THE FLIGHT-TO-LIQUIDITY PREMIUM IN U.S. TREASURY BOND PRICES

Francis A. Longsta®¤

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¤Professor of Finance at the Anderson School at UCLA. Phone number: (310) 825-2218. Email address: francis.longsta®@anderson.ucla.edu. I am grateful for helpful discussions with Avraham Kamara, Jun Liu, Yoshihiro Mikami, Pedro Santa-Clara, Eduardo Schwartz, Abraham Thomas, and Toshiki Yotsuzuka.

ABSTRACT

We examine whether there is a flight-to-liquidity premium in Treasury bond prices by comparing them with prices of bonds issued by Refcorp, a U.S. Government agency. Since Refcorp bonds are, in effect, guaranteed by the Treasury, they have the same credit as Treasury bonds. We find a large liquidity premium in Treasury bonds, which can be more than fifteen percent of the value of some Treasury bonds. We find strong evidence that this liquidity premium is related to changes in consumer confidence, flows into equity and money market mutual funds, and changes in foreign ownership of Treasury debt. This suggests that the popularity of Treasury bonds directly affects their value.

But what is crucial about this distinction is that the individuals who were moving from, let's assume, the illiquid U.S. Treasuries to the liquid on-the-run liquid issues, are basically saying, "I want out. I don't want to know anything about whether a particular investment is risky or not. I just want to disengage." And the reason you go into these liquid instruments is that that is the vehicle which enables one to disengage as quickly as possible.

— Alan Greenspan, October 7, 1998.

1. INTRODUCTION

Historically, fixed income markets have often experienced what are termed flights to quality where some market participants abruptly want to decrease their portfolio exposure to securities bearing credit risk. Bank runs and panics, credit crunches, and sudden declines in the market values of corporate bonds are all examples of the effects of a flight to quality.[1] From an asset pricing perspective, of course, the decrease in the value of risky debt resulting from a flight to quality can readily be explained in terms of changes in perceived default probabilities and in the equilibrium required premium for bearing credit risk.[2]

In recent years, however, a related but distinct phenomenon has been observed in the world's financial markets: flights to liquidity. In a flight to liquidity, some market participants suddenly prefer to hold highly-liquid securities such as U.S. Treasury bonds rather than less-liquid securities. This is consistent with recent papers by Lucas (1990), Woodford (1990), and Holmström and Tirole (1996, 1998) who examine the role of the public sector in providing liquidity to financial markets. A recent example of a flight to liquidity was in the wake of the 1998 Russian default where Treasury bonds suddenly increased in value relative to less-liquid debt instruments, causing credit spreads to widen and resulting in major losses at Long Term Capital Management and many other highly-leveraged hedge funds. Of course, there may have been elements of both a flight to quality and to liquidity during the 1998 hedge fund crisis.

Given that flights to liquidity may occur, however, it is important to consider what effects a pure flight to liquidity may have on security prices. Standard asset pricing theory implies that the value of a security should equal the present value of its cash flows, and should not depend on how popular the security is as a trading vehicle. More specifically, if two securities have identical cash flows in all states of

[1] As examples, see Diamond and Dybvig (1983) and Bernanke and Gertler (1995).

[2] As examples, see Duffie and Singleton (1997, 1999), Duffee (1999), and Liu and Longstaff (2000a).

the world, then the two securities should have the same value even if one suddenly becomes more popular among investors during a flight to liquidity. Finding evidence of a significant flight-to-liquidity premium in the price of the more popular security would pose a challenge to traditional asset pricing theory.

This paper examines whether there are flight-to-liquidity premia in U.S. Treasury bond prices. In doing this, we compare Treasury bond prices directly with the prices of bonds issued by the Resolution Funding Corporation (Refcorp), a government agency created by the Financial Institutions Reform, Recovery, and Enforcement act of 1989 (FIRREA). Refcorp bonds are unique among agency bonds (which usually bear some small credit risk) in that their principal is fully collateralized by Treasury bonds, and that full payment of coupons is guaranteed by the Treasury under the provisions of FIRREA.[3] Thus, Refcorp bonds literally have the same credit risk as Treasury bonds. Since Treasury bonds are more liquid and popular among investors (particularly during flights to liquidity), comparing their prices with those of Refcorp bonds provides an ideal way of testing whether there are flight-to-liquidity premia in Treasury bond prices.

