Reflections on the meaning of "risk free"

Peter R Fisher[1]

How will financial markets adjust to a loss of faith in the idea of risk-free sovereign bonds? Will there be enough suitable collateral for the banking system to function smoothly?

The idea of risk-free sovereign *bonds* is best thought of as an oxymoron or as an anomaly of recent history. It is not a useful, necessary or an enduring feature of the financial landscape.

As we rediscover the meaning of the risk-free *rate* investors will take less risk than they have habitually taken in recent decades. This is because the inherent risks of long-dated sovereign bonds will be more evident and because we will recognize a lower risk-free rate. Also, as we recognize the higher cost of immunizing ourselves against counterparty risk, we will undertake fewer financial transactions. Thus, in my view, it is unlikely that fifty years from now historians will look back on the present time as the beginning of the great collateral shortage. Rather, I suspect that they will look back on us as living at the end of the era of the great glut in financial transactions.

To make sense of this subject, we first need to be more specific about the different financial concepts that we have attributed to sovereign bonds. To assess the implications for financial markets, we need to be much more precise about the claims we are making when we say that we have just discovered that we live in a world without risk-free assets.

What are we talking about?

When we think about sovereign bonds and discuss the risk-free rate there are (at least) six different concepts or purposes that we should distinguish that we attribute to sovereign bonds. We also need to be more specific about the meaning of risk.

First, we can use sovereign liabilities as a measure of the *cost of borrowing*. We also use other benchmark rates, like LIBOR, to reflect credit spreads over a government cost of borrowing. But the concept we are applying is that of the cost of financing a liability.

Second, we measure the *time value of money* – the discount rate that we apply to future cash flows to bring them into present values. We can use sovereign bond, interest-rate swap or corporate credit yield curves to do this. The purpose is to determine the present value of a set of future cash flows.

Third, there is the concept of the *risk-free rate* from the capital-asset pricing model and modern portfolio theory. This is the *hypothetical* risk-free rate that helps us to assess the riskiness of other assets and to build efficient portfolios.

[1] Senior Managing Director, BlackRock.

Fourth, there is the concept of the *benchmark bond* that is a reference for value when assessing the risk-reward characteristics of another security or spread relationships more generally. We can use sovereign or corporate bonds for this purpose. Indeed, even into the 1970s in the United States, when market participants referred to the "benchmark bond" they were likely to be referring to the bonds of either General Motors or American Telephone & Telegraph, which provided the more relevant reference for value.

Fifth, there is the *hedging vehicle of choice*, meaning the instrument that banks and investors use to hedge away (or take more of) certain risks, particularly interest-rate risk. The switch from referring to blue-chip investment grade corporate bonds as the benchmark to referring to the ten-year U.S. Treasury note as the "benchmark" occurred only in the 1990s as investors came to recognize the efficiency of ten-year Treasury securities in hedging the duration risks of mortgage-backed securities in that interest rate environment.

Sixth, there is the concept of the *base asset or reserve asset* of the banking system: the low-volatility, low-credit-risk asset around which bankers and investors build their balance sheets and portfolios. One can also think of the reserve asset as the starting point for the money multiplier. Central bank liabilities are often thought of as the quintessential "high-powered money" but sovereign liabilities appear to play this role as well, particularly for those financial intermediaries that lack direct accounts with the central bank.

The sovereign yield curve has a powerful influence over each of these six concepts. Over the last few decades, sovereign bonds have been used as pretty good proxies for each of these concepts and, thus, we tend to think about sovereign bonds as playing all of these roles. But the fact of recent habit and practice does not mean that this is a necessary condition.

In order to think clearly about "risk-free" we should be specific about the meaning of risk. Risk is deviation from objective and, thus, risk is relative. We each have different objectives and different circumstances so there are different things that can divert us from our objectives. Most financial intermediaries specify a liability, an expected return or an entire benchmark portfolio as their objective and measure risk as deviation from that.

Critical to understanding risk is *investment horizon*. Financial euphoria can be thought of as a condition in which investors have indefinitely long investment horizons and, thus, systematically undervalue liquidity. Financial crises can be thought of as the condition in which many intermediaries' investment horizons are extremely short and, thus, an extremely high value is placed on liquidity. Most investors have a specified investment horizon but they can also be easily diverted from it; thus, in practice, investment horizons are elastic.

