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# The Firm's Decision to Issue Debt Privately: Motivations and Costs

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To the Graduate Council:

I am submitting herewith a dissertation written by David William Blackwell entitled "The Firm's Decision to Issue Debt Privately: Motivations and Costs." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

David S. Kidwell, Major Professor

We have read this dissertation and recommend its acceptance:

Ronald E. Shrieves, F. Y. Lee, Ronnie J. Clayton, John L. Trimble

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Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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# THE FIRM'S DECISION TO ISSUE DEBT PRIVATELY: MOTIVATIONS AND COSTS

A Dissertation

Presented for the

Doctor of Philosophy

Degree

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David William Blackwell

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# ABSTRACT

This dissertation examines the issue cost of public utility debt sold publicly and privately from June 1979 to December 1983 and determines: (1) whether private and public debt have the same issue cost for firms who substitute between private placements and public sales (switch hitters), ceteris paribus; (2) whether issue cost differences between public issues and private placements by switch hitters vary with the degree of market uncertainty; (3) whether firms who do not substitute between private placements and public sales (non-switch hitters) choose to issue debt privately because the agency costs of debt can be resolved less expensively in the private market than in the public market; and (4) whether the benefits which non-switch hitters obtain from issuing privately increase as agency costs of debt increase.

The dissertation's findings suggest that for switch hitters, there is no cost difference on average between public issues and private placements sold during our test period. This finding suggests that switch hitters view the two methods of sale as close substitutes. However, when credit market conditions are uncertain the results are much different. During periods of volatile interest rates such as 1980-1981, switch hitters can save an average of 49 basis points by issuing debt privately rather than publicly. This cost saving was not evident during more stable periods such as 1979 III and 1983.

The results of the tests on non-switch hitters support an economic rationale for the existence of the private placement market. The tests

indicate that below investment grade issues by non-switch hitters would have had substantially higher issue costs had they been sold publicly. Further, the findings show that the cost advantage of private placements over public issues increases as agency costs of debt increase. For investment grade non-switch hitters, the tests indicate no cost difference between private placements and public issues; presumably, these firms could have issued publicly without incurring additional issue costs. However, these firms sell their debt privately because their issues are too small to enjoy a successful public sale.

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# CHAPTER 1

## INTRODUCTION

There is controversy between academics and corporate financial officers over whether private placement of new issues of corporate debt is more expensive than public sale.[1] Academics present empirical evidence which suggests that issuing debt privately is more costly than issuing publicly. Practitioners counter that there are good reasons for issuing debt privately and when their firms do so, they are getting something in return for the higher yields they pay.[2]

Research by Cohan [14], Wolf [66], and Zwick [68] indicates that private yields exceed public yields on average. These studies argue that the private placement market exists primarily to serve smaller companies with relatively high default risk and that some of these borrowers (non-switch hitters) do not have the ability to substitute between public and private issues of debt. Other firms which are larger and have a higher credit standing (switch hitters) are able to substitute between markets. For these firms, the decision to sell debt privately or publicly should be determined by which method of sale is least expensive. Wolf empirically verified that some firms are less

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[1] A private placement is a method of issuing new debt in which the issuer sells the securities directly to the ultimate investor. In public issues, an underwriter purchases the securities from the issuer and then resells them to the public.

[2] This knowledge comes from discussion with a corporate financial officer and an investment banker who advises on private placements.

able to substitute than others by showing that his sample of large, financially secure firms (taken from the Fortune 500) were more sensitive to the yield spread between public and private markets than smaller, riskier firms regarding the decision to issue debt privately. Thus, these studies ([14], [66], [68]) may have found private placements more expensive than public sales because private issues have higher default risk than public issues, on average.

For firms that are able to substitute between private placements and public issues these empirical results are at odds with economic theory for two reasons. First, if private placement is consistently more expensive than public issuance, why would any firm who has a choice choose the more expensive method of sale? Second, in the absence of capital market imperfections, method of sale should not affect new issue borrowing costs because private placements and public issues would be perfect substitutes. On the other hand, for firms unable to substitute between private placements and public issues, there are good economic reasons for issuing privately because it is easier and less expensive to resolve debt-related agency problems with a private placement than with a public sale.

## Purpose of the Dissertation

This dissertation explains the observed issue cost differences between the private and public debt markets and shows that the cost difference can be accounted for by differences in firm characteristics, issue characteristics and market conditions. Previous studies were unable to account for these differences either because they used

aggregate economic data or because they lacked detailed information about the characteristics of individual private placements. In either case, it is not possible to make issue cost comparisons holding all other factors constant; thus, any cost differences found in previous studies may be statistical artifacts of misspecified empirical models. Because we gathered detailed information about private placements from questionnaires sent to the issuers, we are able to use multiple regression to hold firm characteristics, issue characteristics, and market conditions constant. This dissertation examines the issue cost of public utility debt sold publicly and privately from June 1979 to December 1983 and determines: (1) whether private and public debt have the same issue cost for switch hitters, ceteris paribus; (2) whether issue cost differences between public issues and private placements by switch hitters vary with the degree of market uncertainty; (3) whether non-switch hitters choose to issue debt privately because they agency costs of debt can be resolved less expensively in the private market than in the public market; and (4) whether the benefits which non-switch hitters obtain from issuing privately increase as agency costs of debt increase.

## Summary of the Findings

The dissertation's findings suggest that for switch hitters, there is no statistically significant cost difference on average between public issues and private placements sold over the entire test period. This finding suggests that switch hitters view the two methods of sale as close substitutes. However, when credit market conditions are

uncertain the results are much different. During periods of volatile interest rates such as 1980-1981, switch hitters can save an average of 49 basis points by issuing debt privately rather than publicly. This cost saving was not evident during more stable periods such as 1979 III and 1983.

The results of the tests on non-switch hitters supports an economic rationale for the existence of the private placement market. The tests indicate that below investment grade issues by non-switch hitters would have had substantially higher issue costs had they been sold publicly. Further, the findings show that the cost advantage of private placement over public issues increases as agency costs of debt increase. For investment grade non-switch hitters, the tests indicate no cost difference between private placements and public issues; presumably, these firms could have issued publicly without incurring additional issue costs. However, these firms sell their debt privately because their issues are too small to enjoy a successful public sale.

## Organization of the Dissertation

Chapter 2 describes the market for privately placed debt. Chapter 3 develops theoretical reasons for why there may be issue cost differences between publicly and privately issued debt. Chapter 4 reviews past empirical studies of the cost difference between public issues and private placements, develops the empirical model to test the dissertation's hypotheses, and describes the data. Chapter 5, tests the hypotheses and discusses the findings. Finally, Chapter 6 summarizes the dissertation and draws conclusions from the findings.

# CHAPTER 2

# THE MARKET FOR PRIVATELY PLACED DEBT

This chapter: (1) discusses the origin and development of the private placement market; (2) discusses the borrowers and lenders in the private placement market; (3) describes how a private placement deal is conducted; and (4) discusses the distinguishing characteristics of the private placement market.[3] The next chapter presents theoretical arguments for why private placements and public issues have different issue costs.

## Origin and Development of the Private Placement Market

The private placement is a method of issuing new debt securities in which (1) the issuer and the investor directly negotiate the terms of the issue, and (2) title to the securities passes directly to the investor.[4] Since the 1930s, private placements have been an important means of raising capital in the United States. Today, nearly 40 percent of all corporate debt is issued privately. We now discuss the early history and development of the private placement market.

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[3]The discussion in this chapter is a synthesis of much institutional detail surrounding the private placement market. For more information, the reader is referred to Corey [16], Investment Dealer's Digest [31], Kidder, Peabody, and Co. [40], and Shapiro and Wolf [53].

[4]The negotiation may take place with or without a financial advisor such as an investment banker.

Early History of the Private Placement Market

The private placement market became active in the early 1930s. Developments on both the demand and supply sides of corporate debt markets stimulated the use of private placements as investment vehicles for institutional investors and as a means of financing for corporations.

On the demand side, the growth of large institutional investors beginning in the 1920s mirrored the growth of the private placement market. Table 1 shows the growth in life insurance company assets between 1920 and 1950. During this period income of life insurance companies increased from $1.8 billion in 1920 to $10.3 billion in 1949. Thus, there was substantial growth in life insurance company cash flows relative to corporate debt available for investment. Also, life insurance companies had a competitive edge in supplying funds in the private placement market because they had large amounts of money available for investment. Until the 1950s, few other firms had the assets or cash flows necessary to lend large amounts of money to private borrowers. In the early 1950s, pension funds began competing with life insurance companies as a supplier of funds in the private placement market. Both Shapiro and Wolf [53], and Longstreet and Hess [45] agree that the private placement became an important means of corporate financing because of the institutionalization of savings and the resulting large amounts of cash available for investment by institutional investors.[5]

[5] Shapiro and Wolf [53] also state that a shift in acquisitions of corporate bonds from individuals to life insurance companies precipitated private placements.

TABLE 1

TOTAL ASSETS OF U.S. LIFE INSURANCE COMPANIES:
1920-1950

| Year | Total Assets ($ billions) |
|---|---|
| 1920 | $7.3 |
| 1930 | 18.9 |
| 1935 | 23.2 |
| 1940 | 30.8 |
| 1945 | 44.8 |
| 1950 | 64.0 |

Sources: Corey [16, p. 17], and Cohan [15, Table X, p. 32].

On the supply side, the enactment of the Securities Act of 1933 stimulated firms to issue debt by private placement.[6] The act, which was designed to protect the unsophisticated investor, increased the costs and inconvenience of issuing debt publicly because public issues had to be registered with the Securities and Exchange Commission (SEC). The SEC exempted private placements from the registration requirement because "the issues presumably would be sold to a small number of institutional investors who had the capacity to investigate the security and the issuer before purchasing."[7] The passage of the Securities Act of 1933 coincides with a considerable increase in the amount of private placements relative to total new bond issues.[8] Scholars generally agree that this sharp increase in the relative amount of private placements is attributable to the costs of complying with SEC registration and disclosure requirements.[9]

Development of the Private Placement Market

Use of the private placement increased steadily from the passage of the Securities Act of 1933 until 1950. The dollar volume of private placements as a percentage of total debt offerings grew from

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[6]See discussion by Shapiro and Wolf [53], Longstreet and Hess [45], and Jarrell [33].

[7]Shapiro and Wolf [53], p. 2.

[8]See study by Jarrell [33].

[9]See Shapiro and Wolf [53], Longstreet and Hess [45], and Jarrell [33].

0.2 percent in 1933 to 45.3 percent in 1950.[10] This growth is attributable to the advantages of issuing debt privately, which are (1) the absence of registration and disclosure requirements for private placements, (2) the flexibility of the private loan agreement, and (3) low flotation costs of private placements as compared with public issues.[11] The percentage of private placements to total issues declined from 57.1 percent in 1951 to 27.8 percent in 1958.[12] This decline in growth resulted from the decline in the growth of life insurance company cash flows relative to the growth of the supply of corporate debt. This increase in relative supply caused the yield differential between public issues and private placements to widen so that public sales became much less expensive than private sales.

From the early 1960s to 1983, the volume of private placements has steadily increased while the private placement market's share of total debt financing continues to decline. Table 2 shows that during the mid 1970s private placement market share increased significantly over the 1960s and early 1970s; however, the market share never reached the high levels attained during the 1950s. There are two recent developments in the capital markets which may result in a further decline in the use of private placements. First, the private placement is in competition with financial innovations of the 1980s such as the junk bond market

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[10] See study by Jarrell [33].

[11] See Cohan [14], pp. 15-16.

[12] See studies by Cohan [15] and Atkinson [4].

TABLE 2

PRIVATE PLACEMENTS AS A PERCENTAGE OF TOTAL
DEBT OFFERINGS: 1973-1983

| Period | Total Debt Offerings ($ billions) | Private Placements ($ billions) | Private Placements as a Percent of Total (%) |
|---|---|---|---|
| 1973 | $19.1 | $5.7 | 29.8 |
| 1974 | 36.9 | 9.6 | 26.0 |
| 1975 | 48.8 | 11.8 | 24.2 |
| 1976 | 52.4 | 20.5 | 39.1 |
| 1977 | 51.3 | 23.7 | 46.2 |
| 1978 | 45.1 | 21.7 | 48.1 |
| 1979 | 48.4 | 19.5 | 40.3 |
| 1980 | 56.1 | 14.5 | 25.8 |
| 1981 | 63.7 | 16.7 | 26.2 |
| 1982 | 68.5 | 18.6 | 27.2 |
| 1983 | 80.3 | 29.6 | 36.9 |

Sources: Hawkins [26, Table I, p. 57], and Kidder, Peabody, and Co. [40, Market Review, 1981-1983].

and adjustable rate preferred stock.[13] Second, large corporations can achieve the speed of issuance of the private placement by issuing securities publicly under the recently adopted SEC Rule 415 (shelf registration).[14]

## Borrowers in the Private Placement Market

There are two types of borrowers in the private placement market. First, there are large, well-known firms with high credit standing who substitute between public issues and private placements. We call these issuers switch hitters. Second, there are small, risky companies who do not substitute between public issues and private placements. We call these issuers non-switch hitters.

The traditional role of the private placement market has been to serve the long-term financing needs of non-switch hitters. There are three reasons that non-switch hitters choose to confine their borrowing to the private placement market. First, because these firms are small, they only need to issue small amounts of debt at one time. Flotation costs for a private placement are much lower than for a public issue; and because these costs are fixed with respect to issue size, firms with small issues tend toward the private placement market.

Second, non-switch hitters may have unusual borrowing needs. In particular, borrowers with extremely risky projects may find it

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[13] See Kidder, Peabody, and Co. [40, 1983, p. 1].

[14] Rule 415 allows a firm to register all securities it plans to issue over the next 2 years and put them on the "shelf," from which they may be issued at the firm's convenience.

difficult to include nonstandard provisions in the indenture of a public bond issue without sacrificing marketability. On the other hand, lenders in the private placement market may be more willing to accept unusual features in the indenture. In fact, some non-switch hitters may confine their borrowing to the private placement market because they find it prohibitively expensive to adhere to standardized provisions in public bond indentures. Cohan [14] states that the private placement market grew largely because

> certain types of unconventional ventures have been able to obtain financing that would not have been so readily available, and might not have been available, elsewhere. The financial institutions are able to provide the "custom tailoring" service because they enter the market as ultimate purchasers (i.e., they are not wholesalers as are investment bankers), and they are free therefore to buy issues on the merits thereof, without regard to whatever fashions, traditions, or prejudices may dominate the public securities market.[15]

Finally, non-switch hitters may borrow in the private placement market because they can do so less expensively than in the public market. Cohan presents evidence that yields on low quality issues tend to be lower in the private placement market than in the public market. He explains this seeming paradox by asserting that private placement lenders have a preference for these higher yielding, low quality issues, and hence may offer somewhat lower yields to these borrowers to entice them away from the public market.[16]

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[15] Cohan [15, pp. 5-6].

[16] Cohan [15, pp. 22-23].

Switch hitters shift their borrowing activity from public markets to private markets if they find private yields, net of flotation costs, to be lower than public yields. Thus, these issuers are seeking to employ the least costly method of selling their securities. The ability to directly negotiate the terms of the loan agreement does not attract these borrowers to the private placement market. Switch hitters employ standard provisions in their private placement loan agreements so that their private issues are almost identical to their public issues. The cost savings to switch hitters occur because they typically make large issues and are able to take advantage of economies of scale in flotation costs.

## Lenders in the Private Placement Market

The composition of lenders in the private placement market is determined by regulatory restrictions surrounding investment in private placements. The Securities Act of 1933 officially recognized private placements and stipulated that they only be sold to sophisticated investors. Sophisticated investors are presumed to be able to undertake intelligent credit analysis and to bear the risk associated with their investment decisions. Further, the act limits the number of investors in a private placement. Thus, virtually all private placements are purchased by the fifty largest life insurance companies. Smaller amounts are purchased by smaller insurance companies and pension funds, and more recently by commercial banks and savings and loan associations.

Institutional investors are attracted to the private placement for three reasons. First, institutional investors prefer larger issues because the total cost of performing a credit analysis is fixed regardless of the size of the issue. Thus, the per dollar cost of credit analysis is lower, the larger the issue.

Second, institutional investors are attracted to the private placement market because a more complete credit analysis of the proposed security is possible than in a public offering. In the private market, the investor deals directly with the issuer and thus, may have access to more information about the issuer than in the public market.

Finally, these institutions have low effective tax rates and are attracted by the higher before-tax yields in the private placement market. These higher yields are accompanied by the greater default risk of private placements on average, but investors perceive that the effective risk they bear is lower because of the tailor-made terms and provisions of the loan agreement. While the issuer uses tailor-made terms to provide for unique situations, the institutional investor can negotiate for more protective features. Also, because the investor conducts a detailed credit analysis, there is less uncertainty about the actual default risk of the issuer than if they relied on bond ratings. On the other hand, default risk on rated public issues varies widely within bond rating categories.

## Bringing a Private Placement to Market

Once firms decide to issue debt privately, they assess the availability of funds; determine which institutional investors are

currently lending actively; analyze the types of securities that investors are currently demanding; and forecast what level of interest rates will attract investment.[17] From this analysis, firms compile a list of prospects whom they plan to contact about investing in their private issues, and design the characteristics of their issues.

The specifics of the propose issue are included in what is called the private placement memorandum. This document is also referred to as a financing memorandum or an offering circular.[18] The memorandum is analogous to a prospectus in a public issue and is prepared by the issuer, usually with the help of the investment banker advising on the placement. The preparation of the document is usually accomplished in a few weeks. Included in the memorandum are: (1) a description of the issue to include amount, interest rate, payment schedule, offering price and maturity date; (2) an outline of the redemption features such as call provisions or sinking fund requirements; (3) a listing of restrictive covenants; (4) a description of how the proceeds of the issue will be used; and (5) any relevant information on the financial strength of the firm--e.g., annual reports, proxy statements, or earnings projections.[19]

Once the private placement memorandum is prepared, the firm or its adviser will begin contacting potential lenders by telephone. Over the

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[17]Much of this section is summarized from Davey [17].

