

Loose Money, High Rates: Interest Rate Spreads in Historical Perspective

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Abstract

Over the past 50 years interest rate spreads have widened substantially, both between longer and shorter maturity loans and between loans to riskier and less risky borrowers. In much of economic theory, the determination of interest rate spreads is analytically distinct from the determination of the overall level of interest rates. But from a Keynesian perspective that regards interest as fundamentally the price of liquidity, there is no conceptual basis for picking out the difference in yield between money and a short-term government bond as “the” interest rate; there are many other pairs of asset yields the difference between which is determined on the same principles, and may have equivalent economic significance. In this article, we argue that this Keynesian perspective is particularly useful in explaining the secular rise in interest rate spreads since the 1980s, and that both conventional expectations and stronger liquidity preference appear to have played a role. The rise in the term and credit premiums is important for policy, because they mean that the low policy rates in recent periods of expansionary policy have not been reliably translated into low rates for private borrowers.

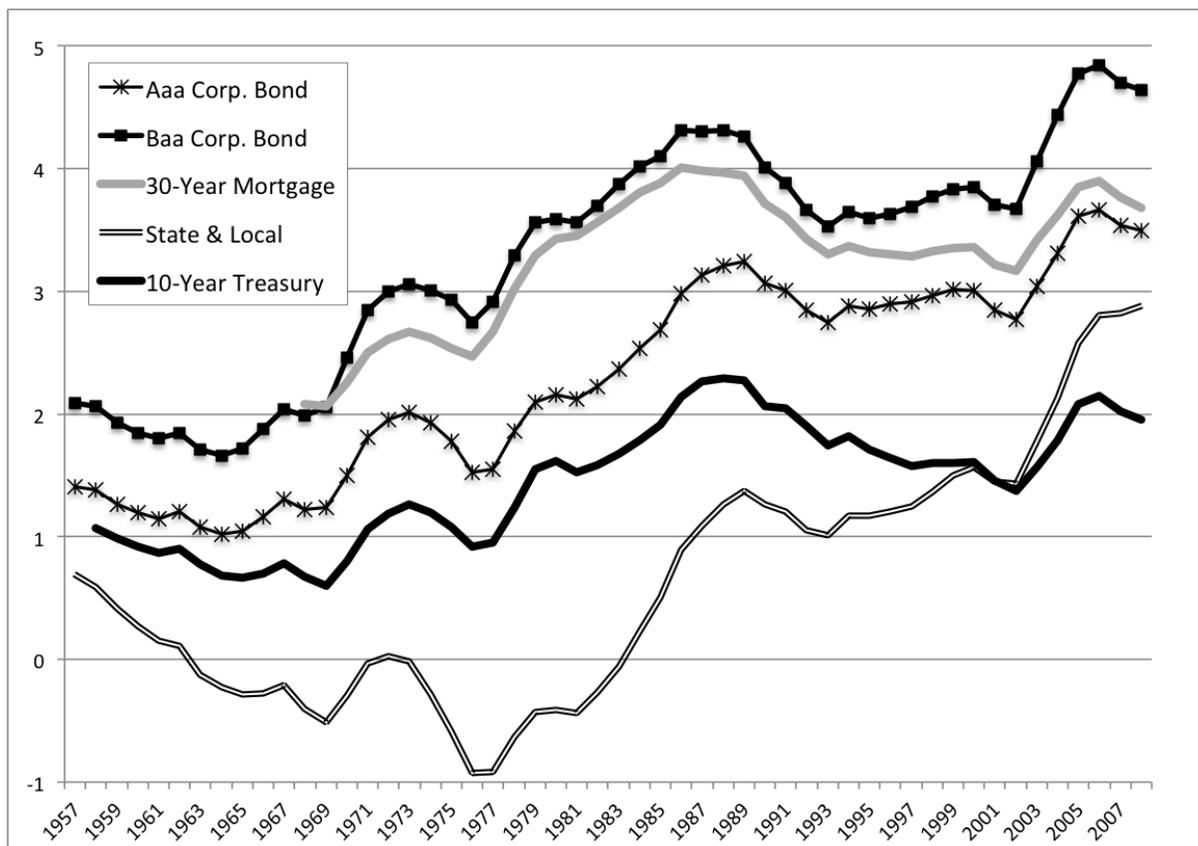
1 Introduction

Interest rate spreads in the US have widened over the past 50 years. As shown in Figure 1, since the 1960s the average rate on 30-year mortgages has increased by approximately 2 points relative to the current rate on short-term

federal debt, while the rate on typical corporate bonds has increased by 3 points. Relative to *ex post* realized policy rates, the increase in spreads is even larger, and takes the form of a sharp transition in the early 1980s. Despite being quantitatively large, and challenging to most established theories of interest rate determination, the increase in interest rate spreads has not received much attention in either the mainstream or heterodox literature. The goal of this paper is to call attention to the divergence of risky long rates from the risk free overnight rate, to assess various possible explanations for this divergence, and to show how this question is well suited to Post Keynesian theory.

The starting point for Post Keynesian analysis of credit markets is that “the rate of interest [is] determined by ... the terms on which the public desires to become more or less liquid and those on which the banking system is ready to become more or less unliquid.” (Keynes, 1937*a*) If credit markets are analyzed systematically in terms of liquidity (rather than saving), with the interest rate as the price of liquidity, then the sharp analytic distinction between the “riskfree” policy rate and the various market rates loses its salience. We can no longer speak of “the” interest rate but only the complex of interest rates, with the same interplay between supply and demand for liquidity determining both the spread between individual rates and shifts in the complex as a whole. Indeed, from a liquidity-preference viewpoint, the policy rate, as the difference between the yield of overnight interbank loans and the yield of money, is just one spread among others, and need not have any special importance. From this point of view, there is also no sharp distinction between conventional monetary policy, unconventional monetary policy, and financial regulation. A reduction in the policy rate, a purchase of private assets, and a relaxation of regulatory limits on lending are all simply ways of increasing the banking system’s readiness to become more unliquid. The second premise of Post Keynesian theories is that “rational” expectations are neither coherent logically nor a reasonable approximation empirically. In any forward-looking transaction – of which long-maturity loan contracts are a paradigmatic example – the expectations process must be explicitly described, and inevitably includes an important element of convention. A more critical perspective on expectations formation, we argue, is an important tool in understanding the historic behavior of interest rates. Finally, and more concretely, this essay seeks to advance the discussion of the question posed by Pollin (2008): If we assume

Figure 1: Selected Interest Rate Spreads, 1953-2013



Source: FRED

The figure shows 10-year rolling averages of the difference between the rates shown and the 3-month Treasury bill. The averages are centered at the year shown on the horizontal axis; the first observation is for the 10-year period beginning in January, 1953, and the last observation is for the 10-year period ending in December 2013. Compared with the 1950s and 1960s, long rates on federal debt have risen by about one point relative to short rates, and rates on corporate bonds have risen by an additional point relative to long rates on federal debt.

“that the Federal Reserve exogenously sets the Federal Funds rate, does that also imply that the Fed exogenously controls the full complement of market rates...? In particular, can the Fed exogenously set the long-term rates that are most important for investment and household borrowing?”

In this paper, we focus mainly on the 30-year conventional mortgage rate and the Baa corporate bond rate, but the pattern of wider spreads is broadly shared across a wide range of debt securities, in the US and elsewhere. Table 1 summarizes the evolution of interest rate spreads since World War II. As the table shows, the rise in term spreads (the premium on long term borrowing over short-term borrowing for a given borrower) was concentrated in the 1980s, while the rise in spreads between rates facing different borrowers has occurred more steadily, over a longer period. The focus in the remainder of the paper will be on federal and corporate bonds, since for other classes of debt it is more difficult to separate changes in interest rates on comparable loans from changes in the composition of borrowing. But it is worth noting that while the broad pattern of an increasing premium over short-term federal debt is shared by both the other classes of debt here, the specific patterns are slightly different. Mortgage rates have risen by less than the other classes of private debt. Meanwhile, rates on municipal bonds have risen by more, going from rates somewhat below short-term federal debt to 3 points higher. This is due primarily to the diminishing value of the tax exemption for interest on municipal debt as top income rates have fallen; municipal borrowers may also face increased risk and/or liquidity premiums. We will not discuss issues specific to these classes of debt in the remainder of the paper, but it’s important to include them here to call attention to the changing structure of interest rates. These changes in spreads mean that the behavior of the complex of interest rates as a whole is not effectively captured by a single measure of “the” level of interest rates.

In the remainder of the paper, we review various theories of the determination of interest rates, and explore their suitability to explain the historical increase in spreads seen in the US.

Table 1: Average Interest Rate Spreads by Decade

	1953-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2013
	Premium over 3-Month Treasury Bill:					
10-Year Treasury	1.0	0.7	1.1	1.9	2.1	2.1
Aaa Corporate	1.3	1.0	1.8	2.7	2.9	3.7
Baa Corporate	2.0	1.7	2.9	4.1	3.6	4.8
Mortgage*	n/a	1.8	2.5	3.9	3.3	3.9
State/Local	0.7	-0.3	-0.6	0.5	1.2	2.9

* 30-year conventional. Mortgage data starts in 1964.

Source: FRED. The State/Local rate is the average rate reported in the Bond Buyer Go 20-Bond Municipal Bond Index.

