An Empirical Analysis of the Choice Among Issuing Straight Debt, Equity, and Equity-Linked Debt Securities

by

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(ABSTRACT)

This dissertation analyzes factors associated with the apparent decision that firms make when choosing a source of long-term capital. Straight debt, common stock, convertible debt, and units of debt with warrants (units) are included in the issuer's opportunity set, with particular emphasis being placed on the choice between convertible debt and units. A unit of debt with warrants is a financial package consisting of a straight bond or note, and one or more common stock warrants. This study finds that issuers earn insignificant average abnormal returns around the announcement and issuance period for unit offerings, thus presenting units as a unique case of a "penalty-free" equity offering.

Finnerty [1986] suggests that units may be structured in such a way as to create a synthetic convertible bond. He shows how a unit provides the issuer an advantage of a larger tax shield than does a comparatively structured convertible. The present study finds that the market views the tax advantage as being only marginally important. Also, a comparison of the terms of units and convertibles reveals that, in practice, units are not structured as synthetic convertible bonds.

A cross-sectional analysis evaluates unit and convertible issuer abnormal returns in light of hypotheses that the securities reduce agency costs to the firm. The evidence is generally inconsistent with the agency cost reduction hypothesis.

This study presents the first information about the valuation consequences of unit issuances and factors that may be related to the decision to make such offerings.

Dedication

This dissertation is dedicated to my parents,

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I extend my sincere thanks to those who have provided support, both moral and material, throughout my graduate education. In particular, I owe a large debt of gratitude to my chairman, Professor Randy Billingsley, for giving of his time most unselfishly over the past year and a half. I am grateful for the many evenings he spent reading my dissertation. Also, I appreciate his providing me with just the right amount of guidance in the preparation of the dissertation, and for insisting that I struggle alone with some issues when it was in my long-term best interest.

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I am very grateful for the patience and assistance of the one who suffered the most during this portion of the doctoral program, my wife, thorough knowledge of statistics has been helpful to me in a number of instances. However, more impressively, she has cheerfully taken on my share and hers, of mundane household responsibilities, despite the fact that she has her own career to pursue. also has been understanding during the times she has had to spend the night in a lonely apartment while I worked, and I appreciate her unwavering devotion to our marriage.

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Chapter 1

Introduction

The purpose of this dissertation is to analyze the choice capital-raising firms make when selecting which type of security to issue. The study emphasizes a type of offering that has been largely neglected in the finance literature, the unit of debt with warrants (units hereafter).[1] Companies raise billions of dollars each year by issuing equity-linked debt instruments,[2] and the present study will provide insight into the consequences for the issuer of floating such securities. For comparative purposes, straight debt and common stock also are considered in the issuer's opportunity set. There is a substantial amount of information on the announcement day and issue day valuation impacts of straight debt, equity, and convertible debt. However, despite the fact that over $9 billion in units was offered to the public between 1981 and 1987,[3] the economic consequences of the issuance of units are unex-

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1 As will be discussed, a unit is not a single security, but a bundle of financial instruments. However, for ease of exposition, a unit will be referred to as a "security" throughout this study.

2 According to Finnerty [1986], between 1981 and 1985 firms raised $35.9 billion from two types of equity-linked debt: convertible bonds and units. Appendix A lists unit offerings made between January 1970 and March 1988.

3 In 1987 through 1989, the primary market in the U.S. has seen few unit offerings. However, in the Euromarket,

plored to date. Along with this topic, the dissertation addresses the question of which firm- and market-specific characteristics are associated with the tendency of certain companies to gravitate toward issuing different types of securities.

Many financial managers appear to at least consider issuing units when obtaining new capital. Of Hoffmeister's [1977, p. 29] sample of 53 convertible debt issuers, 29 percent of industrial firms and 41 percent of financial companies reported that they had considered using units instead, during the capital acquisition process. Thus, at the minimum, units appear to be a *potentially* significant means of raising funds. As will be discussed below, units can be designed as synthetic convertible bonds, and a major aspect of this study is a comparison of the relative capital market effects of issuing these two sources of capital. In addition to analyzing the valuation impact of unit issuances, the present research includes an examination of the financial terms of units and a multivariate analysis of the characteristics of issuing firms. An attempt will be made to explain the observed returns cross-sectionally, using variables derived from financial theory. It is hypothesized that the agency status of the issuer, as well as the terms of the offering, are responsible for influencing the level of announcement and issue day abnormal returns.

A unit of debt with warrants is a financial package consisting of a straight bond or note and one or more common stock warrants. The unit is issued at a single price, but thereafter the two components trade independently. Though such "debt-plus" financings are less frequent than convertible debt offerings, they have been used for at least three decades (Graham, Dodd and Cottle [1962], p. 621).[4] It has long been known that a convertible bond is

offerings of debt with warrants have become commonplace. For example, from February through May of 1989, over $17 billion in debt with warrants has been issued, mainly by Japanese firms.

[4] Unit offerings are apparently a more recent phenomenon than convertible bond issuances. Pilcher [1955] cites evidence that convertible bonds were first issued in England in the 17th century. However, their use in the United States did not become prevalent until the late 1800's.

the financial equivalent of a straight bond plus a *nondetachable* warrant.[5] Finnerty [1986] notes that units and convertibles[6] are financially equivalent securities only if the warrant is nondetachable from the debenture.[7] Depending on the terms associated with the issue, either cash or a debenture may be surrendered as scrip[8] when the warrant is exercised. If cash *or* debt may be used to exercise the warrant portion of a unit, *ceteris paribus*, investors would be likely to view the unit as being more valuable than a convertible due to the unit's superior flexibility with regard to exercise scrip. For both convertibles and units with debt as scrip, there is no cash flow associated with the conversion of a bond into stock. Only in the case of units where cash is used as scrip (and the convertible with a "cash kicker") is there a cash flow on the exercise/conversion date.

Given that convertibles and units can be designed as financially equivalent securities, why do both instruments exist? If one does not provide an advantage over the other, then in efficient markets one should expect to see approximately equal usage of the two forms, instead of the 4-to-1 preponderance for convertibles. In the same vein, why do firms choose to issue debt with warrants rather than debt with shares of stock? One possible explanation is that firms with certain characteristics tend to prefer one type of security over another, or that market conditions largely determine which form of capital is raised. Marsh [1982] and Billingsley, Lamy, and Thompson [1988] find that there are significant differences among issuers of debt, equity, and convertible debt. Anecdotal evidence reported by Finnerty [1986]

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5 Ingersoll [1977a, p. 310] provides a proof of this, his "Theorem V." The result is dependent upon the assumption that the convertible and unit have equivalent terms, including coupons, principal, conversion/exercise provisions and the maturities of both types of securities.

6 "Convertibles" in this dissertation refer to "convertible debentures," and do not refer to shares of convertible preferred stock.

7 Nondetachability is a necessary, but not sufficient, condition for financial equivalence.

8 "Scrip" is what is used to exercise the warrant or to convert a convertible bond. Occasionally, a convertible indenture will allow cash to be paid along with the bond, as part of the conversion scrip. Tennican [1975] refers to this as a "convertible with a 'cash kicker.'"

suggests that there may be systematic differences between firms that offer units and those that offer convertibles.

A firm's financial managers are responsible for securing capital to fund its investment plans. There is an ongoing debate among finance practitioners and academics as to the relative merits of issuing debt versus equity. The benefits from each financing source may differ, depending on the nature of the firm itself (e.g., the firm's current debt level, the marginal corporate tax rate, and the percentage of stock held by insiders). Further muddling the capital structure picture is the presence of convertible debt and units, which are certainly not equity, but are generally not considered to be wholly debt securities.

In summary, the present study is divided into three segments, each of which examines a different facet of the use of equity-linked debt. An event study is performed to evaluate the shareholder wealth implications of issuing units. There is substantial evidence that the issuance of equity is associated with a decrease in the offerer's stock price, and that straight debt offerings produce no significant price reaction. Convertible bond issuances result in a negative price reaction on the announcement and issue dates. If it is found that units are associated with a less severe negative price reaction than convertibles, it could be that units are a financing source that should be considered seriously by firms that are contemplating an offering of convertible debt. The dissertation tests several hypotheses pertaining to the valuation effects of units relative to those of equity, straight debt, and convertibles. Another major focus of the dissertation is a cross-sectional analysis of the announcement and issue day excess returns, in an attempt to determine why shareholders react as they do to issuances of equity-linked debt. Finally, a logit analysis is performed to evaluate factors that financial theory suggests might be associated with the probability of issuing one type of

security versus another. This will provide insight into the types of firms that seem naturally to gravitate toward a given financing source.

The organization of the dissertation is as follows: There are six chapters and an appendix which contains a list of unit issues made during the period covered by this research. Chapter 2 provides a selective review of the literature relevant to the study. Hypotheses are developed and the methodology for testing them is presented in Chapter 3. Chapter 4 describes the data and how they are obtained, and Chapter 5 contains results of the tests. A summary and conclusions are given in Chapter 6.

Chapter 2

Literature Review

The primary focus of this dissertation is a comparative analysis of equity-linked debt securities, straight debt and common stock. Units of debt with warrants have received little attention in the financial literature, but since units and convertibles have many similarities, it is useful to review comprehensively what is known about convertibles. Following this, articles on capital structure theory and the choice of capital type are summarized. The final section reviews the literature concerning units.

2.1 Convertible Debt

Over the years, researchers have studied convertible bonds from a variety of perspectives. This section is divided into seven subsections, each of which represents one area of research on these securities. The first subsection examines the reasons firms give for issuing convertible bonds. Following this is a discussion of the call provision and other com-

mon features of convertibles. Convertible bonds possess both debt and equity components, and the third subsection covers studies that analyze convertibles empirically by taking this into account. Next, theoretical methods of valuation are covered. The conversion option is analyzed in the fifth subsection. The sixth subsection discusses the observed underpricing of new convertible issues, and valuation effects of a convertible issue are presented in the final subsection.

2.1.1 Issuer Motivations

According to Pilcher [1955], Brigham [1966] and Hoffmeister [1977], the two primary reasons that firms issue convertible debt are:

1. Convertible bonds are used as "delayed equity financing," issued with the expectation that the debt will be exchanged for equity after the stock price rises sufficiently.

2. The conversion option is a "sweetener" added to straight debt with the goal of reducing the issuer's interest payments and/or to enhance the marketability of the bond.

Brigham surveyed 22 firms, which issued convertible bonds between 1961 and 1963, regarding their motives for offering this type of security. Seventy-three percent mentioned "delayed equity financing" as their reason, and only 27 percent stated that a convertible was floated to lower the cost of debt. Hoffmeister notes an apparent shift in the attitudes of managers by 1977, with 47 percent of his sample (n = 53) adding the feature to lower the cost of debt or to improve its marketability. Thirty-four percent said that they had issued convertibles as "delayed equity."[9] Hoffmeister tests whether firm-specific traits such as the

[9] Hoffmeister's percentages do not add to 100 because some respondents gave other reasons for issuance,

debt ratio are related to the stated reason for issuing convertible debt. Those with higher (lower) debt-to-total assets ratios were more likely to respond "delayed equity" ("reduce interest cost") when asked for their intention. Hoffmeister offers no explanation for this finding, though it may indicate that, as a firm perceives that it is nearing its debt capacity, convertible debt is used only as temporary debt financing.