[18]See Davey [17, p. 9].

[19]See Davey [17, pp. 10-11].

phone, the prospective purchasers are given a brief verbal description of the issue. If the potential investors express interest, they are immediately sent a copy of the memorandum. If after examining the memorandum the investor is interested in the issue, he contacts the issuer and negotiations over the interest rate and covenants begin.

If negotiations are successful and a preliminary agreement is reached the prospective lender undertakes a detailed credit analysis of the firm. A typical investigation includes an analysis of information in the memorandum and the financial statements, meetings with the firm managers, and inspection of the firm's physical assets.

If the lender is satisfied with the results of the credit analysis, a final meeting between the firm's management and the lender takes place. During this meeting the interest rate is agreed upon and the other terms of the agreement are settled. The date of this final meeting is the commitment date (also called the circle date) and is the day upon which the interest rate is set and the delivery of funds is committed.[20] Actual delivery of the funds may take place from one week to six months after the funds are committed. The delivery date is known as the takedown date. The issuer may take down the entire amount of the issue at one time or may take down portions of the issue on several different dates.

Once the terms are agreed upon, a formal loan agreement is drawn up by independent attorneys retained by the investor, but approved and

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[20]The entire process may be completed within a week or it may take up to 90 days, depending on whether the borrower has issued privately before.

paid by the issuer. Most loan agreements contain five sections.[21] The first section describes the agreement--specifying the amount borrowed, the interest rate, and the takedown dates. The second section specifies the details of any prepayment provisions, to include the call provision and sinking fund requirements. The next section includes affirmative covenants which specify certain acts to be performed by the borrower over the term of the loan. These acts might include the delivery of quarterly financial statements to the lender or the maintenance of property insurance. The fourth section includes the negative covenants which specify certain acts not permitted by the borrower. Negative covenants include dividend restrictions or restrictions on subsequent issuance of senior debt. The final section includes a variety of items: (1) default remedies, (2) agreement by the lender not to resell the debt publicly, (3) procedures for changing the loan agreement, (4) agreement by the borrower to pay legal fees, and printing and engraving fees, and (5) definitions of key terms used in the negative covenants.

## Distinguishing Characteristics of Private Placements

There are several characteristics which distinguish the private placement from a typical public debt issue. First, the private market is much more personal than the public market. In a private placement the borrower and lender meet face to face to bargain over the interest

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[21]This description of the loan agreement is summarized from Zinbarg [67].

rate and to negotiate the terms of the loan agreement. Also, the private borrower deals with a single lender or a very small group of lenders. As a result, it is much easier to renegotiate the terms of the loan agreement. The renegotiation of terms is a practical impossibility for a widely held public issue.

Second, an investment banker plays a different role in a private placement than in a public issue. In the private placement, the investment banker serves as an adviser. At no time does the investment banker bear the risk of an unsuccessful sale because he never takes title to the securities. This risk is born entirely by the private issuer. In contrast, in a public sale, the investment banker serves as an underwriter. If the underwriter is unsuccessful in reselling the issue, he must absorb the securities into his own inventory.

Third, flotation costs are lower for a private placement than for a public issue. Compensation to investment bankers is lower for private placements because no underwriting takes place and because origination services are less detailed than in public sales. Further, SEC registration is not required for privately placed issues. Other sources of cost savings include lower printing and engraving costs, no requirement for certified financial statements and thus no accountant's fees, and fewer legal expenses.

Fourth, the actual transfer of funds can be completed much more quickly in a private placement than in a public sale. The private placement agreement can be consummated in a few days to a few weeks depending on how much negotiation is required. A public offering takes

up to 90 days and may take as long as six months to get SEC approval. However, with the recent adoption of SEC Rule 415 the problem of an extended waiting period may be avoided if the issuer chooses to register securities under this rule.

Finally, private placements offer more flexibility than public debt issues for three reasons. First, there is great flexibility of negotiation over terms and provisions afforded the borrower. Borrowers are able to explain directly to investors unique problems and situations which cannot be easily explained in a prospectus. In some cases, the borrower may desire to communicate more information to potential lenders than is permitted in a prospectus required for public offerings. On the other hand, firms may desire to borrow privately to prevent the widespread dissemination of sensitive information that might be required for public offerings.

Second, private lenders may be more amenable to unusual covenants in the indenture. Inclusion of unusual covenants in a public issue may jeopardize the successful sale of the issue, or even result in a higher interest rate. This "custom tailoring" may be easier to obtain for private issues since investors are few and can easily be shown the firm's projects or be introduced to the company officers.

Finally, the borrower can get a firm commitment on the terms of the agreement at the conclusion of negotiations. Thus, the borrower is certain of the proceeds of the issue well before the actual sale date. There is also flexibility as to when the funds are "taken down" (taken possession of)--all of the funds may all be taken down at once or they

may be taken down serially in which case the private placement debt issue is similar to a line of credit. Takedown flexibility is important since it allows the firm to match the timing of its borrowing to meet the cash flow requirements of its projects. The terms and provisions of a private placement loan agreement can also be renegotiated over the life of the issue. This opportunity may be valuable for small, risky borrowers who encounter unexpected problems with specific projects. The option to renegotiate is seldom used by larger, more financially secure issuers.

## Summary

The private placement market developed in the 1930s in response to the institutionalization of savings and to the increased cost of issuing debt publicly under the registration and disclosure requirements of the Securities Act of 1933. Borrowers in the private placement market are classified as switch hitters or non-switch hitters. Switch hitters are large firms of high credit quality who substitute between public issues and private placements. Non-switch hitters are small, risky firms who do not substitute between markets. Private lenders are the large institutional investors: life insurance companies and pension funds. These lenders are attracted by high after-tax yields, the opportunity to purchase large blocks of securities, and the benefits of a more detailed credit analysis. The private placement market is distinguished from the public debt market by the following characteristics: (1) a more personal relationship between borrowers and lenders; (2) a

lesser role played by the investment banker; (3) lower flotation costs; (4) speedier issuance of securities; and, (5) greater flexibility in the design and renegotiation of the issues.

# CHAPTER 3

## THEORY OF COST DIFFERENCES BETWEEN PUBLIC AND PRIVATE DEBT ISSUES

This chapter develops theoretical reasons for issue cost differences between public and private issues of debt. In perfect capital markets, there would be no cost difference between the two methods of sale. If buyers and sellers are price takers and have equal and costless access to all relevant information, and if there are no frictions such as taxes or transactions costs, then the private placement and the public issue would be perfect substitutes and the law of one price would prevail. However, there are several market imperfections which may cause private placements to differ in issue cost from public issues.

There are conflicting theoretical arguments as to which method of sale is more costly. In the first section, search and marketability differences suggest that private placements may be more expensive. The second section discusses how inexpensive resolution of agency problems in the private market result in lower issue costs for private placements. In the third section we resolve the conflicting arguments by recognizing the existence of two types of private borrowers--those who substitute between public issues and private placements, and those who do not. The fourth section examines the impact of bond market conditions on the cost difference between private placements and public sales. In the final section we state the testable hypotheses which follow from the theory of cost differences.

## Private Placements versus Public Issues of Debt

As discussed above, there are conflicting arguments as to whether private placements or public issues are more expensive. We first discuss how search and marketability favor public issues. Then we discuss how agency costs and flotation costs favor private placements.

### Factors Favoring Public Sales

Search theory. The intensity of competition is an important determinant of new issue borrowing costs. Kessel [39] used Stigler's [58] economics of information to show why increased underwriting competition leads to increased search, which reduces borrowing costs. The knowledge of the demand for an issue is not completely known to any single investment banker. What an investment banker does know, however, is reflected in the price offered for a security. Since underwriters serve different customers, the offering yields at which they can sell an issue vary. Therefore, as the number of competing bidders increases, so does the chance of finding the underwriter whose customers are willing to accept the lowest offering yield.

Kessel's arguments are easily extended to the private placement market. In a private placement, the borrower may search the market by using the services of an underwriter as an agent or finder, or the borrower may canvass the market himself. Since borrowers frequently hire someone else to perform this function in both private and public sales, what matters in Kessel's framework is not who searches the

market, but how many prospective lenders the borrower is able to contact. In either a public or private sale, the greater the extent of the market search, the greater the probability of finding the lenders who are willing to accept the lowest yield. If the search for potential lenders differs depending on which method of sale the borrower uses, issue costs may differ between public sales and private placements.

Less search takes place in the private placement market than in the public market for three reasons. First, Securities and Exchange Commission (SEC) regulations limit a private borrower's search of the market by restricting the number of showings of a private placement to potential lenders.[22] Second, search is reduced in the private placement market if the borrower continues to sell issues to the same lender. In this situation, the relationship between the private borrower and lender is a recurring client relationship very much like that between a firm and a commercial bank. Finally, there are fewer potential investors in the private placement market than in the public market. In the private placement market we know that the major lenders are life insurance companies, private pension funds, and state and local government pension funds; whereas, in the public market the distribution of

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[22]A showing is defined as providing a potential lender with the name of the borrowing company. See Shapiro and Wolf [53, pp. 87-88]. While the SEC has not made a definitive ruling on the permissible number of showings, it is generally acknowledged that larger issues with standard covenants are permitted a greater number of showings than smaller issues with more unusual covenants. However, firms issuing privately are careful not to show their issues too many times because the issue may lose the registration-exempt status. There are no such restrictions for a public issue.

lenders is much more widespread.[23] As a result, search is less complete than if all potential lenders could be canvassed.

In sum, a less complete search of the private placement market than the public market means that new issue borrowing costs for private placements may be greater than costs for comparable public issues.

Marketability. Marketability is defined as the ease with which an asset can be sold without loss of value. A security's marketability is determined by two characteristics. First, the greater the transactions costs required to sell a security, the less marketable the security. Transactions costs include explicit costs such as broker's fees and also include implicit costs such as the opportunity costs of time and effort spent in attempting to sell the security. Second, the greater the price risk associated with a security, the less marketable the security. Price risk is defined as the likelihood that a security will be sold at a price other than its intrinsic value. We generally observe that less marketable securities sell for higher yields to compensate investors for the potential loss of their resources from transactions costs or price risk. Typically, securities which enjoy active secondary markets (i.e., where frequent transactions take place) are considered to be more marketable than those with thin secondary markets.

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[23] See Shapiro and Wolf [53] for a discussion of lenders in the private placement market. They point out that only institutional investors have the large amounts of surplus cash necessary to purchase large blocks of securities.

There are three reasons why private placements are less marketable than comparable public issues. First, SEC regulations restrict the resale of privately placed debt instruments. The reason for these restrictions is that an adequate flow of information is not presumed to have taken place when a private placement is actively resold.[24] The SEC requires registration of new issues of securities to ensure that investors receive adequate information about the nature of the issuer. Private placements are permitted to be sold only to a small number of sophisticated investors who are presumed able to undertake their own detailed analysis of the borrower. To allow unlimited resale of private placements would mean that firms would be able to achieve de facto public distribution of their securities while avoiding SEC registration. Thus, only under certain restrictive conditions are private placements allowed to be resold. The resale is not likely to be challenged by the SEC if it results from a change in the lending company's investment strategy[25] and if a "sufficient" length of time has passed since the initial distribution of the securities.[26]

Second, the typical private placement would be unattractive to other investors even in the absence of regulatory restrictions. Because private placements are directly negotiated, they contain

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[24]See Shapiro and Wolf [53, pp. 79, 104-109].

[25]Note that a change in the issuer's financial condition does not warrant resale.

[26]There is no definitive ruling by the courts or the SEC as to what this length of time is.

provisions that are suited to the desires of a particular lender and these provisions may not suit the needs of other lenders.

Finally, private placements have limited marketability because they are not rated by a major rating agency such as Moody's or Standard and Poor's. Private placements are not rated because lenders perform their own credit analyses of borrowers. On the other hand, bond ratings of public issues enhance marketability because less sophisticated investors evaluate a borrower's default risk using bond ratings instead of conducting their own credit analysis. A detailed credit analysis would be too costly and time consuming for less sophisticated, smaller investors. Thus, because of lower marketability private placements tend to sell for higher yields than comparable public issues.

Factors Favoring Private Placements

Agency problems may be resolved more easily in the private market than in the public market. Since agency costs take the form of explicit costs to the firm's managers and downward valuation of the firm's securities, we argue that managers will choose the method of sale which minimizes these costs. This argument is consistent with the Costly Contracting Hypothesis of Smith and Warner [55] which says that firms will choose the form of financial contracting which is least costly because the managers bear the costs of resolving agency problems. There are two debt-related agency problems of concern here: (1) informational asymmetry between borrowers and lenders, and (2) managerial incentive effects of debt.

Informational asymmetry. The informational asymmetry problem is that borrowers know the true characteristics of their firm while potential lenders do not. Relevant characteristics might be default risk, quality of management, or the quality of the firm's investment projects. Unfortunately, borrowers may not always be truthful about their actual characteristics, because "[t]here may be substantial rewards for exaggerating positive qualities."[27] This prevents the direct transfer of information between borrowers and lenders.

We argue that firms issue debt privately to minimize signalling costs. For firms with severe agency problems, the third party signalling traditionally used in public debt markets may be prohibitively expensive.[28] These third party signals include obtaining bond ratings[29] and having the issue certified through the due diligence activities of investment bankers.[30] Information processing performed by bond rating agencies or investment bankers may be inadequate or too

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[27]Leland and Pyle [44, p. 371]. The rewards of exaggeration exist because potential lenders are unable to distinguish between high and low quality borrowers. Thus, market prices of debt securities will reflect the average quality of borrowers (see Akerlof [1]). In this situation, low quality firms are unable to sell their debt securities at prices greater than warranted. The implication of such behavior is that there is likely to be a high proportion of low quality firms attempting to borrow because above average firms will leave the market, unable to receive a fair price for their securities. If capital markets are to continue to function, information about the true quality of projects to be financed must be transferred.

[28]See study by Thakor [59].

[29]See studies by Wakeman [63] and Hsueh [30].

[30]See study by Booth and Smith [9].

costly to serve the purposes of firms with great agency problems. These firms choose to issue debt privately and transfer information directly to lenders.

The willingness of a firm to expend resources to obtain a bond rating serves as a signal of a firm's quality. Thus, firms who do not purchase ratings may be signalling the market that they are of low quality.[31] Firms who perceive that they will not obtain an investment grade rating may turn to issuing privately placed debt because they can give firsthand information to potential lenders. Furthermore, borrowers who require unusual terms and provisions may find it easier to communicate with potential lenders directly.

Another signal of a firm's quality is the certification of a bond issue which results from the due diligence activities of investment bankers. During the due diligence process, the investment banker produces reliable information about borrowers who pay for underwriting services because

> Most companies raise new capital only occasionally, but underwriters are in the business all the time. Established underwriters are, therefore, worried about their reputation and will not handle a new issue unless they believe the facts have been presented fairly to investors. Thus, in addition to handling the sale of an issue, the underwriters in effect give a "Good Housekeeping Seal of Approval" to it. This implied endorsement may be worth quite a bit to the issuing company.[32]

Investment bankers may refuse to underwrite firms with high default risk or other unusual characteristics to avoid the risk of damaging

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[31] Wakeman [63, p. 396].

[32] Brealey and Myers [10, p. 305].

their reputations and hence, damaging their ability to issue credible signals. Thus, the private placement serves as an alternative to public issuance of securities where high default risk or unusual circumstances surrounding the borrowing firm make signalling through the use of bond ratings or underwriting services too costly. In such cases, direct information transfer is desirable between borrowers and lenders.

Direct information transfer may be desirable for two reasons. First, private placement borrowers communicate the firm's situation directly to the lender.[33] Such information transfer would be difficult and costly for public issues because of the out-of-pocket costs of reading large numbers of potential bondholders and because of the problems created by moral hazard. Further, the borrower may be more willing to reveal relevant information to one or a few lenders rather than publicly. Firms may wish to protect trade secrets or they may want to avoid misinterpretation of the information by a public not able to view the firm's situation firsthand.

Second, direct information transfer may be desirable because the prospectus is an "unwieldy medium" for the communication of information to bondholders. Firms elect private issues of debt so that their situation can be explained to potential lenders more clearly than the regulations surrounding the prospectus allow. In particular, the SEC has been reluctant to permit discussion of future earnings in a prospectus.

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[33]See Corey [16, p. 51].

In sum, direct negotiation between borrowers and lenders allows for firsthand transfer of information relevant to the debt issue. Thus, the private placement solves the informational asymmetry problem at costs that are lower than the costs of signalling through a third party in a public sale.

Incentive problems of debt. The use of debt in a firm's capital structure gives managers incentive to make suboptimal investment decisions. There are two incentive problems of concern here. First, if the firm's equity is considered a European call option on the firm's underlying assets, owner-managers will accept high risk projects that increase the value of the equity at the expense of the debtholders.[34] This occurs because high risk projects increase the variance rate on the firm's assets, but decreases the value of the firm's debt because of increased default risk.

Second, if the firm's debt matures after the value of future investment opportunities is revealed to be less than the face value of the firm's maturing debt, the managers will hand the firm over to the bondholders. Thus, some positive net present value projects are forgone because managers only accept projects whose values exceed the sum of the face value of the firm's debt and the investment outlay.[35]

Myers [25] proposes two possible solutions to the incentive problem. First, restrictive covenants (a form of monitoring costs) that

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[34]See studies by Black and Scholes [8], and Galai and Masulis [22].

[35]See Myers [48].

force desired managerial behavior can be included in the bond contract. Second, provisions for renegotiation can be put into the contract. Both of these measures, while costly, can force managers to accept all positive net present value projects. We argue that these two solutions to incentive problems are more easily implemented in the private placement market than in the public market.