The results are surprising. We find that during the past decade, there are often large liquidity premia in Treasury bond prices. In some cases, these premia can represent as much as 10 to 15 percent of the value of the Treasury bond. We also find that changes in the flight-to-liquidity premia are directly related to measures of market sentiment such as changes in consumer confidence and in the amount of funds flowing into equity and money market mutual funds. We show that these results cannot be explained by differences in tax treatment, perceived credit risk, transaction costs, repo financing costs, or legal and regulatory restrictions on bondholders. These results have important implications for current asset pricing models.

The remainder of this paper is organized as follows. Section 2 describes the Refcorp bonds. Section 3 discusses the data used in the study. Section 4 conducts the empirical analysis. Section 5 evaluates alternative explanations for the results. Section 6 makes concluding remarks.

2. REFCORP BONDS

Refcorp was established by Title V of FIRREA in 1989. The sole purpose of Refcorp was to provide funding for the Resolution Trust Corporation (RTC) which was created in the aftermath of the savings and loan crisis of the late 1980s as a means of liquidating insolvent institutions. Until October 29, 1998, Refcorp was subject to the Thrift Depositor Protection Oversight Board. At that time, the Oversight

[3]In general, bonds issued by government sponsored enterprises such as Fannie Mae, Freddie Mac, and the Federal Home Loan Bank are not explicitly guaranteed by the U.S. Treasury and presumably carry some small amount of credit risk.

Board was abolished and its authority transferred to the Secretary of the Treasury. The day-to-day operations of Refcorp are under the management of a three-member committee composed of the Director of the Office of Finance of the Federal Home Loan Banks and two members selected from among the presidents of the twelve Federal Home Loan Banks. Refcorp is simply a financing vehicle and is not allowed to have any paid employees.[4]

In 1989, Refcorp issued six issues of bonds with fixed coupon rates ranging from 8.125 to 9.375, and with final maturity dates ranging from October 15, 2019 to April 15, 2030. The principal amounts outstanding of these issues range from $4.5 Billion to $5.5 Billion, making these issues comparable in size to many Treasury bond issues. The total principal amount of Refcorp bonds outstanding is $29.5 Billion. As with most recently-auctioned Treasury bonds, Refcorp bonds are eligible to be held in stripped form in the Federal Reserve book-entry system.[5] Refcorp bonds receive the same tax treatment as U.S. Treasury bonds. In particular, Refcorp bonds are taxable for Federal income tax purposes, but are exempt for state tax purposes.

From the proceeds of these bond issues, Refcorp purchased a special domestic series of long-term zero-coupon bonds issued by the Treasury which are pledged to pay the principal amount of the Refcorp bonds. Thus, the principal amounts of the Refcorp bonds are completely defeased by the Treasury zero-coupon bonds. Under FIRREA, and later under the Gramm-Leach-Bliley Act of 2000, the Federal Home Loan Bank system is required to pay some portion of the coupons on the bonds, and thus, coupon payments on Refcorp bonds represent a senior claim on the Federal Home Loan Bank system. To the extent that the payments from the Federal Home Loan Bank system are not sufficient to pay the coupon payments on the Refcorp bonds, however, FIRREA and the subsequent Gramm-Leach-Bliley Act require the Treasury to pay to Refcorp the additional amounts needed to pay the coupon payments. Through March 2000, the Treasury has actually paid more than 75 percent of the annual interest owed on the Refcorp bonds.[6] Thus, while the Refcorp bonds are not explicitly backed by the full faith and credit of the U.S. government, repayment of both the coupon payments and principal amounts of the bonds is, in fact, implicitly guaranteed by the U.S. Treasury. An immediate implication of this is that Refcorp bonds must have the same credit risk as Treasury bonds.[7]

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[4]This summary is based on the description of Refcorp given on pages 1235-1236 of the Appendix to the Budget of the United States Government for Fiscal Year 2002.

[5]The Treasury STRIPS program is described in Grinblatt and Longstaff (2000).

[6]See page 17435 of the Federal Register, Vol. 65, No. 64, April 3, 2000.