If the conversion privilege is considered to be a sweetener, which when added to an otherwise unattractive debenture will cause a more favorable market response, one should observe the widest usage of convertible bonds among smaller, riskier firms, which are presumably the primary suppliers of speculative-grade debt. Dividing his sample into "medium-sized" and "large" firms,[10] Hoffmeister rejects this hypothesis by finding that the conversion option was added to debt as a further enticement by 44 percent of large firms, but by only 16 percent of medium-sized firms.

There is some question as to whether the issuance of convertible bonds *as delayed equity* is a valid financing approach. The statement conjures up the idea that the firm can derive more value from its equity in the form of a convertible bond than it could in the form of a stock issue made today. Brennan and Schwartz [1982] argue that this idea is not valid under all circumstances, by showing that convertibles are a superior financing source only if a firm performs well after the issue. If the firm does not perform well, few bondholders are likely to convert, so convertibles are inferior to common stock because the firm will still have to meet debt service requirements. This situation creates a "hung" convertible, a se-

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including "to avoid the immediate dilution of earnings per share" (6 percent of respondents), and "to take advantage of the current market popularity of the conversion feature" (6 percent). Seven percent answered, "other reasons."

[10] "Large" firms are those with assets and sales of over $80 million and $100 million, respectively. "Medium-sized" firms have assets and sales of at least $20 million, but less than $80 million and $100 million, respectively. The sample size of "small" firms was too limited to evaluate.

curity that the issuer would like to see converted, but that the holders refuse to convert. McDaniel [1983] shows that, in perfect markets, convertibles should be superior to neither equity nor straight debt. There are, however, some existing market imperfections that make convertible debt especially attractive from both the issuer's and investor's perspective, which explain the presence of conversion premiums. A conversion premium is the amount by which the market value of the security exceeds the greater of the straight debt value or the conversion value of the bond. If the market is characterized by information asymmetry, it is in the shareholders' best interests for the company to issue equity if outside investors foresee strong earnings growth and if the firm subscribes to a more pessimistic financial outlook. Here, convertibles are a relatively low cost source of funds, because the investors' required rate of return will be lower than the rate that *should* be required, given the firm's true prospects. Thus, McDaniel argues that, under information asymmetry, investors can be induced to pay a premium for convertible bonds. But because rational investors are expected to learn from past mistakes, one would not expect these premiums to persist over time.

McDaniel contends that investors also acquire convertibles in response to market imperfections. Some institutional investors are prohibited by law or by charter from investing in the options market, which is an imperfection on the demand side of the market. Convertibles allow those who are legally or otherwise prohibited from holding options to add a contingent claim to their portfolios. Also, convertibles can lower transactions costs for investors seeking a cash flow pattern similar to that provided by options. Because investing in a convertible involves the purchase and sale of only one security, transactions costs are likely to be lower for the purchaser of a convertible versus the unit buyer or the holder of common stock and a put option.[11] Finally, stockholders of a firm are assumed to possess all

[11] By put-call parity, as developed by Stoll [1969], the relationship between the implicit components of a con-

relevant information about the company. However, obtaining information about other firms is a more costly endeavor. So the investor who cannot costlessly obtain information about a prospective common stock investment might be able to move closer to his desired risk-return position by purchasing a convertible bond of the (familiar) firm in which he is currently a stockholder.

2.1.2 *Issue Characteristics*

In the case of *callable* convertible bonds, the implicit warrant is inferior to a comparable call option, because the expiration date of the warrant is uncertain. Explicit warrants are rarely callable, so the expiration date of the security is known with certainty at the time of issuance. This is one reason why it is difficult to value the implicit warrant component of convertible debt. According to McDaniel [1983], the Black-Scholes [1973] option pricing model cannot be used for this task due to the interrelated nature of many of the input variables. For example, the time to maturity of a convertible is dependent on when the call occurs. The timing of a call is likely to be dictated by the level of the underlying stock price, as well as by the variance of its returns.[12] Though the conversion feature allows the investor to take part in future stock price increases, convertible bonds also pay interest in the form of semi-annual coupons. Investors require a lower coupon rate on convertible bonds than on straight debt, *ceteris paribus*, because the opportunity to convert into common stock has value. How low the coupon rate can be set is based upon the terms of conversion (e.g., the

vertible versus a stock and put portfolio is $C + E/(1 + i)^T = S + P$, where S is the price of the firm's stock, C and P are the prices of European call and put options on the stock, respectively, E is the principal amount of a zero-coupon bond, and T is the time to maturity of the bond (and the time to the exercise date of the options). The riskless rate is given by i, because the put-call parity relationship is derived by showing that the cash flows from the constructed portfolios of stock and options are risk-free.

[12] Many times convertible calls occur in order to force conversion. Storey and Dipchand [1978] find that, for Canadian firms, the stock price level and volatility are related to the likelihood of conversion.

conversion ratio). To establish provisions that will allow the bond to be issued at par, the firm and underwriter are responsible for achieving the proper trade-off between these two variables. The return on a convertible will be related to interest payments and price appreciation of the underlying common stock. Thus, there is a natural trade-off between the promised coupon rate and the magnitude of the opportunity to take part in potential stock price movement. A convertible with a "high" coupon rate would tend to have a "low" conversion ratio (e.g., investors have to pay a high conversion price to convert), and the security should behave much like straight debt, *ceteris paribus*. A "low" coupon rate will result in a "high" required conversion ratio. In this case, the security is more similar to equity,[13] in that investors will be relatively more reliant upon capital gains for their return. Due to the unpredictable nature of future stock prices (see Fama, [1965]), capital gains are less certain than the payment of coupons and the required rate of return will be greater for convertibles with high conversion ratios. The total value and the make-up of the package of coupon interest and conversion terms are a function of the credit rating of the issue, the firm's growth prospects and the size of the issue (Van Horne, [1984]). Brennan and Schwartz develop [1977] and test [1980] a numerical methods model of convertible bond pricing. In the latter paper they examine a hypothetical debenture and find that a 10 percent reduction in the coupon rate required a 6 percent decline in the conversion price. While this result is relevant only for the specific bond in their study,[14] the result generally illustrates the nature of the trade-off that issuers face.

The call provision is almost always present on convertible bonds, and this option is frequently exercised. Convertible indentures typically grant bondholders a period of pro-

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[13] Van Horne [1984, p. 251] argues that, from a priority-of-claim perspective, convertibles are already similar to equity because convertible debentures are almost always subordinated to all other debt securities.

[14] Brennan and Schwartz manually assign parameters for the convertible bond and the interest rate environment, and use numerical techniques to solve for a convertible's price.

tection from call (a deferred call provision), usually lasting several years. After the expiration of call immunity, a call may result in the surrender of bonds for cash[15] or the investor may choose to exercise the conversion privilege. If the call price (*CP*) is below the current conversion value (*CV*) of the bond, then a rational investor would convert and receive *CV* dollars in stock rather than to receive *CP* dollars in cash from the firm. A firm consequently forces conversion when it calls a bond under this circumstance. This may allow the issuer to refund the debt at a lower interest cost, and it resolves capital structure uncertainty from the perspective of the market.[16] Brennan and Schwartz [1980] and Ingersoll [1977a] attempt to determine the firm's optimal call strategy. They conclude that only when the conversion value of the bond rises to the call price plus accrued interest should the security be called. Calling when the bond price is lower would transfer wealth from stockholders to debtholders. Brennan and Schwartz and Ingersoll assume that the firm is trying to maximize the value of equity, and that doing so requires that the convertible bond value be minimized. Allowing the bond price to exceed the optimal call price is a questionable strategy for the firm, since the bond value is not being minimized. From the firm's perspective, the optimal strategy would be to force conversion at the point where the call price (plus accrued interest) and conversion value are equal.

Ingersoll [1977b] observes that in a sample of 179 firms, the median company waited to call its convertible bond until the conversion value was 43.9 percent above the call price. He attempts to explain this seemingly irrational behavior by noting that firms give investors

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[15] Initially, the call price is often equal to par value plus one year's interest. Also included is interest accrued since the last coupon was paid. This premium over par value, known as the *call premium*, generally decreases over time.

[16] As discussed in a later section, there is uncertainty as to whether the convertible bond should be viewed as debt (that is, the debenture is unlikely to be converted) or equity (conversion is probable). A convertible call, without a refunding of the called issue, will restore the firm's borrowing capacity by relieving the balance sheet of some debt, and it may also make the issuance of equity a less vexing task because questions about potential share dilution will have been answered.

about 30 days to decide whether to surrender the bond for cash or equity. During this notice period, the stock price could move dramatically, even to a point below the conversion price. If the issuer is interested in forcing conversion,[17] then this risk might be dealt with by allowing the stock price to develop a cushion over the call price. But there is no guarantee that the conversion value will remain above the call price and the risk of this becomes greater, the longer is the notice period. Also, the longer is the term to call, the more coupons the firm is obliged to pay in the notice period. However, Ingersoll remains doubtful that these factors are sufficient to explain the observed large premiums over the call price.

Mikkelson [1981] examines the valuation effects of convertible call announcements. Employing a sample of 113 calls, he finds a statistically significant two-day abnormal common stock return of -2.13 percent. Mikkelson postulates that the loss of the interest tax shield of debt is responsible for the negative results. For convertible-calling firms with straight debt also outstanding ($n = 19$), the mean abnormal bond return is +.73 percent for the week of the call announcement. Thus, the negative stock price effect and the positive bond price impact indicate that a convertible call results in a wealth transfer from stockholders to bondholders. The net impact on total firm value is slightly negative, leading Mikkelson to conclude that, on average, corporate call policies are inconsistent with shareholder wealth maximization.

2.1.3 Partitioning the Components of Value

Poensgen [1965] postulates that since the convertible bond investor may hold either debt or equity, at his option, convertibles are hybrid securities consisting of part debt and

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[17] If a bond call is unsuccessful at forcing conversion, it may be necessary for the firm to raise new capital to finance the call. According to Ingersoll, the underwriting fees associated with conversion are less than those charged for refunding with new financing.

part equity. At one point in time, a single convertible bond is either debt or (if converted) equity. However, an entire issue of unconverted convertible debentures may, theoretically, consist of part debt and part equity based upon the probability of conversion occurring in the future. The relative proportions of debt and equity within unconverted convertible bonds are estimated by Brennan and Schwartz [1980], King [1984] and Billingsley, Lamy and Thompson [1986].

With an example, Brennan and Schwartz demonstrate the usefulness of their numerical pricing technique. First, given predetermined parameters, the value of a non-callable, non-convertible bond is computed. Then the model is applied to a similar convertible debenture, with the result that the straight debt value is about 80 percent of the convertible value. Thus, the remaining 20 percent of the price of this hypothetical security must have come from the equity component. Brennan and Schwartz's model treats debt as being virtually riskless.

King uses the foregoing model in a more general fashion to examine 103 actual convertible debt issues. By valuing a convertible issue, then revaluing after elimination of the conversion privilege (i.e., changing the conversion ratio to zero) and noting the difference, King finds the value of the warrant, or latent equity part, to average 18.4 percent of the issue price. The model understates the equity value, because the debt portion is overstated for cases in which a conversion premium exists. Throughout the analysis, King assumes that the issuer's capital structure is comprised only of riskless senior debt, a convertible issue and equity.