Monitoring costs are lower for private placements than for public issues. Smith and Warner note that under the Trust Indenture Act of 1939 the provisions for public issues of debt are restricted in such a way "which makes the enforcement of tightly restrictive covenants very expensive."[36] Private placements generally do not come under the purview of the trust Indenture Act; thus, a trustee may not be required for private placements. It is typically very expensive to enforce tightly restrictive covenants through a trustee, given that the relationship between bondholders and the trustee is a principal-agent relationship subject to agency problems and their related costs. Thus, we observe that private placements usually involve a higher number of more detailed restrictive covenants than are found in public issues. The implication is that more restrictive covenants are not as expensive to enforce on the private placement loan agreement. The reason for this difference is the personal relationship that exists between borrowers and lenders in a private placement loan agreement. This relationship means that lenders have access to information that may be much more

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[36] Smith and Warner [55, p. 125].

timely and detailed than the information available to the trustee in a public issue. Thus, covenants on private issues are more easily and inexpensively enforced; in fact, Smith and Warner state that because of the costs of enforcing the trustee's behavior, the covenants of a public issue are not likely to eliminate incentive effects of debt. Therefore, lower monitoring costs are associated with private placements.

Renegotiation is much more costly for public issues than for private issues. In a public issue, any breach of the bond covenants is considered default. Once a borrower is in default, drastic, and perhaps costly, measures are taken by the trustee to protect bondholders' interests. Assets of the borrower may be seized, or the debt may become immediately due and payable. In this case, renegotiation of public issues may be desirable, but it is difficult and expensive to renegotiate them. Specifically, any change in the covenants has to be approved by the bondholders in that consent is required of

> the holders of two-thirds in principal amount of the outstanding debt . . . . Moreover, the consent of 100 percent of the debtholders is required in order to change the maturity date or principal amount of the bonds.[37]

On the other hand, there is no such problem with the private placement for three reasons. First, the number of lenders is very small relative to the number of bondholders in a public issue. There is typically only one, or perhaps several, lenders in a privately placed issue. Thus, the borrowers avoid the costs of contacting thousands of bond-

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[37]Smith and Warner [55, p. 151].

holders in order to obtain approval for some change in the indenture. Second, the renegotiation process is likely to proceed much more quickly in the private placement since the borrower can deal face-to-face with the lenders. Finally, the close personal relationship between lenders and borrowers in the private loan agreement means that lenders are more informed about the firm's activities and, thus, may even anticipate a firm's request for a change in the indenture.

Private placement loan agreements are renegotiated often. A typical request by a borrower for a modification of the original agreement is very rarely refused outright.[38] Zinbarg [67] says that lenders

> generally view the Loan Agreement as a living document destined to be modified periodically to take account of changing circumstances. Accordingly, these lenders make most modifications routinely, with no quid pro quo exacted from the borrower unless the proposed corporate action will compromise the lender's margin of safety.[39]

Private lenders receive an average of one modification request per year per private loan agreement, and requests are very rarely denied since in most cases the "corporate requests [are] perfectly reasonable and [do] not increase [their] risks materially."[40] Thus, privately placed issues are more easily and inexpensively renegotiated than public issues.

Flotation costs. Besides inexpensive resolution of agency problems, the most important advantage of private placements over public

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[38] See Atamian [2].

[39] Zinbarg [67, p. 35].

[40] Zinbarg [67, p. 35].

sales is lower flotation costs. Lower flotation costs tend to make issue costs for private placements lower than those for public issues. The fact that flotation costs are lower for private issues has long been recognized and is well documented.[41]

There are several sources of lower flotation costs for private placements. First, the investment banker in the private placement plays a different role than the investment banker in a public issue. In a public offering, the distribution and origination services provided by the investment banker are more detailed and complete, and hence more costly. In a private placement the investment banker does not take title to the securities; therefore, he does not bear the risk of an unsuccessful sale and, thus, requires less compensation than what would be received in a public offering. Second, SEC registration is not required for privately placed issues. Finally, other sources of cost savings include lower printing and engraving costs, no requirements for certified financial statements, and thus, no accountant's fees, and fewer legal expenses.

## Resolution of the Conflicting Theoretical Arguments: Switch Hitters and Non-Switch Hitters

The conflicting theoretical arguments above leave us with no clear answer as to whether private placements are more or less expensive than public issues. However, by recognizing that there are two types of private borrowers, we readily resolve the conflict. As discussed in

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[41] See Shapiro and Wolf [53], Corey [16], SEC [52], and Smith [54].

Chapter 2, there are two types of private issuers. On one hand, large, well-known issuers with high credit standing who substitute between private placements and public issues are switch hitters. On the other hand, small, risky issuers who do not substitute between private placements and public issues are non-switch hitters.

Switch hitters issue debt by private placement when they observe that private yields, net of flotation costs, are lower than public yields. Their decision to issue privately is not motivated by lower agency costs of private borrowing because their characteristics (low default risk, large firm size) determine their ability to substitute between the two markets. Because switch hitters use the same standardized provisions in their bond contracts in both markets, the benefits of direct negotiation with lenders are of limited usefulness for these borrowers. In this case, their relationship with lenders is "arm's length." Thus, switch hitters are attracted to the private market by lower private yields since flotation costs are relatively fixed.

Non-switch hitters choose to borrow privately because they can resolve the agency costs of debt more inexpensively than if they issued publicly. When they issue private placement debt, these issuers sacrifice the benefits of greater search and marketability in public markets. On the other hand, these firms have a great deal to gain in terms of lower borrowing costs in that they will bear lower agency costs because of advantages of direct information transfer between borrowers and lenders and because of lower costs of monitoring and

renegotiation. Thus, there is a trade-off between the benefits of public and private borrowing. Presumably, since non-switch hitters elect to do their borrowing privately, the benefits of private placement must outweigh its detriments. Further, the more pronounced a firm's agency problems, the greater are the benefits of issuing debt privately rather than publicly.

## The Effect of Market Conditions on the Cost Difference Between Private Placements and Public Sales

A switch hitter's choice between public and private markets depends on the issue cost differences; therefore, market conditions will affect their decision. Market conditions should not affect a non-switch hitter's decision to issue privately because we presume that they may be unable to substitute between markets due to agency problems. Market uncertainty affects the issue cost of new debt securities in two ways.[42] First, in public sales of debt, an increase in uncertainty about interest rate movements increases the price risk of an underwriter's inventory of securities. This increase in underwriting risk means that investment bankers will increase spreads, reoffer yields or both as compensation. Second, market uncertainty increases information costs for issuers and investors. Issuers canvass the market to find the highest bidders for new debt issues and also must

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[42] See studies by Kidwell, Marr, and Thompson [42], Marr [47], Hays, Kidwell and Marr [28], Bhagat and Frost [6], and Bhagat, Marr, and Thompson [7].

estimate demand for their issues. Potential investors must also determine a "fair price" to offer for the new debt issue. During periods of market uncertainty it is more difficult for both issuers and investors to determine a "fair price" because gathering price and demand information is more costly than during periods when interest rates are more stable.[43]

Switch hitters may elect to issue debt privately because changes in market uncertainty affect public and private issue costs differently. Switch hitters do not employ investment bankers in an underwriting function when they issue private placements. Investment bankers serve only as agents or finders in the private debt issue and bear no underwriting risk in a private sale. Further, increased price risk during periods of market uncertainty should affect private issue costs to a lesser extent than it affects public issue costs for two reasons. First, the yield to the ultimate investor should not include a premium for price risk. In a public sale, only the underwriter bears this risk; the ultimate investors are assumed to eliminate price risk by matching the maturity of their investment with the desired holding period. In a private placement, the purchaser of the issue negotiates for the desired maturity which eliminates price risk. Second, Garbade and Silber [23] show that price risk (what they call liquidity risk) is an increasing function of the time between market clearings. In a

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[43] This concept is consistent with Stigler's model of search for the best price in a market. Studies by Bhagat and Frost [6] and Bhagat, Marr, and Thompson [7] interpret market uncertainty in this way.

public sale, it may take as long as three weeks to sell an entire issue (i.e., to clear the market). Over such a long period, the underwriter may suffer capital losses if the issue is mispriced due to market uncertainty. On the other hand, a private issue is sold instantaneously to only one or a small number of investors. Once the price of the issue is set on the commitment date, the market for that issue is cleared. For the private issue there is no liquidity risk because the market for the new issue clears immediately and further, there is a very limited secondary market for private placements so that investors must hold the issues until maturity. Thus, market uncertainty should have no effect on the level of compensation to an investment banker acting as an agent for a private placement.

Also, information costs may increase by a smaller amount for private issues than for public issues during uncertain markets. As stated earlier, the number of potential buyers for a private placement is lower than the number of potential buyers for a public issue. Thus, a given expenditure on information may produce a greater search of the private market because fewer buyers must be canvassed. As a result of an established client relationship, a firm may sell its private placements to the same lender over time. In this case, the private borrower may canvass only one or two potential lenders. In sum, during periods of market uncertainty, private placements may cost less for switch hitters than comparable public issues because private placements are not affected by increased underwriting risk and because information costs may be lower for private issues.

## Statement of Hypotheses

This chapter has presented theoretical arguments for whether public issue or private placement should be the least expensive method of issuing new debt. There are plausible arguments for either method of sale resulting in the lowest borrowing cost. On one hand, greater search and greater marketability available in the public market suggest that public issues should have lower borrowing costs. On the other hand, the benefits of direct transfer of information between borrower and lender, lower monitoring and renegotiation costs, and lower flotation costs suggest that borrowing costs should be lower for private placements. The conflict is resolved when we establish that switch hitters and non-switch hitters have different motivations for using the private placement market. Further, switch hitters may achieve lower issue costs by borrowing privately during periods of market uncertainty. In the final analysis, we conclude that firms choose the method of sale that best fits their particular circumstances, and hence results in the lowest borrowing cost.

The previous discussion of cost differences between private placements and public issues of debt yield the following testable hypotheses:

1. For issuers who substitute between markets (switch hitters), private placement debt sells for the same issue cost as similar public debt, ceteris paribus.

2. For issuers who substitute between markets, the issue cost of private placements is less sensitive to changes in market uncertainty than comparable public issues, ceteris paribus.
3. Issuers who do not substitute between markets (non-switch hitters) find private placements less costly than public sales of similar debt because agency costs are more easily resolved in the private market, ceteris paribus.
4. For issuers who do not substitute between markets, issue cost savings from issuing privately rather than publicly increase as the agency costs of debt increase, ceteris paribus.

The next chapter reviews the literature of cost differences between public issues and private placements and develops a model to test the above hypotheses.

# CHAPTER 4

# METHODOLOGY

This chapter's first section presents the findings of previous studies of the issue cost difference between public and private debt markets. The second section develops the empirical model of issue costs which we use to test the dissertation's hypotheses. The final section describes the data and presents some preliminary findings.

## Literature Review

Several empirical studies have examined the issue cost difference between public and private issues of debt. Corey [16] used case studies to examine private issues made by four firms. His study revealed that firms engage in a cost-benefit analysis to determine the type of financing which is least expensive. For example, in April 1949 Continental Can Company explicitly considered the flotation cost differences between public and private sales and determined that net of flotation costs, private yields were lower.[44] Overall, Corey concluded that managers choose the least costly method of sale after taking into account firm characteristics, issue characteristics and market conditions. Unfortunately, the small sample size of his case study does not allow generalization of the results.

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[44] See Corey [16, pp. 157-228].

In a later study, Cohan [14] examined the yield differential between public and private issues of debt holding certain issue and firm characteristics constant. Cohan computed a time series of average yield spreads between private placements and public issues for a sample of industrial and public utility issues, using multiple regression to account for differences in issue and firm characteristics such as total interest obligations, total capitalization, size of issue and type of security. For industrial debt, Cohan found that yields on private debt exceeded the yields on public debt by an average of 18 basis points and that the private minus public yield difference varied from -20 basis points to +43 basis points. For public utility debt the spreads averaged +16 basis points and varied from +4 to +29 basis points.[45]

Further, Cohan placed issues into default risk classes based on total capitalization and times interest earned. Cohan then averaged the yield spreads for each default risk class.[46] For industrials, the yield spread declined monotonically as default risk increased, becoming negative for the two highest default risk categories. For utilities, this result was not observed, and the spreads were positive for all of the risk classes.[47]

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[45] See Cohan [14, pp. 129-133].

[46] See Cohan [14, p. 130].

[47] A study by Karna [38] found similar results. For manufacturing and commercial companies he found average private-public spreads declining as ratings lowered. The result was not found for utilities; however, he performed no statistical tests.

Cohan's study suffers from three data deficiencies. First, he did not have a direct measure of default risk. He classified firms into default risk categories based only on total capitalization and times interest earned. Second, for his sample of private placements, Cohan did not have complete data on important issue characteristics such as the commitment-takedown lag, flotation costs, call provisions, and sinking fund requirements. Finally, he did not test for the impact of market conditions on the firm's decision to issue debt publicly or privately.

In another study, Wolf [66] investigated the inability of some industrial firms to substitute between public and private debt markets. He recognized that there is a subset of firms who can borrow in both markets, and that these firms should choose the least expensive method of sale. Wolf measured the ability of firms to substitute by assuming that firms listed in the Fortune 500 could substitute public for private debt more easily than other firms. Thus, Wolf thought that the decision of Fortune 500 firms to issue privately should be more sensitive to the level of the private-public yield spread than the decision of other firms.

Wolf's findings supported his assumption. Specifically, he found that as private placements become more expensive than public sales, firms reduce their proportion of private borrowing. Wolf then separated his data series into Fortune 500 and non-Fortune 500 firms. He found that the proportion of private debt sold by Fortune 500 companies was more sensitive to the private-public yield spread than the proportion of private debt sold by non-Fortune 500 companies.

While Wolf's results are intuitively appealing, his study has several drawbacks. First, Wolf did not control the yield spread for the effects of default risk and other issue and firm characteristics. Also, he did not control for flotation cost differences between the two markets and the commitment-takedown lag in the private placement market. Second, his specification of the Fortune 500 dummy in his empirical model presumes that only firms in the Fortune 500 are able to substitute between markets. Furthermore, he did not determine which firm and issue characteristics impede a firm's ability to issue publicly.

More recently, Zwick [68] studied the determinants of private yields using aggregate time series yields from the American Council of Life Insurance (ACLI). He looked at one ACLI risk category which he judged to be equivalent to Moody's Baa. He regressed the private yield series on the average yield of Baa corporate debt, a measure of interest rate volatility, a measure of life insurance company demand for private placements, and the one-period lagged public yield. Zwick found only the public yield and the lagged public yield to be significant determinants of private yields. He interprets the nonsignificance of the life insurance company demand variable as an indication of segmentation between private and public markets in that life insurance companies may not be able to substitute between debt markets. Zwick also reported that for his sample period, private debt issues were more costly than public issues by an average of 50 basis points and that the spread varied between 5 and 94 basis points.

Zwick's results are not convincing on several accounts. First, because he uses aggregate data, he is unable to consider issue or firm characteristics as potential determinants of yields. Second, he may not have held default risk constant unless we are convinced that Moody's and ACLI apply the same criteria in assigning issues to default risk categories. Third, his conclusion of market segmentation based on the significance of the lagged public yield in his regression equation is at odds with the fact that there are both suppliers and demanders of private debt who are able to substitute between the two markets.[48]

Finally, Hawkins [26] also studied the yield differential between private placements and public issues of debt. Using a sample of private placements gathered from Investment Dealer's Digest, he confirms Cohan's result that the yield spread is positive and declines with increased default risk. He found an average spread of +90 basis points for high quality issues, but for low quality issues the spread became negative. Hawkins expected to find a small or zero private-public spread, ceteris paribus. Though interesting, Hawkins' results should be viewed with some skepticism. While he does control for default risk and subordination status of the issue, he performs no statistical tests to determine whether his yield differentials are significantly different from zero. Further, he does not adjust for the commitment-takedown lag or flotation costs.

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[48] Cabanilla [11] finds no support for market segmentation after examining residuals from the equation where private yields are regressed on contemporaneous and lagged public yields.

## Summary of the Evidence

These studies show that an average, private yields exceed public yields. These findings are at odds with the notion that firms choose the least costly method of sale. If one method consistently dominates the other, then the more costly method should disappear. Thus, in the absence of market imperfections, the method of issuing debt should result in no issue cost difference, ceteris paribus. Yet, we observe firms who have a choice issuing privately when on average, public yields are lower. The studies by Cohan and Hawkins also show that any yield premium of private over public issues declines with increased default risk. However, no study satisfactorily controls for default risk differences between issues.

None of the studies had detailed, microeconomic data with which to make ceteris paribus comparisons of issue costs between private and public issues. As a result, no study has correctly modeled the difference between firms who substitute between public and private debt issues (switch hitters) and those who do not substitute (non-switch hitters). Further, no study examines whether the yield differential for individual issues varies with market conditions.

## The Model

Chapter 3 developed theoretical arguments for whether public issue or private placement should be the least expensive method of issuing new debt. There are arguments favoring either method of sale. On one hand, greater search and marketability in the public market suggest

that public issues should have lower issue costs. On the other hand, the benefits of direct transfer of information between borrower and lender, lower monitoring and renegotiation costs, and lower flotation costs suggest that issue costs should be lower for private placements. The conflict is resolved when we establish that switch hitters and non-switch hitters have different motivations for using the private placement market. Further, switch hitters may achieve lower issue costs by borrowing privately during periods of market uncertainty. In the final analysis, we conclude that firms choose the least expensive method of sale, given their circumstances. These theoretical arguments yield the following testable hypotheses:

1. For issuers who substitute between markets (switch hitters), private placement debt sells for the same issue cost as similar public debt, ceteris paribus.
2. For issuers who substitute between markets, the issue cost of private placements is less sensitive to changes in market uncertainty than comparable public issues, ceteris paribus.
3. Issuers who do not substitute between markets (non-switch hitters) find private placements less costly than public sales of similar debt because agency costs are more easily resolved in the private market, ceteris paribus.
4. For issuers who do not substitute between markets, issue cost savings from issuing privately increase as the agency costs of debt increase, ceteris paribus.