[7]In fact, one could argue that Refcorp bonds may actually have slightly better credit than Treasury bonds. This is because if the Treasury does not default on its obligations, Refcorp bondholders will be paid in full. If the Treasury does default, however, the Federal Home Loan Bank system is still required to pay some portion

3. THE DATA

Both U.S. Treasury bonds and Refcorp bonds can be held in stripped form and markets for both Treasury and Refcorp zero-coupon bonds exist. To measure the size of the flight-to-liquidity premium, we take the market yields for zero-coupon Refcorp bonds with maturities ranging from three months to 30 years and subtract from them the market yields for the corresponding maturity Treasury zero-coupon bonds. The advantage of using zero-coupon bonds in this analysis is that it allows us to compare the yields on bonds with identical cash flows, thereby avoiding any possible bias from comparing yields on bonds with different coupon rates. By estimating the liquidity premium as the difference in yields between Treasury and non-Treasury bonds, this paper differs from earlier papers such as Kamara (1988), Amihud and Mendelson (1991), Boudoukh and Whitelaw (1991), Longstaff (1992), and Kamara (1994), which compare the yields on different Treasury bonds. This is important because it allows us to uniquely identify the size of the liquidity premium associated with bonds issued by the U.S. Treasury.[8]

The data consist of monthly observations of yields for Treasury and Refcorp zero-coupon bonds for the 10-year period from April 1991 to March 2001. The data are obtained from the widely-used Bloomberg system. This system gathers quotations for both Treasury and Refcorp zero-coupon bonds on an ongoing basis from a variety of bond dealers and financial institutions. Because of the high liquidity of the Treasury bond market, prices for Treasury zero-coupon bonds are available from more than two dozen sources on an intraday basis. In contrast, the liquidity of Refcorp zero-coupon bonds is much lower. Despite this, however, there are typically at least seven or eight sources that provide intraday or daily pricing information for Refcorp zero-coupon bonds. To verify that the pricing information is reliable, we checked a number of the sources providing Refcorp zero-coupon bond prices and confirmed that the prices are updated on an intraday basis within the Bloomberg system.

The maturity dates for Treasury and Refcorp zero-coupon bonds follow a common quarterly cycle out to 30 years. Yields for specific constant maturities are computed by Bloomberg from a fitting algorithm that interpolates the yields for the bonds with maturities closest to the target maturity. Bloomberg uses coupon rather than principal strips in computing the constant maturity yields. This has the advantage of avoiding any reconstitution option value that might be present in principal strips; see the discussion in Daves and Ehrhardt (1993). Table 1 provides summary

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of the coupons on the Refcorp debt.

[8]Other relevant papers about the effects of liquidity on asset prices include Lippman and McCall (1986), Boudoukh and Whitelaw (1993), Longstaff (1995, 2001), Brenner, Eldor, and Hauser (2001), and Holmström and Tirole (2001).

statistics for the flight-to-liquidity premia and Figure 1 graphs the flight-to-liquidity premium for the one-year and 30-year maturities.

4. EMPIRICAL ANALYSIS

Table 1 shows that there are significant liquidity-related premia in Treasury bond prices. The average premia range from about 10 to 16 basis points and are highly significant even after taking into account the serial correlation of the premia. Table 1 and Figure 1 also show that the premia vary significantly over time. The maximum values of the premia range from 90 basis points for the three-month premium to about 35 basis points for the seven-year premium. We note that the minimum premium for a number of the maturities is negative. This is clearly due to the fact that there must be measurement errors in the data which adds noise to the estimates of the premia. Despite this noise, however, the mean estimates are still statistically significant, indicating that the results are not entirely due to measurement errors.

Although not shown, it is straightforward to translate the differences in yields between the Treasury and Refcorp zero-coupon bonds into percentage price differences. The mean percentage price difference between the two bonds (measured as a percent of the Treasury zero-coupon bond price) ranges from .035 percent for the three-month maturity to 5.05 percent for the thirty-year maturity. The pricing differences for the longer-maturity bonds, however, can exceed 10 or even 15 percent.

At this point, we have shown that there are liquidity premia in the Treasury bond prices, but we have not yet linked these premia to the flight-to-liquidity phenomenon. To do this, we regress the premia on a number of measures that may reflect on the popularity of Treasury bonds relative to other investment vehicles.