Billingsley, Lamy and Thompson present a two-equation model to price convertibles. By estimating an appropriate discount rate (unlike what Brennan and Schwartz contend, it is found to average about 3 percent above the riskless rate), the value of the straight debt component can be determined. In a sample of 95 offerings, the authors find an average

predicted equity value of 38 percent of the convertible price. This study suggests that the conversion privilege is more valuable than was previously thought.

2.1.4 Overall Valuation of Convertible Bonds

Several researchers (e.g., Poensgen [1965], Walter and Que [1973], and Jennings [1974]) Brennan and Schwartz [1977] and Ingersoll [1977a]) present models to value convertible bonds mathematically. Brigham [1966] takes an intuitively appealing graphical approach to valuation. Prior to 1975, the typical approach taken was to attempt to split the security into its debt and equity (warrant) components, and to value separately the two parts. Most studies concentrated on finding the determinants of conversion premiums, because the value of the price floor is easily determined. The price floor plus the premium equals the market price of the convertible. Option pricing theory was revolutionized with the development of the Black-Scholes [1973] model and related work by Merton [1973], and more recent papers (Brennan and Schwartz [1977] and Ingersoll [1977a]) have concentrated on the contingent claim aspect of convertible bonds.

It is convenient to develop upper and lower price boundaries as a first step in determining the value of a convertible bond. The value of a firm's assets serves as an upper price limit for a convertible bond because the concept of limited liability for common equityholders implies that the stock price may never be negative. Prior to maturity, a convertible bond must be worth at least its conversion value, because the straight debt value (*SDV*) of the security provides a lower price boundary. So the price of a convertible must be greater than *SDV*. If the stock price falls to near zero, as long as the firm does not default, the investor continues to receive coupon payments and will eventually receive principal reimbursement. Thus, a second lower price boundary is the conversion value *CV*. Though the straight bond

aspect of a convertible provides downside price protection, the convertible bond price should typically exceed this minimum value, because the equity participation privilege of the conversion option has a positive value to investors. The higher of these two price floors represents the minimum value of a convertible bond, which means that the minimum convertible bond value may be expressed as *max(SDV, CV)*. If the conversion value floor is penetrated, riskless arbitrage profits can be made by buying the convertible, exercising the implicit warrant and selling the stock.[18] In a market composed of rational investors, the price of a straight bond should not be above the convertible bond price. Convertible bonds usually do not sell for an amount equal to either price floor. The difference between the market value of a convertible and the greater of the conversion value and the straight debt value is called the *conversion premium*.

Brigham notes an interesting phenomenon regarding the size of convertible premiums when *CV* is greater than *SDV*. He observes that the premium over conversion value tends to shrink as the conversion value (driven by the underlying stock price) increases. As the stock price rises, the risk of a call by the firm management increases.[19] Thus, as the conversion value drives the convertible bond's price ever higher, the debt floor guarantee is of decreasing importance. The possible percentage loss of wealth from a stock price decline thus becomes larger. Also, as equity equivalents, convertible debentures are inferior to

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[18] As an illustration of an arbitrage opportunity, assume that for a convertible debenture the stated conversion ratio is 20. With the underlying common stock selling for $45 per share, the conversion value of the bond is $900. If the market price of the convertible was $800, an investor can earn a riskless $100 profit by taking the following steps:

a) Buy the bond for $800.

b) Convert the bond into 20 shares of stock.

c) Sell the stock for a total price of $900.

[19] Managers are assumed to be working on behalf of stockholders. If Modigliani and Miller's Proposition I holds, an increase in the debt value results in a decrease in the equityholders' wealth. So a value-maximizing manager will not allow the conversion value to rise above the call price.

common stock. Although convertible bondholders and common stockholders share in capital gains, dividends to stockholders often rise over time, while coupon payments to bondholders do not.

Jennings' [1974] model also estimates convertible bond premiums by treating the convertible bond value as a weighted average of *CV* and *SDV*, using the probability that *CV* is greater than *SDV* and the probability that *SDV* is greater than *CV*, respectively, as weights. The discount rate used is derived from the capital asset pricing model, and thus only undiversifiable risk is assumed to be relevant. Depending upon which price floor is dominant, the required rate is a combination of the required rate on debt and the risk-free rate (debt floor dominates) or the required rate on equity and the risk-free rate (the conversion value dominates).

Jennings claims that the size of conversion premiums is positively related to the following:

1. The amount of risk protection that a convertible provides over straight debt or equity.
2. The magnitude of convertible debt cash flows versus common stock dividends.
3. The capital gains stemming from the conversion privilege, relative to the straight debt value.
4. The time period of the option to convert.
5. The convertible call price.
6. The level of transactions costs involved in trading a convertible versus an equivalent number of shares of common stock.
7. The extent of convertible bondholder protection from share value dilution.

Jennings' model incorporates only determinants 1, 2, 3 and 5 above. The size of conversion premiums are found to be relatively insensitive to factors 4, 6 and 7. When testing the model, Jennings finds several systematic biases in convertible premium estimation. On average, the model overestimated "large" premiums and underestimated "small" premiums.

Without commenting further, the author asserts that the use of nonsynchronous convertible bond and stock price data is a likely reason for this.

2.1.5 *The Conversion Option*

Ingersoll [1977a] develops criteria for timing the optimal conversion of convertible bonds and finds that, given several assumptions,[20] conversion will not occur prior to the debt's maturity. Using an arbitrage proof he shows that, until maturity, the convertible bond is worth more unconverted. However, he later relaxes some of the assumptions and notes that optimal voluntary conversion may occur either when dividends are paid or just prior to an adverse change in conversion terms. According to Brennan and Schwartz [1980], the optimal strategy for the investor is to convert a bond only when the convertible bond price equals the conversion value. The convertible cannot sell for less than the conversion value floor, but if the bond price is greater than the conversion value, conversion is unwise because the holder will lose wealth. Thus, if the bond value rises above the conversion value, a rational investor would probably not convert a bond. If the debtholder earns coupon income that is significantly higher than the dividend to be paid on the stock received upon conversion, then the bond will definitely not be converted voluntarily. Similarly, an optimal policy can include voluntary conversion as long as the dividend is higher than the coupon income, even if the implicit warrant is not "in the money."

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[20] Ingersoll assumes perfect capital markets, constant conversion terms and no cash dividend payments.

2.1.6 *Underpricing of Convertible Debt Offerings*

Ibbotson [1975] shows that the average initial public offering of common stock tends to be underpriced. In an earlier paper, Vinson [1970] concludes that this underpricing holds true for convertible debt. He notes a positive "price gap," which is the first trade price in the secondary market minus the initial issue price. Firms should attempt to minimize this gap to obtain funds at the lowest cost. Vinson finds that 70 out of 77 convertible debt issuances between 1956-68 had positive price gaps. Alexander and Stover [1977] use the market model to assess the extent to which stockholders and convertible bondholders earn positive abnormal returns around the convertible issuance date. With a sample of 142 issues, they find significantly positive abnormal price performance for both the convertible bond and the underlying common stock, between the date of issue and the time of the initial secondary market price quote. There are two possible reasons why positive price gaps exist:

1. The issuer and/or the investment banker underprice the offering, or

2. Between the time of issue and the initial secondary market price quote, the convertible bond price rises.

The latter cause may occur through changes in the conversion value floor resulting from stock price movements. That is, a stock price rise will increase the conversion value price floor, which will have a nonnegative impact on the convertible bond price. Perhaps both phenomena persist, but Vinson addresses the possibility of underpricing, giving several reasons why this phenomenon might occur:

1. There is a high concentration of market power in the investment banking industry. In 1967 (three years before the study was published), 20 firms handled 74 percent of the

business. Vinson suggests that the basis for inclusion in a syndicate is not often dictated by good financial sense, but by friendships and historical partnerships. However, there is no reason to believe that this situation is limited to the convertible debt market.

2. Convertible bonds are imperfectly allocated to investors. The offering firm and investment banker attempting to clear the entire issue at a single price. If markets were perfect, then the price at which convertibles should be issued could be ascertained from the intersection of the supply and demand curves. However, if some investors willing to pay prices above the equilibrium price are left out of the marketing plan for the issue, the offering may have to be sold for a concessionary price. This type of price may also be necessary if bonds are rationed to certain groups of investors.

3. Underwriters are likely to underprice so as to avoid the short- or long-term reputational damage that might accrue following an unsuccessful issue. Firms, also, seek to avoid jeopardizing the success of future capital market offerings. Underpricing can be done inconspicuously with convertibles, because, while selling at par value, an issue can still contain lenient conversion terms relative to other convertibles in the market. Still, consistent underpricing of issues can damage the investment banker's reputation among potential clients.

4. Investment bankers want to avoid the resource expenditures necessary to provide sufficient price support for the issue in the aftermarket.

5. From the firm's perspective, if the issue is intended to be delayed equity, underpricing creates a higher probability of the stock price rising above the conversion price. Thus, conversion becomes more likely. Firms that issue convertibles rather than equity pre-

sumably believe that the bonds offer a cost savings over stock. It seems irrational that the issuer would then underprice the convertible, possibly negating that cost advantage.

2.1.7 Announcement and Issuance Effects

Dann and Mikkelson [1984] provide evidence regarding the common stock price reaction to the announcement of convertible debt offerings. The two-day average abnormal return for the 132 issue sample was a statistically significant -2.32 percent, and the average residual continues to be negative even 60 days following the offering. About 78 percent of the sample issues were accompanied by negative two-day residuals. With a smaller, cleaner[21] sample of convertibles, Eckbo [1986] confirms this result, with a statistically significant abnormal two-day return of -1.71 percent. Hence, the issuance of convertibles appears to be inconsistent with the goal of stock price maximization. The authors hypothesize that the initial issue underpricing observed by Vinson [1980], and Alexander and Stover [1977] was a transfer of wealth from existing stockholders to potential stockholders, hence the observed negative price performance. To test this, Dann and Mikkelson examine the announcement effects of convertible bond rights offerings. A rights offering occurs when the current shareholders are given the right of first refusal to buy when the firm is marketing a new issue. With a convertible bond rights offering, there should be no transfer of wealth even if convertibles are underpriced, because the stockholder who purchases a convertible bond realizes the benefit and also absorbs the cost of underpricing. Upon examination of 38 convertible bond rights offerings, Dann and Mikkelson still find a statistically significant -1.23 two-day effect on stockholder value. Thus, original issue underpricing cannot fully explain the observed negative response.

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[21] Dann and Mikkelson do not screen out non-industrial firms, and their sample includes nine commercial banks.

Dann and Mikkelson extend the analysis to examine issuance period returns to shareholders of firms offering convertible debt. The average abnormal stock return on the offering day and the following day for an issuer of convertible debt is -1.54 percent, and is statistically significant. This would seem an odd result in an efficient market, because one would think that if the market views a convertible bond issuance as signalling bad news, the price impact should be limited to the announcement period. Dann and Mikkelson offer three possible explanations for the observance of negative abnormal returns:

1. For many convertible issuers, the precise terms of the offering are not known until shortly before flotation actually occurs. Thus, not all information is revealed during the announcement period. The *negative* abnormal return is a curious result, because there is no reason to believe that abnormal returns around an issuance day should be consistently negative whenever uncertainty is resolved. One expects that from the market's perspective, on average, there should be as many pleasant as unpleasant surprises.