To test these hypotheses we need to develop an empirical model which explains the variation of issue costs for new issues of bonds by public utilities. Fortunately, a substantial body of research exists on the theoretical and empirical determinants of the interest cost paid by individual firms on their long-term bond issues. Previous studies [28, 42, 56, 21, 41] suggest that interest cost is a function of issue size, default risk, the presence of a call provision, the presence of a sinking fund, the prevailing market rate of interest, credit market conditions, the average spread of public utility yields over Treasury yields, and competition for the issue.[49]

The regression model is estimated by ordinary least squares and is formally stated as

$$\underset{-}{} \quad \underset{-}{} \quad \underset{-}{} \quad \underset{+}{} \quad \underset{+}{} \quad \underset{+}{} \quad \underset{+}{}$$

$$YOT = f\,[LNSIZE, CALL, SINK, DRISK, TREAS, VOL, SPREAD] \qquad (1)$$

where the sign above each variable shows the expected direction of the partial relationship. The variables are described below.

Dependent Variable

YOT = yield spread calculated as follows: yield to maturity of the issue minus the yield to maturity of a treasury issue with the same maturity sold on the same day. Daily treasury rates were used as reported in Federal Research Statistical

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[49] For example, see Sorensen [56], Kidwell, Marr, and Thompson [42], Hays, Kidwell, and Marr [28], and Marr [47].

Release, H.15: Selected Interest Rates. When a treasury rate with a matching maturity was not available, the appropriate treasury yield was calculated by interpolating the yields between the two treasury issues with maturities bounding the issue. The yield to maturity for each issue is calculated accounting for flotation costs and the commitment-takedown lag.[50]

Independent Variables

LNSIZE = the natural logarithm of the dollar size of the issue (in thousands).

CALL = years to first call divided by the years to maturity.

SINK = zero-one variable where SINK = 1 if the issue has a sinking fund and SINK = 0 if the issue does not have a sinking fund.

DRISK = a continuous and ordinal measure of default risk estimated from a probit model using a sample of publicly rated bonds. This measure is developed in detail in Appendix A.

TREAS = the average daily interest rate on 10 year and longer U.S. treasury bonds on the date of issue as reported in Moody's Bond Survey.

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[50]Kidwell, Marr, and Thompson [43] first used YOT as the dependent variable in an empirical model of new issue pricing.

VOL = the standard deviation in the long term daily treasury rate (TREAS) over twenty days prior to the sale date of the issue as reported in Moody's Bond Survey.

SPREAD = the difference between average interest rates on public utility debt and the average long-term treasury rate as reported in Moody's Bond Survey.

Discussion of Variables

The dependent variable for the model, YOT, is the yield spread off a treasury issue with a comparable maturity. Because borrowers are concerned with total issuing costs, the yield to maturity on the issues is computed as an effective yield on net proceeds. This measure is an improvement over yield measures used in previous studies since for private issues it explicitly accounts for the commitment-takedown lag, the possibility of multiple takedown dates, and all flotation costs. Daily treasury rates are used to control for interday changes in interest rates and term structure effects. The YOT model used in this study closely resembles the way in which financial advisers and underwriters price public and private debt issues. Typically, interest rates on new securities, public or private, are set off of rates on equivalent treasury securities.[51]

Size of the issue may help to explain issue cost because the fixed nature of flotation costs in both underwritten and nonunderwritten

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[51] See Investment Dealer's Digest [31, p. 7]. Also see Kidwell, Marr, and Thompson [42].

issues conveys economies of scale. Thus, for larger issue sizes, the flotation cost per dollar declines as issue size increases. To account for the possibility that economies of scale are exhausted for very large issue sizes the variable is entered in logarithmic form. The expected sign is negative.

A call provision allows the issuer to redeem its bonds at a stated price. Should market interest rates decline below the bond's current yield, borrowers can call the bonds and refinance at a lower issue cost. A call provision may also allow a firm to refinance should its financial condition significantly improve. In this case, a firm may call in a debt issue to rid itself of bond covenants it considers unduly restrictive given the change in its circumstances. The call provision offers flexibility to borrowers, and thus, borrowers are willing to pay for its inclusion. On the other hand, the exercise of the call by a borrower may be detrimental to the lender for two reasons. First, if the issue is called when market interest rates are declining, investors suffer an opportunity loss because they can reinvest only at a lower interest rate. Second, investors incur additional transactions costs to reinvest their funds. Thus, investors require a premium to compensate them for the expected loss which results from the inclusion of the call feature. CALL measures the degree of call protection. The longer the call deferment period relative to the final maturity, the greater the call protection. Therefore, the call variable should enter the equation with a negative sign.

A sinking fund provision requires borrowers to retire a certain amount of debt over the life of the bond issue. The issuer may retire the debt either by purchasing it in the secondary market or by redeeming it for a specified price from individual investors. Sinking funds can benefit investors in two ways. First, because borrowers must periodically purchase a certain amount of outstanding debt, an active secondary market is created for the issue. This increases an issue's marketability and results in a lower borrowing cost for the issuer. Second, the sinking fund provides information about the probability of default since uncertainty about a firm's ability to pay is resolved as payments to the sinking fund are made. Thus, a sinking fund is expected to lower borrowing costs of new issues and the sinking fund variable should obtain a negative sign.[52]

Default risk is the probability that a borrower will fail to make a promised payment as stipulated in the bond contract. Investors form subjective beliefs about the probability of default for a bond issue. As that probability increases, investors require greater yields as compensation for expected losses and for risk bearing. Investors have found the quality ratings assigned either by Standard and Poor's or Moody's to be good indicators of the probability of default. Past studies have measured default risk by including a series of dummy variables representing the different rating categories.

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[52]SINK is also included in the bond rating model explained in Appendix A. However, SINK is included in the YOT model because it is expected to reflect other aspects of its effect on YOT.

For private placements, however, publicly available ratings are not used; thus, this method of measuring default risk is not possible for these issues. One solution to this problem is to assign ratings to private placements with a bond rating model estimated for a sample of rated, publicly sold public utility bonds. This approach is not practical because new public issues by public utilities typically do not receive ratings below investment grade. This means that it would not be possible to use a straightforward classification model to ordinally rank private placements on default risk because some private issuers would receive ratings below investment grade were they to issue publicly. Hence, ratings assigned to private placements in this fashion would be upwardly biased.

To eliminate this problem, we use the probit methodology on our sample of public issues to estimate the unobserved default risk index for each public and private issue. First, for the public sample we estimate a probit bond rating model which contains a standard set of issue characteristics, issuer characteristics and market conditions. This procedure gives us estimates for the unobservable default risk index and also tells us how to classify issues into rating categories based on the estimated index. Then, we substitute issue characteristics, issuer characteristics and market conditions for the sample of private placements into the probit model to obtain estimates of the default risk index for these issues. This default risk index (DRISK) is a continuous, ordinal measure of default risk which obtains values anywhere on the real line. Thus, below investment grade issues will

have high values for DRISK. Further, we determine which issues are below investment grade by estimating the first order statistic of DRISK for the sample of public issues. Issues with a value for DRISK greater than the first order statistic are assumed to be below investment grade. Readers desiring a detailed description of our method of measuring default risk for private placements should see Appendix A.

The daily long-term Treasury rate (TREAS) is included in the model to control for any effect that changes in the level of interest rates have upon YOT. TREAS should obtain a positive sign. The pricing of new debt issues is also influenced by credit market conditions at the time of sale. Credit market uncertainty is measured by the standard deviation (VOL) of the long-term treasury rate (TREAS) twenty trading days (one trading month) preceding the issue's sale date. Note that VOL is a measure of market uncertainty and not of the underwriting risk involved with the sale of an individual issue. Issue cost is also influenced by the business cycle. We include the average spread between public utility issues and long-term Treasury issues (SPREAD) on the sale date in the model to control for the systematic variation in YOT due to changes in the business cycle.[53]

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[53]Van Horne [61] argues that investors' utility may be state dependent. They seem to prefer higher quality issues during recessions and lower quality issues during expansions, and they shift their holdings accordingly. Supply and demand pressures resulting from this behavior cause risk premiums to vary contracyclically. Jaffee [32] and Benson, Kidwell, Koch, and Rogowski [5] present empirical evidence supporting this hypothesis. SPREAD is also included in the bond rating model for reasons explained in Appendix A. However, SPREAD is included in the YOT model because it is expected to reflect other aspects of its effect on YOT.

## The Data

The data consist of 293 public utility debt issues sold publicly and privately from June 1979 to December 1983.[54] The 57 private placements were identified using Ebasco's Analysis of Public Utility Financing; however, because complete public information is not available for private placements, it was necessary to survey each issuer to obtain detailed information about each issue such as commitment dates, takedown dates, call provisions, sinking funds, flotation costs and coupon rates. Eighty percent of the firms surveyed responded to the questionnaire. A sample questionnaire is included as Appendix B. The collection of detailed information on individual private issues is important because past studies have been unable to adjust private yields for flotation costs, the commitment-takedown lag and the fact that some issues have multiple takedown dates.

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[54] Issues by telephone companies are excluded from the sample since they are not energy-related, and since they are regulated differently. Evidence by Hays, Kidwell, and Marr [28] indicates that telephone company debt issues are priced differently than debt issued by other utilities. Thus the sample consists of electric companies, gas companies, and gas/electric combinations. Issues by Public Service of New Hampshire were excluded to increase the homogeneity of the sample. PSNH experienced severe financial difficulty associated with its nuclear involvement. See Business Week, Oct. 1, 1984, "Failure at Seabrook Could Set Off Chain Reaction." PSNH had its issues downgraded by Moody's as a result of its problems. See Moody's Bond Survey, April 23, 1984, April 30, 1984, and September 17, 1984. New issues by PSNH were the only ones in the sample to obtain ratings below Baa. Several private issues were committed during the last 6 months of 1979, but were taken down in 1980. The issues were priced on the commitment date. Thus, the public sample was extended back to June 1979 so that it would contain controls for these private issues.

Information about the 236 public issues was gathered from Ebasco's Analysis of Public Utility Financing and Drexel, Burnham, and Lambert's Public Offerings of Corporate Securities. Issues with conversion features or variable coupon rates are excluded to create a more homogenous sample that better allows for interissue cost comparisons. Next, we examine the descriptive statistics for the sample and discuss some preliminary findings.

## Public and Private Yields

The empirical evidence reviewed earlier suggests that private yields generally exceed public yields. Preliminary analysis of the data shows the contrary. Figure 1 shows the average monthly yield on net proceeds for public and private issues during the test period.[55] Throughout most of the test period, public yields exceeded private yields. Only during three periods did private yields exceed public yields as we expected--May 1980-July 1980, February 1982-December 1982, and July 1983-September 1983. Thus, issue cost savings appear to be the motivation for public utilities to issue debt by private placement.

This finding is contrary to previous empirical findings for three possible reasons. First, yield on net proceeds accounts for all flotation costs. For public issues, these costs include out-of-pocket expenses and underwriter's spread. For private issues, there are only

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[55]Yield on net proceeds is the yield to maturity adjusted for flotation costs. Flotation costs are subtracted from the face amount to obtain net proceeds. Flotation costs include the underwriter's spread and out-of-pocket expenses for public issues and agent's fees and out-of-pocket expenses for private issues.

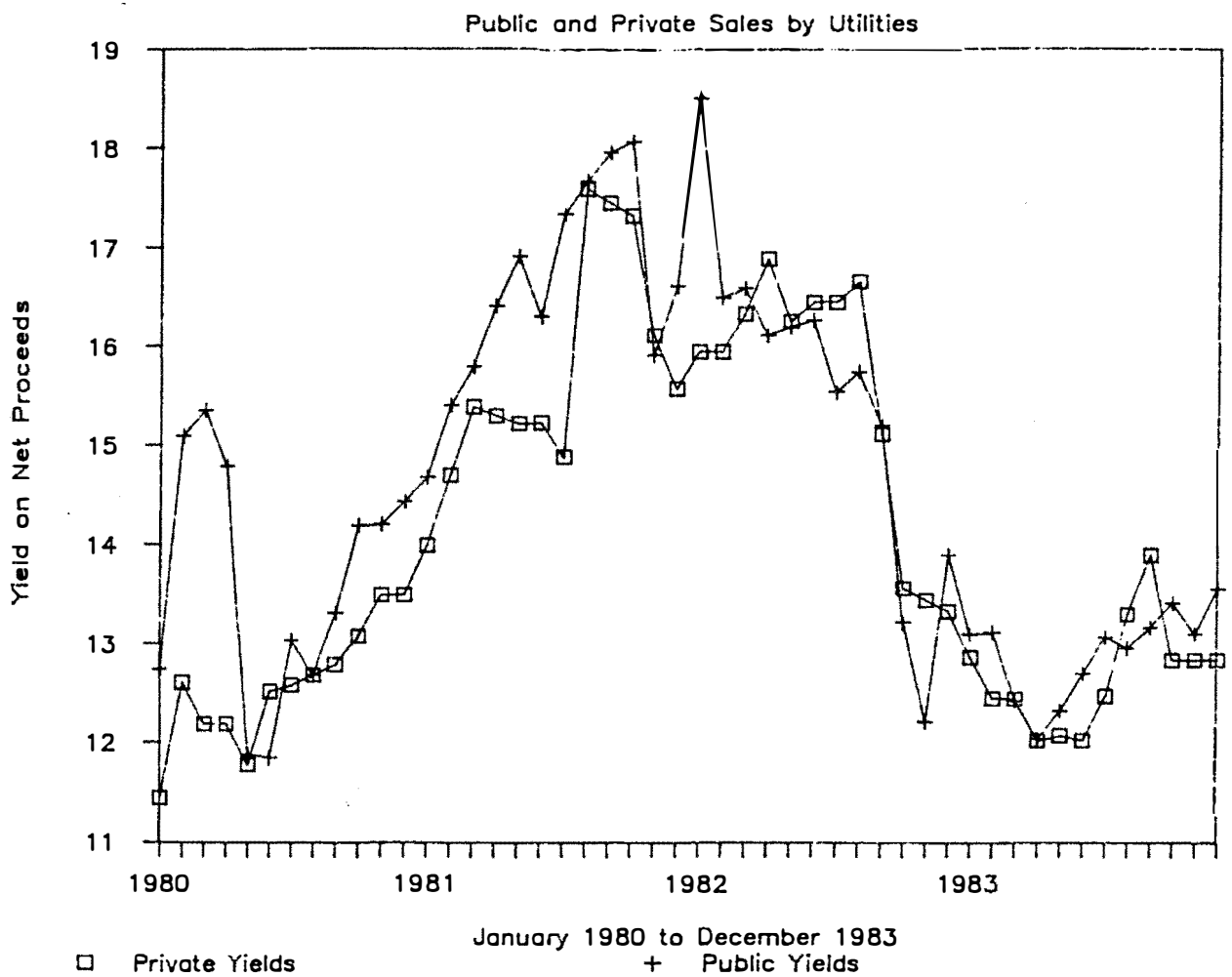


Figure 1. New Issue Borrowing Costs

out-of-pocket expenses. Thus flotation costs are likely to be much higher for public issues than private issues, and this difference may result in a higher yield on net proceeds for public issues.

Second, we have not controlled the issue cost difference for the effects of market conditions. Discussion in Chapter 3 suggests that public issues may be more expensive than private issues during periods of volatile interest rates. The late 1970s and early 1980s were periods of unprecedented uncertainty about interest rate movements. Thus, public issues are likely to be more expensive during this period.

Finally, we have not held default risk constant and it is possible that there are more investment grade private issues than previously thought. For below investment grade issuers, the stricter covenants on private placements may result in lower actual default risk and lower borrowing costs. In sum, we cannot make meaningful comparisons of issue costs without holding flotation costs, market conditions, and default risk constant.

Figure 2 shows the difference between public and private yields over the test period. What is interesting is that the interest cost savings from issuing privately are quite large--at one point they exceed 300 basis points (March 1980). While unadjusted for interissue differences such as default risk or market conditions, the magnitude of the differences suggests interest cost savings as a possible economic rationale for the existence of the private placement market.

