THE JOURNAL OF FINANCE • VOL. XXXV, NO. 1 • MARCH 1980

Yields on Privately Placed Corporate Bonds

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I. Introduction

IN MANY HIGHLY ORGANIZED financial markets, investors can substitute easily between alternative financial assets. Differences in asset yields tend to reflect differences in term to maturity (or duration), in risk arising either from possible default or from illiquidity, or in the tax treatment of investment returns. During the 1961–77 period, the average yield on privately placed corporate bonds exceeded those on publicly issued corporate bonds—of roughly similar quality, duration, and tax treatment—by about 50 basis points. Higher flotation costs in public offerings and increased flexibility for borrowers in private placements account for most of this average private-public yield spread of 50 basis points. However, the level of the spread did not remain fixed at 50 basis points but varied over the 1961–77 period from a quarterly low of 5 basis points in 1970:2 to a quarterly high of 94 basis points in 1962:4. While lower flotation costs and greater convenience seem adequate to explain most of the average private-public yield spread, changes in relative cost and convenience do not seem sufficient to explain changes in the spread.

The purpose of this paper is to analyze private placement yields relative to yields on public offerings of roughly similar quality and duration. The parameters of a reduced form private placement yield model are estimated using quarterly data from the 1961–74 period. The empirical results indicate how private placement rates, relative to public rates, are affected by the level of the public rate, changes in this rate, the supply of credit relative to demand in the private market, and interest rate expectations adjusted for uncertainty about future rates. These results provide information about the degree of segmentation between the private and public markets, the impact of interest rate expectations and uncertainty about future rates on private placement rate negotiations, and the rate of adjustment of the private placement market to broader public market conditions. Insofar as the model can be used for forecasting the private-public rate spread, the results are useful for borrowing and lending decisions in the private and public markets for corporate bonds.

The paper consists of three sections. Section I presents a reduced form model of the private placement rate. Empirical results from estimating the parameters of the model are presented in Section III, along with a discussion of the major implications of these results. Section VI is a summary and conclusion.

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* I am extremely grateful to Cathy Randazzo for research assistance and to J. Robert Ferrari, Michael Hamburger, William Melton, Vance Roley, Charles Sivesind, Charles Wolf, and Edward Zinbarg for helpful comments. The paper solely reflects my own views and not those of the Prudential Insurance Company of America.

II. A Reduced Form Model of Private Placement Rates

If public market flotation costs were the only difference between the private and public markets for corporate bonds, the private placement rate (Pri) would be equal to the yield on public issues of similar quality and duration (Pub) plus public market flotation costs (Cost), so that, in implicit form:

$$\text{Pri} = \text{Pri}(\text{Cost}, \text{Pub}) \qquad \text{Pri}_{1,2} > 0 \tag{1}$$

However, one potentially important difference between the private placement corporate bond market and a number of public securities markets is the relative importance of a single purchaser—life insurance companies. Though private and public pension funds have at times been active lenders in the private placement market, life insurance companies purchase the bulk of private placement issues. Moreover, their purchase of publicly offered bonds is relatively limited. If life insurance companies are not able to shift between the private and public markets on the basis of rate spreads, changes in the supply of funds to life insurance companies (Life) relative to overall economic activity (GNP) or credit demand could change private placement yields relative to public yields, so that:

$$\text{Pri} = \text{Pri}(\text{Cost}, \text{Pub}, \text{Life/GNP}) \qquad \text{Pri}_{1,2} > 0 \qquad \text{Pri}_3 < 0 \tag{2}$$

A second distinctive feature of the private placement market—and one that also could cause private rates to vary relative to public rates—is the six month lag, on average, between the commitment of private placement funds by the lender and the actual delivery of these funds to the borrower. If private placement borrowers and lenders forecast rate changes over the period between the time of commitment and the time of takedown, then these expected rate changes ($\overline{\Delta R}$) would affect private commitment rates relative to contemporaneous public rates, so that:

$$\text{Pri} = \text{Pri}(\text{Cost}, \text{Pub}, \text{Life/GNP}, \overline{\Delta R}) \qquad \text{Pri}_{1,2,4} > 0; \qquad \text{Pri}_3 < 0 \tag{3}$$

If borrower and lender use of rate forecasts is positively related to their confidence in these forecasts, the size of the coefficient of $\overline{\Delta R}$ should be inversely related to uncertainty about future rates (VarR), in which case:

$$\text{Pri} = \text{Pri}(\text{Cost}, \text{Pub}, \text{Life/GNP}, \overline{\Delta R}/\text{VarR}) \qquad \text{Pri}_{1,2,4} > 0; \qquad \text{Pri}_3 < 0 \tag{4}$$