2. Prior to issuance, there is some probability of an offering being withdrawn. Thus, the negative abnormal return associated with the issuance period reflects resolution of the uncertainty surrounding whether flotation will occur. Dann and Mikkelson point out that the number of convertible offerings withdrawn is a small percentage of those announced, so it should come as little surprise to the market when a given convertible issue is floated.[22]

3. A convertible bond issuance increases the number of potential common shares outstanding, and this has a negative impact on the stock price. However, a rational investor

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[22] Mikkelson and Partch [1988] explore the consequences of firms withdrawing proposed common stock and convertible debt issues. They find a statistically significant positive abnormal return around the withdrawal date of common stock issues, and an insignificant effect when convertible debt offerings are withdrawn.

would not choose to convert to common stock around the time of the issuance, because to do so would cause a decrease in his wealth. Thus, convertibles, at issuance, represent only *potential* equity, and this fact is known not only at issuance, but at announcement as well.

Bond issuances have not been the only subjects of valuation studies. In an examination of a sample of 388 seasoned equity offerings of industrial firms, Masulis and Korwar [1986] demonstrate that, on average, the issuance of seasoned equity has negative consequences for a firm's stock price. They find a statistically significant return for the common stock of the issuer on days 0 and −1 relative to issue of −3.25 percent, versus an average market return of +.06 percent. Judging from the valuation effect, common stock offerings seem to signal adverse information about the issuing firm, though the exact nature of the information is not yet understood. In contrast, Dann and Mikkelson [1984] and Eckbo [1986] show that the valuation impact of straight debt offerings is negligible. The former study finds a two-day abnormal return at announcement of −.37 percent, which is significant only at the 10 percent level. Examining a much larger sample (n = 459), Eckbo finds a statistically insignificant two-day return of −.06 percent. Clearly, though the average market response to a debt issue is non-positive, bond offerings are associated with a far smaller market value penalty to stockholders than are equity flotations.

Masulis and Korwar conclude that the preceding evidence supports the Myers and Majluf [1984] hypothesis that external equity financing is the "last resort" source of funds. In a cross-sectional analysis of the abnormal returns to debt issuers, Eckbo finds the abnormal returns to be unrelated statistically to the quality rating of the security. This result is inconsistent with the assertions of Myers and Majluf, who postulate that the issuance of stock is perceived by the market as a signal that the management of the firm considers its

future growth opportunities to be fully reflected in the current stock price. In fact, the asymmetric information model of Myers and Majluf has managers seeking to issue an "overvalued" security, when possible. In their model, the less risky is the security, the more preferable it is as a financing source. This result implies a "pecking order," in which internal equity, straight debt and external equity, respectively, are viewed as increasingly unfavorable to current stockholders. Presumably, hybrid securities such as convertibles and units would fall between debt and external equity in the "pecking order." It is thus plausible to infer that the more equity-like is a security, the more negative is the expected stock price reaction. Conversely, the more debt-like is the security, the less negative is the expected stock price response.

Since the valuation effects of equity offerings are more severe than for straight debt, Dann and Mikkelson suggest that the negative valuation impact of convertible debt results from a leverage decreasing effect of the issue. This idea is consistent with predictions by Ross [1977], whose model regards debt as a signaling vehicle for management. The issuance of debt conveys to the market information that the firm expects future operating income to be high enough to meet debt service payments. But Dann and Mikkelson find that convertible bond offerings are debt-increasing, so the valuation effect is not consistent with Ross's prediction.

Dann and Mikkelson do not address specifically the question of the net effect of a convertible bond issuance on firm value (as Mikkelson [1981] does for convertible calls), nor whether the shareholders' loss is the bondholders' gain. In his study of convertible bond underpricing, Vinson [1970] shows that, on average, the buyers of new convertible issues purchase the securities at a favorable price. The implication is that during the offering proc-

ess, wealth is flowing from the stockholders to new debtholders. Even so, corporations continue to raise several billion dollars of capital per year with convertible debentures.

Despite the abundance of research available on convertible bonds, equity-linked debt securities have received scant attention in the capital structure literature. But it is possible to make some inferences about the proper place of convertibles and units in several models of capital structure. The next section notes briefly some of the theoretical models that have been proposed on the topic of corporate capital structure.

2.2 A Brief Sketch of Capital Structure Theory

Several of the hypotheses specified in the next chapter are based on the predictions of theoretical capital structure models. This section gives a short overview of the research pertaining to a firm's financial structure. The discussion provides selected highlights of the progress made in the finance profession in the last 30 years.

With their capital structure irrelevance model, Modigliani and Miller [1958] prove that, in an environment with corporate and personal tax rates of zero, firm value is insensitive to the type of financing a company selects. Thus, whether straight debt, convertible debt or equity are used, stockholder wealth is unaffected. Adding corporate taxes to the problem, Modigliani and Miller [1963] show that the interest tax shield provided by debt should encourage the value-maximizing firm to carry as much leverage as possible. However, capital structures of nearly 100 percent debt are not observed. Because of the fixed interest payments involved, as the usage of debt rises, the probability of insolvency also increases. According to Kim [1978], bankruptcy costs will cause the optimizing firm to choose a level of debt that equates the expected marginal tax benefit to the expected marginal cost of

insolvency. Incorporating personal taxes, Miller [1977] revives the idea of capital structure irrelevance by dismissing the importance of bankruptcy costs and personal taxes. From the viewpoint of the firm, no capital source is preferred; only on the macroeconomic level is there an optimum. DeAngelo and Masulis [1977] show that in a world of non-interest tax credits and personal taxation, an interior optimum capital structure obtains because the interest tax shield ceases to be useful after all net operating income has been fully exempted. If debt is acquired in amounts beyond the optimum, tax shields are wasted.

Jensen and Meckling [1976] integrate organizational behavior with capital structure theory by assuming that managers work at least as fervently in their own self-interest as for the welfare of the equityholders. Stockholders seek to minimize this agency problem by monitoring the performance of managers. One way to lessen the need for monitoring is to give managers a large ownership interest in the firm's equity. Bondholders reduce the risk of wealth transfers to managers/shareholders by demanding protective indenture covenants. Jensen and Meckling's optimal capital structure occurs at the point where the sum of agency costs to debtholders and stockholders is minimized. Convertible bonds can be useful vehicles for dealing with the agency problems of holding debt. When bondholders perceive that the agency costs of continuing to hold debt have become intolerable, they will execute the option to convert the bonds into equity. The higher is the dividend, the lower is the bond value due to the heightened default risk. However, the right to convert limits losses imposed by large dividend payments.

Though Jensen and Meckling's work addressed the capital structure question through an agency cost approach, the models of Myers and Majluf [1984] and Miller and Rock [1985] are based on a signaling framework. These latter two studies predict a negative stock price reaction to all types of external financing. Their models, which have managers working to

better the welfare of current shareholders, are based on the idea that the announcement of a new equity offering signals that the management feels that the stock is overpriced, and that financing can now be obtained at a relatively low cost. In a market of rational investors, this will be perceived and acted on as an unfavorable signal. Though Miller and Rock predict an equally negative reaction following debt or equity issuance, Myers and Majluf consider equity to be a less desirable source of capital than debt. Presumably, the latter model would hold convertible debt to be better than equity but less attractive than straight debt.

The next section summarizes two studies that have attempted to identify the factors that cause firm managers to issue one type of security versus another. The question that is answered is: Are there systematic differences between firms that issue straight debt, equity, and convertible debt?

2.3 Empirical Determinants of Capital Structure

For British firms, Marsh [1982] examines the choice between issuing equity and debt. Using a logistic regression model, he explains the firm's use of debt or equity financing on the basis of company-specific characteristics and financial market conditions. The explanatory variables in the model include proxies for firm target debt ratios, as well as possible determinants of the debt ratios. Marsh hypothesizes that target debt ratios are influenced by company size, operating risk, and asset composition. Market timing variables also are included in the analysis, due to the observation that firms may occasionally stray from target debt ratios to take advantage of currently favorable market conditions. Marsh finds that the level of interest rates and the performance of the aggregate stock market appear to be correlated with the probability of whether a debt or equity issue is made. Other factors that

apparently influence the choice are firm size, asset riskiness, target debt ratios and the recent price performance of the issuer's stock. Generalizing Marsh's results to any time period is unwise, because the significance levels of the coefficients of his regressors change dramatically over time.[23]

Billingsley, Lamy, and Thompson [1988] extend Marsh's study to include the possibility of convertible bonds. Using a modified version of Marsh's basic equation, they find that the model explains well the choice between debt and convertible bonds, but the explanatory power is poor for the equity vs. convertible debt decision. Their results indicate that the level of stock returns and equity issuances are important determinants of whether convertibles, equity, or debt are offered. Also, firm size, operating risk, and the return on the firm's stock have statistically significant coefficients. Data used are from the 1977-1983 period, and as with Marsh's study, it is unclear whether the results are applicable to other time periods.

2.4 Cross-sectional Analysis of Abnormal Returns

Numerous papers have attempted to determine factors that influence the abnormal returns to security issuers. For example, regressing announcement period abnormal returns on tax- and leverage-related variables has been used to test the empirical validity of capital structure theories. Much of the important cross-sectional work pertaining to securities issuance was published in a special issue of the *Journal of Financial Economics* in 1986 (e.g., Eckbo [1986], Masulis and Korwar [1986], Asquith and Mullins [1986] and Mikkelson and Partch [1986]).

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[23] Marsh splits his analysis into two time periods, 1959-1964 and 1965-1970, and then uses issues from the years 1971-1974 as his holdout sample. For both estimation periods, the deviation from the target long-term debt ratio and short-term debt ratio are significant, as is fixed assets. However, depending upon the period in question, the statistical significance of debt market-, equity market-, size-, and risk-related factors varies.

Eckbo divides capital structure theories into categories according to the predictions of each for the impact of a debt issuance upon firm value. For example, Modigliani and Miller [1958] and Miller [1977] hold that firm value is invariant to the portion of long-term capital that a company maintains in the form of debt. Eckbo states that these two models suggest a "zero-impact hypothesis." Other papers such as Miller and Rock [1985] and Myers and Majluf [1984] are placed in the "negative-impact " category, because they hypothesize that capital issuances generally decrease shareholder wealth. Models that incorporate the tax advantage of debt or that suggest an agency rationale for debt issuance are included in the category associated with the "positive-impact hypothesis." The approach used by Eckbo, of separating the variables into categories, is questionable. It is possible that factors from positive-, zero-, and negative-impact hypotheses simultaneously influence abnormal returns. Thus, potentially important information is being excluded from each equation.

The zero-impact hypothesis is tested by regressing two-day abnormal returns on the underwriter spread and the projected use of the funds. The papers noted in the zero-impact hypothesis suggest that, if there is a nonzero valuation effect from securities issuance, it stems from factors other than capital structure changes. The underwriter spread variable is statistically influential, and is negatively related to abnormal returns. Furthermore, the dummy variable for "capital expenditure" has a statistically significant coefficient. Eckbo does not reveal how he treats offerings for which more than one reason for issuance is given.

In his test of the positive-impact hypothesis, Eckbo regresses abnormal returns on several variables that proxy for the tax shield provided by debt. All coefficients are statistically insignificant.