Finally, most financial intermediaries are *volatility constrained* in that they cannot (or should not) allow their assets and liabilities to deviate "too much" from one another. The shorter an intermediary's actual investment horizon the more volatility constrained they are; the longer the horizon, the less they are volatility constrained.

What precisely do we mean by "the end of the risk-free rate"?

There are seven different, but related, claims that one might be making when asserting that we have reached a terminal point in the utility of the idea of risk-free sovereign bonds. These are:

1. Sovereign bonds are not risk free.
2. Some sovereign bonds are too risky to serve effectively as a base asset.
3. Sovereign bonds are not a good proxy for the risk-free rate.
4. There is not enough good collateral for the banking system to function smoothly.
5. There is not an entirely elastic, frictionless supply of pure interest-rate risk.
6. Some sovereign bond yields are too low to compensate for their potential future volatility.
7. The observed risk-free rate is too low to be a useful guide for investors.

Each of these claims has different implications for the behavior of investors, bankers, central bankers and financial markets.

1. Sovereign bonds are not risk free. Of course there is no such thing as a risk-free sovereign bond. Sovereign bonds have duration, curve, volatility, and inflation risks relative to investors' objectives. Foreign investors also face foreign exchange risk. All investors have always faced default risk with respect to a possible failure of sovereigns to pay interest or repay principal.

Perhaps "risk free" was meant as a shorthand for *de minimus default risk* or *free of idiosyncratic risk* as investors focused on the macro-economic risks that would reflect the behavior of the economy (and the central bank), allowing investors to ignore the condition of the sovereign issuer. But this may be too generous given market participants' acute attention to changes in supply caused by greater and lesser government borrowing requirements.

The implication of a recent "discovery" that sovereign bonds contain more risk than expected (but not so much risk as to undermine confidence in the bond's role as a reserve asset) is that investors will reduce risk elsewhere in their portfolios to return to their intended level of risk. This is how investors behaved in August 2011 when one of the credit-rating agencies downgraded U.S. Treasury debt: Treasury securities increased in price while other assets fell. The world was a riskier place than investors anticipated but Treasuries remained a "good enough" reserve asset, so they reduced overall risk in their portfolios while retaining or increasing their holdings of Treasuries.

2. Some sovereign bonds are too risky to serve effectively as a base asset. This claim reflects the observed behavior of intermediaries when they decide that particular sovereign bonds no longer provide them with sufficiently low volatility (and high liquidity) to play the role of a stabilizing, core holding. It may reflect heightened default risk or it may simply reflect higher observed volatility, caused by unstable or uncertain supply and demand conditions. It is important to note that this is binary: either an asset is or it is not "good enough" to anchor a balance sheet.

In the European crisis we have observed Greek, Portuguese, Spanish and Italian government bonds decline precipitously in price and exhibit much greater volatility. My sense is that many banks, pension funds and sovereign wealth funds did not make a conscious decision about default risk but simply could not accept such heightened volatility in an asset whose purpose is to provide low volatility.

The implication of losing the status of base asset is that monetary conditions are effectively tightened as the supply contracts of what is accepted as a reserve asset and good collateral. The forcefulness of the European Central Bank's responses over the past year has been aimed at restoring base asset status particularly to the Spanish and Italian governments to avoid such a tightening.

3. Sovereign bonds are not a good proxy for the risk-free rate. Sovereign bonds are not at all a good proxy for the risk-free rate.

The risk-free rate of the capital-asset pricing model and modern portfolio theory is *hypothetical* but the suggested real-world proxy is the yield on *short-term government bills*. The yield on short-term U.S. government bills has been falling for most of the last thirty years (see accompanying chart). Somewhere along the way it came to be accepted (mistakenly) that we could shift our concept of the risk-free rate out the yield curve to ten-year government bonds.

Since the 1980s, we have been living through the historical anomaly of concerted disinflationary policies. As a consequence, as central banks were following (or anticipating) Taylor-rule disinflationary policies, the returns on cash and cash equivalents – such as short-term government bills – have on average been somewhat greater than the sum of the real growth rate and the rate of inflation.