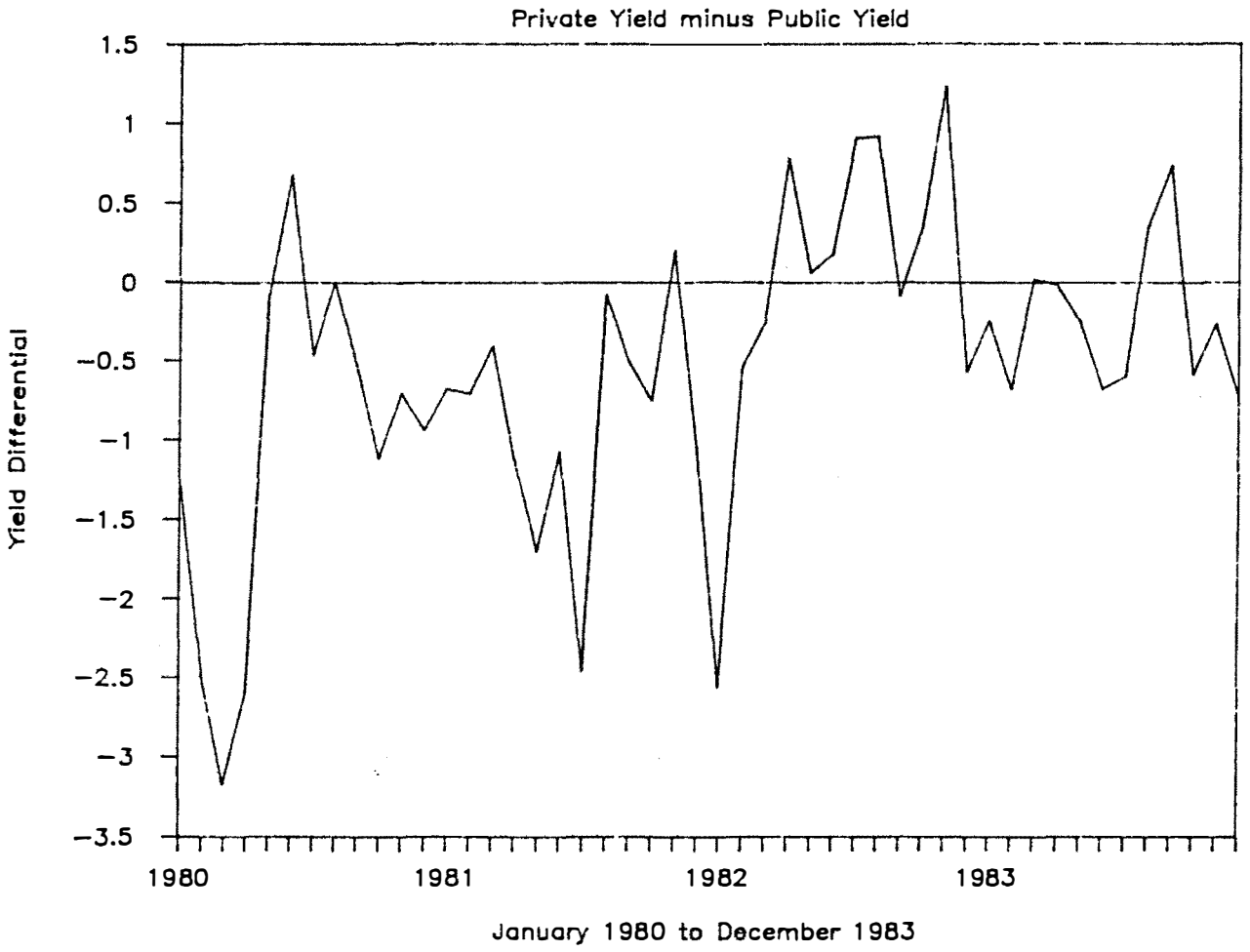


Figure 2. Private-Public Yield Differential

Identification of Switch Hitters and Non-Switch Hitters

Before we can meaningfully discuss the characteristics of the sample, we must operationalize the division between private issuers who substitute between public issues and private placements (switch hitters) and those who do not (non-switch hitters). We identified switch hitters and non-switch hitters based upon three factors. First, we considered the length of time since the issuer had issued in the public market because issuers who have been out of the public market for long periods of time may find in consistently less expensive to issue privately. We measured this length of time as the number of years since the last public sale. Second, we considered the firm's default risk because Cohan [14] and Shapiro and Wolf [53] suggest that firms with high default risk may be confined to the private market. We measured default risk using our default risk index (DRISK). Finally, because Cohan and Shapiro and Wolf suggest that smaller firms tend to be confined to the private placement market, we used total assets to distinguish between switch hitters and non-switch hitters.

We identified switch hitters and non-switch hitters applying the following three criteria. First, all private issuers who issued publicly during the sample period were classified as switch hitters. Second, all below investment grade private issuers who had not issued publicly in over five years were classified as non-switch hitters. Finally, of the remaining firms, those with total assets less than one billion dollars and who had not issued publicly in over five years were classified as non-switch hitters. Appendix C gives a listing of years

since the last public sale, the default risk index, and total assets for each private issuer. Further, the appendix identifies switch hitters and non-switch hitters.

Mean Characteristics of the Sample

We examine the mean characteristics of the sample shown in Table 3 to gain further insight into the differences between private placements and public issues. The findings confirm some of the statements about private placements made in Chapters 2 and 3. Table 3 shows that YOT for public issues exceeds that for private issues by 52 basis points on average. Similarly, issue cost for public issues exceeds that for private issues by 65 basis points on average. These results are at odds with the widely held belief that private yields exceed public yields on average.

Before comparing flotation costs between private placements and public issues we should note that flotation costs consist of two components. One part of flotation cost is the underwriter's spread. This spread is the underwriter's compensation for origination services and risk bearing in a public sale of debt. Private placements are not underwritten; thus, there is no underwriter's spread for these issues. The other component of flotation costs is out-of-pocket expenses. These expenses include such items as legal fees and accountant's fees. For public sales, out-of-pocket expenses also include the cost of SEC registration. Private placements do not incur the cost of SEC registration. However, for private placements, out-of-pocket expenses include a finder's fee paid to the firm's financial adviser.

TABLE 3

MEAN CHARACTERISTICS FOR SAMPLE OF PUBLIC UTILITY BONDS

| Characteristic | Public Issues | Private Issues | | |
|---|---|---|---|---|
| | | Total | Switch Hitters | Non-Switch Hitters |
| Number | 236 | 57 | 39 | 18 |
| Yield off Treasury (%) | 2.34 | 1.82 | 1.81 | 1.82 |
| Issue Cost (%) | 14.56 | 13.91 | 13.80 | 14.16 |
| Flotation Costs ($ per $1000): | | | | |
| Underwriter's Spread | 8.06 | 0.00 | 0.00 | 0.00 |
| Out-of-Pocket Expenses | 3.59 | 7.86 | 7.96 | 4.98 |
| Total | 11.62 | 7.86 | 7.96 | 4.98 |
| Issue Size (milions of $) | 80.19 | 39.65 | 47.85 | 21.90 |
| Total Assets (billions of $) | 3.36 | 2.26 | 3.04 | 0.56 |
| Default Risk Index | 1.36 | 7.04 | 1.31 | 19.47 |
| Years Since Last Public Issue | * | 11.42 | 1.92 | 15.39 |
| Maturity (years) | 19.56 | 12.47 | 12.35 | 12.72 |
| Years to First Call | 5.43 | 5.64 | 5.42 | 6.10 |
| Sinking Fund Issues (%) | 18.20 | 70.20 | 66.70 | 77.70 |

*This characteristic is not applicable to current public issuers.

Table 3 presents the average flotation costs for public and private issuers. As expected, flotation costs are much lower for private placements than for public issues. Total flotation costs for private placements average $7.86 per $1000 compared with $11.62 per $1000 for public issues. Clearly, the underwriter's spread for public issues of $8.06 per $1000 causes flotation costs to be greater for public issues. Out-of-pocket expenses for public issues are lower on average than those for private issues, but this result is reasonable because some of the services of a financial adviser which a private issuer pays for explicitly would be paid by the public issuer implicitly through the underwriter's spread. Thus, it may not be correct to compare out-of-pocket expenses of public and private issues.

One point of conventional thought about private placements verified by the sample is that the average issue size of private placements is considerably smaller than that of public issues. Specifically, Table 3 shows that the average public issue is twice the size of the average private placement ($80 million versus $40 million). Further, notice that switch hitters sell much larger issues than non-switch hitters ($48 million versus $22 million).

There are several reasons that private placements are smaller than public sales. First, firms issuing privately tend to be smaller than firms issuing publicly. Notice that private issuers have average total assets of $2.26 billion compared with $3.36 billion for public issuers; however, public issues and private issues by switch hitters tend to be made by firms of similar size ($3.36 billion versus $3.04 billion). As

expected, non-switch hitters tend to be much smaller; the average non-switch hitter has total assets of only $0.6 billion. Second, it may be that switch hitters of good credit quality issue privately when the size of issue is small because of the difficulty of selling small issues publicly. Finally, investment grade non-switch hitters may sell privately because their small issues would have limited marketability in public markets.

The average values of the default risk index (DRISK) show that private placements have much higher default risk than public issues. The average value of DRISK for private placements is 7.04 and only 1.36 for public issues. Two other observations are worth noting. First, the average default risk index for the switch hitters is nearly identical to that for public issuers. We expect this result because switch hitters have free access to both markets. Second, non-switch hitters exhibit much higher levels of default risk than switch hitters and public issuers. This result is expected because high default risk of non-switch hitters means that their issues would have limited marketability in public markets.

To gain further insight into the default risk differences between public issues and private placements we examine the distribution of issues among bond rating categories in Table 4. To rate private placements, we placed their characteristics into the probit bond rating model and obtained estimated bond ratings. Because the probit model does not predict below investment grade ratings, the cutoff for investment grade was determined by finding the first order statistic for

TABLE 4

COMPARISON OF BOND RATINGS BETWEEN PUBLIC AND PRIVATE ISSUES OF DEBT

| Moody's Bond Rating | Public Issues | Private Issues | | |
|---|---|---|---|---|
| | | Total | Switch Hitters | Non-Switch Hitters |
| Aa | 19.5% | 15.8% | 15.4% | 16.7% |
| A | 50.0 | 42.1 | 56.4 | 11.1 |
| Baa | 30.5 | 24.6 | 28.2 | 16.7 |
| Below Investment Grade | 0.0 | 17.5 | 0.0 | 55.5 |
| | 100.0% | 100.0% | 100.0% | 100.0% |

the default risk index (DRISK). Bonds with values of DRISK greater than the first order statistic were placed in the below investment grade category. Table 4 confirms that private issues tend to have higher default risk than public issues. First, note that the public sample has a greater percentage of issues in each of the investment grade categories than the private sample. Further, notice that there are no issues below investment grade in the public sample while 17.5 percent of the private sample would be considered below investment grade in the public markets. Next, we find a lower percentage of investment grade issues among non-switch hitters than among switch hitters. Additionally, we find that over half of the non-switch hitters (55.5 percent) are below investment grade while there are no switch hitters in this category. Finally, notice that switch hitters and public issuers have a nearly identical distribution among bond rating categories.

This analysis of issue size, total assets and default risk supports the conventional wisdom that non-switch hitters tend to be smaller, riskier firms who issue small amounts of debt. The distinction between switch hitters and non-switch hitters is clear when we notice that non-switch hitters have been out of the public market 15 years on average as compared with 2 years for switch hitters (See Table 3).

Table 3 shows that issue characteristics differ between private placements and public issues. First, private placements have shorter maturities than public issues on average (12 years versus 20 years). This result confirms market lore that purchasers of private placements

prefer intermediate-term issues.[56] Lenders may perceive that they can mitigate the agency problems of private issuers by shortening the maturity of the borrower's debt.[57] Second, call protection as measured by years to first call appears to be similar for public and private issues; however, when we consider years to first call relative to the term to maturity we see that call protection is much greater for private issues (0.48 versus 0.27). Finally, there is a much greater percentage of issues with sinking funds in the private market than in the public market (70.2 percent versus 18.2 percent). This result is consistent with the idea that shortening the debt's maturity will reduce agency problems. The sinking fund is one means of shortening the debt's effective maturity. Further, the sinking fund may reduce the default risk of private borrowers because uncertainty about a firm's ability to pay is resolved as sinking fund payments are made. Also notice that the percentage of sinking fund issues is greater for non-switch hitters than for switch hitters (77.7 percent versus 66.7 percent). This result shows that non-switch hitters may exhibit greater agency problems than switch hitters.

## Summary

Past empirical studies show than on average, private yields exceed public yields. This result is not surprising given the fundamental

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[56] See Kidder, Peabody, and Co. [40].

[57] See Myers [48].

differences between public issues and private issues. However, holding all other factors constant, method of sale should not influence issue cost and so there should be no issue cost differential between private placements and public issues. Past studies found such differentials as statistical artifacts of default risk differences, flotation cost differences, and other differences in issue and issuer characteristics given that detailed information on individual private issues was not available.

This chapter develops an empirical model of new issue borrowing costs to test the dissertation's hypotheses. Issue cost for new issues of debt is influenced by issue size, default risk, call provisions, sinking fund provisions and market conditions. A distinguishing characteristic of this dissertation is that we have collected sufficient information to make ceteris paribus comparisons of issue cost between individual issues of publicly sold and privately placed debt. In particular, we account for default risk, flotation costs, the commitment-takedown lag, the non-switch hitter phenomenon and issue characteristics.

The chapter also presents some preliminary findings. First, issue costs are greater for public issues than for private placements over the sample period. While these cost differences were substantial during some periods, the differences were not adjusted for important issue characteristics, issuer characteristics and market conditions at the time of sale. Second, an examination of the sample's characteristics reveals substantial differences between public issues and private

placements and indicates the need to control for these characteristics before making issue cost comparisons. The next chapter develops empirical tests for each of the dissertation's hypotheses and discusses the findings.

# CHAPTER 5

# THE FINDINGS

This chapter tests the hypotheses developed in Chapter 3. The first section presents the findings on whether private placements or public issues are more expensive for switch hitters, ceteris paribus. The second section presents the findings on how agency costs of debt affect issue costs of non-switch hitters. The final section summarizes the empirical results.

## The Cost Relationship Between Private Placements by Switch Hitters and Public Issues

This section tests the two hypotheses of issue cost differences between private placements by switch hitters and public issues. The dissertation's first two hypotheses are restated below:

1. For issuers who substitute between markets (switch hitters), private placement debt sells for the same issue cost as similar public debt, ceteris paribus.
2. For issuers who substitute between markets, the issue cost of private placements is less sensitive to changes in market uncertainty than comparable public issues, ceteris paribus.

To test these hypotheses we use the empirical model of issue cost developed in Chapter 4 (Eq. 1). The sample consists of 275 new bond issues sold by public utilities during 1979-1983: 236 issues are

negotiated public sales[58] and 39 are private placements by switch hitters.

Private Placements versus Public Sales

To test whether issue costs differ between private placements by switch hitters and public sales (the first hypothesis stated above), we include the dichotomous variable PRIV in Eq. 1 and then estimate the model with ordinary least squares regression. PRIV equals one for private issues by switch hitters, and zero for public issues and its coefficient is an estimate of the average issue cost difference between a public sale and a private placement, ceteris paribus. Previous discussion suggests that any consistent cost advantage of one method of sale over the other would result in the disappearance of the more costly method; thus, we should be unable to reject the null hypothesis that the coefficient of PRIV is different from zero. This result is consistent with the idea that switch hitters view private placements as close substitutes for public sales.

Table 5 presents the results of the empirical tests. Equation 5.1 is the estimate of the control model except that our default risk index (DRISK) is omitted. This allows us to focus on the impact of DRISK on the model's explanatory power. Turning to Equation 5.1, we notice that the explanatory power of the model is low: the adjusted $R^2$ is only 0.326. However, all coefficients have the predicted sign and are

[58]Negotiated issues are used to hold the effects of competition for the issues constant. This assumes that a negotiated issue and a private placement effectively receive one bid for the issue.

TABLE 5

YIELD OFF TREASURY REGRESSION ESTIMATES FOR SAMPLE OF PUBLICLY AND PRIVATELY ISSUED PUBLIC UTILITY DEBT

| Explanatory Variable | Equation (5.1) | | Equation (5.2) | | Equation (5.3) | | Equation (5.4) | |
|---|---|---|---|---|---|---|---|---|
| | Coefficient | t value | Coefficient | t value | Coefficient | t value | Coefficient | t value |
| Controls | | | | | | | | |
| CONSTANT | -0.977 | -2.40 | -0.866 | -2.48 | -0.815 | -2.31 | -0.892 | -2.54 |
| CALL | -0.961 | -4.85 | -1.036 | -6.10 | -1.021 | -5.99 | -1.037 | -6.15 |
| SINK | -0.398 | -3.73 | -0.417 | -4.56 | -0.377 | -3.80 | -0.375 | -3.83 |
| TREAS | 0.167 | 4.52 | 0.145 | 4.57 | 0.144 | 4.52 | 0.147 | 4.66 |
| VOL | 1.799 | 4.39 | 1.677 | 4.77 | 1.665 | 4.74 | 1.979 | 5.37 |
| SPREAD | 0.580 | 5.71 | 0.482 | 5.50 | 0.471 | 5.34 | 0.463 | 5.30 |
| DRISK | . | . | 0.322 | 9.91 | 0.322 | 9.88 | 0.317 | 9.96 |
| Hypotheses | | | | | | | | |
| PRIV | . | . | . | . | -0.131 | -1.07 | 0.391 | 1.66 |
| PRIV*VOL | . | . | . | . | . | . | -2.302 | -2.60 |
| Adjusted $R^2$ | | 0.326 | | 0.505 | | 0.518 | | 0.516 |
| F statistic | | 27.539 | | 47.637 | | 41.015 | | 37.503 |
| Std. Error | | 0.754 | | 0.646 | | 0.646 | | 0.639 |
| Dep. Mean | | 2.266 | | 2.266 | | 2.266 | | 2.266 |
| Sample Size | | 275 | | 275 | | 275 | | 275 |

statistically different from zero at a one percent significance level. The signs and magnitudes of the coefficients of Equation 5.1 are similar to those of issue cost models in previous studies [28, 42, 56, 21, 41].[59] CALL holds the effect of the call provision constant. The coefficient of CALL obtains the negative sign as predicted. The coefficient on CALL suggests that a one percentage point increase in the call deferment period as a percentage of final maturity results in an issue cost savings of approximately one basis point.[60] SINK is a zero-one variable measuring the presence of a sinking fund provision. The coefficient of SINK obtains the predicted negative sign and tells us that an issue which employs a sinking fund will save 40 basis points on average over an issue without a sinking fund, ceteris paribus. The YOT scaling variable, TREAS, obtains the predicted positive sign. The coefficient suggests that an increase of one percentage point (100 basis points) in the current long-term Treasury rate corresponds to an increase in YOT of 16.7 basis points. The measure of market uncertainty, VOL, also has the predicted sign and suggests that a one percentage point increase in the volatility of market interest rates ($\Delta$VOL = 0.01) results in an increase in YOT of approximately 1.8 basis

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[59] Issue size is excluded from the model. The variable was tried in different functional forms and did not obtain a significant coefficient or the correct sign. Explanatory power of the model (adjusted $R^2$) increased when the model was removed from the equation. None of the results in this dissertation was affected by leaving out issue size.

[60] $\delta$YOT/$\delta$CALL = -0.961 which is approximately -1 basis point.

points.[61] The cyclical variable, SPREAD, has the expected positive sign and its coefficient suggests that a 100 basis point increase in SPREAD corresponds to an increase in YOT of 58 basis points. This finding for SPREAD is evidence that YOT behaves as a risk premium over the business cycle--widening during recessions and narrowing during expansions.