Dividing $\overline{\Delta R}$ by VarR in this reduced form equation for Pri was suggested by the structural model of the supply of life insurance company commitments developed by Lintner [6]. Lintner assumed that interest rates and life insurance company cash flows are inversely related and that life insurance companies are averse to running out of funds. From these two assumptions, Lintner rigorously demonstrated that the supply of commitment funds by life insurance companies is inversely affected by expected rate changes divided by the uncertainty about these changes. Initially, I thought that VarR should also affect Pri independently of $\overline{\Delta R}$ and with a positive sign. Such an effect, however, requires assymetric borrower-lender behavior, with lenders demanding higher rates to compensate for increased uncertainty while borrowers fail to insist on lower rates in the presence of uncertainty.

A third difference between the private placement market and dealer markets in public issues is the direct contact between borrowers and lenders. Such contact provides an opportunity to vary not only the yield but also various non-price parameters that concern borrowers and lenders. In another direct contact market, that for home mortgages, Fair and Jaffee [1] suggest that varying non-price factors may cause rates—and also the housing expenditures financed by home mortgages—to adjust with a lag to changes in public market rates. This lag would most likely occur during periods of high and rising rates if home mortgage lenders ration mortgage credit by raising down-payment and other requirements, rather than raising rates by the full amount of the rise in public market rates.

An alternative explanation implying lagged adjustment in direct placement markets—and one that does not require the market disequilibrium and credit rationing emphasized by Fair and Jaffee—was suggested by Guttentag [4] in another study of the home mortgage market. Guttentag observed that home mortgage yields lag public rate changes to a degree that cannot possibly be explained by variations of non-price parameters in home mortgage contracts. He suggested that the lag occurred not because of credit rationing but because lenders, in a direct and personalized market, are averse to sharp changes in rates. They therefore allow changes in public rates to persist for several weeks or months before adjusting their own rates.

This discussion of the direct contact between borrowers and lenders in the private placement market suggests that private placement rates may lag public rate changes, either because of credit rationing or because of lender aversion to sudden rate changes. To test for lagged adjustment, the lagged value of the public rate is introduced into Equation 4 to obtain:

$$\text{Pri} = \text{Pri}(\text{Cost}, \text{Pub}, \text{Life/GNP}, \overline{\Delta R}/\text{VarR}, \text{Pub}(-1))$$

$$\text{Pri}_{1,2,4,5} > 0; \qquad \text{Pri}_3 < 0 \quad (5)$$

Equation 5 assumes, of course, that Pri and Pub are yields on issues of similar maturity. For the sake of completeness and without trying to determine its sign, an additional variable (Mat) is introduced into Equation 5 and will be defined so as to capture the differences in maturity between private and public issues, so that:

$$\text{Pri} = \text{Pri}(\text{Cost}, \text{Pub}, \text{Life/GNP}, \overline{\Delta R}/\text{VarR}, \text{Pub}(-1), \text{Mat})$$

$$\text{Pri}_{1,2,4,5} > 0; \qquad \text{Pri}_3 < 0; \qquad \text{Pri}_6 \gtrless 0 \quad (6)$$

III. Empirical Results

The parameters of Equation 6 were estimated with quarterly data for the 1961:1–1974:2 period. The variables were measured as follows:

Pri: Life insurance companies holding about two thirds of total industry assets report private placement yields to the American Council of Life Insurance. Except for a small proportion of private placements with special characteristics, such as foreign issues or issues with conversion features, these placements are broken down into four rating categories,

which correspond roughly to Moody's four highest rating categories. The fourth category, roughly Moody's Baa, is the largest. The results using the yield for the fourth category are used here. Results using the composite yield are quite similar to the reported results. Because of a 6 week lag, on average, between the time of negotiation (when rates are set) and commitment (when rates are reported), leads of one and two months as well as the current value of the private placement yield series were used in the estimation. The one month lead provides the best results, in terms of R-squared and t-statistics, and these results are reported here. The coefficient of the public rate is about ⅓ smaller when the current private rate is used and about ⅙ larger when the two quarter lead is used. The other coefficients are very insensitive to the choice among these values of Pri.

Cost: Cost, assumed to be constant and equal to the average value of the private-public rate spread over the 1961–74 period of estimation, is not included as a separate variable.