This is quite a handsome rate of return for something that is our best proxy for risk free. Normally we think of "cash" as the thing that is perfectly liquid, has no volatility (trades ever at par) and earns no return. But because central banks sought to wring inflation out of their economies, the risk-free rate proxy provided on average a consistent, positive, real return. With this "risk-free rate" as our starting point, and as our refuge in times of volatility, investors could seek even higher returns for taking risk.

Not only were short-term bill rates high, they were also declining as inflation was, in fact, progressively squeezed out of the system. While we enjoyed the disinflationary trend, in a bit of muddled thinking, long-dated sovereign bonds slipped into our vocabulary as being "risk free" – perhaps because they provided the even-better-yielding risk-free total return bonanza as rates consistently declined.

Now bankers and investors are waking up from the long bull-run in interest rates to the awkward reality of more risk and less return *than they have been accustomed to* and to the recognition that long-dated sovereign bonds are not a good proxy for the risk-free rate.

4. There is not enough good collateral for the banking system to function smoothly. There are two different ways to think about this claim.

First, this might just be a complaint about the high price (and low yield) of government bonds. With yields so low the opportunity cost of holding government bonds as a base asset, or as collateral to secure financial transactions, is correspondingly high. Those who fear that the banking system will not "function smoothly" may just be expressing the sentiment that it will not function the way that they are accustomed to. But this might also be a much stronger, more interesting claim, that monetary conditions are actually tight or even too tight.

Perhaps I will be proved wrong and historians will look back at the present time as the start of the great collateral shortage. If that happens, it will likely be a consequence of the fact that central banks are, in fact, hoarding what we think of as the best collateral: government bonds.

Some central banks (and sovereign wealth funds) have accumulated developed market sovereign debt for the purpose of managing their exchange rates.

Major developed market central banks have been accumulating (principally their own) sovereign bonds for the purpose of providing monetary accommodation via quantitative easing. By bringing down the cost of borrowing they hope to stimulate economic activity and by bringing down the discount rate on future cash flows they hope to push up asset prices (housing and equities).

By hoarding progressively more sovereign bonds the central banks collectively are also draining the best collateral, the base asset, out of the banking system. On balance does this provide accommodative or restrictive conditions?

If we were living in a modified gold regime, where gold was the base asset of the banking system, and you learned that the central bank was progressively buying and hoarding gold, would you think that the central bank was easing or tightening policy?

My first guess would have been that this was a policy of tightening by contracting the availability of the reserve asset. If the banking system were crying out for more central bank liabilities and eager to swap gold for central bank deposits, then perhaps this would appear as an easing of policy. But in the absence of evidence that the level of excess reserves was inadequate for the needs of banking system, a central bank that was hoarding gold would – curiously – be pushing down on short-term interest rates (by issuing more of its own liabilities) but, at the same time, tightening monetary conditions by removing the banking system's preferred collateral.

To be taken seriously, the claim that there is not enough good collateral for the banking system to function is a claim that monetary conditions are too tight. Given the expressed intention of the Federal Reserve, and other central banks, to provide accommodative policy, this claim presents a contradiction that is yet to be resolved.

5. There is not an entirely elastic, frictionless supply of pure interest-rate risk. For some, expressing angst about the end of the risk-free rate appears to reflect a sense of entitlement to a perpetually available, elastic abundance of default-free, low-volatility, positive-real-return-yielding, pure expressions of nominal and real interest-rate risk in the form of long-dated sovereign liabilities and their synthetic-derivative clones that can be bought and sold at such low transaction costs as to be virtually frictionless. If this is what you had in mind, and you thought that this was a necessary and enduring feature of a smoothly functioning banking system, then you had best prepare yourself to be disappointed.

That we have experienced something like this "elastic abundance" in recent decades is an historical serendipity – a consequence of the long decline in interest rates and of our collective willingness to obfuscate counterparty risk in over-the-counter derivatives.

In the early days of the derivative market counterparty risks were simply ignored. Then the dealers created "AAA Swap Co's" but found this expensive. Subsequently, the dealers persuaded the authorities to treat derivatives, in the event of a counterparty failure, as senior to all other claims, thereby socializing the cost of

counterparty risk away from derivatives contracts and onto all other creditors. Now, in the wake of the financial crisis (and the AIG debacle, in particular), the authorities have decreed that over-the-counter derivatives will be cleared through central counterparties with counterparty risks collateralized with initial and variation margin.