Equation 5.2 includes all the regressors in Equation 5.1 plus our default risk index, DRISK. The default risk index has the predicted positive sign and reduces the unexplained variance (1 - adjusted $R^2$) by 27 percent.[62] The estimated coefficient suggests that an increase of one unit on the default risk index increases YOT by approximately 32 basis points. The high t value for DRISK (t = 9.91) and the large reduction in unexplained variance of YOT reinforces the importance of default risk as the major determinant of issue cost and is evidence of the effectiveness of our measure in controlling for interissue variation in default risk.

To test the first hypothesis we add the zero-one variable PRIV to the model in Equation 5.3. As predicted, the estimated coefficient of PRIV is not significantly different from zero; thus, over the test

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[61] Suppose $\Delta VOL = 0.01$, then $\Delta YOT = 0.01 \times 179$ basis points or approximately 1.8 basis points.

[62] [adj.$R^2$(Eq. 5.2)-adj.$R^2$(Eq. 5.1)]/[1-adj.$R^2$(Eq. 5.2)] = (0.505-0.326)/(1-0.326) = 0.266, or approximately 27 percent. Also note that DRISK can be considered an instrumental variable, given its estimation based on some of the variables in the model. The t values are adjusted with a technique suggested by Godfrey [24] which gives unbiased t values for instrumental variables. The unadjusted t values for DRISK were 10.07, 9.91, and 9.85 for Equations 5.2, 5.3, and 5.4, respectively.

period there appears to be no issue cost difference on average between private placements by switch hitters and public sales. This finding is consistent with the absence of market segmentation between public and private markets because firms selling their debt in the least costly market would eliminate any consistent cost difference. In the extreme, all switch hitters would issue debt in the market with the lowest cost, and the other market would cease to exist. However, because we know that both markets exist, there must be conditions under which one method of sale is less expensive than the other. In particular, Figure 2 (see Chapter 4, p. 60) shows substantial cost differences which vary over time. Discussion in Chapter 3 suggests that the cost difference between public issues and private placements varies with the degree of market uncertainty. In the next section, we test for the effects of market uncertainty on issue costs.

Market Uncertainty Tests

To test whether the issue cost of private placements by switch hitters is less sensitive to changes in market uncertainty than public issues (the second hypothesis stated above) we add the interactive variable PRIV * VOL to the model in Equation 5.4. The estimated coefficient of PRIV * VOL measures the relationship between YOT and VOL for switch hitters (i.e., $\delta YOT/\delta VOL$ when PRIV = 1). The coefficient of PRIV * VOL is significantly different from zero and has the expected negative sign. This finding suggests that private issue costs are less sensitive to changes in market uncertainty than public issue costs. For the mean value of VOL for the sample (VOL = 0.23), the coefficient

of PRIV * VOL suggests that switch hitters can save 13.8 basis points by issuing privately; as expected, this estimated saving is nearly identical to that suggested by the estimate of PRIV in Equation 5.3 (-13.8 basis points versus -13.1 points) which was not significantly different from zero.[63]

As markets become unstable, a cost advantage of private placements over public issues is apparent. For the maximum value of VOL (VOL = 0.796), Equation 5.4 suggests that switch hitters may save as much as 144 basis points by issuing privately rather than publicly.[64] Such a large cost differential is consistent with the observed public-private cost differences seen in Table 3 (p. 63) and Figure 2 (p. 60). Further, the idea that there may be rather large cost differentials favoring private placements is inconsistent with Wall Street lore and previous empirical studies. However, because 1979-1983 was characterized by unprecedented interest rate volatility, the results may be specific to our test period. During more stable periods, the results suggest the cost differential may become smaller or actually reverse. Specifically, for the minimum value of VOL (VOL = 0.05), Equation 5.4 indicates that private placements may have cost 28 basis points more than public issues, on average.[65] This result supports the possible cost reversal mentioned above.

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[63] $\delta YOT/\delta PRIV = 0.391 - 2.302*VOL = 0.391 - 2.302(0.23) = 0.138$ or -13.8 basis points.

[64] $\delta YOT/\delta PRIV = 0.391 - 2.302*VOL = 0.391 - 2.302(0.796) = -1.44$ or -144 basis points.

[65] $\delta YOT/\delta PRIV = 0.391 - 2.302*VOL = 0.391 - 2.302(0.05) = 0.276$ or 27.6 basis points.

Additional Evidence on Market Uncertainty

To confirm our findings on the effects of market uncertainty on the issue cost differential between public issues and private placements we divide the sample into periods of stable and unstable interest rates. Table 6 gives the quarterly average values of VOL over the sample period and shows that market uncertainty, as measured by VOL, was quite high during the years 1980 and 1981. During this period VOL averaged 0.30 as compared with 0.23 over the entire sample period. Furthermore, participants in the bond markets are in agreement that 1980 and 1981 were periods of volatile interest rates. Regarding 1980, Kidder, Peabody and Co. stated

> [a]t no time in recent years were markets more difficult than in 1980. Reflecting the influence of inflation, government policy, investor sentiment, corporate financing needs, and the interplay of national and international financial markets, long- and short-term interest rates in 1980 were among the most volatile in history.[66]

In 1981 Kidder, Peabody and Co. reported that obtaining financing continued to be difficult because of "unprecedented market volatility and uncertainty with respect to the economy."[67] Thus, we identify 1980 and 1981 as periods of unstable market conditions.

Stable periods were more difficult to identify because practitioners do not typically complain about these periods. However, from Table 6 we are able to identify some possible stable periods. During 1979 and 1982-1983, VOL averaged only 0.15 as compared with 0.23 over

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[66] Kidder, Peabody, and Co. [40, 1980, p. 9].

[67] Kidder, Peabody, and Co. [40, 1981, p. 4].

TABLE 6

VOLATILITY OF INTEREST RATES:
1979-1983

| Year | Quarter | Average Volatility (%) | Average Long-Term Treasury Rate (%) |
|---|---|---|---|
| 1979 | III | 0.06 | 8.99 |
| | IV | 0.22 | 10.00 |
| 1980 | I | 0.40 | 11.74 |
| | II | 0.27 | 10.34 |
| | III | 0.19 | 10.85 |
| | IV | 0.38 | 12.00 |
| 1981 | I | 0.23 | 12.19 |
| | II | 0.24 | 13.11 |
| | III | 0.29 | 14.28 |
| | IV | 0.37 | 13.46 |
| 1982 | I | 0.17 | 13.43 |
| | II | 0.19 | 13.27 |
| | III | 0.26 | 12.64 |
| | IV | 0.15 | 10.70 |
| 1983 | I | 0.12 | 10.61 |
| | II | 0.14 | 10.52 |
| | III | 0.13 | 11.54 |
| | IV | 0.10 | 11.68 |
| Mean values | | 0.23 | 11.52 |

the entire sample period. More specifically, Table 6 indicates that the third quarter of 1979 and the entire year of 1983 were relatively stable given the low values for VOL during these periods. The fourth quarter of 1979 was rejected as a stable period because it was in October 1979 that the Federal Reserve Board began the policy of controlling monetary aggregates rather than focusing on controlling interest rates. Most economists and practitioners agree that interest rates became more volatile during this period. Additionally, Table 6 indicates that 1982 was a transition period when interest rate volatility was decreasing; thus, we conducted tests with and without 1982 included as a stable period.

To test for cost differences during stable and unstable markets, we estimate Equation 5.4, less VOL, for the periods identified above. We remove VOL from the model because we used it to divide the sample into stable and unstable periods. Table 7 contains the results of the estimation.[68] For brevity, we report only the estimated coefficients of PRIV. The estimated coefficients of the control variables are similar to those presented in Equation 5.3. For the unstable market period (1980-1981), the coefficient of PRIV is negative and significantly different from zero and suggests that on average switch hitters save 49 basis points by issuing debt privately rather than publicly when

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[68] We estimated the model with and without VOL and the results were not affected. VOL was not significant during the stable periods; however, during the unstable period there was still enough variation in VOL for it to obtain a significant coefficient. Other coefficients in the equation were unaffected.

TABLE 7

YIELD OFF TREASURY REGRESSION ESTIMATES DURING STABLE AND UNSTABLE MARKETS

| Time Period | Number of Issues | PRIV Coefficient | t value | Adjusted $R^2$ |
|---|---|---|---|---|
| Unstable Period | | | | |
| 1980-1981 | 134 | -0.492 | -3.01 | 0.601 |
| Stable Periods | | | | |
| 1979 III and 1983 | 58 | -0.162 | -1.26 | 0.702 |
| 1979 III and 1982-1983 | 128 | 0.205 | 1.24 | 0.550 |

markets are uncertain. This result confirms our finding from Equation 5.4 that private placements may be less expensive than public issues during unstable periods.

For both periods of stable market conditions (1979 III, and 1983; 1979 III and 1982-1983) the coefficient of PRIV is not significantly different from zero and suggests that on average, switch hitters should not expect cost savings from issuing privately rather than publicly during these periods. The cost advantage of private placements appears only during unstable market conditions; the findings of Table 7 do not corroborate the cost reversal between private placements and public issues which we suggested earlier. Thus, during periods when market conditions are stable, it appears that there is no cost advantage in either market on average, a result consistent with the findings from the test of the first hypothesis (Equation 5.3).

## Non-Switch Hitters and the Agency Costs of Debt

This section tests the two hypotheses of whether agency costs of debt affect the decision of non-switch hitters to issue debt exclusively by private placement. The dissertation's third and fourth hypotheses are restated below:

3. Issuers who do not substitute between markets (non-switch hitters) find private placements less costly than public sales of similar debt because agency costs are more easily resolved in the private market, ceteris paribus.

4. For non-switch hitters, issue cost savings from issuing privately rather than publicly increase as the agency costs of debt increase, ceteris paribus.

To test these hypotheses, we need to compare the forecasted public issue cost with the actual private issue cost of non-switch hitters. A statistically significant cost savings is evidence that they choose the least costly method of issuing debt. Then, we investigate the relationship between the estimated cost savings of private placement over public issues and agency costs of debt.

Methodology for Non-Switch Hitter Tests

To predict public issue cost for our sample of 18 issues by non-switch hitters, we first estimate the new issue pricing model developed in Chapter 4 (Eq. 1) with our sample of 236 public issues sold during 1979-1983. The results appear in Table 8 (Equation 8.1). The model explains 57 percent of the variation in YOT and is similar to Equation 5.3. All estimated coefficients obtain the predicted sign and are statistically different from zero at the one percent significance level. Next, we forecast the public issue costs for non-switch hitters by substituting their characteristics into Equation 8.1. Then we subtract the actual YOT from the forecasted YOT and obtain estimates of the cost savings which non-switch hitters obtain by issuing privately rather than publicly.

We use the issuer's default risk as a proxy for the existence of agency problems. Default risk is a reasonable proxy of agency costs of

TABLE 8

NEW ISSUE PRICING MODEL FOR PUBLIC ISSUES

| Explanatory Variable | Equation (8.1) | |
|---|---|---|
| | Coefficient | t value |
| Controls | | |
| CONSTANT | -0.919 | -2.65 |
| CALL | -1.565 | -8.65 |
| SINK | -0.363 | -3.61 |
| TREAS | 0.186 | 6.07 |
| VOL | 2.040 | 6.00 |
| SPREAD | 0.361 | 4.10 |
| DRISK | 0.300 | 9.51[a] |
| Adjusted $R^2$ | 0.567 | |
| F statistic | 51.570 | |
| Std. Error | 0.585 | |
| Dep. Mean | 2.366 | |
| Sample Size | 236 | |

[a]The t value for the coefficient of DRISK is adjusted by Godfrey's technique. The unadjusted t value for DRISK was 9.53.

debt for at least two reasons.[69] First, if we view the firm's equity as a European option, owner-managers have an incentive to accept high risk projects which increase the value of the equity by increasing the variance rate of the firm's underlying assets. This acceptance of riskier projects means that bondholders bear higher default risk. Second, informational asymmetry means that managers may be unable to unambiguously communicate the true return distribution of their projects to bondholders (or other outsiders). This problem introduces uncertainty about the firm's true characteristics and causes bondholders to perceive a higher probability of default. This information uncertainty means that bondholders bear higher default risk.

Given this discussion, we use the predicted bond ratings as a measure of agency costs. We estimate the bond ratings for non-switch hitters with the bond rating model discussed in Chapter 4 and developed in Appendix A. To determine which private issues are below investment grade, we apply the theory of order statistics to our default risk index, DRISK. The expected value of the first order statistic for the sample of 236 publicly issued bonds is our estimate of the maximum value which DRISK obtains for investment grade issues.[70] This procedure is reasonable because all of our public issues have bond ratings above investment grade. For our private sample, we classify issues

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[69]This list is not exhaustive. There may be other reasons for default risk to proxy agency problems.

[70]Professor John L. Trimble suggested this technique in a doctoral seminar at the University of Tennessee. Hsueh [30] first applied it to a sample of nonrated municipal bonds.

with DRISK greater than 4.73 as below investment grade. We created two categories below investment grade--BELOW1 for issues with 4.73 < DRISK ≤ 41.34 and BELOW2 for issues with DRISK > 41.34.

Table 9 reports the average predicted cost savings for non-switch hitters by rating category and for the entire sample. The t statistics are the predicted cost savings divided by the standard error of the prediction.[71] The t value tests the null hypothesis that the predicted cost savings equal zero versus the alternative that the cost savings differ from zero. Table 9 also reports average issue size for each bond rating category.

Findings of Non-Switch Hitter Tests

The results in Frame A of Table 9 show that on average, non-switch hitters would have paid significantly higher issue costs had they issued in the public markets.[72] This result is consistent with

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[71]The standard errors are computed as follows:

$$\hat{\sigma}(e_f) = s[1 + X_o(X'X)^{-1}X_o']^{1/2} \quad ,$$

where s is the standard error of Equation 8.1, $X_o$ is the (1xk) vector of the issue characteristics for each non-switch hitter, and X is the (nxk) matrix of regressors from Equation 8.1. The t statistics have (n-k) degrees of freedom.

[72]We hesitate to argue that these predicted cost savings are reasonable. For example, Frame A of Table 9 suggests that non-switch hitters pay 559 basis points less than they would issuing publicly. This is clearly an unreasonable cost savings to expect. However, we argue that the cost savings exist and are considerable. The predicted YOT for the non-switch hitters are higher than seem reasonable because non-switch hitters are clearly beyond the bounds of DRISK of the sample used to estimate the public model. Table 3 (p. 63) shows that the average value for DRISK for non-switch hitters is 19.47 and for public issues is 1.36. Professor Ronald E. Shrieves suggested that the true

TABLE 9

PREDICTED PUBLIC ISSUE COSTS OF NON-SWITCH HITTERS

| Bond Rating (Predicted) | YOT | | Predicted Cost Savings (%) | t value | Issue Size ($ millions) |
|---|---|---|---|---|---|
| | Predicted Public (%) | Actual Private (%) | | | |
| Frame A | | | | | |
| Entire Sample (n = 18) | 7.40 | 1.81 | 5.59 | 5.88 | 20.2 |
| Frame B | | | | | |
| Investment Grade (n = 8) | 1.83 | 1.75 | 0.08 | 0.81 | 15.7 |
| Aa (n = 3) | 1.39 | 2.20 | -0.81 | 1.35 | |
| A (n = 2) | 1.61 | 1.29 | 0.32 | 0.54 | |
| Baa (n = 3) | 2.41 | 1.60 | 0.81 | 0.22 | |
| Frame C | | | | | |
| Below Investment Grade (n = 10) | 11.87 | 1.86 | 10.01 | 8.06 | 26.8 |
| BELOW1 (n = 6) | 8.31 | 1.37 | 6.94 | 7.38 | |
| BELOW2 (n = 4) | 17.2 | 2.59 | 14.61 | 9.07 | |

the third hypothesis which suggests that non-switch hitters choose the least costly method of sale. The reason that non-switch hitters do not go to the public market to issue debt is that the public alternative is much too costly for them on a consistent basis because of agency problems. However, we have not considered the degree of agency problems faced by non-switch hitters.

The fourth hypothesis suggests that the benefits of issuing debt by private placement should increase with the severity of agency problems. Thus, the cost savings of issuing privately are greater for those non-switch hitters who exhibit higher default risk, and by inference, greater agency costs of debt. For investment grade issues, Frame B of Table 9 shows that the predicted cost savings are not significantly different from zero. This finding suggests that non-switch hitters with ostensibly good credit quality could have sold their debt publicly without incurring higher issue costs.

For the below investment grade issues, Frame C of Table 9 shows that the predicted cost savings are significantly greater than zero. These firms would have paid substantially higher issue costs had they issued publicly and we conclude that they have truly selected the least costly method of sale. This result further supports the third

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functional form of DRISK might be quadratic or cubic and that a linear specification would bias YOT for extreme values of DRISK. We attempted both quadratic and cubic functional forms for DRISK. The quadratic and cubic terms did not enter the equation significantly and the coefficients were such that they would further increase the estimates of YOT beyond reason. Additionally, we converted DRISK to a z-score and used the area to the left of the z-score on the normal curve as a proxy for default risk. This also did not improve the estimates.

hypothesis because it is likely that these firms suffer from costly agency problems which they can more easily resolve in the private debt markets. Also notice that the predicted cost savings increase monotonically from BELOW1 to BELOW2. This finding further supports the prediction of the fourth hypothesis that cost savings from issuing privately rather than publicly increase as agency costs increase. Interestingly, the average issue size for below investment grade non-switch hitters is much greater than for investment grade issuers ($27 million versus $16 million). It is possible that these issues are large enough to enjoy a successful public sale; however, high default risk (symptomatic of agency problems) limits the attractiveness of these issues in a secondary market.

In sum, as a result of agency problems below investment grade non-switch hitters choose the less costly private placement as the method of issuing new debt, despite sufficient issue size to sell publicly. On the other hand, investment grade non-switch hitters may issue privately because their issues are too small to enjoy a successful public sale.