2 The Determination of Interest Rates

2.1 The Interest Rate as the Price of Saving

Classical writers did not see the interest as a fundamental macroeconomic variable. It was the profit rate that mattered, both for distribution and for the evolution of the economic system over time, with interest regarded as a component of (or deduction from) profits. Classical writers also did not see interest as a monetary phenomenon – the link between the money supply and interest rates was one of the supposed errors for which “Mercantilist” economists were criticized. Marginalists, including Bohm-Bawerk, Walras, Cassel and Fisher, similarly regarded interest as the price of “saving,” meaning deferring consumption to a later period. From this perspective, there is no connection between the reward for risk-bearing, the reward for management of the production process, and the reward for deferred consumption as such. The latter in principle should be equal across all classes of assets. So it is natural to treat the interest rate as only the reward for “waiting” or “abstinence” and ignore the variation among market interest rates as of secondary importance. (Arnon, 2010)

The innovation of Wicksell (2007, first published 1898) was to refocus attention on the existence of different rates of return. In his case, the concern was the possibility of a divergence between the return on investment by business, on the one hand, and the interest rate set by the banking system, on the other. Wicksell called the optimal intertemporal rate described by the marginalists as the “natural rate,” and claimed (for not entirely clear reasons) that the expected rate of return on new investment was connected to this natural rate. Under credit-money system, however, the market rate of interest is set by banking system, and there is no mechanism to bring it into line with the natural rate. For Wicksell, the critical issue was that under a credit-money system, price adjustments would carry interest rate in the “wrong” direction with respect to price stability. (Leijonhufvud, 1997) Wicksell’s approach still dominates practical policy discussions, with the idea the monetary authority can control the interest rate, and must exercise this control to assure price stability, coinciding uneasily with a theory of the natural rate that has no place for monetary policy or inflation. (Smithin, 2006)

One weak point of the Wicksellian framework has always been the absence of a clear link between the “natural rate” as the rate consistent with price

stability, on the one hand, and as the technology-and-tastes-determined price of a good today in terms of a good tomorrow, on the other. This weak point was highlighted by Sraffa in his controversy with Hayek over the latter's adaptation of Wicksell's argument in *Money and Capital*. (Sraffa, 1932*a,b*) The essence of Sraffa's argument was this. Suppose we take $p_{i,j}$ as the price of good i at time j . Then the ratio $p_{i,t}/p_{i,t+1}$ is the rate of interest in terms of good i . The problem is that these "own-rates of interest" will in general be different for each good. Given any two goods, if

$$p_{1,t}/p_{2,t} > p_{1,t+1}/p_{2,t+1}$$

then the interest rate measured in terms of good 1 will be greater than the interest rate measured in terms of good 2. The Walrasian system gives us no basis on which to choose any particular good as the preferred *numeraire*, so there is no way to decide which of these various own-rates corresponds to the money-rate compatible with price stability. Thus, a unique natural rate of interest is defined only for the case in which relative prices do not change. Sraffa's challenge was never successfully answered by Hayek. (Lawlor and Horn, 1992) Nor does it appear to have been answered subsequently, despite the continued salience of the "natural rate" concept. Modern models of the natural rate normally sidestep the problem by working in terms of a single commodity. More generally, the natural rate is defined as the interest rate that will exist when "all markets are in equilibrium and there is therefore no pressure for any resources to be redistributed or growth rates for any variables to change." (Archibald and Hunter, 2001, quoted in Cuaresma and Gnan 2007) There is no obvious way to map this hypothetical interest rate onto real-world economies in which prices are changing, nor is it clear how technological change (which typically is included in models of the natural rate) takes place without any reallocation of resources. Milton Friedman's famous assertion that the natural rate is the rate that would be "ground out by the Walrasian system" in a market system that incorporated "the actual structural characteristics" of the real economy, including all of its "market imperfections, stochastic variability in demands and supplies, costs of gathering information..., costs of mobility, and so on" is an example of the incoherence that comes from marrying Wicksellian policy to Walrasian theory. As Gordon (1979) observes, "The world that Friedman is talking about is not a Walrasian world."

Woodford (2005) is the canonical effort to rigorously integrate the Wicksellian policy framework into modern models of intertemporal optimizing in

a rigorous way.¹ Woodford avoids the confusion embodied in the Friedman quote by explicitly constructing a model in which the interest rate that produces price stability is the same one that would prevail in market without monetary frictions. But this is achieved only by custom-designing the frictions to produce just this result, as Woodford himself acknowledges. And it also requires abstracting away from all the “actual structural characteristics” alluded to by Friedman, including everything related to the concrete practice of monetary policy. In Woodford’s core model, there are no capital goods or long-lived assets of any kind, and no private financial contracts; the central bank is able to control the interest rate because it has a monopoly on all lending and borrowing. (Mehrling, 2006) So the question of how private interest rates are set, and the extent to which they will move with each other and with the policy rate, cannot even arise in this model. Elsewhere, Woodford (2010) offers a more realistic picture, explicitly discussing the possibility that spreads between the policy rate and rates facing nonfinancial borrowers reflect liquidity conditions within the financial system (what Woodford calls “the supply of intermediation”) and inconsistent expectations, as well as the objective risk properties of loans. Monetary policy, he argues, “should take into account changes in financial conditions – particularly changes in interest rate spreads”; furthermore, sufficiently large shifts in financial conditions will be impossible to fully offset with changes in the policy, and will require the monetary authority to directly target credit conditions for nonfinancial borrowers. This more sophisticated vision of multiple, endogenously determined interest rates finds no support in Woodford’s preferred theory. It is natural to think that the “supply of intermediation” is ultimately rooted in institutional structures, in trust, in uncertainty about the future, or more broadly in the difficult coordination problems posed by the reorganization of large-scale production processes. But none of these possibilities can be addressed within a framework of optimization under rational expectations. Instead, Woodford ultimately explains the supply of intermediation in terms of the intertemporal preferences of savers – precisely the factor that would govern interest rates in a hypothetical world without intermediaries.

¹It is no coincidence that Woodford’s title echoes Wicksell (2007). Woodford describes his approach as “neo-Wicksellian” and opens his book with a quote from Wicksell.

2.2 The Interest Rate as Liquidity Premium

Keynes offered an alternative basis for theorizing monetary policy by offering an explicitly monetary account of interest rates. His emphasis on role of banks in setting the terms of lending is similar to Wicksell's. The difference is that Keynes saw a diversity of private rates of return as an essential feature of capitalism, rather than as a problem that could be eliminated by appropriate policy. In the *Treatise on Money*, *The General Theory*, and in subsequent articles, Keynes developed a theory of the interest rate that begins from liquidity rather than intertemporal preferences. Liquidity preference denies that interest is paid in compensation for waiting – in general, the creation of a new loan does not require anyone to reduce current consumption. Rather, it is compensation for accepting a less liquid balance sheet position. Liquidity is a property possessed in varying degrees by many different assets, and there is no particular reason to draw the line in one particular place.² In fact it is a matter of indifference which particular liquidity premium we choose to call “the” interest rate. Thus, while the determination of the overall level of interest rates is usually treated as conceptually distinct from the determination of spreads between different rates – with the latter a detail of secondary importance – for Keynes they are just two ways of looking at the same problem.

What is meant by liquidity? The term liquidity is widely used but not always consistently defined. Depending on the context, it may refer to: monetary ease, as reflected in low interest rates and the absence of credit rationing; sufficiently thick markets for an asset that it can be bought or sold without moving the market price (transaction liquidity); the extent to which economic units can acquire assets by issuing new debt (funding liquidity); or the volume of central bank liabilities, or of reserves held by the banking system. (Tirole, 2011)

Further confusion arises from the conflation of liquidity preference in the sense of the desire to be able to make payments in unforeseen circumstances, with the desire to avoid capital losses. Nonetheless, the term has come to

²“We can draw the line between ‘money’ and ‘debts’ at whatever point is most convenient for handling a particular problem. For example, we can treat as money any command over general purchasing power which the owner has not parted with for a period in excess of three months, and as debt what cannot be recovered for a longer period than this; or we can substitute for three months one month or three days or three hours or any other period.” (Keynes, 1936, p. 174)

acquire a clear meaning in Keynesian and Post Keynesian Theory: “Liquidity of a balance sheet ... is a judgement of the adequacy of the liquid assets comprised in it ... to meet the claims, of whatever kinds, that may be made on them.” In other words, liquidity means the capacity to make money payments in the future whenever the need arises. The one amendment more recent work would add is that liquidity is not only a property of assets. It also depends on the ability to incur new liabilities on acceptable terms. A unit’s capacity to borrow at short notice is part of its liquidity, even though it is not formally recorded on the balance sheet. (Beggs, 2012)

From a Keynesian liquidity-centered prospective, there is no special importance to the policy rate. It is merely one tool among others available to policy makers to increase or diminish the banking system’s willingness to provide liquidity to the nonfinancial sector by becoming more illiquid itself. And indeed, historically central banks have used a wide variety of tools to regulate the pace of credit creation. (Epstein, 2007) As will be discussed below, there is a substantial empirical literature that suggests that most of the spread between yields on different classes of debt security are better explained by liquidity premium in the Keynesian sense than by default risk. Not only is liquidity preference a natural way to integrate discussions of interest rate spreads with the overall level of interest rates, attention to spreads is essential to maintaining the usefulness of the liquidity preference framework itself. In a “horizontalist” perspective in which the whole complex of interest rates moves together and that the monetary authority sets the policy rate, there is no place for liquidity as an independent factor. (Smithin, 2008)

2.3 The Transmission of Monetary Policy

In modern economies, the usual way of thinking about interest rates is to first identify the policy rate set by the central bank, and then ask to how far other interest rates lie above the policy rate. The mechanism linking monetary policy to market rates has evolved historically, with a variety of targets and instruments being used by central banks to regulate the pace of expansion of the monetary system as a whole. In the wake of the worldwide financial crisis of 2008, it may be that another major shift is occurring in the channels through which monetary policy operates, with interest on reserves replacing open market operations and a wider range of assets being purchased by central banks. (Friedman, 2014) That said, it is useful to go step by step along the full chain of the monetary transmission mechanism as it operated (or was

understood to operate) prior to the crisis. First, the central bank changes its policy rate. Second, this changes the current funding costs of financial institutions. Third, the change in current funding costs changes expectations of average funding costs over the length of a given loan. Fourth, a change in expected funding costs changes current risk-free long rates. Fifth, a change in the risk-free rate at a given maturity changes the the rate faced by private borrowers on loans of similar maturities. And finally, sixth, a change in borrowing rates changes desired expenditure. At each of these steps, there may be factors that act as wedges, raising the next rate by some more or less stable amount, and/or that dampen changes in both directions. Most discussions of interest rates in macroeconomic contexts ignore the intermediate steps and simply ask whether the policy rate is (or can be, in the case of the zero lower bound) set at the appropriate level. Many older Keynesian writers did express doubts about the final step, from borrowing costs to real economic activity.