Finally, abnormal returns are regressed on offering size and proxy variables for the risk of the bonds (including the issuer's debt-to-equity ratio). Both classes of factors are expected to be negatively related to abnormal returns. The issue size variable is not statistically significant, and the risk variables, as well, appear to be unimportant.[24]

Masulis and Korwar perform a cross-sectional analysis of the abnormal returns of equity issuers. Their regressions include control variables that are thought to be positively associated with the probability of an equity offering being made, on the basis of Marsh's [1982] results. Also included are several other variables hypothesized by financial theory to influence firm value. Abnormal returns are postulated to be negatively related to the percentage increase in the number of shares outstanding as a result of the issue. This is because an increase in shares outstanding could, *ceteris paribus*, reduce the portion of the firm controlled by managers, and can result in agency problems. The second factor employed is the change in leverage caused by the issue, because future earnings are thought to be signalled by the amount of debt the firm carries. These two variables are likely to be significantly negatively correlated, so it is probable that multicollinearity is being introduced. A dummy variable is included in the regression, to indicate whether the equity offering involves sales of stock by managers, also to measure possible agency effects. However, no indication of the magnitude of sales is included. The variance of the stock's return is the final factor employed, to identify how precisely the market is able to value the firm's assets. The magnitude of the variance should be negatively related to the issuer's abnormal returns, according to Myers and Majluf. Among the factors that control for the likelihood of a stock issuance occurring, only the variables reflecting recent market movements are found to be significant.

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[24] The size coefficient for the convertible dummy variable is significant, but Eckbo claims that this results from convertibles and straight debt being included in the same regression, and is a reflection of the different-sized abnormal returns observed around straight debt and convertible offerings.

Results are mixed for the variables suggested by financial theorists. Factors measuring an increase in the number of shares and a decrease in leverage are significant (with expected signs), but only when each is used in a regression that omits the other. This result is suspect, since it might be more appropriate to evaluate both variables in the same model. But, as noted earlier, multicollinearity is likely to be a problem in such an equation. The dummy variable indicating if the equity offering involves sales by management is significant and negative, supporting Jensen and Meckling's [1976] agency arguments. Masulis and Korwar find that regression results differ substantially for samples of public utilities which have issued stock, indicating that abnormal returns for these types of firms are affected by the explanatory factors much differently than are abnormal returns of industrial firms.

Asquith and Mullins [1986] specify regressions to test whether the abnormal return observed around the time of a common stock issue is associated with the size of the issue, and the price performance of the firm in the year preceding the offering. They find that, if a stock has a price "run-up" prior to the announcement period, the market penalty for issuing equity is less severe than for firms not experiencing a pre-announcement price increase. Also significant (with a negative sign) is the size-of-issue variable, lending support to Scholes' [1972] price pressure hypothesis,[25] as well as information asymmetry models.

Asquith and Mullins also incorporate a factor to measure the leverage effect of an equity offering. The variable used is the change in the issuer's net debt ratio, based on a five-year historical average.[26] The leverage coefficient is marginally significant in the simple regression, but is insignificant in the presence of size and price run-up variables. Asquith

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[25] Scholes [1972] postulates the reason for a decrease in firm stock price around an equity issuance is due to an increase in the quantity of shares outstanding, in the presence of a downward-sloping demand curve for the firm's equity. The existence of a downward-sloping demand curve would suggest that there are no close substitutes for a firm's shares.

[26] "Net debt ratio" refers to total debt, less cash, divided by total assets.

and Mullins conclude that their results lend support to the Miller and Rock [1985] and Myers and Majluf [1984] asymmetric information theories, which posit that valuation effects are a result of the type of security being offered rather than a capital structure change, *per se*.

Mikkelson and Partch's cross-sectional study considers security issues in general, and includes factors measuring the risk of debt offerings, the stated reason for the offering, the net amount of new financing associated with the offering, offering size, and the type of security issued. The risk of debt offerings, as measured by bond ratings, is not significantly related to abnormal returns. Mikkelson and Partch examine the use of issue proceeds by including only those issues for which the firm stated a single intended use. For common stock offerings, the abnormal return is more negative for issuers that intend to use the proceeds to refinance debt than for those that commit the funds to a capital expenditure program. The subsample sizes are 12 and 11 issues, respectively. The robustness of the results is open to question, particularly since they are inconsistent with Masulis and Korwar's finding for a much larger sample. However, a further cross-sectional regression of 24 issues results in a statistically significant, positive coefficient on a "capital expenditures" dummy variable. For straight debt, the dummy variable coefficient for "general corporate purposes" is positive and significant. Finally, in the regression of convertible abnormal returns, the variable measuring issue size is significantly different from zero (and negative), corroborating Eckbo's result, about which he is doubtful.

Mikkelson and Partch's sampling procedure is questionable, given that the sample is further broken, into subsamples, throughout the study. By deciding to consider only 25 issues of convertible debt (from an 11-year period), one wonders how much information can be derived from tests that divide the sample into groups of nine, four, and five issues, as in the case of the "reason for issuance" analysis. Thus, the results would inspire more confi-

dence if the number of issues under consideration had been increased. To the authors' credit, they do not assume that the data are distributed normally, and nonparametric tests frequently are used. Also, weighted least squares regression is employed to correct for possible heteroscedasticity in the data.

2.5 Units of Debt with Warrants

The literature pertaining to units of debt with warrants is reviewed below. The first subsection contains a review of published research that portrays units as potential substitutes for convertible debt. The second subsection reviews literature that explores the possibility that units (and convertibles) can be employed by managers to lower the agency cost of debt.

2.5.1 Units as Synthetic Convertibles

Jones and Mason [1986] and Finnerty [1986] find that, from the perspective of the firm, units are superior to convertible debt. Convertibles and units are usually issued at par value, but the warrant (implicit in the case of convertibles) value comprises a major fraction of this amount. Thus, the straight debt portion of a unit (with a $1000 maturity value) is floated at a large discount, the amortization of which provides the firm with a potential tax shield. However, Yeasting [1970] argues that there is some added degree of capital structure uncertainty surrounding units, because the type of warrant exercise scrip used is often left to the discretion of the investor. Thus, despite the tax advantage of units, the superiority of units over convertibles remains open to question. For convertible debt, only the debenture may be used to exercise the implicit warrant(s), so a conversion results in debt

being transformed directly into equity. Straight warrants,[27] according to Yeasting, may also accomplish the goal of converting debt into equity because the firm can apply the exercise proceeds to the retirement of outstanding debt.

From the investor's viewpoint, the desirability of units versus convertibles is also ambiguous. The original issue discount, though beneficial to the firm, is taxable income for an investor. Typically, convertible bond owners do not face this problem, so the unit is an inferior asset in this regard. However, Finnerty indicates that many holders of units are tax-exempt investors such as pension funds. Synthetic convertibles structured as units offer an advantage of flexibility over traditional convertibles, because the debt and warrant components may be bought and sold separately. Thus, investors can respond more effectively to phenomena that would raise (lower) warrant returns and simultaneously lower (raise) the return on debt. To illustrate this, *Value Line Convertibles* [1987, p. 153] cites an example of an increase in interest rates, which would cause the debt price to fall, and thus, the effective exercise price of the warrant to fall,[28] if the warrants may be exercised through the surrender of debt. This decrease in the effective exercise price will result in an increase in the warrant value. If the investor anticipates such an event, an appropriate strategy would be to sell the bond and purchase the warrants with the proceeds. Alternatively, if the stock price is above the exercise price, one might want to use the debentures to exercise the warrants after the interest rate increase.[29]

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[27] A *straight warrant* is one which is issued unaccompanied by any other security, and for which cash is the only allowable exercise scrip.

[28] The contractual exercise price will remain constant, however. The effective exercise price will fall only if the debenture sells at a discount from par after the interest rate shock.

[29] See footnote 33 for a numerical example illustrating the relationship between the contractual exercise price and the effective exercise price.

Jones and Mason contend that it is more advantageous for a firm to make a dual offering of debt with stock than to issue units of debt with warrants. This is because all of the funds from a dual offering are received at the time of issuance, but the funds from a warrants issue are received in two payments: at issuance (time t_1) and on the date of warrant exercise (time t_2). Thus, a dual issue of debt with stock is superior to an issue of units of debt with warrants by an amount equal to the opportunity cost of capital (r) times the warrant exercise proceeds (E). So the amount by which the cash flows to the firm making a dual offering exceed the cash flows to a unit issuer are given as:

$$\text{Benefit} = E(1 + r)^{t_2 - t_1}. \tag{2.1}$$

It is unclear whether capital-raising firms actually make a choice between issuing units and making dual offerings, but a case could be made that both forms of capital accomplish the same capital structure objective. A dual offering of debt with stock, however, does not allow for the tax benefits of an original issue discount, which is supposedly the primary advantage of units of debt with warrants over convertible bonds.

Finnerty notes that, although the conversion option (i.e., the latent warrant) usually lasts throughout the life of a convertible bond, units are characterized by the presence of warrants having a shorter maturity than the corresponding debentures. Yeasting discusses the implications of differing maturities on the probability of warrant exercise. Warrant exercise is more likely, the greater is the discount on the bond. As maturity nears, the discount gradually vanishes so, *ceteris paribus*, a long maturity bond will be used as exercise scrip before a short maturity debenture. Warrants typically sell at a premium (called a *speculative premium*) over their intrinsic value,[30] but this premium diminishes as the expiration date ap-

[30] For an "in-the-money" warrant, the intrinsic value is the stock price less the exercise price. Otherwise, the intrinsic value is zero.

proaches, and disappears on that day. An investor is more likely to choose not to exercise a warrant with a high speculative premium, so exercise will occur with greater frequency as a warrant approaches expiration. Given these observations, one can predict that a warrant is more likely to be exercised with the surrender of a discount bond if the warrant maturity occurs prior to that of the debt security. If the debenture sells at a premium, then the "optimal" relative maturity conditions for exercise are unclear.

Callable warrants, giving management the right to force exercise, are relatively rare. A more common feature is a "step-up" in the warrant exercise price, stipulating increases in the exercise price on prespecified dates. This can act as an implicit warrant call, also forcing exercise. As noted above, Brennan and Schwartz [1980] assert that it may be optimal for the investor to convert a convertible bond just prior to an adverse change in the conversion terms. For a unit, a warrant exercise step-up is an adverse change.[31]

Yeasting refers to the warrant within a unit as a "CD warrant," because cash or *d*ebt may be used as scrip. If the attached debenture is used, only when the bond sells at or above par will the price at which the warrant is actually exercised equal the warrant's contract exercise price. When a discount bond is used as scrip, the effective exercise price will be lower than the contract exercise price,[32] because the latter is based upon the surrender of assets worth $1000. The computation of the effective warrant exercise price, using a bond as scrip, is as follows:

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[31] Yeasting documents five instances of a *step-down* in exercise prices, all occurring at the discretion of firm management. A step-down would increase the market value of a warrant. If a manager is striving to maximize the wealth of current shareholders, an action of this sort, which decreases the value of equity, is irrational. Lowering the exercise price increases the wealth of debtholders to the detriment of stockholders.