The first of these variables is the change in the consumer confidence index reported by the Conference Board. A sudden decline in this widely-cited index may signal that there is a greater wariness among market participants holding riskier assets, perhaps encouraging some to migrate to the safe haven of Treasuries. If the difference in yields between Treasuries and Refcorp bonds represents a flight-to-quality premium, we might expect that there may be a negative relation between changes in consumer confidence and the premia. The data for consumer confidence are obtained from the Bloomberg system.

The second variable is the change in the amount of Treasury debt held by foreign investors. If U.S. investors, who presumably may benefit more from Treasury liquidity than many foreign holders of Treasury debt, suddenly begin to purchase Treasury debt from these foreign holders, the yield spread between Treasuries and the Refcorp bonds could increase to reflect the increased popularity of holding Treasuries. The data on foreign ownership of Treasury bonds are obtained from the Federal Reserve Board.

The third variable is the percentage change in the amount of funds held in money market mutual funds. These funds are short-term nearly-riskless investments. When investors become concerned about the investment environment, some may have incentives to allocate their funds towards these near-money investments since their values are less likely to be affected by market turbulence. This suggests that if the difference in yields between Treasuries and Refcorp bonds represents a flight-to-quality premium, there could be a positive relation between this variable and the premia. The amount of funds held in money market mutual funds is included in the M3 monetary aggregate and the data are obtained from the Federal Reserve Board.

The fourth variable is the percentage change in the amount of funds held in equity mutual funds. The rationale for this variable mirrors that for the money market mutual fund variable. If investors feel confident, they are more likely to invest in equity mutual funds and to allow previous gains to remain in their accounts. Thus, we might expect that there would be a negative relation between yield differences between Treasury and Refcorp bonds and the amount of funds flowing into equity mutual funds. The data on the amount of funds held in equity mutual funds are taken from the monthly releases of the Investment Company Institute.

Note that in using these 'flow of funds' variables, we are viewing them as potential indicators of public sentiment rather than as actual changes in the quantities of financial assets. If investors place more funds in equity mutual funds, of course, the mutual funds must purchase the equities from other market participants and total financial asset quantities may not change unless corporate equity issuance or repurchase programs are affected. In a market with heterogeneous investors, however, changes in the amounts held in mutual funds may well represent shifts in the household sector's perception of financial market risk.

In addition to these variables, we include two other explanatory variables as controls in the regressions. First, as shown in Table 1, the yield differences between Treasuries and Refcorp bonds are serially correlated. To avoid the risk of finding a spurious relation between the yield spread and one of the explanatory variables with similar time series properties, we include the lagged value of the yield spread as an additional explanatory variable in the regression. Second, while there is effectively no default risk in the Refcorp bonds, there may be a market perception that there is default risk. To control for the possibility that the market believes that Refcorp bonds have credit risk, we include the spread between AAA and BBB rated bonds as a second additional explanatory variable. Thus, if the spread between Treasuries and Refcorp bonds is due to a belief that there is credit risk in the Refcorp bonds, this variable should explain most, if not all, of the difference. Since this variable represents the difference between two corporate yields rather than the difference between a corporate yield and either the Treasury or Refcorp yield, we avoid the situation where the same variable appears on both the left and right sides of the regression. The data on this credit spread are obtained from the Federal Reserve

Board. Table 2 reports summary statistics for the explanatory variables used in the regression.

The regression analysis is conducted by regressing the month-end liquidity spread on the lagged liquidity spread, the changes in the BBB-AAA credit spread, the consumer confidence index, and the foreign holdings of Treasury bonds during the month, and the percentage changes during the month in the aggregate amount of funds in money market and equity mutual funds. The regression results are summarized in Table 3. The results indicate that there is a strong relation between the premium and the measures of Treasury bond popularity. This justifies viewing the difference between the yields of the Refcorp and Treasury bonds as a flight-to-liquidity premium.

As shown, the relation between the liquidity premium and changes in consumer confidence is almost always negative, and is significant for the maturities ranging from two years to 10 years. This is consistent with hypothesis that there is a movement towards the liquidity of Treasury bonds when consumer confidence drops. The results also suggest that Treasury bonds with intermediate maturities become more popular when confidence declines.