There are at least three important possible points at which “wedges” can appear in this chain. First, the relationship between the policy rate and the funding costs of financial institutions depends on the mix of liabilities on those institutions’ balance sheets. In particular, access to low-cost deposit funding tended to lower banks’ funding costs relative to the policy rate, and the loss of it has tended to raise them. Second, there is the issue most emphasized by Keynes, the term structure. For banks considering a longer loan, what matters is not funding costs today, but the behavior of interest rates over the life of the loan. The majority of mainstream theory, drawing on a rational expectations framework, is explicitly committed to the idea that expectations of economic variables are always an unbiased estimate of those variables’ future values, so the fact that a central bank will be following a certain policy rule in the future determines market participants’ beliefs about future rates today. In this framework, there is no reason for central banks to actively communicate future policy, since “the public has no difficulty in correctly perceiving the pattern in the central bank’s actions.” (Woodford, 2005, p. 18) Conversely, if the central bank cannot control market participants’ beliefs about *future* interest rates, it will have little control over long rates today. Finally, the spread between loans of the same maturity may vary for reasons beyond the risk of default losses. Probably the most important of these is the liquidity premium, but market power may also have an effect.

The distinction between the policy rate and rates facing nonfinancial borrowers is particularly important in contemporary debates about mone-

tary policy preceding the Great Recession. The financial system's failure to translate expansionary monetary policy into low borrowing costs for end users, especially given its ability to do so before 1980, raises questions about the extent to which the deregulation and growth of finance have in fact improved credit provision for the real economy. Higher interest rate spreads are part of the larger phenomenon described by Phillipon (2012), that "the unit cost of intermediation is higher today than it was a century ago, and it has increased over the past 30 years. One interpretation is that improvements in information technology may have been cancelled out by increases in other financial activities whose social value is difficult to assess."

In the remainder of the essay, we consider interest rate spreads from three different perspectives. We may think of interest rate spreads in terms of maturity, as the difference between yields on shorter and longer duration loans. We may think about interest rate spreads in terms of borrower (or project) characteristics, as the difference between yields on loans to higher quality and lower quality borrowers. Or, we may think about interest rate spreads in terms of monetary policy transmission – that is, from the point of view of credit intermediaries, as the difference between the yield on assets and funding costs. For each of these perspectives, we offer a review of the empirical evidence and then ask how well it is handled by the Classical-Walrasian and liquidity approaches.

3 Term Spreads and Expectations

Term spreads refer to the difference between interest rates on otherwise similar loans of different maturities. It is generally assumed that term spreads will be positive, with higher rates on loans of longer maturities; the opposite case, in which shorter maturity debt carries higher interest rates than longer maturity, is referred to as a "yield inversion" and considered exceptional. (As noted above, in the 19th century short rates typically exceeded long rates.) Here, we focus on the spread between the 10-year Treasury bond and 3-month Treasury bill as a measure of the term spread. It is difficult to calculate exact term spreads for other loans since it is not in general possible to get long and short rates for the identical population of borrowers.

If the interest rate is an intertemporal price, that means it is the price to transfer one unit of income or expenditure from time $t + 1$ to time t . In other

words, it is equal to the ratio $p_{i,t}/p_{i,t+1}$ for any good i .³ Arbitrage should ensure that

$$p_{i,t}/p_{i,t+u} = (p_{i,t}/p_{i,t+v})(p_{i,t+v}/p_{i,t+u}) \quad (1)$$

for any intervals u and v . In other words, the expected yield on a long loan should be the same as on a series of shorter loans covering the same period. The view that, because investors have unbiased expectations of future short rates, this arbitrage condition will be satisfied on average, is referred to as the “expectation hypothesis.” It is often written in log form as:

$$i_{nt} = \frac{1}{n} \sum_{j=0}^{n-1} i_{tj}^e \quad (2)$$

where i_{nt} refers to the rate on an n period bond and $\frac{1}{n} \sum_{j=0}^{n-1} i_{tj}^e$ refers to the average of the expected short rates till period n . The modified version of the expectation hypothesis adds a pure forward time premium that is constant over time ρm to account for the risk of holding the long bond to maturity.

3.1 Empirical Evidence on the Term Spread

Table 2 shows term spreads for three periods: 1954 to 1980, 1981 to 2013, and 1981 to 2003. The third period is included to allow comparisons of the long rate with the *ex post* average short rate. The table shows that the spread between current short and current long rates was almost 2 points wider after 1980 than before 1980, and the realized spread between long rates and short rates over the length of the loan averaged almost 4 points higher.

Figure 2 shows current interest rates on Treasury securities of various maturities over the full period. The wider term spreads of the post-1980 period are clearly visible. The widening applies to the whole term structure, but is more pronounced for the longer end; during much of the earlier period, there is no term premium for 20-year bonds over 10-year bonds, and often none for 10-year bonds over 5-year bonds either. The widening of the term structure is most pronounced during periods in which short rates are low, which may

³As noted above, the existence of a unique interest rate in this framework requires either working in terms of a single representative good, or assuming no changes in relative prices between periods.

Table 2: Interest Rate Term Premiums Pre- and Post-1980

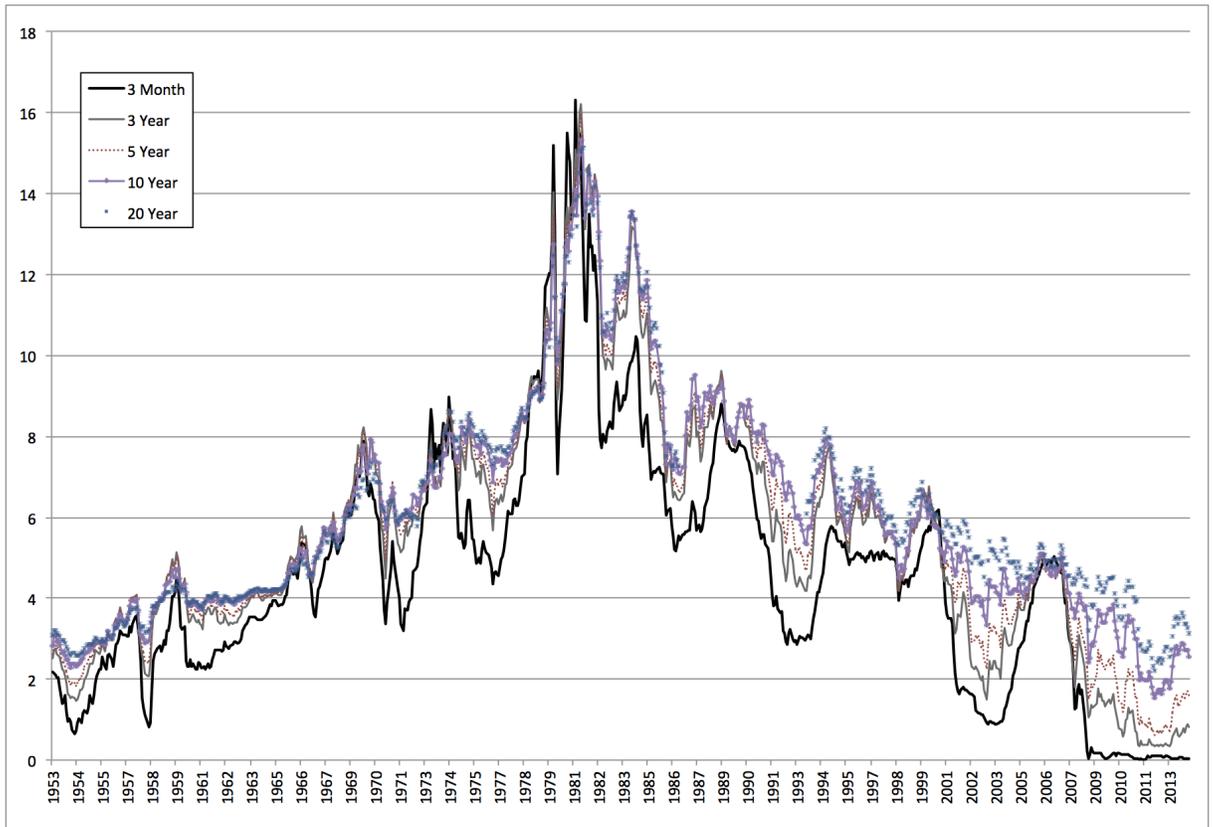
	1954-1980	1981-2013	1981-2003
3-Month Treasury Bill			
Mean	4.8	4.6	5.7
Standard Deviation	2.5	3.4	3.0
10-Year Treasury Bond			
Mean	5.7	6.5	7.6
Standard Deviation	2.2	3.1	2.8
Mean Yield Premium, 10-Year Bond over 3-Month Bill			
Current	0.9	1.9	1.8
Realized	-0.1	3.9	3.9

Source: FRED

The realized spread is the difference between the current 10-year bond rate and the geometric mean of the short rate over the following 10 years.

have implications for the causes of the increase in term spreads. Figure 3 shows the *ex post* spreads for 10-year Treasury bonds and corporate bonds, that is, the difference between the current rate and the geometric mean of the 3-month Treasury rate over the following 10 years. Here the break around 1980 is especially dramatic. In the two decades from 1960 through 1979, there were only two years in which the realized term premium on 10-year bonds was positive, and then by less than 0.2 percentage points in each case. By contrast, in every single year since 1980 there has been a positive realized term premium of at least one point in every year, with much larger premiums common. Given the magnitude and abruptness of this change in realized term premiums, it is not plausible that it simply reflects increased compensation for interest rate risk, especially given the relatively modest increase in interest rate variance documented in Table 2. It's also worth noting from figure 3 that realized spreads were highest for bonds issued at the peak of monetary policy tightening episodes, when short rates were highest. A natural way to make sense of both this pattern and the long-term increase in term premiums is that market participants placed too much weight on business-cycle frequency interest movements, and too little weight on longer frequency movements. So they were surprised both when interest rates returned to their old levels after a tightening or loosening episode, and when interest rates failed to return to their old levels after rising or falling over a longer period. This is consistent with the empirical literature on expecta-