[32] The discount from par must be greater than all accrued interest for this statement to hold true. Otherwise, the effective and contractual exercise prices are equivalent. For an elaboration on this point, see equation (2.2) and the example in footnote 33 below.

$$E_e = E_c \cdot \frac{(B + I)}{M}, \qquad (2.2)$$

where,

E_e = effective warrant exercise price

E_c = contract exercise price of the warrant

B = market price of the debenture

I = interest accrued from the most recent coupon payment date, and

M = bond par value

Note that if the bond sells at a discount, the effective exercise price is driven down. But the unitholder who surrenders a bond also misses out on the next coupon payment, so there is an opportunity cost associated with the warrant exercise. Hence, for the effective exercise price to be lower than the contractual exercise price, the magnitude of the bond discount must be greater than the accrued interest.[33]

2.5.2 *Units as a Solution to Agency Problems*

Jensen and Meckling [1977] discuss the problem of debt agency costs as being one of conflict between stockholders and bondholders. They explain how, under certain conditions, it is in the stockholders' best interest for the firm to undertake an abnormally risky project

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[33] A numerical example will help to clarify the potential ramifications of this equation for the wealth of the unitholder. Assume that an investor holds a unit consisting of one 8% semiannual coupon bond ($1000 par value) and 25 common stock purchase warrants (with an exercise price of $40). The most recent coupon payment was made three months ago, so the accrued interest is $20. The bond is currently selling for $950, and is usable as scrip to exercise the warrants. When the firm's stock price rises above $40, a rational investor will consider whether it is appropriate to exercise the warrant, and if so, what type of scrip to use. If cash is used as scrip, the effective exercise price will equal the contractual exercise price of $40. However, if the bond is used, the effective exercise price will be lower than $40, as shown below:

$$E_e = \$40 \cdot \frac{\$950 + \$20}{\$1000} = \$38.80 .$$

because such an investment can result in an unlimited potential gain but a limited liability for the shareholder. The bondholder is also subject to limited liability, but the debtholders' potential gain from a profitable project is nil. Another form of debt agency cost is the cash dividend to common stockholders. As Black [1976, p. 7] notes, an effective way for shareholders to expropriate wealth from bondholders is "...to pay out all of its assets in the form of a dividend, and leave the creditors holding an empty shell." Bondholders have stridently sought to avoid such problems by demanding the inclusion of restrictive covenants in bond indentures (see Smith and Warner [1979]). But the level of dividends to be paid remains a point of contention between shareholders and bondholders.

Even in the absence of dividends, the agency cost problem can manifest itself in other ways. Myers [1977] shows that in a two-period world where a firm possesses no tangible assets and is presented with a single growth opportunity, the presence of risky debt can create a situation whereby the firm rejects a project with a positive net present value. Over some states of nature, the firm must pay the debt service rather than invest in the project. The resultant level of investment is below that which would maximize shareholder wealth.

Jensen and Meckling suggest that convertible bonds are potentially useful vehicles for mitigating the agency costs of debt.[34] If bondholders perceive that shareholders are exploiting them, they can simply exercise the conversion option and become stockholders. Because of the existence of a warrant component in units, they should be useful in reducing agency costs. Jensen and Meckling (p. 354) address the topic as follows:

> "... [W]e conjecture that potential bondholders will find it attractive to have warrants attached to the risky debt of firms in which it is relatively easy to shift the distribution of outcomes to expand the upper tail of the distribution to transfer wealth from bondholders. ... [I]t would make little difference if the warrants were detachable (and therefore salable separately from the bonds) since their mere existence would re-

[34] See also Barnea, Haugen and Senbet [1985] for a more technical discussion of convertibles as a solution to the agency cost problem.

duce the incentives of the manager (or stockholders) to increase the riskiness of the firm (and therefore increase the probability of bankruptcy)."

The agency cost of debt in the Myers framework also can be addressed if the firm's assets can be used as collateral on the debt. Typically, only tangible, fixed assets are usable to secure debt. If debt cannot be collateralized, then potential bondholders are likely to seek favorable terms, thus increasing the likelihood that the firm ultimately will issue equity.

Green [1984] presents a model that describes the incentives for firm managers, if there is risky debt outstanding, to engage in the "asset substitution" activity described by Smith and Warner. That is, bondholders are interested in the firm remaining as free as possible from investment in highly risky projects. When bonds are issued, prospective purchasers form expectations about the future risk of the firm's investment activities. However, stockholders have an incentive to see that the firm takes on projects that lengthen the tails of the distribution of investment returns. Due to limited personal liability for stockholders, the distribution is truncated on the left (to the detriment of other stakeholders in the firm[35]), but bondholders are excluded from participation in the benefits associated with the upper tail of the distribution. Green shows that, if a warrant feature is added to a bond issue (to create a convertible bond or unit), the common stockholders then have access only to the "upper tail of the upper tail" (p. 125), and the incentives to engage in the practice of asset substitution are significantly reduced.

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[35] Stakeholders include not only stockholders and bondholders, but customers, suppliers, employees, distributors, and providers of complementary goods and services. See Cornell and Shapiro [1987] for a discussion of corporate stakeholders and their implications for corporate finance.

Chapter 3

Hypotheses and Testing Methodology

3.1 Introduction

This chapter is divided into three sections, concerning unit offerings, the conditions under which firms issue them, and their impact on the issuer's capital structure and agency situation. The first section discusses the methodology used to assess the possible valuation effects of the announcement of the planned issuance of units of debt with warrants, and of the actual issuance event. Then, a traditional method is presented for testing whether the average abnormal return to shareholders of unit-issuing firms differs from the average abnormal returns to shareholders of common stock-issuing, convertible-issuing or straight debt-issuing firms. In the second subsection, hypotheses are developed to analyze cross-sectionally the abnormal returns found on the announcement and issue dates for units. The factors specified should explain the stock price reaction associated with an issuance of this security. The final section specifies a logistic regression (logit) model, which will examine whether there are systematic differences among firms that issue common stock, straight

debt, convertible bonds, and units of debt with warrants.[36] Financial theory suggests a number of possible determinants of a firm's capital structure. For example, in a Jensen and Meckling [1976] framework, the agency costs of equity and the agency costs of debt determine a firm's debt ratio. The specification of the logit model is tied to theoretical explanations behind the firm's issuance decision.

An important question in the present study is which forms of financing should be included in the analysis. The primary focus of this dissertation is on units of debt with warrants and, to a lesser extent, convertible debt. The poor discriminatory results that Billingsley, Lamy, and Thompson [1988] report in their logit analysis for the convertible versus equity case serve as an argument against including equity in the present analysis. However, Brigham [1965] and Hoffmeister [1977] both provide evidence that frequently convertible issuers offer the securities with the hope of seeing the bonds later converted into equity.[37] Convertible bond issuers, then, might be making a choice between issuing equity (shares of stock) or "delayed equity." For this reason, common stock issues are included in the event study and logit analyses.

Hoffmeister's survey of convertible bond issuers indicates that, during the process of deciding whether to offer convertible debt, 29 percent of industrial firms and 41 percent of financial firms considered issuing debt with attached warrants instead of convertibles. Hence, a significant fraction of convertible issuers feels that there is a choice to be made

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[36] It is acknowledged that not all firms choose *explicitly* between issuing one type of security versus another. However, available evidence suggests that, often, a choice is being made (e.g., Hoffmeister's finding that 29 percent of industrial issuers of convertible bonds also considered making an offering of straight debt with a warrant).

[37] Based on the phrasing of the survey questions, it is unclear whether the desired switch from convertibles to common stock would be through forced or voluntary conversion. Of Hoffmeister's sample, 34 percent of issuers report that the primary motivation behind including a conversion feature on the offering was the desire to convert the issue to equity in the future. Brigham's results are not as strong, however, since the sample size consists of only 23 issues.

between the two. In Hoffmeister's study, 30 percent of issuers responded that their convertibles were issued as straight debt with a "sweetener." Such firms use the conversion privilege to lower the return required by investors in the form of coupon payments. Just as the inclusion of a conversion feature will lower the coupon rate on a bond, *ceteris paribus*, the addition of warrants to a straight debt issue should also result in concessions on the coupon rate by the market. Consequently, straight debt issues are included in the present analysis because it appears that many issuers of convertibles (and perhaps units as well) are interested, at least initially, in floating a straight debt issue.

3.2 Valuation Effects of Unit Offerings

3.2.1 Announcement Period Effects

The stock price valuation impact of financing decisions of managers has been a topic of interest in the finance profession. Though there exists substantial evidence concerning the stock price reaction to the issuance of straight debt, common stock, and convertible debt, there is currently no published information on the shareholder wealth implications of a unit offering. *A priori*, it is postulated that the stock price reaction to a unit issuance is comparable to that associated with a convertible bond flotation. This prediction stems from the fact that the financial composition of the average unit more closely matches that of the typical convertible debenture than any other security. Research by Eckbo [1986] suggests that shareholders of firms that announce a convertible issue suffer a greater wealth loss than shareholders of firms that issue straight debt. Accordingly, the following hypothesis is tested:

$H_0^1(A)$: The average abnormal return on a portfolio of unit-issuing firms' common stock for days −1 and 0 relative to *The Wall Street Journal* announcement of a planned unit offering[38] is not significantly different from that observed for a portfolio of convertible bond issuers' common stock.[39]

Thus, $AAR_{-1\&0,udw} - AAR_{-1\&0,cd} = 0$.

3.2.2 *Issuance Period Effects*

Dann and Mikkelson's [1984] finding of a statistically significant −1.54 percent average abnormal return for the common stock of firms on the issuance date of a convertible bond would seem a strange result if capital markets are efficient. If the market learns of a pending issue a number of days prior to the flotation date, should this fact not be fully impounded in the stock price on the announcement day? Efficient markets research tells us that the answer is "yes," but provided only that all relevant information about the issue is known at the time of the initial announcement. The authors note that the terms of convertible offerings are frequently changed or finalized on or just before the date of the issuance. They hypothesize that it is this resolution of uncertainty that influences the level of abnormal returns to issuers.

As Chapter 4 will reveal, the precise terms of unit offerings (e.g., the number of warrants per unit and the warrant exercise price) are not known on the announcement date.

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[38] The decision to include a two-day window is based on several factors. *The Wall Street Journal* is a primary source of financial information for many market participants. After information is published in *The Journal*, it can truly be said to be "publicly available." But most news appearing in *The Journal* has been released by the firm(s) involved one day earlier, so in many cases it takes two days for information to be disseminated to the investing public. The work of Patell and Wolfson [1984] appears to support this conjecture. Their study of the market's response to earnings and dividend announcements finds that the stock price reaction to such news is virtually completed within several hours after the announcement. However, significant average returns are also found for the first thirty minutes of the day following the announcement. Thus, it seems appropriate to include returns from both the announcement day and the following day.

[39] Another important, related hypothesis to be evaluated is whether unit issuer average abnormal returns are statistically different from zero. This will be tested for the issuance and announcement periods for unit offerings.

This observation reinforces the prediction that unit issuers and convertible issuers should experience similar abnormal returns during the issuance period. If abnormal returns for unit issuers are statistically insignificant, this would tend to refute the validity of Dann and Mikkelson's explanation for negative abnormal returns observed upon the issuance of convertible bonds. Thus, the following hypothesis is specified:

$H_0^1(I)$: The average abnormal return on a portfolio of unit-issuing firms' common stock for days −1 and 0 relative to the offering date is not significantly different from that observed for a portfolio of convertible bond issuers' common stock. More formally, $AAR_{-1\&0,udw} - AAR_{-1\&0,cd} = 0$.