The relation between the premium and changes in foreign holdings of U.S. Treasury debt is always negative, and is significant for maturities of six months, two years, and three years. This implies that that investors are willing to pay more for Treasury bonds during periods when domestic investors are buying bonds back from foreign holders. This is clearly consistent with a flight-to-liquidity or Treasury popularity interpretation.

Table 3 also shows that there is a strong positive relation between the premium and the percentage change in funds held in money market mutual funds. The coefficient is positive for all maturities and is significant in seven cases. Since money market mutual funds are conservative investments, this implies that the premium increases during periods where more funds are flowing into less-risky investments. Again, this is consistent with the interpretation that the premium increases when investors behave more cautiously.

The relation between the premium and the percentage change in funds held in equity mutual funds is almost always negative, and is significant for seven of the maturities. Interestingly, the relation is strongest for the shortest and longest maturities. Thus, when investors act confidently by placing more of their assets in the stock market, the flight-to-liquidity premium in Treasury bonds narrows. This is again consistent with the view that the spread between Refcorp and Treasury yield reflects the level of confidence investors have in the market.

The lagged premium is significant for most of the maturities, reflecting the fact that there is a high degree of persistence in the premium. Interestingly, the change in the credit spread is often significant, but is uniformly negative in sign. This strongly

suggests that the premium is not a credit spread. If the difference between Refcorp and Treasury yields was due to perceived credit risk in the Refcorp bonds, we would expect the difference to be positively related to other credit spreads.

5. ALTERNATIVE EXPLANATIONS

In this section, we consider whether there are alternative explanations that could account for the difference in yields between Refcorp and Treasury bonds.

5.1 Differential Taxation

If there were differences in the way that Refcorp and Treasury zero-coupon bonds are taxed, then this might account for some of the flight-to-liquidity premium. In actuality, however, both Refcorp and Treasury bonds receive the identical tax treatment. Specifically, both are treated as capital assets and are subject to the standard original issue discount provisions of Sections 1271-1275 of the Internal Revenue Code for Federal tax purposes. Refcorp and Treasury bonds are not taxable at the state level. Thus, differential taxation does not explain either the level or the variation in the flight-to-liquidity premium.

5.2 Bid-Ask Spreads

Since Treasury securities are more liquid that Refcorp bonds, it is not surprising that Treasury securities have smaller bid-ask spreads. The issue, however, is whether the difference in the size of the bid-ask spreads is such that it might account for the flight-to-liquidity premium. To this end, we spoke with several Wall Street firms that make markets in both Treasury and Refcorp zero-coupon bonds. For institutional investors, the typical bid-ask spread for a Treasury zero-coupon bond is on the order to two to three ticks or 32nds of a dollar per $100 notional face amount. The typical bid-ask spread for Refcorp zero-coupon bonds is slightly larger, usually on the order of three to four ticks. Spreads of this size translate into yield spreads of only about a basis point or two. Since our analysis is based on the midpoints of market quotes, it is unlikely that the difference in the sizes of the bid-ask spread can explain much of the flight-to-liquidity premium. Even more clearly, differences in the bid-ask spreads are unlikely to explain the systematic time variation in the flight-to-liquidity premium.

5.3 Differential Repo Rates

As discussed by Duffie (1996), Longstaff (2000), Liu and Longstaff (2000a), and many others, institutional investors often leverage their positions in Treasury and Agency securities through the use of security repurchase or repo contracts. If there was a systematic difference between the borrowing or repo rates associated with Treasury and Refcorp zero-coupon bonds, then there might rationally be a valuation difference between the two securities to reflect the present value benefit of the reduced financing cost. Our discussions with the Treasury and Agency bond dealers indicated

that few Treasury zero-coupon bonds can be financed at special repo rates.[9] Thus, the premium is unlikely to be due to the difference between general collateral repo rates for Refcorp zero-coupon bonds and special repo rates for Treasury zero-coupon bonds. This leaves open the possibility, however, that there may be a difference between the general collateral rates available for Treasury and Agency collateral. To test whether there is a difference in the general collateral repo rates available for Treasury and Agency securities, we collected monthly data from 1991 to 2001 on general Treasury and Agency collateral repo rates from the Bloomberg system. The mean difference between the two repo rates was only .25 basis points. Thus, differences in the general collateral repo rates between Refcorp and Treasury zero-coupon bonds do not account for the flight-to-liquidity premium.