## Summary

The preponderance of the evidence presented here suggests that previous empirical studies of the private placement market found consistent cost savings for public issues over private issues because of insufficient data and the failure to make the distinction between switch hitters and non-switch hitters. In this study, we hold issue

characteristics and market conditions constant and reveal that there is no cost difference on average between private issues by switch hitters and public issues during normal market conditions. The institutional facts of the private placement market indicate that switch hitters issue private debt that looks very similar to the debt they issue in public markets. If debt markets are efficient, we would expect for the two methods to offer the same issue cost, ceteris paribus. The empirical results indicate that these firms view the two forms of debt as close substitutes since we find no significant cost difference. However, the results also show that credit market uncertainty may provide the incentive for switch hitters to issue debt privately. The evidence supports the notion that switch hitters achieve issue cost savings during periods of uncertain market conditions.

The results of the tests on non-switch hitters support an economic rationale for the existence of the private placement market. In the face of agency problems, firms who would find it costly to issue debt publicly use the private placement market as a cost-effective alternative. The nature of the private placement allows for relatively inexpensive resolution of agency problems. The tests indicate that below investment grade issues by non-switch hitters would have had substantially higher issue costs had they been issued publicly. Since these firms are presumed to have excessive agency problems from the perspective of the public markets, we conclude that they issue privately on a consistent basis. The results presented here also support the notion that these firms choose to issue privately. This finding

clarifies statements in previous studies suggesting that there are firms who are confined to the private placement market.

# CHAPTER 6

## SUMMARY AND CONCLUSIONS

This dissertation explains the observed issue cost differences between private placements and public issues by public utilities between 1979 and 1983 and determines: (1) whether private and public debt have the same issue cost for switch hitters, ceteris paribus; (2) whether issue cost differences between public issues and private placements by switch hitters vary with the degree of market uncertainty; (3) whether non-switch hitters choose to issue debt privately because the agency costs of debt can be resolved less expensively in the private market than in the public market; and (4) whether the cost savings of private placements by non-switch hitters increase as agency costs increase. To test the dissertation's hypotheses, we use ordinary least squares regression to estimate issue cost equations for new debt issues. The sample consists of 236 negotiated issues and 57 private placements of public utility debt sold between June 1979 and December 1983.

### The Private Placement Market

The private placement is a method of issuing new debt in which (1) the issuer and the investor directly negotiate the terms of the issue, and (2) title to the securities passes directly to the investor. The private placement market developed in the 1930s in response to the institutionalization of savings and to the increased cost of issuing

debt publicly under the registration and disclosure requirements of the Securities Act of 1933.

The private placement market is distinguished from the public debt market by the following characteristics: (1) a more personal relationship between borrowers and lenders; (2) a lesser role played by the investment banker; (3) lower flotation costs; (4) speedier issuance of securities; and (5) greater flexibility in the design and renegotiation of the debt contract. Private lenders are the large institutional investors: life insurance companies and pension funds. These lenders are attracted by high after-tax yields, the opportunity to purchase large blocks of securities, and the benefits of a more detailed credit analysis. Borrowers in the private placement market can be classified as switch hitters or non-switch hitters. Switch hitters are large firms of high credit quality who substitute between public debt and private placements. Non-switch hitters are small, risky firms who do not substitute between markets.

## Cost Differences Between Private and Public Issues

There are two conflicting arguments as to which method of sale results in the lowest issue cost. On one hand, public issues should have lower issue costs because of greater search and marketability available in the public market. On the other hand, private placements could have lower issue costs because of a less expensive resolution of debt-related agency problems and lower flotation costs. Further, private placements may have a cost advantage over public issues during

periods of high market uncertainty. The conflict is resolved when we establish that switch hitters and non-switch hitters have different motivations for using the private placement market. In the final analysis, we conclude that firms choose the method of sale that best fits their particular circumstances, and hence results in the lowest borrowing cost.

## Summary of the Findings and Conclusions

The dissertation's evidence suggests that for switch hitters there is no consistent cost difference between private issues and public sales. This indicates that switch hitters view the two forms of debt as close substitutes. However, during periods of high credit market uncertainty such as 1980-1981, switch hitters can save an average of 49 basis points by issuing privately. We found no statistically significant cost difference during stable periods such as 1979 III and 1983.

The results of the tests on non-switch hitters support a strong economic rationale for the existence of the private placement market. The tests indicate that below investment grade issues by non-switch hitters would have had substantially higher issue costs had they been issued publicly. We also find that the estimated issue cost savings of issuing privately increase monotonically with our proxy for agency costs of debt (default risk). Because these firms are presumed to have high agency costs of debt from the perspective of public markets, we conclude that below investment grade non-switch hitters issue privately to resolve agency problems at lower cost than in the public market.

Further, we find that investment grade non-switch hitters would have paid the same issue cost, ceteris paribus, had they issued publicly. The findings suggest that investment grade non-switch hitters did not have large enough issues to facilitate a successful public sale.

Thus, this study resolves the controversy between academic researchers and finance practitioners over whether private placement of new issues of corporate debt is more expensive than public sale. The findings support the view of the finance practitioners that their firms have good economic reasons for issuing debt privately. The evidence shows that switch hitters may lower their issue costs during uncertain markets by issuing privately rather than publicly and that non-switch hitters incur lower agency costs of debt by issuing privately. Thus, any observed cost differences are explained by an issue's characteristics and market conditions at the time of issue. Other studies found these significant cost differences because they did not have the data necessary to hold important factors constant for individual issues. Further, these studies did not attempt to account for the different motivations of switch hitters and non-switch hitters for borrowing privately.

## Limitations of the Study and Suggestions for Future Research

We should be careful not to ascribe the results obtained with this sample of public utilities to corporate issuers in general. We chose to study public utilities because data was easily obtainable and a more homogeneous sample was desired. Debt issues in different industries

may be priced differently and thus, any study of industrial private placements should control for industry differences. However, we expect that the theory developed in this dissertation is robust and will apply equally well to industrial issues.

The empirical results regarding the role of market uncertainty in the decision of switch hitters to issue privately may depend on which measure of market uncertainty is used. Some earlier studies have used the mean absolute deviation of past interest rates as a measure of market uncertainty. This study employs the standard deviation of past interest rates as its proxy. A criticism of both of these measures is that they are ex-post measures of uncertainty. They merely tell us the variability of past interest rates; they do not represent true expectations of future interest rate movements without nontrivial statistical and economic assumptions (perhaps, rational expectations). Another possible criticism of these measures is that empirical results obtained with them may be sensitive to the length of time over which they are computed. Given that these measures have been widely used in studies of the costs of issuing new securities, it will be worthwhile to develop a market uncertainty measure that not only reflects how underwriters actually price new issues, but also is grounded in one of the basic theoretical paradigms in finance. Future research on this topic should include a sensitivity analysis to determine the impact of different measures of market uncertainty on empirical results.

This dissertation did not explicitly test for which factors are important determinants of the public-private borrowing decision. In

future research we will employ qualitative dependent variable techniques to test for issue characteristics and market conditions that significantly influence a firm's decision to issue privately. These techniques explicitly model the firm's choice of method of sale. For non-switch hitters, this analysis may reveal the nature of the agency problems experienced by these firms in terms of financial variables which indicate high agency costs.

Finally, in the tests for non-switch hitters, we implicitly assumed that there is a high correlation between default risk measures and agency costs. This is clearly a notion that warrants further study. In particular, future researchers should develop a theory of the relationship between default risk and agency problems and then test for the importance of this relationship.

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# APPENDIXES

# APPENDIX A

# DEFAULT RISK MEASUREMENT

# DEFAULT RISK MEASUREMENT

This appendix develops a measure of default risk for public utility private placements which are not rated by the bond rating agencies. One possible approach would be to rate private placements with a bond rating model estimated for a sample of rated, publicly sold utility bonds. This approach is not practical because new public issues by public utilities typically do not receive ratings below investment grade. This means that it would not be possible to use a straightforward classification model to ordinally rank private placements on default risk since issuers in the private placement market are likely to have characteristics which would result in a below investment grade rating were they to receive a published agency rating. Thus, by applying a classification model based only on investment grade bonds, we would be estimating ratings beyond the bounds of the sample used to estimate the classification model. In the case of a multiple discriminant analysis model, below investment grade bonds classified in this manner would simply be placed into the lowest bond rating category of the model. In this case, bonds whose actual characteristics indicate that they are really a B rated bond, would be classified as Baa, since that is the lowest category that the model "knows." To naively apply such a model to private placements would mean that there would be substantial variation of bond quality among bonds classified into the Baa rating category, and hence this information would be of little value in identifying the level of default risk for a particular private placement with "below investment grade" characteristics. Fortunately,

McKelvey and Zavoina [46] have developed a methodology, n-chotomous probit, which can be extended to deal with this problem.

## Probit Methodology

Assume that there is a variable of theoretical interest, Y, which satisfies

$$Y = X\beta + u$$

where Y is the nx1 vector of measurements on the dependent variable, $\beta$ is a 1x(K+1) vector of unknown slope coefficients, X is a nx(K+1) matrix of independent variables ($X_0 = 1$ for all observations), and u is a nx1 vector of normally distributed random disturbance terms with mean 0 and variance-covariance matrix $\sigma^2 I$. Let us assume that we cannot directly observe Y. We could estimate Eq. (1) by ordinary least squares, but we can only observe an ordinal representation of Y, Z, which does not satisfy the assumptions of ordinary least squares estimation. Z is a categorical variable with M response categories $R_1, \ldots, R_M$ arising from the underlying, unobserved dependent variable in the following manner. First, assume an extended real line with real numbers $\mu_0, \mu_1, \ldots, \mu_M$ where $\mu_0 = -\infty$ and $\mu_M = +\infty$, and with $\mu_0 \leq \mu_1 \leq \ldots \leq \mu_M$. Z is defined by Y as follows:

$$Z_j \in R_i \iff \mu_{i-1} < Y_j \leq \mu_i, \quad 1 \leq j \leq M \tag{2}$$

Note that no assumption has been made as to the size of the interval $[\mu_{i-1}, \mu_i]$; ordinary least squares would assume equal intervals. If $X_j$

is the vector of independent variables for observation j (letting $X_{0j}$ = 1 for all j) we can write

$$\mu_{i-1} < Y_j \leq \mu_i \iff \mu_{i-1} \leq \Sigma\beta_i X_{ij} + u_j \leq \mu_i \iff$$

$$(\mu_{i-1} - \Sigma\beta_i X_{ij})/\sigma < u_j/\sigma \leq (\mu_j + \Sigma\beta_i X_{ij})/\sigma \qquad (3)$$

Since we have assumed in Eq. (1) that u is multivariate normal, we can write

$$PR[Z_j \in R_k] = \Phi[(\mu_i - \Sigma\beta_i X_{ij})/\sigma] - \Phi[(\mu_{i-1} - \Sigma\beta_i X_{ij})/\sigma] \qquad (4)$$

where $\Phi(.)$ is the cumulative standard normal density function. Since any linear transformation of the underlying variable Y also applied to $\mu_0, \mu_1, \ldots, \mu_M$ would lead to model (4), we identify the model by assuming that $\mu_1 = 1$ and $\sigma = 0$. Thus we get

$$PR[Z_j \in R_k] = \Phi[(\mu_i - \Sigma\beta_i X_{ij}] - \Phi[\mu_{i-1} - \Sigma\beta_i X_{ij}] \qquad (5)$$

To estimate the M+K-1 parameters of Eq. (5), $\mu_2, \ldots, \mu_{M-1}$ and $\beta_0, \ldots, \beta_k$ we define Z as a series of dummy variables such that $Z_{jk} = 1$ if $Z_j \in R_k$, and 0 otherwise. Thus we can rewrite Eq. (5) as

$$Pr[Z_{jk} = 1] - \Phi_{j,k} - \Phi_{j,k-1} \qquad (6)$$

and the likelihood of Z given fixed values of the parameters is

$$L = L(Z|\beta_0, \ldots, \beta_k, \mu_2, \ldots, \mu_{M-1}) \qquad (7)$$

and the log likelihood function is

$$L^* = \log L = \Sigma\Sigma[Z_{jk}\log(\Phi_{j,k} - \Phi_{j,k-1})] \qquad (8)$$

The log likelihood function is maximized subject to the constraint that $\mu_1 \leq \mu_2 \leq \ldots \leq \mu_{M-1}$. McKelvey and Zavoina have written a computer program which solves for the M+K-1 unknowns.

Once we have solved for $\mu_2, \ldots, \mu_{M-1}$ and $\beta_0, \ldots, \beta_k$ it is possible to predict the probability that $Z_j$ is in each of the M response categories given values for the independent variables. Letting $\hat{P}_{jk}$ be the predicted probability that $Z_j$ is in the kth category, we can write

$$\hat{P}_{jk} = \Phi[\hat{\mu}_k - \Sigma\hat{\beta}_i X_{ij}] - \Phi[\hat{\mu}_{k-1} - \Sigma\hat{\beta}_i X_{ij}] \qquad (9)$$

It is also possible to predict values of the underlying (unobserved), theoretical variable Y for a particular observation given the maximum likelihood estimates of

$$\beta_0, \ldots, \beta_k; \text{ i.e., } \hat{Y} = \Sigma\hat{\beta}_i X_{ij} \quad .$$

Kaplan and Urwitz [37] applied the n-chotomous probit model to the problem of predicting agency ratings. They posit that probit is a superior methodology to either multiple regression or multiple discriminant analysis in this particular application since bond ratings are ordinal as well as categorical measure of default risk. The probit methodology explicitly uses the ordinal information in bond ratings.

Kaplan and Urwitz argued for the existence of a theoretical (unobservable) measure of default risk which is only evidenced through the existence of ordinal, categorical bond ratings. From the estimation of the probit model for the sample of rated bonds I will obtain

maximum likelihood estimates of $\beta_0, \ldots, \beta_k$ and $\mu_2, \ldots, \mu_{M-1}$. I will then apply the estimated $\beta$'s to the samples of rated bonds and nonrated private placements to obtain estimates for the underlying, theoretical measure of default risk, $\hat{Y}$. This method avoids the problem of assigning noninvestment grade private placements to the Baa category since the estimated $\mu$'s partition the entire real; i.e., $\hat{Y}$ can potentially attain values anywhere on the real line, and given the constraint built into the maximum likelihood estimation we are guaranteed a consistent, ordinal ranking of bonds on default risk. This measure of default risk will represent default risk in the empirical model developed in Chapter 4.

## Discussion of the Variables

This section discusses variables to be used in the empirical model which explains the variation in Moody's ratings for the sample of publicly issued utility bonds. Previous studies suggest that bond ratings are determined by a firm's financial condition, the environment in which the firm operates, the characteristics of the bond contract, and by overall economic conditions. The model employed in this study includes explanatory variables from each of these categories.

The variables used in this appendix are based on models of bond ratings by Altman and Katz (AK) [2] and Kidwell, Marr and Ogden (KMO) [41]. Additionally, environmental variables and issue specific variables are included because they are considered important by Tripp-Howe [60] and Standard and Poor's [57] as determinants of default risk.

Variables Measuring Financial Condition

ASSETS is total assets in billions of dollars. This variable measures the size of the firm. We typically observe that larger firms tend to have more stable earnings than smaller firms and thus tend to have lower default risk.

CFREL is cash flow divided by current liabilities. Cash flow is defined as earnings before interest and tax, less preferred dividends. This variable is a coverage or liquidity measure which tells the number of times that the firm's earnings cover short-term obligations.

CWTA is the dollar amount of construction work in progress relative to total assets. Wingler and Watts [65] have shown that regulatory treatment of charges to current construction projects adversely affects the accounting quality of earnings for public utilities.

DEPREV is depreciation divided by operating revenues. This variable is an efficiency measure which indicates the rate of asset consumption per dollar of sales. The lower this rate, the more sales a given dollar of assets generates and thus, the more efficient the firm.

EASA is earnings before interest and tax per dollar of operating revenues. This variable is a measure of profitability indicating the amount of operating earnings per dollar of sales.

GRSALE is the growth rate of sales over the last three years. Firms whose sales are growing rapidly are likely to be more profitable and hence, more able to meet debt obligations than firms with lower or negative sales growth rates.

LNTI is the natural logarithm of times interest earned. Times interest earned measures how many times the firm's earnings cover current interest payments.[73]

LPTA is long-term debt plus preferred stock relative to total assets based on face values. Since firms employing more leverage are usually considered more risky, LPTA is included to control for differences in leverage. RETA is retained earnings divided by total assets. This variable is another leverage measure. A greater amount of retained earnings means that total assets is composed of a higher proportion of equity.

REVTA is operating revenue relative to total assets. This variable measure the efficiency of the firm's use of its assets since it indicates the amount of revenue generated per dollar of total assets.

SDEA and SDTI are stability measures. They are the standard deviation over the last nine years of earnings after interest and before tax and times interest earned, respectively.

Variables Measuring the Firm's Environment

NUKE is a zero-one variable where NUKE = 1 means that the firm is somehow involved with the use of nuclear power--it either has existing nuclear generation capacity or nuclear capacity under construction at the time of issue. NUKE = 0 for all other firms. Recent events such as the Three Mile Island accident and the Washington Public Power

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[73] Kidwell, Marr, and Ogden [41] found that this functional form performed best in their bond rating model.

System default, as well as a growing social movement opposing nuclear power indicates that firms with nuclear exposure operate in a more risky environment than other firms.

REG1-REG5 is a series of dummy variables which indicates the severity of the firm's regulatory environment. The five variables correspond to the categories into which Duff and Phelps classify severity of state regulation. REG1 equals 1 if the firm is subject to the least strict regulation and equals 0 otherwise, and REG5 equals 1 if the firm i subject to the most strict regulation and equals 0 otherwise. Firms regulated by federal agencies such as the Federal Communications Commission and the Federal Energy Regulatory Commission are assigned to Duff and Phelps' first category since federal regulation is considered to be less severe than state regulation in general.

A series of industry dummy variables is used to measure differences in default risk attributed to industry differences. The categories are gas pipelines (GAS = 1, 0 otherwise), electric companies (ELEC = 1, 0 otherwise), and gas-electric combinations (COMBO = 1, 0 otherwise).

Issue Characteristics

SINK is a zero-one variable where SINK = 1 if the issue has a sinking fund and SINK = 0 otherwise. The study by KMO suggests that the periodic retirement of principal may reduce default risk.