Figure 2: Term Structure of Federal Debt, 1953-2013

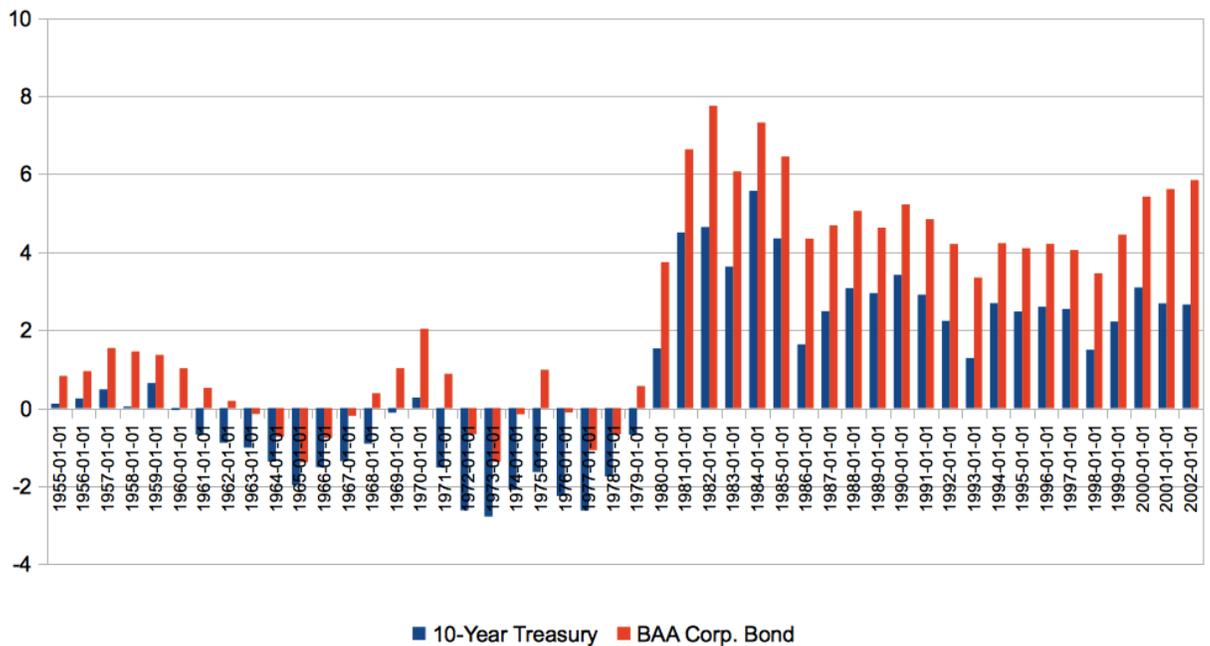


Source: FRED

tions in bond markets, as we will see in the next section. The pattern of high realized term premiums when monetary policy is tight is also consistent with the idea of interest rate spreads driven by liquidity premiums. If the return on a long bond is compensation for its relative illiquidity, one would expect that return to be highest when liquidity is scarce.

Diebold, Rudebusch and Aruoba (2003) note that “severe failures of the expectation hypothesis” have been found in empirical tests ever since the hypothesis was first formulated in the 1930s. Their own VAR tests find that the yield curve is strongly affected by recent macroeconomic conditions, but has little predictive power for conditions in the future. Another review of the em-

Figure 3: *Ex Post* Term Spreads, 1953-2003



Source: FRED

The figure shows the difference between the current 10-year Treasury and Baa corporate bond rate, respectively, and the geometric mean of the 3-month Treasury bill rate over the following 10 years. Note that the average maturity of corporate bonds throughout this period is close to 10 years.

pirical literature finds that the expectations hypothesis “is strongly rejected with US interest rates”; despite considerable efforts to identify biases that might led to false rejections of the hypothesis, “it remains inconsistent with the data.” (Bekaert and Hodrick, 2001) Numerous studies have confirmed that both the pure expectations and modified expectations lack empirical backing. (See Guidolin and Thornton (2008) and Sarno, Thornton and Valente (2007) for more thorough reviews). The consensus of the this literature is that the expectations hypothesis “simply fails empirically.” (Mehrling and Neilson, 2009) As Froot (1990) observes, “If the attractiveness of an economic hypothesis is measured by the number of papers which statistically reject it, the expectations theory of the term structure is a knockout.”

There are a number of ways of making sense of the empirical failure of the expectations hypothesis. For simplicity, we will discuss them in terms of bonds, but the same logic applies to bank loans and other kinds of debt.

First, it may be that bond market participants are attempting to apply Equation 2, but are unable to predict future short rates. Alternatively, Equation 2 may not accurately describe the behavior of bond markets. If debt securities are not always held to maturity but may be traded in the secondary market, then potential bond purchasers will take into capital gains or losses that will occur if long rates change while they hold the bond, as well as the bond’s yield. This means that long rates will be influenced by expectations of future *long* rates, which may be independent of expectations of short rates. The possibility of capital gains or losses is what allows for the existence of self-sustaining interest rate conventions, and was the basis of Keynes’ conception of the liquidity trap. A third possibility is that bondholders are not simply seeking to maximize expected return, but are weighing return against liquidity. In that case, if bonds of different maturities are different in terms of the ease with which they can be resold, accepted as collateral, or otherwise used to generate cashflows, then their expected returns will be different even taking account of capital gains.

3.2 Do Long Rates Reflect Future Short Rates?

If bond markets correctly anticipate future interest rate movements, then the current level of a long bond should be equal to the geometric average of short rates over the life of the bond, plus a risk premium. Given the risk premium, there should be no excess profits from holding long bonds over any particular period. Any systematic variation over time in excess profits ,

then, logically can be due to unrealized expectations (i.e the failure of rational expectations), or to a time varying risk premium.

For the most part, explanation of the deviations of expected short rates from the long rate has been focused on examining differences in risk assessment of market players. (Campbell and Cochrane, 1995) More recent work however suggests that forecasts of the long rate are strongly influenced by prevailing short rates and that the failure to adequately assess future short rates may be the main reasons behind the failure of the expectations hypothesis. Piazzesi and Schneider (2009) note that for example examine professional forecaster data that historical survey data finds that “forecasts of interest rates are made *as if* both the level and the slope of the yield curve were more persistent than they appear in hindsight.” (Emphasis in original.) Piazzesi and Schneider also note that “Most asset pricing studies .. assume that investors’ historical predictions were identical to in-sample predictions derived today from statistical models, thus ruling the first reason [i.e. unrealized expectations] out.” Forecasting models used by government and businesses typically incorporate an assumption that market participants expect current short rates to be more persistent than the model itself predicts. For example, the FRBUS model used by the Federal Reserve in macroeconomic forecasting is able to generate realistic responses to interest rate shocks only because in its model of expectations, after short rates rise they are “anticipated to persist at an elevated level far longer than the actual policy model entails.” (Brayton and Tinsley, 1996)

An explicit test of the short-rate forecasts embodied in long rates find that a model that uses current long rates to predict future short rates cannot improve on a random walk. (Guidolin and Thornton, 2008) In other words, long rates include no information about future short rates. In much of the empirical literature, this failure is explained in terms of an unobservable, time-varying risk premium. Guidolin and Thornton (2008) suggest the more natural explanation that market participants find it impossible to predict future short-term interest rates to any degree. Along the same lines, (Froot, 1990) uses survey data to compare interest rate forecasts to observed bond yields, and finds that the behavior of long rates closely follows market participants’ self-reported forecasts of short rates. This suggests that varying risk premiums are not an important component of term premiums, and that the failure of the expectations hypothesis is due to the failure of rational expectations. market participants do not actively forecast the future (at least beyond a short horizon), but act as if current conditions will persist

indefinitely.)

This seemingly excessive confidence that current short rates will persist is consistent with Keynes’s analysis of the bond market. From his perspective, the expectation of future rates is contingent, independent of “fundamentals,” and guided by prevailing market conditions. Keynes (1937*b*)

This belief that , as Keynes puts it “the present is a ... serviceable guide to the future” Keynes (1937*b*) can help explain the increase in term spreads after the early 1980s. From the end of World War Two through 1980, short rates followed a steadily increasing trend. From 1981 through the present, they have followed a decreasing trend. Anyone who expected current rates to persist would have been surprised by both of these trends. Thus, bond market participants systematically underestimated future rates in the period of rising rates prior to 1980, and overestimated them in the period of falling rates since then. Under these conditions, the attempt to behave according to Equation 2 would have resulted in greater realized spreads in the second period than in the first one. In its simplest form, this cannot be the full story, since rates on long bonds also increased relative to the current short rate. As Table 2 shows, the increase in the term premium over current short rates accounts for about half the increase in the *ex post* realized term premium.

3.3 Capital Gains and Self-Sustaining Conventions

The second strand of Keynesian analysis of term spreads is the idea that, like exchange rates and stock prices, interest rates on long-maturity loans are set in large part by convention. (Hannsgen, 2004) While convention is often discussed in terms of mass psychology, conventional prices arise naturally when profit-seeking investors trade long-lived assets. The reason for this is that, over any time horizon shorter than the life of the asset, returns will incorporate capital gains or losses as well as yields. The shorter the horizon relative to the life of the asset, the more important will be capital gains or losses due to valuation changes.⁴ Capital gains or losses depend on changes in the price of the asset, which in turn depend on changes in its expected returns. But insofar as capital gains or losses are a major component in returns, expected returns depend in turn about expectations of future prices. The price which profit-seeking investors will pay for an asset is based on whatever they expect the price to be in the future. So once a given price

⁴See the thorough discussion in Rezende (forthcoming).

becomes accepted as “normal,” rational investors should purchase the asset at any price below that, and sell at any price above it.