3.2.3 *Event Study Methodology*

3.2.3.1 *Analysis of Abnormal Returns*

The present study addresses the hypotheses stated above by using the market model to separate general market movements from those associated with a firm-specific event. First, using the Center for Research in Security Prices (CRSP) daily returns tape from days -170 to -21 relative to the event, parameters are estimated for the following model:

$$R_{jt} = \hat{\alpha} + \hat{\beta} R_{mt} + \varepsilon_{jt,} \tag{3.1}$$

where R_{jt} is the return on firm j's stock during day t, R_{mt} is the return observed on the CRSP equally weighted market index on day t, $\hat{\alpha}$ and $\hat{\beta}$, respectively, are the estimated intercept and slope parameters, and ε_{jt} is the error term. For each of days -20 to +20 relative to the event, the expected return on firm j's stock, $E(R_{jt})$, is computed as:

$$E(R_{jt}) = \hat{\alpha} + \hat{\beta} R_{mt,} \tag{3.1a}$$

The abnormal return for firm j on day t is the realized return less the expected return, given as: $AR_{jt} = R_{jt} - E(R_{jt})$. The next step is the formation of a portfolio consisting of the stock of firms subject to the event, to determine the average abnormal return, AAR_t, for day t:

$$AAR_t = \sum_{j=1}^{n} \frac{AR_{jt}}{n}. \tag{3.2}$$

The AAR_ts are summed over time to determine cumulative average residuals (CARs), which reflect the accumulated impact of the event over time. To test whether the one-day AAR_t is significantly different from zero, the following t-statistic is computed:

$$t = \frac{AAR_t}{\hat{\sigma}}, \tag{3.3}$$

where:

$$\hat{\sigma} = \left[\frac{1}{T} \sum_{t=-170}^{-21} (\hat{\varepsilon}_t)^2 \right]^{1/2} \text{ with } T = 150. \tag{3.4}$$

The statistical significance of two-day abnormal returns is tested using equations 3.3 and 3.4, except in this case, T represents the number of two-day intervals in the parameter estimation period. Hence, $T = 75$.

3.2.3.2 Differences of Means

Analysis of variance (ANOVA) should indicate whether there are significant differences among the day -1 and day 0 average abnormal returns observed for the issuers of common

stock (AAR_{cs}), straight debt (AAR_{std}), convertibles (AAR_{conv}), and units (AAR_{udw}). However, the ANOVA procedure assumes that the classes of data (e.g., common stock issues, straight debt issues, etc.) have equal variances. In the presence of roughly equal sample sizes, results are not particularly sensitive to violations of the unequal variance assumption (Walpole and Myers [1985, p. 417]). Since the sample sizes of the classes in the present study are unequal, it is necessary to test whether the variances are equal across samples. If the variances are found to be unequal, the ANOVA procedure should be discarded in favor of the Kruskal-Wallis test, a nonparametric alternative (Lentner [1984, p.308]). To determine if the Kruskal-Wallis test is the appropriate method to use, the following hypotheses are tested:

$H_0^2(A)$: There is no significant difference among the variances of common stock abnormal returns for the population of issuers of straight debt, units, convertible debt and common stock around the *announcement* date of the planned financing. Thus, $\sigma^2_{AAR(A)_{std}} = \sigma^2_{AAR(A)_{udw}} = \sigma^2_{AAR(A)_{conv}} = \sigma^2_{AAR(A)_{cs}}$.

$H_0^2(I)$: There is no significant difference among the variances of common stock abnormal returns for the population of issuers of straight debt, units, convertible debt and common stock around the date of the actual *issuance* of securities. Thus, $\sigma^2_{AAR(A)_{std}} = \sigma^2_{AAR(A)_{udw}} = \sigma^2_{AAR(A)_{conv}} = \sigma^2_{AAR(A)_{cs}}$.

To evaluate the above hypotheses, Bartlett's test for homogeneity of variances is conducted. Bartlett's test requires the computation of a pooled variance, as follows:

$$\sigma^2_{pooled} = \frac{\sigma^2_{udw}(n_{udw} - 1) + \sigma^2_{conv}(n_{conv} - 1) + \sigma^2_{std}(n_{std} - 1) + \sigma^2_{cs}(n_{cs} - 1)}{n - k}. \qquad (3.5)$$

The result is used in a "b-statistic:"

$$b = \frac{\sigma_{udw}\left(\frac{n_{udw} - 1^2}{n - k}\right) \times \sigma_{conv}\left(\frac{n_{conv} - 1^2}{n - k}\right) \times \sigma_{std}\left(\frac{n_{std} - 1^2}{n - k}\right) \times \sigma_{cs}\left(\frac{n_{cs} - 1^2}{n - k}\right)}{\sigma^2_{pooled}}. \qquad (3.6)$$

The value for b is compared with a value from the Bartlett distribution (see Walpole and Myers, pp. 586 - 587), given as:

$$b(\alpha; n_{udw}, n_{conv}, n_{std}, n_{cs}) = \frac{b(\alpha; n_{udw}) \times n_{udw} + b(\alpha; n_{conv}) \times n_{conv} + b(\alpha; n_{std}) \times n_{std} + b(\alpha; n_{cs}) \times n_{cs}}{N}, \tag{3.7}$$

where α is the level of statistical significance. The null hypothesis of equal variances is rejected if $b < b(\alpha; n_{udw}, n_{conv}, n_{std}, n_{cs})$. If the population variances are judged to be unequal, a nonparametric method of analysis will be performed to test whether the mean abnormal returns associated with each type of security issuance are unequal.

As Chapter 5 reveals, the hypotheses $H_0^2(A)$ and $H_0^2(I)$ are rejected, and a nonparametric method of assessing the equality of means must be conducted. The nonparametric counterpart to ANOVA, the Kruskal-Wallis test, is carried out as follows. The abnormal return observations for all four samples are combined and sorted in ascending order. All observations are given a rank, with the lowest abnormal return being assigned a rank of 1 and the highest taking on a rank of $N = n_{udw} + n_{conv} + n_{std} + n_{cs}$. Ranks for each of the $k(=4)$ samples are summed, producing random variables R_{udw}, R_{conv}, R_{std}, and R_{cs}, respectively. The statistic used to perform the Kruskal-Wallis test is:

$$H = \frac{12}{N(N+1)} \sum_{i=1}^{k} \frac{R_i^2}{n_i} - 3(N+1), \tag{3.8}$$

which is approximately distributed χ^2_{k-1}. The critical region is that for which $H > \chi^2_{\alpha; k-1}$.

If it is determined that the abnormal returns from the four groups are not all derived from identical populations, then a *t*-test is used to assess whether abnormal returns differ between paired subsamples.

Under the condition in which the population variances of abnormal returns for units and convertibles are known and equal, the difference of means test to be used would not be the same as the one used when the population variances are unknown or unequal. Because the present study uses only *samples* of units, convertibles, straight debt and common stock, the variances of both populations are unknown. It remains to test the null hypothesis that the population variances are equal. Since variances are found to be statistically different, the following test statistic is used to determine whether abnormal returns for the samples of two security types are different:

$$t = \frac{AAR_{t,udw} - AAR_{t,cd}}{\left[\frac{\hat{\sigma}^2_{udw}}{n_{udw}} + \frac{\hat{\sigma}^2_{cd}}{n_{cd}} \right]^{\frac{1}{2}}}, \tag{3.9}$$

with degrees of freedom given as:

$$df = \frac{\left[\frac{\hat{\sigma}^2_{udw}}{n_{udw}} + \frac{\hat{\sigma}^2_{cd}}{n_{cd}} \right]^2}{\left[\frac{\left[\frac{\hat{\sigma}^2_{udw}}{n_{udw}} \right]^2}{(n_{udw} - 1)} + \frac{\left[\frac{\hat{\sigma}^2_{cd}}{n_{cd}} \right]^2}{(n_{cd} - 1)} \right]}. \tag{3.10}$$

For equations (3.9) and (3.10), $\hat{\sigma}^2_{udw}$ and $\hat{\sigma}^2_{cd}$ are again the variances of the abnormal returns of the respective samples calculated for the period from 170 days to 21 days before the given event and n_{udw} and n_{cd} are the sizes of the samples. The foregoing equations are given for

the units vs. convertibles case, but are used also to make pairwise analyses for all four types of offerings.

3.3 Cross-Sectional Analysis of Abnormal Returns

3.3.1 Introduction

Section 3.2 of this chapter gives the methodology for estimating the abnormal returns surrounding a firm's announcement of a pending capital market offering. However, the next question of interest becomes, "Which factors influence the market to reward or to penalize firms that undertake the action under consideration?" This question is of particular relevance if statistically significant abnormal returns are found. Nonetheless, even if statistically *insignificant* abnormal returns are obtained, the approach is valid because of the existence of variability within the sample of excess returns. A well-specified model can help to explain observed cross-sectional variability in stock returns. Eckbo [1986] performs cross-sectional regressions of straight debt abnormal returns, though the average abnormal return for debt issuers is not significantly different from 0. The purpose of this section is to hypothesize the factors that determine to what extent, if at all, shareholder wealth increases or decreases in response to the announcement of a pending unit issuance. The methodology follows that of Eckbo [1986], Masulis and Korwar [1986], and others. Individual firms' abnormal returns from a two-day event "window" (days -1 and 0, relative to an event) are regressed on variables intended to measure factors from the finance literature that are potentially relevant to the issuance of units of debt with warrants. Thus, the form of the model is

$$AR_{j,-1\&0} = \hat{\beta}_0 + \hat{\beta}_1 X_{j1} + \ldots + \hat{\beta}_m X_{jm}, \tag{3.11}$$

where $AR_{j,-1\&0}$ is the abnormal return for firm j during days -1 and 0 relative to the announcement or issue date of an offering of a unit, $X_{j1},\ldots, X_{jm}$ are the m factors postulated to influence the abnormal returns, and $\hat{\beta}_1,\ldots, \hat{\beta}_m$ are the m ordinary least squares regression coefficients reflecting the sensitivity of the abnormal returns to individual factors. The intercept term is $\hat{\beta}_0$.

Standard *t*-tests and *F*-tests are used to evaluate the statistical significance of the models chosen. Another traditional measure of model performance, the coefficient of determination (R^2), is not used. Rather, an adjusted coefficient of determination, $\overline{R}^2$, is employed to assess the explanatory power of the equations. This measure recognizes that the unadjusted R^2 tends to rise as more variables are added to a model, regardless of whether the marginal factors offer explanatory significance. The adjustment takes into account the number of variables in the equation, and automatically penalizes the R^2 when an additional factor is included. The relationship between the adjusted and unadjusted R^2s is:

$$\overline{R}^2 = 1 - (1 - R^2)\,\frac{N-1}{N-k}, \tag{3.12}$$

where N is the sample size and k is the number of parameters (including the intercept) in the model. Note that the adjusted R^2 can be negative if the unadjusted R^2 is low, and k is greater than 1.

One of the objectives of this dissertation is to compare the provisions of and market reactions to unit and convertible issuances. It will become clear in the next few subsections that some of the variables hypothesized to influence the abnormal returns of unit issuers

may also have an impact on firms that offer convertibles. Thus, for comparative purposes, a cross-sectional analysis of convertible issuers' abnormal returns is performed as well. Though the dual analyses will be useful for comparative purposes, the approach does not directly attempt to explain the differences between shareholder reaction of each security issuance. The following subsections discuss the motivation behind each of the factors chosen for the cross-sectional studies.