5.4 Regulatory and Legal Restrictions

Many institutions such as mutual funds, insurance companies, commercial banks, pension and retirement funds, local government entities, etc. have various regulatory and legal restrictions on the types of securities they are permitted to invest in. If, for example, there were many investors who were allowed to invest in Treasury zero-coupon bonds, but not Refcorp zero-coupon bonds, then clientele differences might offer some explanation for premium. To explore this issue, we did an extensive search for institutional investors who had posted their list of permissible investments on the web. These institutions included several dozen states, counties, cities, mutual funds, universities, and other entities. In virtually every case, the institutions were explicitly allowed to hold both Treasury and Agency securities. This accords well with the common Wall Street view that Treasury and Agency securities are virtually perfect substitutes for many purposes.

5.5 Is There an Arbitrage?

The fact that there are significant differences in the prices of securities with identical cash flows in all states of the world immediately raises the issue of why arbitrageurs do not exploit the opportunity and eliminate the spread. The answer to this question most likely lies in the transaction costs that an arbitrageur would experience. Specifically, to benefit from the price difference between a Treasury and Refcorp zero-coupon bond, an arbitrageur would need to buy the Refcorp security and simultaneously short the Treasury security. Furthermore, the arbitrage position might need to be held until the maturity date of the bonds since there is no guarantee that the pricing difference between the bonds would converge to zero prior to the maturity date. In general, shorting a Treasury bond involves a significant cost, which can often exceed 50 basis points per year. In addition, investors typically cannot borrow the Treasury bond they wish to short for a horizon much beyond six months to a year. Thus, there is no guarantee that an arbitrageur would be able to keep his

[9]For a discussion of special repo rates, see Duffie (1996), Jordan and Jordan (1997), and Liu and Longstaff (2000a).

short position until the maturity date of the bonds. Furthermore, Liu and Longstaff (2000b) show that when arbitrageurs face margin requirements, as they would in this case, textbook arbitrages can actually become risky investments which a rational arbitrageur may choose to underinvest in or avoid altogether. Thus, the high cost of shorting Treasury bonds, the uncertainty of being able to hold the short position until maturity, and the risk created by the margin requirements and the fact that the flight-to-liquidity premium could get larger all imply that arbitrageurs may well find it uneconomic to exploit pricing differences, thereby allowing them to persist.

6. CONCLUSION

This paper examines whether there is a flight-to-liquidity premium in U.S. Treasury bond prices. This is done by comparing the prices of Treasury zero-coupon bonds with those of Refcorp zero-coupon bonds. By their nature, Refcorp bonds are effectively guaranteed by the U.S. Treasury and have the same default-free status as Treasury bonds. Thus, the differences between Treasury and Refcorp bond prices can be attributed entirely to liquidity.

We find that the yield spread between Refcorp and Treasury bonds is statistically and economically significant and is directly related to a number of variables such as consumer confidence, the amount of Treasury bonds domestic investors repurchase from foreign holders, and flows into equity and money market mutual funds. These results are consistent with the view that the difference in yields reflects the willingness of investors to pay a premium for the liquidity of Treasury bonds when markets are unsettled. This study provides evidence of a significant flight-to-liquidity component in Treasury bond prices.

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Table 1

Summary Statistics for the Flight-to-Liquidity Premia in Treasury Bond Prices. This table reports summary statistics for the flight-to-liquidity premia for the indicated maturities, where the premium is computed as the difference between the yields on REFCORP and Treasury zero-coupon bonds with the same maturity. The t-statistic for the mean is corrected for first-order serial correlation. The data are monthly from April 1991 to March 2001, and the number of observations for each time series is 120. The flight-to-liquidity premia are measured in basis points.