In particular, the holder of a given bond will experience a capital gain when the market interest rate on that type of bond falls, and a capital loss when the interest rate rises. This implies that if future long rates on a bond are expected to be even moderately different from current rates, it will take a very large difference in yield (relative to short rates) to offset the expected capital gain or loss. This in turn stabilizes expectations about the long rate. In this way, the belief in a normal level of interest rates can be self-confirming and does not require any departure from rational profit-seeking behavior, even if there is no objective basis for the belief. In practice, expectations of future rate changes, and associated capital gains or losses on long bonds, may be most important when current rates are low. But in principle, strongly anchored expectations of any level of long rate will produce expectations of capital losses when interest rates fall below that level. The resulting bond sales will prevent rates from falling much below the expected level, which will confirm expectations about the “normal” level of long rates, regardless of the behavior of short rates. So while what Taylor (2009) calls the “Hicks-Krugman liquidity trap” is a distinct phenomenon of the zero lower bound on nominal interest rates, this is not true of the Keynesian expectations-based liquidity trap: “*Any* level of interest which is accepted with sufficient conviction as *likely* to be durable *will* be durable.” (Keynes, 1936, emphasis in original)

The stability of conventions about the “normal” level of long rates is significantly enhanced by political factors. In particular, institutions with portfolios of interest-bearing assets but whose own liabilities are not-interest bearing, will see their survival threatened by a fall in interest rates below some threshold. Today, this is primarily an issue for pension funds, insurance companies and similar institutional investors with contractually fixed liabilities. Formerly, it also included banks, which funded themselves mainly with non-interest-bearing deposits. Opposition from banks for this reason may have been an important reason that the Fed did not conduct more expansionary policy in the early 1930s. (Epstein and Ferguson, 1984)

For our purposes, the key point is that stability of long rates will mean large gap between long and short rates when short rates are used for expansionary policy. This has been more common since 1980 than in the immediate postwar period, in part because aggregate demand has had a stronger tendency to fall short of potential output, in part because policy has relied more

exclusively on interest rates to close output gaps.

4 Credit Spreads: Risk, Liquidity, Institutions

In addition to the spread between longer and shorter interest rates, there is also a range of interest rates on securities of the same maturity. This is referred to as the credit spread. It is common to describe credit spreads as risk premiums. This is reasonable provided we are clear that there is a wide variety of possible risks being charged for, and that the observed premium does not necessarily have any relationship to the true *ex post* riskiness of the security by any measure. Still, to avoid confusion it may be better to prefer the more neutral term credit spread, and reserve risk premium for that portion of the credit spread that is demonstrably explained by the costs of bearing default risk.

In general, there are five reasons we might expect positive credit spreads. First is default losses – the expected return on a risky loan is less than its yield because some fraction of loans will default, and recoveries in the case of default will generally be less than the full value of the loan. So to give the same expected return as a risk-free asset of similar maturity, a risky loan must carry a higher interest rate, with the difference equal to the expected probability of default, times one minus the recovery rate in the case of default. This product is referred to as the credit loss rate. Second, since the incidence of defaults is unpredictable, and because defaults tend to be correlated with each other and with low returns from other assets, investors will generally require some compensation for bearing default risk, so the spread will be larger than the expected default loss. Third, risky bonds typically trade in thinner markets than Treasuries, so transaction costs will be higher. Compensation for these higher costs is sometimes referred to as the liquidity premium, but we prefer to reserve that term for the fourth factor below, and call this an intermediation or transactions-cost premium. Fourth, the holder of an asset faces a danger that in a situation where current cash commitments exceed current income, the asset may not be readily convertible into cash, or only at a substantial discount from its value if held to maturity. This is sometimes called “liquidation risk.” (Ziegler and Duffie, 2001) This class of risk is treated in much of mainstream literature as an unimportant

or trivial contributor to credit spreads. (Amato and Remolona, 2003). But from a Keynesian perspective it is a central factor in credit spreads. As discussed in Section 2.2 above, from this perspective the fundamental reason interest is paid as compensation for giving up liquidity, that is, the ability to make payments as needed. Finally, to the extent that lenders enjoy market power vis-a-vis certain classes of borrowers, they will be able to set interest rates at a higher markup over funding costs plus the premiums above. This will create a credit spread between loans to borrowers with relatively less and more capacity to switch lenders.

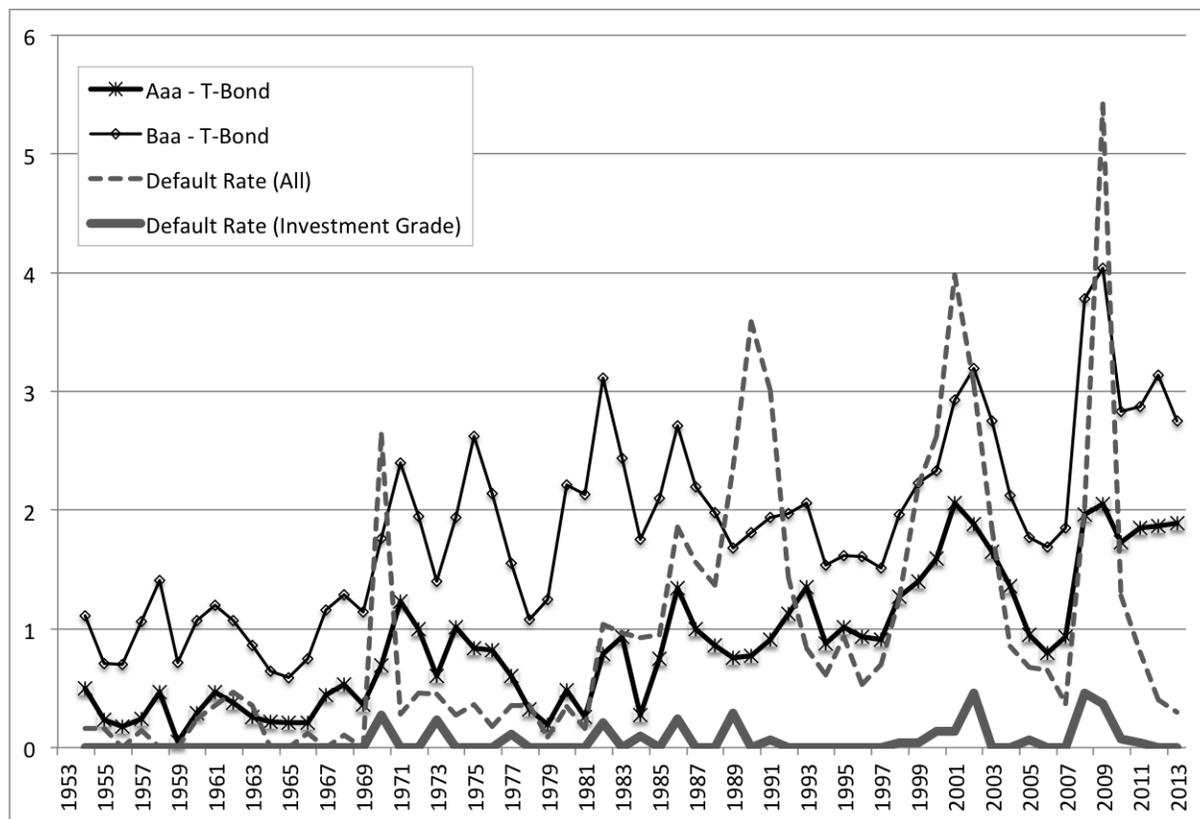
The bulk of the literature on credit spreads focuses on the first two factors, which connect the spread between debt securities of the same maturity as a function of default risk. Indeed, since the “risk” relevant to debt contracts is normally assumed to be default risk, the practice of referring to these spreads as “risk premia” treats this explanation as true by definition. Empirically, however, it is not easy to establish a connection between credit spreads and default risk.

4.1 Interest and Default Rates for Corporate Bonds Historically

Figure 4 shows the spread between Aaa and Baa corporate bond rates and the 10-year Treasury rate, and the annual default rates on investment-grade (Baa and better) corporate bonds and on all rated bonds. Initially, the data in Figure 4 might appear consistent with the idea that credit spreads reflect default risk. The premium for Baa bonds over the 10-year Treasury rate is of the same order of magnitude as the overall default rate for corporate bonds, and the two seem to follow a similar pattern over time, with peaks and troughs coming in the same years. In addition, there has been a secular increase in both credit spreads and default rates. Between 1946 and 1979, the overall default rate for corporate bonds was only 0.3 percent, and there were a number of years in which no defaults on rated corporate bonds. By contrast, the corporate bond default rate has averaged 1.5 percent in the period since 1980.

This apparent fit between credit spreads and default rates may be misleading, however. In the first place, periods of high default involve bonds of various vintages, so a rational risk premium should vary less over the cycle than default rates themselves do. Thus, the tight link between fluctuations

Figure 4: Credit Spreads and Default Rates for Corporate Bonds, 1953-2013



Source: FRED, Moody's, author's analysis.