If the authorities are successful, the cost of writing and holding derivatives contracts will go up as counterparty risks are internalized. At the same time, the opportunity cost of "suitable collateral" is rising (as yields on highly-rated sovereign debt fall).

If the elastic abundance of pure interest-rate risk is an accident of history, as I suggest, then the cost of hedging and speculating in interest-rate risk (and other risks expressed in over-the-counter derivatives) will be higher and in all likelihood there will less of it and, correspondingly, lower revenues from these activities for the bankers and dealers.

6. Some sovereign bond yields are too low to compensate for their potential future volatility. This claim can be thought of as merely reflecting investors' and bankers' frustration that the yield on sovereign bonds is too low. More importantly, it may be evidence that we are in a liquidity trap: that the yield on long-term lending is too low to compensate for the potential future volatility (or backup) in yields, so investors and lenders will prefer to invest and lend only for the very short term.

Those central banks pursuing quantitative easing believe themselves to be easing policy via the "portfolio balance" channel. As the central bank hoards sovereign debt (and, in the U.S., mortgages), other investors will be forced to replace those assets (in their portfolios) with assets bearing a comparable or greater amount of risk and this will lead the actions of investors to further bring down interest rates, ease financial conditions and encourage credit creation.

But the impact on other investors' portfolios is more ambiguous. As the central bank seeks to solve the zero rate boundary by hoarding long-term bonds and dragging real rates lower, some investors can and do chase yield with some of their portfolio by buying other risky assets, such as high-yield bonds.

Yet with each move higher in bond prices, and lower in yields, investors and lenders of all types reasonably fear the reversal of this process when prices decline and yields rise. Importantly, most financial intermediaries are *volatility constrained*: they cannot allow the price movements in their assets and liabilities to be too far out of alignment over relatively short periods of time. As the nominal coupon on long-dated bonds is dragged lower, it no longer compensates the intermediary for the potential future volatility. Moreover, volatility *is* bounded at zero and as it approaches zero investors (particularly ones that have recently experienced the volatility shock of 2007 and 2008) brace themselves for higher volatility.

As yields move lower investors can also observe the lower opportunity cost of holding cash and cash equivalents. So as the central banks drag down the level of interest rates, the more attractive cash becomes on a relative basis, leading to a less favorable portfolio re-balance that looks just like a liquidity trap – but perhaps might always have been better labeled a volatility trap.

Perhaps the Federal Reserve is intentionally driving the banking system through a liquidity trap and "out the other side" in the hope of incenting banks to write loans, rather than buy securities, as their net-interest margins contract. But this will depend on the willingness of bankers, and the providers of bank capital, to accept the higher risks rather than to shrink their balance sheets.

7. The observed risk-free rate is too low to be a useful guide to investors. This claim might just be that yields on government bonds are being manipulated by central banks and, thus, are artificially too low or too low compared to what investors expect. But it can also be interpreted as a claim that such a low risk-free rate will incent investors to reduce their risk taking at the very time that central banks are pursuing quantitative easing policies aimed at encouraging investors to take more risk.

Central banks control the risk-free rate – properly understood as the yield on short-term government bills. This is a fact of financial life but not one that we often think about. The capital-asset pricing model and modern portfolio theory take the risk-free rate as "given" rather than as "decided". But when U.S. Treasury bill yields were over 16% in 1982 they were just as "manipulated" by the Federal Reserve as are the low yields today.

