is foolish to ignore history. We can see from Figure 3 that a “normal” level of interest rates, at least in the United States, is approximately 4%. Even if interest rates on 10-year bonds rose only to 4% from their current level around 2.9%, that move would represent a 9% capital loss (beyond the loss already experienced since July 2012). But interest rates are likely to move well beyond the 4% level.

Why? As we’ve emphasized, there are only two ways for a government to repay domestic creditors less in real terms than it borrowed from them: default and inflation.<sup>8</sup> The U.S. Treasury is not going to default. So it will pursue policies that make it possible to pay back the debt in full in nominal, but not real, terms. Which policies?

Well, politicians are human, central bankers are human, and taxpayers are human. Human nature is to take the easy way out, and to incur costs that cannot be seen in preference to those that can.<sup>9</sup> Let’s focus on taxpayers, since I know the psychology of one (me) firsthand — politicians and bankers I only see on television. We taxpayers are infatuated to a greater or lesser degree with government services and benefits; “mine” is the tax exemption for nonprofit institutions — I’ve worked for two of them. No one is an island and no one exists completely free of government subsidies of some kind. But paying taxes is painful. So we tend to vote for more government expenditure than can be paid for with current taxation. This is inherently inflationary.

To protect ourselves from ourselves, a variety of barriers have been erected so that this tendency does not get out of hand. Balanced budget amendments, commodity-money standards, and tax protest movements are examples. But, in the end, higher expenditures and lower taxes usually win. Since all economic costs of governing must eventually be paid for, the “plug” or residual is usually the confiscation of savings through inflation. There simply aren’t that many levers to push, and, absent a formal constraint such as a gold standard, inflation is the easiest one.

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<sup>8</sup> I added “domestic creditors” because, if all creditors are foreign, the debt can be repaid more cheaply through currency devaluation. Devaluation is usually inflationary, but not always.

<sup>9</sup> As Frédéric Bastiat (1848) famously observed. See <http://www.econlib.org/library/Bastiat/basEss1.html>.

Thus, we will have renewed inflation. This higher level of inflation will be reflected in higher bond yields, and capital losses on existing bond positions. The losses will be larger, the longer the bond duration. Prudent investors should shorten their duration, and very risk-averse investors should move to a duration near zero. In fact, the *total portfolio duration*,<sup>10</sup> reflecting the sensitivity of all asset classes combined to changes in interest rates, should be near zero or even negative.<sup>11</sup>

### OPTIONALITY IN THE INFLATION-HEDGING DECISION

Bond investing near the zero-interest-rate lower bound is a one-sided proposition. If you protect against rising rates by going to a zero duration, you've lost 3% or 4% in annual yield, but you haven't sacrificed any meaningful possibility of a gain beyond that — interest rates can't go much lower. However, if you don't protect against rising rates, you're exposed to the fluctuations of a long-term bond portfolio, which historically has suffered a one-year real price return as poor as -26.4% (in 1980). While this last data point is a worst-case scenario and I don't expect it to repeat, it provides a guidepost as to how bad long-term bond returns can get.

The choice inherent in a bond duration decision at current low interest rates can be expressed in a different, more vivid way. Matthew Kenigsberg of Fidelity Investments studied inflation and tax hedging strategies over roughly the last 70 years.<sup>12</sup> He concluded that investors who hedged against inflation by buying real assets, but who were wrong (because the inflation did not occur), experienced *disappointing* returns — they received the returns on real assets, which were lower than the returns on nominal assets. But investors who did not hedge against inflation, and who were wrong (because inflation *did* occur), experienced *catastrophic* returns. At any reasonable spending rate, even 3% of their nest egg per year, they were wiped out over a 30-year time horizon.

So, if you don't know the direction of inflation, it's better to hedge by positioning your portfolio as if inflation were practically guaranteed to accelerate — even though we cannot be sure that it will.<sup>13</sup>

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<sup>10</sup> Total portfolio duration is the interest-rate sensitivity of the whole portfolio, including equities and other non-bond asset classes. See Leibowitz, Martin L. 1986. "Total Portfolio Duration: A New Perspective on Asset Allocation," *Financial Analysts Journal* (September-October).

<sup>11</sup> We usually express asset-class sensitivities as *betas* and the sensitivity to changes in inflation or interest rates should be no exception. An asset, such as bonds, that falls when inflation and interest rates rise has a *negative beta* on inflation or interest rates. When talking about fixed-income assets, most readers are more comfortable with duration terminology, so we've used that, but beta is a more general and, ultimately, more useful way of expressing the same thing.

<sup>12</sup> Kenigsberg, Matthew. 2013. "Investment Performance, Inflation, and Taxes: Redefining History's Bear Markets." *Journal of Retirement*, Vol. 1, No. 1 (Summer): pp. 123-123.

<sup>13</sup> Investors who either hedged or did not hedge, and who were *right*, had very good returns. (These are investors who hedged against an inflation which later did occur, and investors who did not hedge against inflation but the inflation that was feared did not occur.) Kenigsberg's analysis also includes taxes, which we do not consider here. His work was presented at the Chicago Quantitative Alliance, September 11, 2013.