The solid and dashed gray lines show annual dollar-weighted default rates for all corporate bonds and investment-grade corporate bonds, respectively, from Moody's "Annual Default Study: Corporate Default and Recovery Rates." Investment grade includes ratings Baa and above. The marked black lines show the interest rate premium on Aaa and Baa-rated corporate bonds, respectively, over the current 10-year Treasury bond rate.

in default rates and fluctuations in credit spreads is evidence *against* the idea that credit spreads primarily reflect default risk. More generally, there is no reason for rational investors to demand higher interest rates on newly issued debt at a time when *current* default rates are high. Rather, they should demand higher interest rates when there is reason to expect defaults to be higher in the future. So if periods of high interest rates reflect a rational judgement that default risk has increased, they should precede periods of elevated defaults, rather than coinciding with or following them. The anomalous relationship between defaults and credit spreads is especially noticeable in the most recent cycle. By the standards of the post-1980 period, credit spreads were relatively low in the years prior to the financial crisis, giving no indication that bond market participants anticipated the elevated default rates of 2008-2009. Since the crisis, however, spreads have remained close to the highest level on record. Yet perhaps surprisingly, recent default experience is not exceptional by the standards of recent business cycles. At over 5 percent of bonds outstanding, defaults were very high in 2009. But perhaps due to the exceptional interventions of the Federal Reserve and other central banks, corporate defaults dropped back to normal levels more quickly than in other recent recessions. Over the five years 2008-2012, a cumulative total of 9.8 percent of outstanding corporate bonds went into default. This is somewhat more than double the postwar annual average of 0.9 percent per year. But it is lower than for the five-year periods of elevated defaults around the previous two business cycle peaks: 13.7 percent in 1999-2003, and 11.2 percent in 1989-1993.⁵ Thus, it is hard to interpret the pattern shown in Figure 4 as reflecting a premium for varying levels of default risk. The credit spread varies too much over the cycle, fails to anticipate periods of elevated defaults, and is not proportionate to the *ex post* riskiness of high-rated corporate bonds. As we will discuss below, these impressions are borne out by the empirical literature, which does not in general find that credit spreads are informative about future default rates.

It is important to realize that defaults are heavily concentrated among corporations with “speculative-grade” ratings well below Baa, and that a large part of the long-term rise in the overall default rate represents an increase in the proportion of bonds issued by such risky borrowers, as opposed to an increase in default risk for borrowers with a given rating. In Moody’s

⁵These numbers are derived from Moody’s Investor Service, “Annual Default Study: Corporate Default and Recovery Rates,” various years.

rating system, Baa is the lowest “investment-grade” rating, and defaults of investment-grade bonds are very rare, averaging less than 0.05 percent for the postwar period as a whole. For higher ratings, defaults are even rarer. The postwar average dollar-weighted default rate for corporate bonds rated A and above is 0.01 percent, and no Aaa-rated corporate bond has defaulted since 1920. These numbers do not give the full picture of the riskiness of such bonds, however, since defaults are normally preceded by a downgrade. What is relevant is not the rating at the time of default, but the rating at the time the bond was issued.

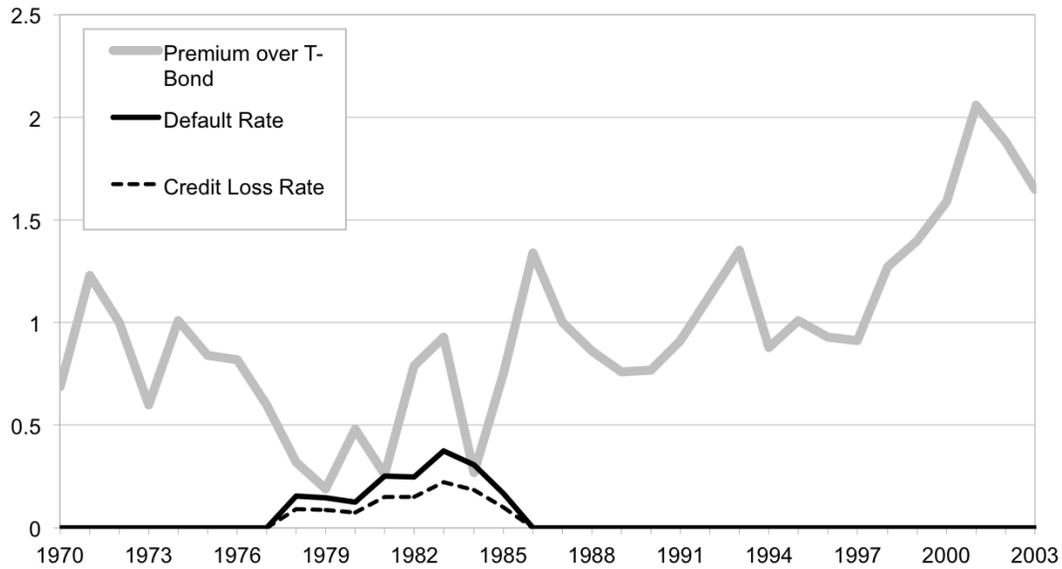
Because defaults of Aaa-rated corporate bonds are exceptionally rare, it is hard to explain either the size or the trend in these spreads in terms of default risk. In fact, in the entire period since World War II, the only years in which the bonds of *any* corporations rated Aaa at issuance have defaulted, were 1988 and 1991. It is striking that the financial crisis of 2007-2008 did not produce any such defaults, though it did of course involve many defaults of Aaa-rated asset-backed securities. (Ou, 2012) Even more strikingly, for corporate bonds *issued* with investment-grade ratings, the default rate was lower over the 2008-2012 period than for the postwar period as a whole – a fact that has been the source of some surprise to financial market participants.⁶

Figure 5 shows the premium on Aaa- and Baa-rated corporate bonds over 10-year treasury bonds in the year they were issued, and the cumulative default rates on those bonds over the following decade. (The average corporate bond has a maturity of just under 10 years.) The figure also shows estimated credit losses, using the historical average recovery rate in corporate defaults of 40 percent. As can be seen, the premium on both Aaa- and Baa-rated bonds is much higher than realized default losses. There have been no defaults for corporate bonds issued after 1985 (or before 1978), yet these bonds continue to carry interest rates one to two points higher than Treasury bonds of similar maturity.

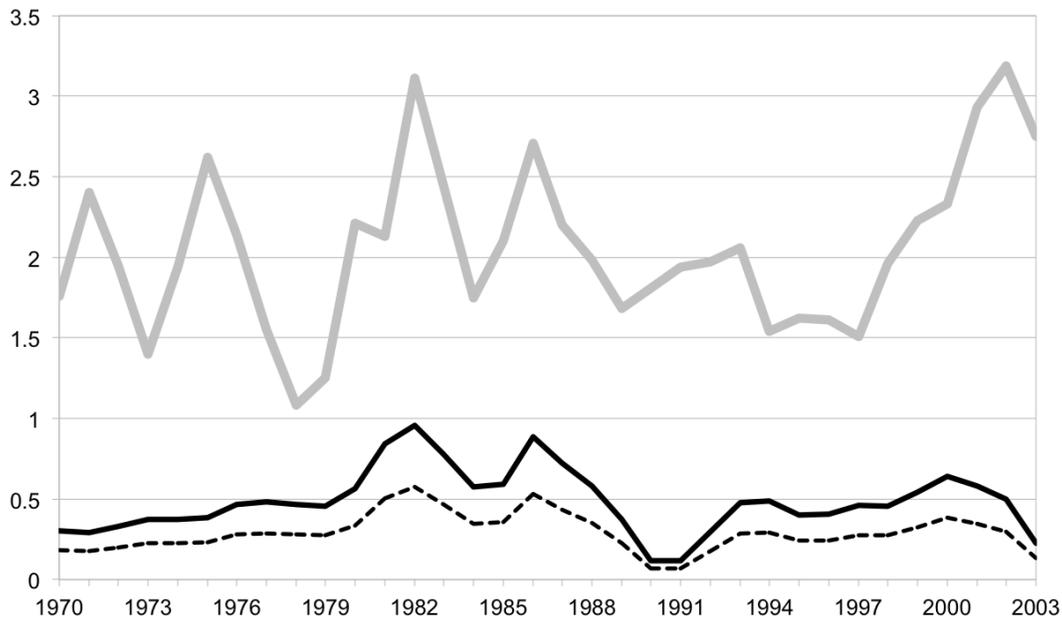
In principle, the existence of some default risk even for the highest-rated

⁶For instance: Deutsche Bank’s 2012 report, “Five Years of Financial Crisis: The Default Bark Is Far Worse than the Bite.” See also Moody’s Analytics June 2011 report, “If the Default Rate is So Low, Why Are Credit Spreads So Wide?” The report notes that “credit spreads are too wide from the perspective of a comparatively low ... default rate,” and attributes the excessive spreads to a “perceived reduction in the ability of sovereign governments and central banks to prevent or remedy economic downturns” and to “much greater financial systemic risk.”

Figure 5: Corporate Bond Interest Premium and *Ex Post* Default Rate, 1970-2003



(a) Aaa-rate at Issue



(b) Baa-rate at Issue

Source: FRED, Moody's, author's analysis.

The heavy gray lines show the difference between the market interest rate for Aaa- and Baa-rated corporate bonds, respectively, and the 10-year Treasury bond rate at the time of issue. The solid black line shows the cumulative default rate for corporate bonds issued in that year with that rating over the 10 subsequent years. The dotted line shows the estimated credit loss over the same 10 years, using the average recovery rate for corporate bonds of 40 percent.

corporate bonds can help explain the spread between their yields and Treasuries. But on the face of it, it does not appear that the bond market priced this risk into Aaa yields in a meaningful way. As can be seen, the 1988/1991 default episodes involved bonds issued from 1978 through 1985. But bond interest rates in those years were not especially high, as one might expect if the market price incorporated information about future default probabilities not incorporated into bond ratings. In fact, the bonds that would default in 1988 and 1991 were mostly issued at times when the spread between the Aaa and 10-year Treasury rate was unusually low. Of course, it is possible that market participants did know the true *ex ante* distribution of default risk, and that the late 1980s simply saw an unusually poor draw from that distribution, while the low spreads in the late 1970s and early 1980s were due to an unusually high level of risk appetite among bond buyers in that period. It is striking, however, that the Aaa-10-year Treasury spread reached its highest levels in the later 1990s and 2000s. This is consistent with the psychologically plausible story that bond market participants revised upward their beliefs about Aaa default probabilities following 1988-1991. This is not, however, compatible with the view that bond market participants know the true *ex ante* distribution of default risk.