Maturity in Years	Mean	Standard Deviation	Minimum	Median	Maximum	ρ	t-Statistic for the Mean
.25	13.83	17.14	-35.00	11.00	90.00	.601	4.45
.50	11.61	11.66	-28.00	10.00	62.00	.597	5.52
1.00	11.37	13.46	-13.00	8.00	80.00	.823	2.94
2.00	9.35	10.28	-9.00	6.00	46.00	.767	3.68
3.00	9.66	9.78	-10.00	7.00	44.00	.770	3.96
4.00	10.04	9.54	-7.00	6.00	45.00	.760	4.32
5.00	9.99	9.16	-6.00	7.00	41.00	.752	4.56
7.00	11.41	8.59	-5.00	10.00	35.00	.629	7.00
10.00	13.13	7.40	.00	12.00	38.00	.726	7.84
20.00	14.93	7.58	3.00	13.00	44.00	.815	7.03
30.00	16.28	9.33	2.00	15.00	54.00	.822	6.11

Table 2

Summary Statistics for the Explanatory Variables in the Flight-to-Liquidity Regression. This table reports summary statistics for the variables used as explanatory variables in the flight-to-liquidity regression. The variable Δ Spread is the monthly change in the spread between the BBB and AAA corporate yields measured in basis points. The variable Δ Confidence is the monthly change in the Conference Board Index of Consumer Confidence. The variable Δ Foreign Holdings is the monthly change in the total amount of foreign holdings of U.S. Treasury bonds measured in billions of dollars. MM Mutual Fund Percent is the monthly percentage change in the aggregate amount of funds in money market mutual funds. Equity Mutual Fund Percent is the monthly percentage change in the aggregate amount of funds in equity mutual funds. The data are monthly from April 1991 to February 2001, and the number of observations for each time series is 118.

Variable	Mean	Standard Deviation	Minimum	Median	Maximum	ρ
Δ Spread	-.025	7.526	-25.000	.000	24.000	-.057
Δ Confidence	.253	5.264	-12.900	-.200	12.500	.107
Δ Foreign Holdings	5.881	12.073	-17.932	5.046	45.391	.295
MM Mutual Fund Percent	1.045	1.044	-2.198	1.105	3.704	.595
Equity Mutual Fund Percent	2.149	4.111	-15.881	2.856	11.648	-.098

Table 3

Regression Results. This table reports the estimated coefficients and t statistics from the regression of the flight-to-liquidity premium on the lagged flight-to-liquidity premium and the explanatory variables described in Table 2. The data are monthly from April 1991 to February 2001. * denotes signficance at the 10 percent level; ** denotes significance at the 5 percent level.

$$\begin{aligned}\text{Premium}_t = \beta_0 &+ \beta_1\ \text{Premium}_{t-1} \\ &+ \beta_2\ \Delta\text{Spread}_t \\ &+ \beta_3\ \Delta\text{Confidence}_t \\ &+ \beta_4\ \Delta\text{Foreign Holdings}_t \\ &+ \beta_5\ \text{MM Mutual Fund Percent}_t \\ &+ \beta_6\ \text{Equity Mutual Fund Percent}_t + \epsilon_t\end{aligned}$$

Maturity	β_0	β_1	β_2	β_3	β_4	β_5	β_6	t_{β_0}	t_{β_1}	t_{β_2}	t_{β_3}	t_{β_4}	t_{β_5}	t_{β_6}	R^2
.25	.074	.531	-.304	.0010	-.0016	1.109	-.574	3.28**	6.45**	-1.85*	.41	-1.51	.93	-1.97**	.368
.50	.050	.523	-.251	.0011	-.0013	1.949	-.358	3.13**	6.35**	-2.21**	.67	-1.81*	2.40**	-1.80*	.369
1.00	.015	.797	-.083	-.0007	-.0008	1.341	.062	1.20	12.01**	-.88	-.53	-1.27	1.90*	.37	.689
2.00	.030	.687	-.145	-.0026	-.0012	1.320	-.270	2.94**	10.38**	-1.83*	-2.31**	-2.42**	2.16**	-1.89*	.631
3.00	.028	.709	-.172	-.0023	-.0010	.924	-.149	2.71**	10.94**	-2.28**	-2.11**	-1.97**	1.66*	-1.11	.615
4.00	.027	.735	-.159	-.0030	-.0002	.594	-.189	2.54**	11.08**	-2.08**	-2.72**	-.47	1.05	-1.39	.601
5.00	.027	,716	-.200	-.0029	-.0002	.865	-.235	2.59**	10.91**	-2.78**	-2.79**	-.53	1.64*	-1.84*	.605
7.00	.036	.595	-.059	-.0024	-.0002	1.310	-.072	2.81**	8.05**	-.71	-2.04**	-.36	2.15**	-.49	.434
10.00	.043	.708	-.098	-.0016	-.0002	.372	-.282	3.75**	10.36**	-1.56	-1.73*	-.62	.81	-2.51**	.547
20.00	.028	.790	-.041	-.0000	-.0002	.836	-.194	2.72**	13.89**	-.75	-.01	-.64	2.05**	-1.98**	.679
30.00	.035	.817	-.062	-.0005	-.0004	.436	-.338	3.07**	15.24**	-.94	-.52	-.86	.90	-2.86**	.701