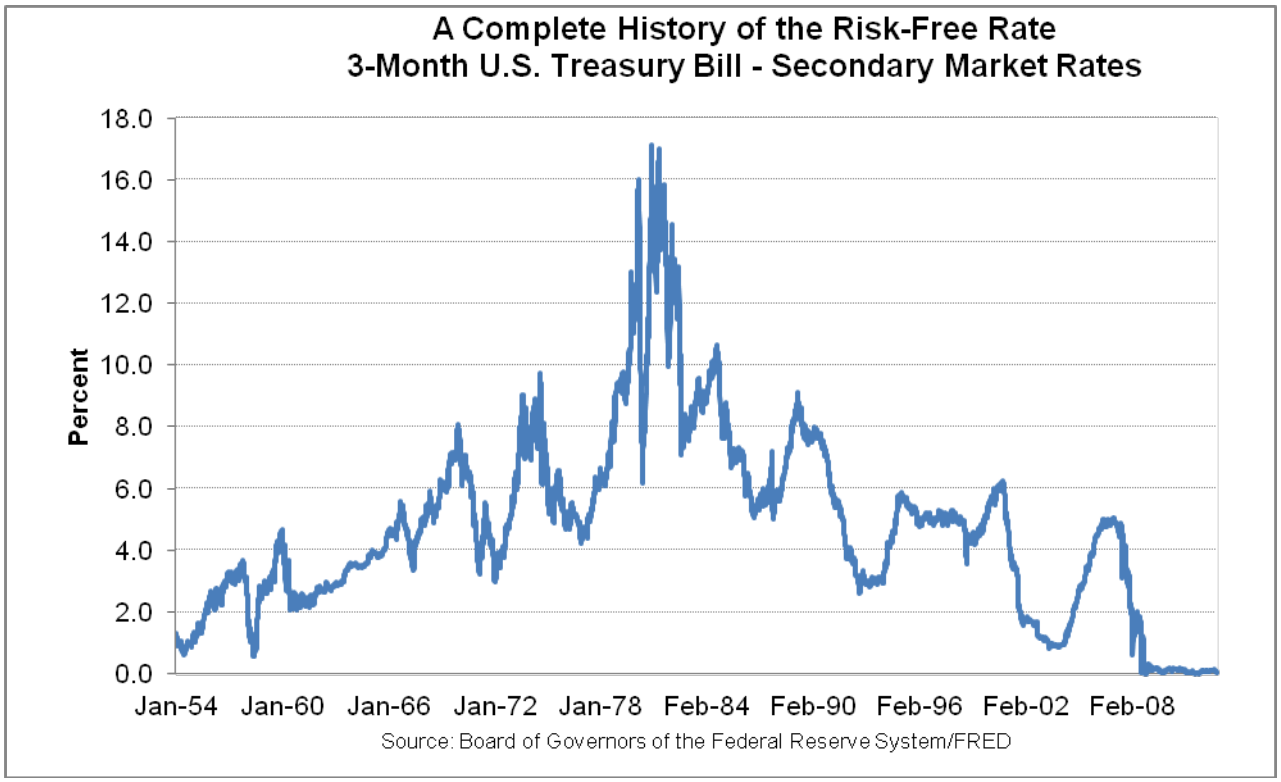
For investors, the risk-free rate is what it is. Today it is effectively zero. For most of the last sixty years it has been much higher. Is there an equilibrium risk-free rate? If the long-run, real return to capital is, say, 2½%, should that be the long-run risk-free rate? I don't know. My hypothesis is that an equilibrium risk-free rate is lower than most investors have to come to expect (having become habituated to conditions over the last thirty years) but that it is or should be higher than zero. But the observed risk-free rate over the past three years *is approximately zero.*

QE-practicing central banks, like the Federal Reserve, face a conundrum. To stimulate the economy (or perhaps to prevent deflation) the central bank lowers interest rates. This brings down the cost of borrowing and the discount rate on future cash flows. The *change* in rates induces changes in borrower and lender behavior. In order to encourage this change in behavior (and also to reduce concern about rates abruptly rising), the central banks have made various, conditional commitments to maintain exceptionally low interest rates.

But the longer central banks hold down the level of rates, and the more credible is their commitment to do so for an extended period, the greater the likelihood that investors will become habituated to an exceptionally low risk-free rate. This will make other assets investors might purchase appear riskier (than they otherwise would).

As investors come to internalize a much lower risk-free rate, there will be a tension between their habitually-received expected returns (and habitually-received notions of the risk-free rate) on the one hand, and the risk-free rate of zero that we now observe, on the other.

Thus, the longer central banks sustain exceptionally low rates, the more likely it is that the portfolio balance channel will be self-defeating. In colloquial terms, it may be that "the bubble will burst" when rates go back up. But, alternatively, it may also be that "the air will come out of the balloon" when investors internalize the exceptionally low risk-free rate.


A Complete History of the Risk-Free Rate
3-Month U.S. Treasury Bill - Secondary Market Rates
Percent
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Jan-54
Jan-60
Jan-66
Jan-72
Jan-78
Feb-84
Feb-90
Feb-96
Feb-02
Feb-08
Source: Board of Governors of the Federal Reserve System/FRED