Pub: The rate on new Baa corporate issues was used to measure Pub. The absence of new Baa issues during late 1974 and early 1975 prevented continuous estimation outside the 1961–74 period. To extend the period of estimation and also to use a series based on a larger number of issues, the equation for Pri was estimated for the 1961–77 period using the rate on new Aa utility issues. The 1961–77 results using the Aa utility rate are quite similar to the reported results.

Life: GNP Life is measured as the net acquisition of financial assets by life insurance companies less increases in their policy loans. Results using the absolute level of Life instead of the ratio of Life to GNP are similar to the reported results.

$\overline{\Delta R}$: The expected changes in both private and public rates were used as measures of $\overline{\Delta R}$. For both the private and public measures, $\overline{\Delta R}$ was initially constructed, as in Lintner, Piper and Fortune [7], by subtracting the current rate from its moving average over the past year. For both private and public measures, $\overline{\Delta R}$ was subsequently constructed by subtracting the current rate from an estimate of the expected rate conditional on the set of rates from the past year. Results for both private and public measures of $\overline{\Delta R}$, constructed using both the moving average and the conditional estimates of the expected rate, are quite similar. The reported results are for the expected change in private rates, with the expected rate estimated conditional on the past set of rates. The reported results are also related to those of Fleuriet [3], who tested for expectations effects using a forward rate measure of the expected rate. (Fleuriet used the yield on higher quality public issues allowing the calculation of a forward rate.)

VarR: Following Lintner, Piper and Fortune [7], VarR is measured as the variance, over the past year, of the private commitment rate (when $\overline{\Delta R}$ is measured using private rates) and of the public rate (when $\overline{\Delta R}$ is measured with public rates).

Mat: Differences in the average maturity of private and public issues could lead to differences in relative rates, if default premiums vary with term

to maturity. Also, differences in maturity or duration would cause relative rates to vary with the cycle in the term structure of rates. There do not appear to have been any systematic differences in the term to maturity of private and public issues. However, call protection has been somewhat stronger on private placements than on publicly offered utility issues, though similar in strength to the call protection on industrial issues sold publicly. Insofar as data permitted, the sensitivity of the results to the alternative use of industrial and utility public rates was analyzed. The results appear to be insensitive to the choice, suggesting that stronger call protection on private issues, which would lower their yield relative to public rates during periods of high rates, exerted little if any effect on the private rate relative to the public rate.

Using ordinary least squares regression analysis (and the Hildreth-Lu procedure to adjust for autocorrelation of the residuals), the parameters of the equation for Pri were estimated for the 1961:1-1974:2 period. The parameter estimates are presented below, with t-statistics in parentheses below the repression coefficients.

$$\begin{array}{lllll} \text{Pri} = 1.43 & +.58\ \text{Pub} & +.000\ \overline{\Delta R}/\text{VarR} & -27.8\ \text{Life/GNP} & +.36\ \text{Pub}(-1) \\ \quad (4.50) & (12.46) & (.74) & (-1.63) & (7.74) \end{array}$$

$$\text{Adj. } R^2 = .994 \qquad \text{DW} = 1.99 \qquad \rho = .65 \qquad \text{S.E.} = .133$$

As measured above, the major role of life insurance companies as suppliers of private placement funds (and their limited supply of funds to the public market) suggests that changes in the supply of life insurance funds relative to total credit demand induce an opposite change in private yields relative to public yields. In the reported estimates, the negative coefficient of Life/GNP indicates that private rates move inversely to changes in life insurance flows. This inverse response suggests some degree of segmentation between the private and public markets for corporate bonds, but the size of the negative coefficient of Life/GNP and its t-statistic suggest that this segmentation is fairly limited. This evidence showing little market segmentation is consistent with that of Wolf [9], who identified a large number of borrowers able to shift between the private and public markets and thereby offset the effects of exogenous supply shifts on the private-public rate spread. This evidence is also consistent with that of Modigliani and Sutch [8] on the term structure and of Jaffee [5] on the risk structure, where the primary determinants of the rate structure were behavioral parameters of the general economy—such as liquidity premiums, cyclical change in default risk, etc.—rather than supply and demand shifts in particular markets. On the other hand, Fair and Malkiel [2] report segmentation between the government and corporate bond markets.