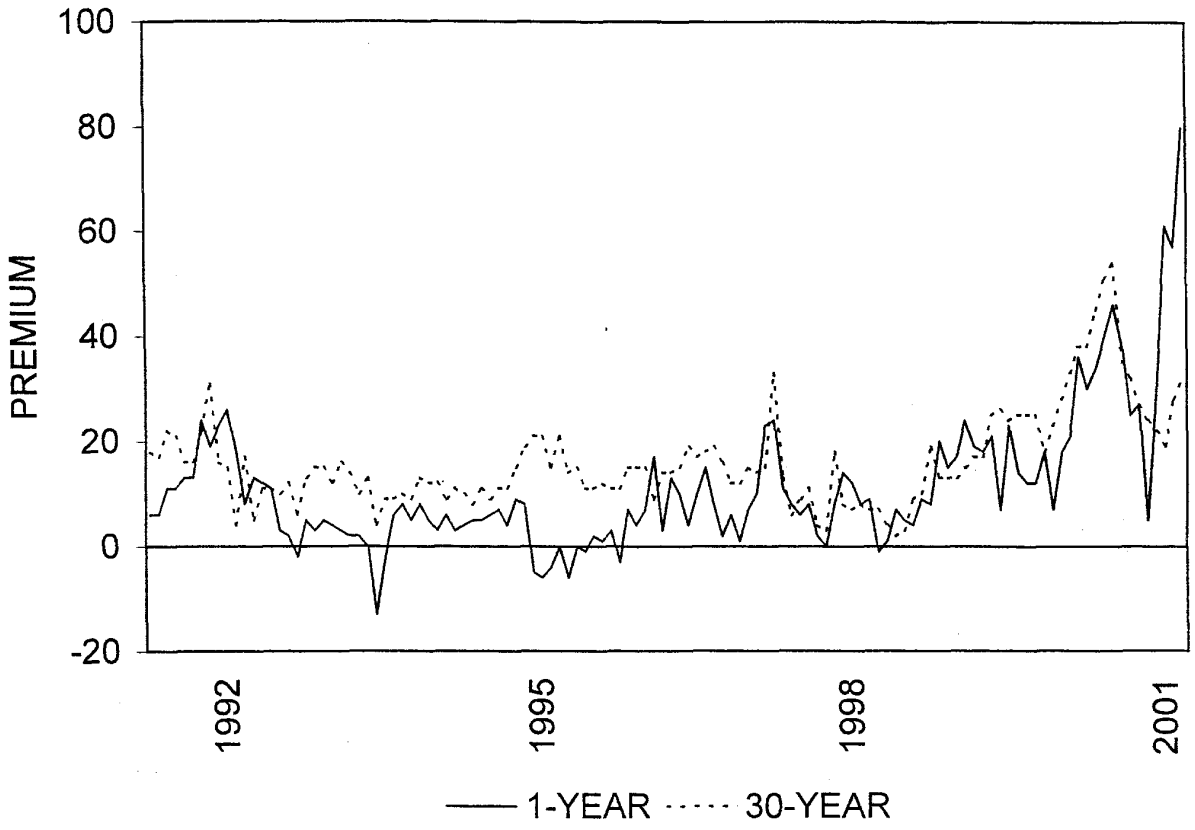

Figure 1. This graph shows the flight-to-liquidity premia for the 1-year and 30-year maturities. The data is monthly from April 1991 to March 2001. The flight-to-liquidity premia are measured in basis points.