SUBORD is a zero-one variable where SUBORD = 0 for first mortgages (which are presumed senior to all other forms of debt) and SUBORD = 1

for all other issues. SUBORD controls for the fact that first mortgages are considered more secure than other forms of debt.

Economic Conditions

SPREAD is the benchmark pricing variable for new debt issues. It is measured as the average yield on public utilities less the average yield on long-term Treasury issues. Since SPREAD can also be regarded as the average risk premium for public utilities, it is a contracyclical variable. During periods when SPREAD is high, the economy is in recession and some researchers believe that all issues carry more default risk during "bad" economic times.[74] On the other hand, SPREAD is relatively low during expansions, and we expect that all issues are considered less risky during "good" economic times. Thus there may be a tendency for new issues to obtain lower ratings in recessions and higher ratings in expansions.[75] SPREAD is included in the model to control for the fact that the issues in the sample were sold at different points in the business cycle.

## Data

The data used for this study consist of 236 new issues of public utility debt (excluding debt issued by telephone companies) from June 1979 to December 1983. Information on issue characteristics was taken

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[74] See Van Horne [61], Jaffee [32], and Benson, Kidwell, Koch, and Rogowski [5].

[75] This is a logical extension of Van Horne's "flight to quality" argument to the new issue market.

from Drexel, Burnham and Lambert's Public Offerings of Corporate Securities and Ebasco's Analysis of Public Utility Financing. Data used to construct financial ratios were obtained from Moody's Public Utility Manual, Standard and Poor's COMPUSTAT tapes, Duff and Phelps, and NUS Corporation. Table 10 shows the mean characteristics of the sample by bond rating category.

## Results of the Probit Analysis

The results of the probit estimation are shown in Table 11. The model performs well, explaining 60 percent of the estimated total variation in the underlying default risk index and categorizing 69 percent of the issues correctly. Eight of the variables obtain coefficients that are significantly different from zero.

Variables that are particularly important determinants of default risk are LNTI, LPTA, SUBORD, NUKE and DEPREV. LNTI is the interest coverage measure. The negative coefficient for LNTI suggests that firms with greater interest coverage have lower default risk. LPTA measure the firm's use of leverage. The positive coefficient for LPTA indicates that firms with higher leverage have higher default risk. We expect this result since firms employing large amounts of leverage have high fixed obligations of interest payments. SUBORD obtains a positive sign. This is consistent with the idea that debt issues with subordinate claims against the firm's assets in bankruptcy are regarded as being more risky. NUKE obtains a positive sign. This result indicates that firms exposed to nuclear risks are considered to have higher

TABLE 10

MEAN CHARACTERISTICS FOR SAMPLE OF PUBLIC UTILITY BONDS USED IN PROBIT ANALYSIS OF BOND RATINGS

| Variable | Entire Sample (n = 236) | Aa (n = 46) | A (n = 118) | Baa (n = 72) |
|---|---|---|---|---|
| Qualitative Variables (%) | | | | |
| NUKE | 72.0 | 65.2 | 73.7 | 73.6 |
| SINK | 18.2 | 15.2 | 19.5 | 18.1 |
| SUBORD | 20.3 | 4.3 | 17.8 | 34.7 |
| GAS | 19.9 | 13.0 | 22.9 | 19.4 |
| ELEC | 62.3 | 63.0 | 62.7 | 61.1 |
| COMBO | 17.8 | 24.0 | 14.4 | 19.5 |
| REG1 | 16.5 | 13.0 | 20.3 | 12.5 |
| REG2 | 19.5 | 19.6 | 28.8 | 4.2 |
| REG3 | 15.7 | 15.2 | 17.8 | 12.5 |
| REG4 | 33.5 | 39.1 | 25.4 | 43.1 |
| REG5 | 15.6 | 13.1 | 7.7 | 27.7 |
| Quantitative Variables | | | | |
| DEPREV | 0.06 | 0.06 | 0.06 | 0.06 |
| REVTA | 0.58 | 0.56 | 0.61 | 0.54 |
| LNTI | 1.02 | 1.20 | 1.05 | 0.86 |
| CFREL | 0.78 | 0.82 | 0.82 | 0.70 |
| LPTA | 0.45 | 0.43 | 0.44 | 0.47 |
| RETA | 0.11 | 0.12 | 0.12 | 0.09 |
| EASA | 0.25 | 0.23 | 0.24 | 0.26 |
| CWTA | 0.22 | 0.15 | 0.21 | 0.27 |
| SDEA | 8.51 | 6.44 | 9.11 | 8.85 |
| SDTI | 0.62 | 0.68 | 0.60 | 0.62 |
| GRSALE | 0.25 | 0.10 | 0.13 | 0.53 |
| SPREAD | 2.30 | 2.28 | 2.28 | 2.35 |
| ASSETS | 3.36 | 2.47 | 3.90 | 3.03 |

TABLE 11

COEFFICIENT ESTIMATES FOR PROBIT ANALYSIS OF
BOND RATINGS OF PUBLICLY ISSUED BONDS

| Explanatory Variable | Probit Rating Model | |
|---|---|---|
| | Coef. | t value |
| Intercept | -0.744 | -0.50 |
| DEPREV | -15.426 | -2.02 |
| REVTA | 2.070 | 3.95 |
| LNTI | -3.716 | -6.52 |
| CFREL | -0.361 | -0.98 |
| LPTA | 4.832 | 2.65 |
| RETA | 4.586 | 1.92 |
| EASA | 8.290 | 4.20 |
| CWTA | -0.791 | -0.73 |
| NUKE | 0.921 | 2.80 |
| SDEA | 0.020 | 1.21 |
| SDTI | -0.020 | -0.13 |
| GRSALE | 0.049 | 0.35 |
| SUBORD | 1.899 | 5.90 |
| SINK | -0.148 | -0.40 |
| REG2 | -0.340 | -0.96 |
| REG3 | -0.009 | -0.02 |
| REG4 | 0.009 | 0.10 |
| REG5 | 0.086 | 1.11 |
| ELEC | -0.237 | -0.75 |
| COMBO | -0.145 | -0.38 |
| SPREAD | 0.217 | 1.08 |
| ASSETS | -0.045 | -0.95 |
| Estimated $R^2$ | 0.600 | |
| Percent Correctly Categorized | 68.600 | |

default risk. DEPREV is a measure of efficiency. Its negative sign indicates that firms with greater asset turnover per dollar of operating revenues have lower default risk than less efficient firms.

REVTA, RETA and EASA also obtain coefficients significantly different from zero. The profitability measure, REVTA and EASA obtain positive signs. This result seems to indicate that more profitable firms are more risky. However, if profitable firms tend to use more leverage than less profitable firms, then the profitability measure may be proxies for high leverage. Thus, a positive relationship with default risk results. Further, these two profitability measures also indicate the sensitivity of a firm's profitability to changes in selling prices or volume of business. As such, they may indicate greater default risk.[76] RETA is an indicator of potential insolvency. Thus, higher values of RETA would seem to indicate lower default risk, meaning that it should obtain a negative sign. However, RETA obtains a positive sign because firms with higher default risk tend to have smaller asset bases on average.[77]

## Comparisons with Other Studies

In order to validate the specification of the model shown in Table 11, comparisons are made with the results obtained in other studies. Table 12 compares the specifications of the model developed

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[76] See discussion by Standard and Poor's [57, p. 32].

[77] Altman and Katz [2] also obtained this result. It is also possible that the sign on REVTA was affected by the same phenomenon.

TABLE 12

COMPARISON OF SPECIFICATIONS*
OF BOND RATING MODELS

| Variable | Blackwell | KU | KMO | JJA | AK | PSJ |
|---|---|---|---|---|---|---|
| ASSETS | X | X | X | X | X | X |
| DEPREV | X | | | | X | |
| REVTA | X | X | | X | X | X |
| LNTI | X | X | X | X | X | X |
| CFREL | X | | X | | X | |
| LPTA | X | X | X | X | X | |
| RETA | X | | | | X | |
| EASA | X | | | | X | |
| CWTA | X | | | | | X |
| NUKE | X | | | | | |
| SDEA | X | X | | X | X | |
| SDTI | X | | X | | X | |
| GRSALE | X | | | | X | |
| SUBORD | X | X | X | X | | |
| SINK | X | | X | | | |
| REGULATION | X | | | | | X |
| INDUSTRY | X | X | X | X | X | |
| SPREAD | X | | | | | |

*X indicates that a variable or a reasonable proxy is in the model of the paper indicated.

in this appendix with model specifications in studies by Altman and Katz [2] (AK), Kaplan and Urwitz [37] (KU), Pinches, Singleton and Jahankhani [49] (PSJ), Kidwell, Marr and Ogden [41] (KMO), and Jones, Jackson and Anderson [36] (JJA). Table 12 shows that my model contains variables that have been used in past studies of bond ratings with two exceptions. NUKE and SPREAD have not been used in previous studies. While SPREAD was not a significant determinant of default risk in my model, the coefficient on NUKE shows that firms with nuclear exposure have significantly higher default risk.

Some variables used in other studies are not included in my model. AK included the ratio of market value of equity to book value of debt and return on equity. I did not use these variables because I was unable to obtain the measures for all of the issues in the sample. KU and JJA included measures of systematic risk of the firms' equity in their models. KU found that $\beta$ is a significant determinant of bond ratings while JJA find that it isn't. Other studies also obtain mixed results on whether $\beta$ is important in predicting bond ratings. Schwendiman and Pinches [51] find that bond ratings are associated with the systematic risk of a firm's common stock, while Reilly and Joehnk [50] find it to be an unimportant determinant of bond ratings. In view of these conflicting results I do not include $\beta$ as a variable in my model. The two variables SDEA and SDTI which I include in the model are reasonable measures of firm specific risk. Additionally, there is little theory to suggest a relationship between the default risk of a firm's debt and the systematic risk of its common stock.

The explanatory power of my model compares favorably with the models in the existing bond rating literature. Table 13 summarizes the explanatory power of the various models considered here.

KU, KMO, and JJA employ probit to estimate bond ratings. Thus, my model of bond ratings is directly comparable with theirs. The estimated $R^2$ of my model is well below that obtained by KU and KMO. JJA do not report estimated $R^2$ since they probably view the measure to be of limited usefulness. This goodness of fit measure is only an estimate because it is based on the estimated total variation in the estimated values of the underlying default risk index. Since we cannot observe the true values of the underlying measure of default risk, we do not know the true value of $R^2$ for the probit model. Thus, comparing the models on estimated $R^2$ may not be appropriate. On percent correctly categorized, my model compares favorably with the other probit models. Only the KMO model classifies a greater percentage of the issues correctly than my model. On this dimension, my model performs considerably better than the other probit models examined.

In order to compare the explanatory power of my model with the models of AK and PSJ, I estimate a quadratic discriminant model for my data.[78] AK and PSJ estimated bond ratings for electric utilities. I deleted gas companies and gas/electric combinations from my sample in

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[78]PSJ used linear discriminant analysis. AK used quadratic discriminant analysis to control for the heterogeneity of the within group covariance matrices. I performed the likelihood ratio test for the homogeneity of the within group covariance matrices in my sample and rejected the null hypothesis of homogeneity. Thus, I employed quadratic discriminant analysis.

TABLE 13

COMPARISON OF THE EXPLANATORY POWER
OF BOND RATING MODELS

| Models | Estimated $R^2$ | Percent Correctly Classified |
|---|---|---|
| Probit | | |
| Blackwell (n = 236) | 0.60 | 68.6 |
| KU | 0.81 | 62.0 |
| KMO | 0.76 | 72.4 |
| JJA | * | 51.0 |
| Discriminant | | |
| Blackwell (n = 147) | | 85.0 |
| PSJ | | 70.6 |
| AK | | 85.0 |

*Not reported.

order to make the comparison more reasonable. My model classifies 85 percent of the issues into the correct bond rating category. This figure is substantially higher than the percent correctly categorized obtained by PSJ and equals the figure obtained by AK. It is worth noting that AK has the highest percent correctly classified of any published study of bond ratings which I have reviewed.

## Conclusion

The bond rating model developed and estimated in this appendix is reasonable and performs comparably to other models in bond rating literature. The specification of my model is reasonable as compared with existing studies of bond ratings. In addition, my use of NUKE as a determinant of default risk is a minor contribution to the bond rating literature. Additionally, the explanatory power of my model clearly meets or exceeds any reasonable standard of correct classification rates in the existing literature. Thus, I expect that my estimate of the default risk index used in the multiple regression analysis of issue costs will explain a significant portion of the inter-issue variation of YOT. The empirical results presented in Chapter 5 indicate that the variable does perform well, obtaining the expected positive sign and high t values.

# APPENDIX B

# SAMPLE QUESTIONNAIRE

# SAMPLE QUESTIONNAIRE

Firm:_____

Date of Issue:_____Type of Security:_____

Amount of Issue:_____Maturity Date:_____

Interest Rate:_____

Investment Banker's Fee:_____

Out of Pocket Expenses (including lawyer's fees):_____

Commitment Date (circle date):_____

Call Provision: Noncallable for_____years.

Sinking Fund Provision: Sinking fund begins in year_____and retires

_____percent of the issue prior to maturity.

# APPENDIX C

## SWITCH HITTER AND NON-SWITCH HITTER CHOICE CRITERIA

TABLE 14

SWITCH HITTER AND NON-SWITCH HITTER CHOICE CRITERIA

| DRISK | ASSETS ($billions) | YRSPUB (years) | SH | NSH |
|---|---|---|---|---|
| -1.24 | 0.83 | 7 | | x |
| -1.17 | 0.72 | 2 | x | |
| -1.00 | 0.72 | 2 | x | |
| -0.73 | 0.25 | 6 | x | |
| -0.45 | 0.76 | 6 | | x |
| -0.38 | 0.36 | 7 | | x |
| -0.35 | 0.83 | 3 | x | |
| -0.20 | 0.83 | 3 | x | |
| -0.06 | 1.65 | 3 | x | |
| 0.14 | 0.21 | 4 | x | |
| 0.29 | 2.01 | 3 | x | |
| 0.31 | 0.89 | 1 | x | |
| 0.35 | 0.16 | 21 | | x |
| 0.45 | 2.78 | 2 | x | |
| 0.45 | 2.78 | 2 | x | |
| 0.52 | 3.45 | 0 | x | |
| 0.57 | 0.61 | 1 | x | |
| 0.76 | 3.09 | 1 | x | |
| 0.84 | 3.17 | 3 | x | |
| 0.96 | 2.68 | 0 | x | |
| 1.03 | 3.45 | 5 | x | |
| 1.05 | 0.98 | 3 | x | |
| 1.19 | 2.48 | 1 | x | |
| 1.32 | 0.12 | 7 | | x |
| 1.51 | 3.78 | 2 | x | |
| 1.59 | 1.96 | 1 | x | |
| 1.60 | 3.34 | 2 | x | |
| 1.62 | 6.49 | 1 | x | |
| 1.68 | 3.09 | 1 | x | |
| 1.99 | 5.70 | 1 | x | |
| 1.99 | 5.70 | 1 | x | |
| 1.99 | 0.61 | 1 | x | |
| 2.02 | 2.93 | 1 | x | |
| 2.19 | 0.74 | 8 | | x |
| 2.33 | 7.59 | 0 | x | |
| 2.34 | 0.74 | 8 | | x |
| 2.36 | 0.12 | 3 | x | |
| 2.45 | 3.34 | 2 | x | |
| 2.48 | 7.59 | 0 | x | |
| 2.49 | 3.81 | 0 | x | |
| 2.53 | 6.87 | 0 | x | |

TABLE 14 (continued)

| DRISK | ASSETS ($billions) | YRSPUB (years) | SH | NSH |
|---|---|---|---|---|
| 2.62 | 5.01 | 0 | x | |
| 2.94 | 5.25 | 8 | x | |
| 2.97 | 1.32 | 6 | x | |
| 3.32 | 5.53 | 0 | x | |
| 3.55 | 5.01 | 0 | x | |
| 3.88 | 0.03 | 25 | | x |
| 6.38 | 0.10 | 25 | | x |
| 8.43 | 0.16 | 10 | | x |
| 21.87 | 0.40 | 9 | | x |
| 22.02 | 0.40 | 9 | | x |
| 35.75 | 0.53 | 8 | | x |
| 41.34 | 0.01 | * | | x |
| 49.64 | 1.19 | 6 | | x |
| 52.28 | 1.22 | 8 | | x |
| 52.33 | 1.22 | 7 | | x |
| 52.35 | 1.22 | 7 | | x |

*This firm had not issued publicly in over 30 years.

# APPENDIX D

# CORRELATION COEFFICIENTS

TABLE 15

CORRELATION COEFFICIENTS

| | Correlations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Y | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 |
| Y | 1.00 | -0.14 | -0.20 | 0.39 | 0.26 | 0.33 | 0.48 | -0.20 | -0.18 |
| X1 | . | 1.00 | 0.08 | 0.24 | 0.23 | 0.04 | 0.04 | 0.09 | 0.10 |
| X2 | . | . | 1.00 | -0.07 | 0.08 | 0.03 | 0.03 | 0.39 | 0.35 |
| X3 | . | . | . | 1.00 | 0.41 | 0.24 | 0.13 | -0.11 | -0.01 |
| X4 | . | . | . | . | 1.00 | -0.06 | 0.08 | 0.00[a] | 0.19 |
| X5 | . | . | . | . | . | 1.00 | 0.14 | -0.11 | -0.12 |
| X6 | . | . | . | . | . | . | 1.00 | -0.01 | -0.02 |
| X7 | . | . | . | . | . | . | . | 1.00 | 0.86 |
| X8 | . | . | . | . | . | . | . | . | 1.00 |

Y = YOT X1 = CALL X2 = SINK X3 = TREAS X4 = VOL

X5 = SPREAD X6 = DRISK X7 = PRIV X8 = PRIV*VOL

[a]Correlation coefficient is less than 0.01.

# VITA

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