If, as mentioned above, borrowers and lenders in the private placement market explicitly compare current commitment rates and expected future rates in negotiating private rates and condition their use of rate forecasts on their confidence in these forecasts, an increase in the expected rate change adjusted for rate uncertainty between commitment and takedown should raise the private rate relative to the contemporaneous public rate. In the reported results, the coefficient of $\overline{\Delta R}/\text{VarR}$ is virtually zero. Apparently, despite the lag between commit-

ment and delivery of funds, lender and borrower behavior in the private placement market is not affected by expected rate changes adjusted for rate uncertainty.

In structural estimates of the supply of life insurance commitments, Lintner, Piper and Fortune [7] report a negative effect of expected rate changes adjusted for rate uncertainty. Insofar as negative expectations effects in these supply equation estimates imply a positive expectations effect in the reduced form equation estimated in this paper, the absence of expectations effects in the reported estimates contrasts with these structural estimates of commitment supplies. The reported results also contrast with those of Fleuriet [3], who used a forward rate to measure the expected rate and reported a positive rate expectations effect on the private-public rate spread. However, in Fleuriet's work, the rate expectations variable affects private rates with a lag. In view of the .997 correlation between the current rate and Fleuriet's forward rate measure, lagged adjustment of the private rate to his forward rate measure of rate expectations is directly implied by lagged adjustment of private rates to public rates, completely apart from expectations effects on private placement rate negotiations.

Lagged adjustment of the private rate to the public rate, even when the private rate is lead by one month to adjust for a six week reporting lag, is strongly revealed in the reported estimates. In addition to the current value of the public rate, the major determinant of the private rate is last quarter's public rate. The coefficients of Pub and Pub(−1), .58 and .36, imply that, in the current quarter, the private rate adjusts by only .58 of a change in the public rate. Within two quarters, however, the private rate adjusts by almost the full amount of the public rate change. (When the private rate series is led by two months, the coefficients of Pub and Pub(−1) are .69 and .29. In addition to lagged adjustment, the positive coefficient of Pub(−1) may partly reflect the still longer reporting lags of some of the companies in the ACLI sample.)

These results, which suggest that private placement lenders take a quarter or so to fully adjust their quotes to public market conditions, may reflect non-price credit rationing in the private placement market. As mentioned above, Fair and Jaffee [1] interpret lagged adjustment in the housing market as evidence of credit rationing and market disequilibrium in the home mortgage market. Guttentag [4] indicated, however, that during the 1951–63 period, variations in down payment requirements and in maturities on conventional mortgages exerted almost no effect on effective lending rates in the home mortgage market. Discussions with a number of large private placement lenders suggest that private placements lenders make very few changes in the private placement contract over the credit cycle. For a given quality issue, the loan contract is quite standard, and commitment fees vary quite narrowly around a standard fee of ½ of one percent.

Apart from an apparent lack of non-price credit rationing in both the private placement and home mortgage markets, it is not clear why a lagged private rate response due to rationing in the private placement market should persist for only one quarter, rather than for the duration of a credit crunch. The alternative explanation of why private placement lenders take a quarter to fully adjust their quotes to public market conditions—and one that does not require credit rationing—is that private placement lenders are averse to sudden rate changes and try to adjust their rates gradually to rate changes in the public markets. Such a

lagged response may seem inconsistent with the generally perceived sophistication of private market lenders. However, Guttentag argues that such lagged and stepwise movement of rates is advantageous in direct contact markets and provides the most satisfactory explanation of the lagged rate adjustment in the home mortgage market. Similar adjustment lags occur in the commercial loan market. Under the Citibank formula, the movement of the prime rate (and the effective lending rate, as well) lags the commercial paper rate by several weeks, and the lag may well have been longer before Citibank introduced its formula.

IV. Summary and Conclusion

Rates on privately placed corporate bonds vary relative to rates on public issues of similar quality, duration and tax status. This paper estimates the effects of three private placement market characteristics—the primary role of life insurance companies as suppliers of private placement funds, the lag between commitment and delivery of these funds, and the direct contact between borrowers and lenders in the private placement market—on private rates relative to public rates. The estimates imply a modest effect of life insurance company flows (and implied market segmentation) on private rates and virtually no effect of the commitment-takedown lag and associated rate expectations on private rates. The major variation in private rates relative to public rates occurs because of a one quarter lag in the complete adjustment of private rates to public rate changes. This lag may reflect credit rationing. However, a more likely explanation is that private placement lenders, as lenders in other informally organized markets such as those for commercial loans and home mortgages, are averse to sharp changes in rates. As a result, they gradually adjust their rates—over a period of perhaps 4 to 8 weeks—to changes in public market rates.

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