Furthermore, the absolute level of the Aaa premium is hard to reconcile with the realized default rate. Since 1980, the annual default rate on bonds of corporations with Aaa ratings at issuance, has been approximately 0.05 percent – one twentieth of one percentage point. And given an average recovery rate of around 40 percent, the default losses have been even lower. But the premium of Aaa bonds over 10-year treasuries has been 1.2 percent – around 40 times the expected annual default loss. The case of Baa bonds is only a little less extreme, with credit spreads averaging about ten times expected default losses. Even if default risk were largely undiversifiable, as argued by Amato and Remolona (2003), there is no plausible level of risk aversion that could produce such a premium. And in fact, a large number of financial instruments exist precisely to allow the hedging of credit risk. One can logically tell a story in which the market is pricing in the possibility of very low-frequency events with much larger default rates than observed since World War II – as in the 1870s. (Barro and Ursa, 2012) It is debatable how much of the higher spreads over the whole 1980 period represented expectations of some chance of 2008-like crisis; there is strong evidence that the expected *ex ante* probability of such a crisis was much lower than even one realization of a 2008-type crisis in two or three decades. (Crotty, 2009) For

the increase in spreads to be a rational response to higher expected default rates, however, the expected probability of a crisis would have to be much *higher* than what has been actually realized. This seems implausible.

4.2 The Credit Spread Puzzle

These observations are borne out by much of the empirical work on the “Credit Spread Puzzle” – the lesser known cousin of the equity premium puzzle. While there has been little attention paid to the *increase* in credit spreads since 1980, the larger question of whether expected default risk can explain the existence of large credit spreads has attracted significant empirical work. As with the term spread, there is a consensus that the observed pattern of yields across debt classes is inconsistent with any straightforward model of rational expectations. A survey of the literature concludes that “credit risk cannot possibly explain the observed corporate yield spreads.” (Huang and Huang, 2002)

The credit spread puzzle refers to the fact that the interest premium on risky bonds is much higher than expected default losses, and not strongly correlated with them either over time or across borrowers: “measures of a company’s probability of default do not seem to be as variable as the credit spread over time.” (Federal Reserve Bank of San Francisco, 2004) Goldstein (2009) examines the ability of the standard bond-pricing models to explain observed credit spreads, and finds that “it is difficult for a basic structural model to explain why credit spreads are as high as they historically have been, given relatively low historical default rates.” The Baa-treasury spread, for example, is five times larger than the average annual default losses from Baa bonds. Chen, Collin-Dufresne and Goldstein (2009) similarly find that conventional models of bond pricing by risk-averse investors generate spreads between Aaa- and B-rated bonds of approximately 0.57%, less than half [the] historical value. Amato and Remolona (2003) find that “across all rating categories and maturities, expected loss accounts for only a small fraction of spreads.” Over 19997-2003, for example, B-rated 3-5 year bonds had yields 170 basis points above the riskfree rate, yet annual default losses averaged only 20 basis points. Similarly, Huang and Huang (2002) find that “calibrating models with actual default data shows none can explain more than 20-30% of observed yield spreads.” They note that almost all models that predict credit spreads similar to those observed, do so by predicting default rates much higher than observed. When default rates are constrained to his-

torical levels, these models predict much lower spreads. “Under empirically reasonable parameter choices, ... for investment grade bonds of all maturities, credit risk accounts for only a small fraction – typically 20% – of the observed corporate-Treasury yield spreads.”

While the empirical literature is consistent in finding that credit spreads are, in general, too large to be explained straightforwardly by default risk, little of the work in this area is concerned with the variation in spreads over time. One of the few exceptions is Giesecke et al. (2011), which looks at the relationship between bond yields and default rates over the whole history of the American corporate bond market, going back to the mid-19th century. While the default rates of investment-grade bonds have varied sharply over time – with default rates reaching 35 percent in the 1870s – bond yields seem completely insensitive to subsequent default rates: “Changes in credit spreads have no forecast power for realized default rates.” This is all the more striking since various macro variables do predict future default rates. The logical conclusion is that expected future default losses is not a useful framework for thinking about credit spreads, which seem to be driven mainly by “financial market factors such as illiquidity and risk premia, rather than by fundamentals.”

4.3 The Credit Spread as Liquidity Premium

A number of various ad hoc, more or less implausible explanations have been offered for credit spread puzzle within the standard framework of risk priced by rational, optimizing agents. There is also a strand of evidence that the premium of risky bonds should be thought of as compensation of illiquidity rather than risk-bearing. Analyzing credit spreads in these terms requires the specific Keynesian idea of liquidity.

In the standard framework decisionmakers are households intertemporally maximizing utility from consumption. In this framework liquidity typically means simply the transaction costs associated with taking a position in the asset; in some cases, it may also imply that the value of the asset will be low in states of the world in which the marginal value of consumption is high. (Goldstein, 2009) But the analysis is always conducted in terms of households maximizing their expected utility from consumption. The alternative is to see the economy as essentially monetary, and the question of taking an asset position (particularly for the kinds of units that hold credit market debt) is not to improve the expected distribution of consumption over the lifetime,

but to achieve positive returns while keeping the probability of being able to meet all current obligations above some threshold. This is a fundamentally different view of liquidity, which is not simply about transaction costs, but more broadly about the ease and reliability of turning ownership of an asset into command over money. In this story, economic units are matching cash receipts and cash flows, and the risk is not facing a suboptimal consumption path, but bankruptcy if contracted cash payments cannot be made. Critically, here, there is no assumption that the sale price of an asset is normally equal to its present value if held to maturity; if that were the case, liquidity would have no meaning, since it refers specifically to the degree to which an asset can be converted to cash. One important implication of this view is that demand for liquidity will depend strongly on how likely lenders believe they are to face the risk of insolvency – which, for banks and other institutions that depend mainly on short-term funding, largely depends on the perceived chance they will be subject to self-fulfilling panics or runs. The larger implication is that the credit spread may depend less on the financial condition of borrowers, than of lenders; the higher the probability assigned by banks and other financial institutions to the possibility of having current cashflows fall short of cash obligations (in the event of a run, for example), the greater the premium they will pay for assets that can be reliably converted to cash in those circumstances.

The idea that liquidity refers specifically to the extent to which holding a given asset contributes to a unit's ability to meet its cash obligations is not an unfamiliar idea in mainstream economics. Tirole (2011) But it has not been systematically applied to questions like the credit spread puzzle, since it is not easily compatible with a methodology that frames all problems in terms of maximizing the expected value of lifetime consumption. Nonetheless, there is considerable empirical evidence that liquidity premia can explain a large part of observed credit spreads. (Perraudin and Taylor, 2004; Ziegler and Duffie, 2001) One particularly striking recent study compares yields on various securities guaranteed by the German government, and so presumably facing identical (very low) default risk, but of differing liquidity as measured by the depth of the market, etc. (Schwarz, 2010) Extrapolating from this to a variety of European bonds suggests that over two-thirds of observed credit spreads can be explained by liquidity premia. Bongaerts, De Jong and Driessen (2012) similarly find that for US corporate bonds, liquidity (as proxied by trading volume, bond age, and amount issued) can explain a substantial part of excess credit spreads. Federal Reserve Bank of San Francisco

(2004) notes that the large increase in US bond spreads after the 1998 Russian crisis shows the importance of liquidity effects, since US defaults did not move (or is there reason to think that the Russian crisis changed expectations about default rates for US companies.) In a loanable-funds model of interest rate determination, the Russian crisis should have *reduced* interest rates for US borrowers, since they would no longer have to compete with Russian borrowers for the supply of savings. There is little empirical work looking specifically at the rise in credit spreads after 1980. But to the extent that the “anomaly” of credit spreads greatly in excess of expected default loss can in general be explained by liquidity premia, it is natural to suppose that this also contributed to the rise in credit spreads after 1980.

In other words, we suggest that increased credit spreads can be understood as an increase in the liquidity premium. The institutions that are the direct holders of most debt securities have placed a greater premium on assets that are “more certainly realisable at short notice without loss.” That is, the concern is less with the expected return on the security, nor with its variance or other moments of the distribution of returns. Rather, it is with the extent to which the security can be *reliably* used to make cash payments as needed. This requires not only a stable market value, low transactions costs, and thick markets, but that the security be regarded by other market participants as liquid – and that these conditions can be relied on to hold at the time that some unplanned-for payment must be made. A security is liquid only if it is possible to sell it or use it as collateral in any state of the world in which the holder needs to generate additional cashflow.

In a crisis, a financial institution may need to convert assets into immediate cash in order to meet its survival constraint. If there is any question about a security’s saleability, it will be of less value in the face of the possibility of such a crisis. And to the extent that potential counterparties may also be facing a survival constraint, this fact in turn makes the asset less reliably saleable. Here we see the essentially conventional aspect of liquidity. Because demand for a liquid asset is in large part motivated by the need for certainty that it will always be demanded by others, even a modest difference in risk can produce a drastic difference in liquidity premiums, and doubts about the liquidity of an asset can be self-confirming. It has been argued that this sort of “expectations cascade” was responsible for the collapse of interbank lending in 2008. (Gorton and Metrick, 2009)

The liquidity-premium story helps explain why high credit spreads coincide with high default rates, rather than anticipating them. The same

conditions that produce high default rates among borrowers increase the probability that holders of financial assets will need to generate cash at short notice. During these periods, an asset's ability to be immediately sold or borrowed against will be more important than its returns, since future income from the asset is of no use if the asset's holder does not survive to receive it. So it is natural that in these periods, the most readily saleable assets – Treasury bonds – enjoy the highest relative price, and accordingly the lowest interest rate. It also helps explain the persistence of high credit spreads after a crisis. Liquidity is, in part, a convention, and conventions take time to reestablish themselves once disrupted.

In this sense, credit spreads do represent compensation for risk, but not risk associated with borrowers or (directly) with the real economy. Rather, they compensate for risk associated with the financial system itself. Credit spreads will be larger in proportion to the concern that asset holders – financial institutions in particular – have that they may need to make unplanned payments at short notice. Both the descriptive evidence presented in Section 4.1 and the empirical literature reviewed in Section 4.2 are consistent with the idea that variation in credit spreads over time is driven mainly by demand for liquidity.

The question of why demand for liquidity might have increased over time is largely beyond the scope of this essay. But one possible contributor is the decline in the supply of the most liquid debt securities, Treasury bonds. Compared with the 1950s and 1960s, holdings of government debt has been a much smaller fraction of financial system assets in recent decades. Treasury securities made up a full 70 percent of credit-market assets held by the financial system at the end of World War II, and remained over 15 percent through the 1960s. By 2007, Treasuries had fallen to just 5 percent of credit market assets held by financial institutions. Treasuries are a uniquely liquid asset, offering nearly the same security as holding cash itself. So it seems natural that a fall in the relative supply of this most liquid asset would lead to a rise in the liquidity premium on other assets. Rising liquidity premia on private debt as a result of a fall in the supply of public debt is consistent with more formal models of liquidity and asset prices. (Holmström and Tirole, 1996)

4.4 Financial Repression

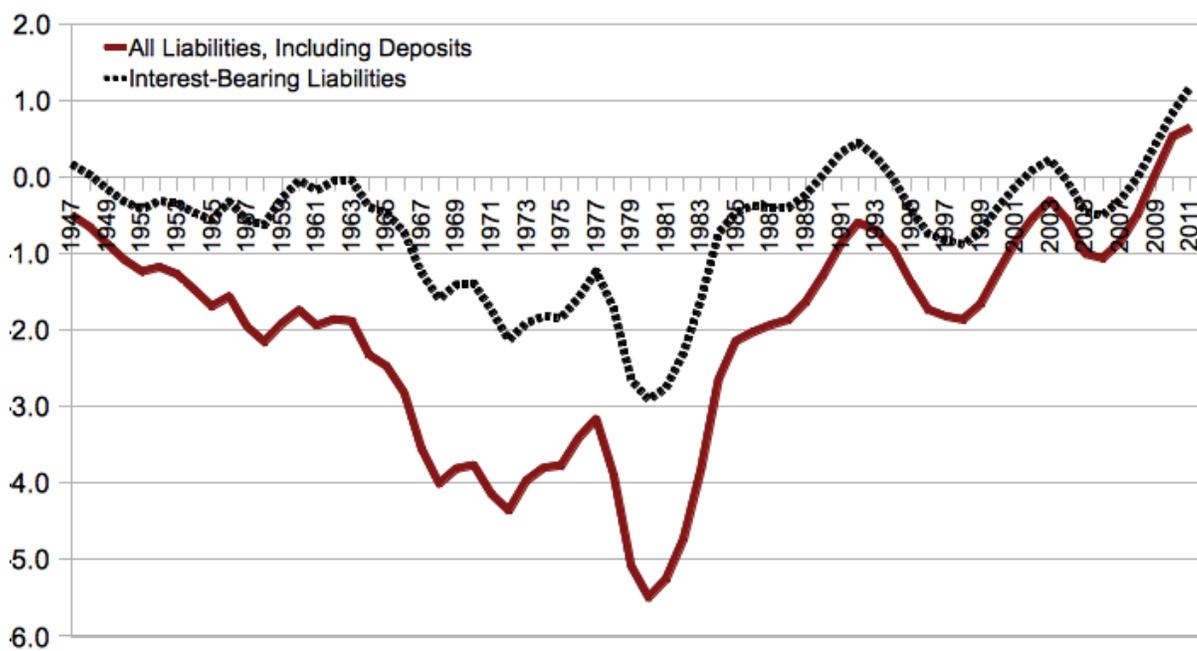
The rise in interest rates faced by ultimate borrowers after 1980 is not so surprising when one recalls that holding down borrowing costs to maintain high levels of fixed investment was one of the main goals of New Deal banking legislation. This has been largely forgotten, with banking reforms usually thought of as being aimed at crisis prevention, but holding down the interest rates faced by nonfinancial borrowers was a major concern at the time. (Russell, 2008) In order to achieve this without unduly depressing lender profits (which could threaten the stability of the banking system) regulation also aimed at holding down banks' funding costs. In other words, banks' market power was to be restrained vis-a-vis borrowers, but enhanced vis-a-vis savers, so that holders of assets in the form of claims on banks (middle and upper-income households, essentially, but not the very rich) were forced to subsidize loans for productive investment. Thus for instance Senator Glass argued that interest rate controls on deposits would "put a stop to the competition between banks in payment of interest, which frequently induces banks to pay excessive interest on time deposits." (Quoted in Russell (2008).) These measures included restrictions on entry to new banks, or existing banks to new markets; bans on interest on checking deposits; ceilings on interest on time deposits; regulations to limit the ability of interest-bearing accounts to substitute for checking accounts for transaction purposes; as well as deposit insurance, to help induce savers to accept lower returns on bank deposits. While these regulations were perceived as restrictions by individual banks (and opposed accordingly), their effect, as policymakers like Glass understood, was to limit competition between banks for deposits and thereby hold down their funding costs. As Russell (2008) puts it:

This regulatory framework ... inhibited financial capitalist firms ... from competing with each other ... for access to funds... Meanwhile, in the market to provide investment capital to productive capitalist firms, competition could be vigorous... [which] helped to exert downward pressure on the cost of accessing investment capital. ... So long as competition was vigorous in the second phase of financial intermediation, New Deal banking reforms might enhance the profitability of commercial banks in the first phase of financial intermediation without necessarily subverting the agenda for the accessibility of investment capital on

favorable terms... Thus New Deal banking reforms simultaneously encouraged competition among financial intermediaries in one respect [interest rates paid to savers] while restraining it in another [interest rates charged to borrowers, especially for fixed investment.] (Russell, 2008)

During the 1980s, however, these regulations were effectively eliminated, and the funding advantage of commercial banks largely disappeared (though transaction accounts with no or very low interest rates did continue to exist, on a diminishing scale.) The effect of increased competition among banks for deposits, as well as the shift away from deposits as a funding source, is shown clearly in Figure 6. This figure shows the average funding cost of commercial banks – computed as total interest payments divided by total liabilities, and by interest-bearing liabilities, respectively – relative to the Federal Funds rate. As the figure shows, for most of the 1950s, 1960s and 1970s, commercial banks faced an effective cost of funds two to four points below the Federal Funds rate. With the disappearance of their privileged access to cheap transactions balance funding after deregulation in the 1980s (and later with the fall in nominal rates), this funding advantage diminished, and after 2000 essentially disappeared. In Russell’s terms, we can say that deregulation raised the cost of borrowing for nonfinancial businesses (and households) through both, first, increased competition among banks for savings, and, second, reduced competition (because of consolidation, the combination of commercial and investment banking functions, etc.) among banks as lenders. But for the commercial bank sector, at least, the evidence of Figure 6 suggests that the former effect was quantitatively more important.

Figure 6: Commercial Bank Funding Costs Relative to Federal Funds Rate, 5-Year Moving Averages



Source: FDIC

5 Conclusion

Over the past 50 years interest rate spreads have widened substantially, both between longer and shorter maturity loans and between loans to riskier and less risky borrowers. This increase in spreads is hard to explain in conventional models in which the interest rate is the price of deferred consumption, and spreads between rates for different borrowers represent rational expectations of risk. The empirical literature on interest rate spreads consistently finds that long rates do not predict future short rates, contradicting the expectations hypothesis; and it consistently finds that spreads between riskier and less risky bonds are too large to explain in terms of default risk, and carry no information about future defaults. For the orthodox theory, these results are anomalous. But for a Keynesian approach, they point toward an alternative framework for thinking about interest rates – one in which the overall level of rates and the spreads between different rates are the same fundamental phenomenon.

The Keynesian approach to interest rate determination differs from the orthodox approach in two essential respects. First, it regards interest as compensation for illiquidity, rather than for deferring expenditure. And second, it treats expectations as an independent variable rather than restricting models to those that predict the same value for x_t and for agents' expectations of x_t in all periods prior to t . In principle, these are two distinct issues. But there is a deep connection between them, because it is the lack of knowledge of the future that makes liquidity desirable.

This Keynesian perspective provides a useful paradigm to make sense of the patterns of rising term and credit spreads in the post 1980s period. First, from such a perspective it is not useful to think of expectations, or prices incorporating them, as representing the true probability distribution of future events; expectations are essentially conventional and backward looking. Thus, they are likely to overweight recent changes in short rates – a result consistent with both the empirical literature and the assumptions of more policy oriented macro models. At the same time, the importance of capital gains in the returns on longer bonds means that a conventional level or floor on such rates, once established, will be stabilized by the behavior of profit-seeking investors. Thus long rates may be quite stable even in the face of large changes in short rates or other economic data. In an environment where monetary policy is relied on to maintain full employment and where unemployment is more common than inflation, this stability of long rates will

lead to large term spreads.

Finally, from a Keynesian perspective, liquidity is central to the structure of interest rates. The interest rate is the price of liquidity (not the price of saving) and depends primarily on developments within the financial system. From a Minskyian viewpoint, liquidity refers to the capacity to meet cash commitments. This implies a world where the goal is to manage cashflows so as to make contracted cash payments where the payment that can be received by sale or hypothecation of an asset is in general lower (often much lower, or zero) than the present value of the income expected from holding the asset. As Minsky puts it “The fundamental speculative decision of a capitalist economy centers around how much, of the anticipated cash flow from normal operations, a firm, household, or financial institution pledges for the payment of interest and principal on liabilities.” (Minsky, 1975). The extent to which the post 1980s financial system is less liquid than the postwar system, in the sense of having less reliable cashflows relative to its cash commitments, can help explain the increase in the credit spread.

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