3.3.2 Original Issue Discount

Jones and Mason [1986] and Finnerty [1986] contend that the presence of a tax advantage provided by the original issue discount (OID) is a reason that unit issuances may be superior to convertible bond issuances. The sale of bonds with an OID can be beneficial to the firm, because the U. S. government allows a tax deduction for the discount. Lamy, O'Neil, and Thompson [1988] find that the shareholder wealth effects on a firm issuing OID bonds are insignificant. However, bonds carrying OIDs tend to have lower coupon levels than other bonds issued contemporaneously. For a unit, the size of the OID reflects the amount of book equity being issued with each bond.[40] Previous research[41] has suggested that the more equity-like is the security, the more negative is the expected impact on shareholder wealth. The corporate tax benefit of the OID for units has a negative impact of similar magnitude on the tax liability of the taxable unitholder. Thus, it is unclear whether - and, if

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[40] When issued, the bond or note portion of a unit goes on the firm's books as debt, and par value less the debt amount equals the part of the issue that is recorded as equity. As the firm amortizes the OID each year, equal amounts of debt and equity are added and subtracted, respectively. The sum being added and subtracted is equal to the amount of debt amortized for the year in question, but equation 3.13 indicates that the amount to be amortized generally varies from year to year.

[41] See Eckbo [1986], Masulis and Korwar [1986], and Dann and Mikkelson [1984], all of which are discussed in subsection 2.1.7.

so, to what extent - the size of the OID affects the issuing firm's stock price. For testing purposes, the null hypothesis is stated as follows:

H_0^3 : The average abnormal return on a portfolio of unit-issuing firms' common stock for days −1 and 0 relative to the date of the *Wall Street Journal* announcement of a planned unit offering is not significantly associated with the size of the original issue discount.

Variable Used

The original issue discount is measured as $1000, less the first price at which the bond trades after issuance. For the cross-sectional analysis, though, the OID per bond is multiplied by the number of units issued, and then is scaled by dividing by the market value of the firm's equity.[42] Hence,

$$\text{SCALED OID} = \frac{[\$1{,}000 - \text{First Trade Value}] \times \text{Number of Units in the Issue}}{\text{Market Value of Common Stock}}. \quad (3.13)$$

Though offering firms look favorably upon the tax implications of an OID, a change in the tax law effective July 1, 1982 made the OID less attractive to issuers.[43] Prior to this date, issuers amortized the OID using the straight-line method. However, the statutes were amended to require firms to compute the amortization as follows:

$$\text{Amortization} = i\,(\text{Par Value} - \text{Issue Price}), \quad (3.14)$$

where i is obtained by solving:

$$\text{Issue Price} \times (1 + i)^n = \text{Par Value}. \quad (3.15)$$

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[42] The variable is scaled relative to equity because the numerator, also, is in market value form.

[43] The Tax Equity and Fiscal Responsibility Act of 1982 changed the method of accounting for an OID.

In equation (3.15), i is the geometric average annual price appreciation, and n is the number of years to the bond's maturity. The effect of the tax law change is to decrease the amortized OID during the early years of a bond's life, and to increase the annual amount as the bond nears maturity. Thus, the issuer's discounted benefit from the OID was decreased after July 1, 1982. In order to hold constant for changes in the tax law, a dummy variable is included in the cross-sectional regression, taking on a value of 1 if the associated issue was made after July 1, 1982, and 0 otherwise. Furthermore, an interaction term, SCALED OID * JUL82OID, is used as an explanatory factor, because the tax law change might cause a change in the coefficient of the SCALED OID variable as well as a shift in the intercept. The JUL82OID dummy measures only a shift in the regression intercept. As with the SCALED OID factor, the expected signs of the coefficients on the OID dummy variable and the interaction term are *a priori* indeterminate. Since the expected effect of the OID on issuer abnormal returns is unclear, it is inappropriate to hypothesize about the sign of the tax law dummy.

H_0^4 : The average abnormal return on a portfolio of unit-issuing firms' common stock for days −1 and 0 relative to the date of the *Wall Street Journal* announcement of a planned unit offering and the unit offering date is not significantly associated with whether the offering was made before July 1, 1982 ($JUL82OID = 0$) or after July 1, 1982 ($JUL82OID = 1$).

Note that, unlike the other factors in the cross-sectional study, the OID variables are used in regressions with *issuance* period abnormal returns. The OID amount is not known until the unit is priced in the market, so it is appropriate to use issuance rather than announcement period abnormal returns. While the SCALED OID factor is omitted from the announcement period regression, the JUL82OID dummy is used in both regressions. When the planned offering is announced, the market has information about the tax regime that the firm will face when accounting for the OID. The JUL82OID dummy should also be included in the

issuance period, because the OID presumably will be evaluated in light of the prevailing tax climate.

3.3.3 Warrant Exercise Scrip

When discussing units, *Value Line Convertibles* [1988] refers to the bond surrendered upon the exercise of a warrant as a "usable security." Some units are composed of a warrant plus a "usable security," while others consist of a warrant plus a bond that is not usable as exercise scrip. Because corporations have issued both forms of units over the years, a natural question that arises is, "What, if any, are the implications for shareholder wealth of issuing a unit containing a usable security versus a unit for which only cash may be used as scrip?" Without addressing this question directly, Finnerty [1986, pp. 75, 78] notes that the choice of allowable warrant scrip complicates the analysis of units. When cash may be used as scrip, it is difficult to value a unit as being analogous to a convertible. When debt only may be used as scrip,[44] the unitholder faces the possibility of an involuntary loss of the warrants when the straight bond portion is called. If such warrants are not exercised prior to the call of the bond, the warrants will be worthless after the call. In actuality, most units allow a combination of debt and cash to be used as warrant exercise scrip. The two problems noted above are discussed in the remainder of this subsection.

Jones and Mason [1986] and Finnerty [1986] create a synthetic convertible bond by constructing a unit of debt with warrants that replicates the convertible's cash flows. An essential feature of this synthetic convertible is that only the debenture is usable as warrant exercise scrip. If either *cash or bonds* may be used as warrant scrip, then convertible bonds

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[44] This type of scrip arrangement generally is not available, but it is included in the discussion for purposes of completeness. Allowable scrip is usually 'any combination of debt or cash,' but some indentures specify that 'cash only' may be used.

cannot easily be used to value a unit by analogy. This is because the cash flows from a coupon-bearing convertible bond may be replicated with a straight bond plus a warrant, but only one for which the debenture alone may be used as exercise scrip. However, this section includes a hypothesis that deals with the use of debt or cash as exercise scrip.

For the hypothetical case in which *debt only* can be used to exercise the warrant, the unit is thought to be most similar to a convertible bond. The only apparent difference between the two securities is that the implicit warrant within a convertible is not detachable from the bond, but the warrants in a unit are traded separately from the debenture. Finnerty argues that the warrant detachability feature of a unit allowing debt as scrip can result in the following problem: If the firm repurchases a portion of the debenture component (for example, to make a sinking fund payment),[45] and if investors may use *debt only* as warrant scrip, then part of the warrant issue might be rendered worthless. After the repurchase there may not be enough bonds remaining to allow for the exercise of all the warrants.[46]

As in the case of convertible debt, the issuance of units introduces capital structure uncertainty because, *ex ante*, no one knows if or when exercise will take place. When it does occur the capital structure is affected doubly, because if debt is used as scrip, there is an impact on both the debt *and* the equity accounts. Unlike the situation where debt is issued or called, or when common stock is issued or repurchased, the exercise of the warrant

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[45] The presence of a sinking fund feature in a unit issue also complicates the comparison of units and convertibles. For example, a sinking fund related call of convertible debt influences the number of shares into which the issue may be converted. However, for units such an action would reduce the debt outstanding, but not the warrant portion of the issue. This follows because of the separability of the debt and warrant components.

[46] As an example of this problem, assume that a firm issues $1 million of units, consisting of $800,000 in straight debentures and $200,000 of detachable warrants, exercisable only by surrendering the bonds. There are a total of 10,000 warrants, each with an exercise price of $75 per share. If an $80,000 annual sinking fund payment is made, then even after the first year there will not be a sufficient quantity of bonds remaining to exercise all of the warrants. There will be $75x10,000 = $750,000 worth of exercise payments to be made if all the warrants are redeemed, and only $800,000 − $80,000 = $720,000 of bonds with which to make those payments.

within a unit adds E dollars of equity and simultaneously eliminates E dollars of debt. If the market deems that capital structure is relevant in determining firm value, the hypothetical issuance of a unit with debt only as scrip (and by the same reasoning, a convertible bond issuance) should have an "unusually" negative announcement impact[47] on common stock returns. The hypothesis concerning warrant exercise scrip is:

H_0^5 : The average abnormal return upon issuance is lower (i.e., more negative or less positive) for units that permit cash with debt to be used as warrant exercise scrip than for units that permit cash only as scrip. Hence, the expected sign of the dummy variable coefficient is negative. Still, a negative announcement effect is expected, as explained above in Section 3.2.

3.3.4 Size of Issue

Though Eckbo [1986] fails to provide convincing evidence that larger convertible issues lead to more severe decreases in shareholder wealth, Mikkelson and Partch [1986] document such a relationship. Furthermore, Asquith and Mullins [1986] also find a negative correspondence between the size of common stock offerings and the issuers' announcement period abnormal stock returns. It thus appears that issue size is important to the stock returns of issuers of equity-like securities. For this reason, an issue size variable (the dollar amount of the offering, scaled by the market value of common stock) is included in the unit issue cross-sectional study, with the expectation that, in this case, too, it is related to abnormal returns.[48]

H_0^6 : The average abnormal return upon issuance is negatively related to the size of the issue, scaled by the market value of the offerer's equity.

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[47] The term "unusually" negative is intended to mean an effect of greater negative magnitude or lesser positive magnitude than that associated with the issuance of warrants with *cash only* as scrip.

[48] Another idea is to use the natural logarithm of issue size as an explanatory variable. However, the employment of this method does not recognize explicitly the potential stock price dilution associated with an equity or equity-linked debt offering.

3.3.5 *Agency Costs*

As was developed in Chapter 2, convertible debt is generally regarded as a vehicle by which agency costs of debt can be reduced. Because units contain a component that allows for equity participation, the issuance of units may also be seen as an agency cost-reducing mechanism. Assuming that stockholders and managers seek to minimize the value of the debt and maximize the value of the equity (see Brennan and Schwartz [1977, 1980] and Ingersoll [1977a]), it could be argued that a firm's level of debt agency costs as measured by the proxies developed below should be negatively related to the abnormal return of the issuer. That is, the presence of high potential agency costs of debt creates a situation whereby the firm is compelled to offer convertibles and units rather than straight debt. Still, this partial solution to the debt agency problem should be looked upon favorably by stockholders. Figure 3.1 is a partial reproduction of Figure 5 in Jensen and Meckling's paper [1976, p. 344], which illustrates the determination of an optimal capital structure in terms of a trade-off between agency costs of debt and equity.

The vertical axes represent total agency costs, which are a function of the proportion of external capital held in the form of debt.[49] Note that, for a given firm size, the agency costs of equity, $A_S(E)$, rise as the non-insider holdings of equity as a proportion of total external capital increase. The curve representing agency costs of debt, $A_B(E)$, shows that such agency costs increase as the proportion of external debt to external capital increases. The sum of costs represented by $A_S(E)$ and $A_B(E)$ is given by $A_T(E)$, the total agency costs resulting from the firm's ownership structure. The minimum of $A_T(E)$ is the optimal financing mix for the firm, E^*, resulting in total agency costs $A_T(E^*)$.

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[49] *External capital* refers to debt or equity held by investors other than the firm's managers or directors.

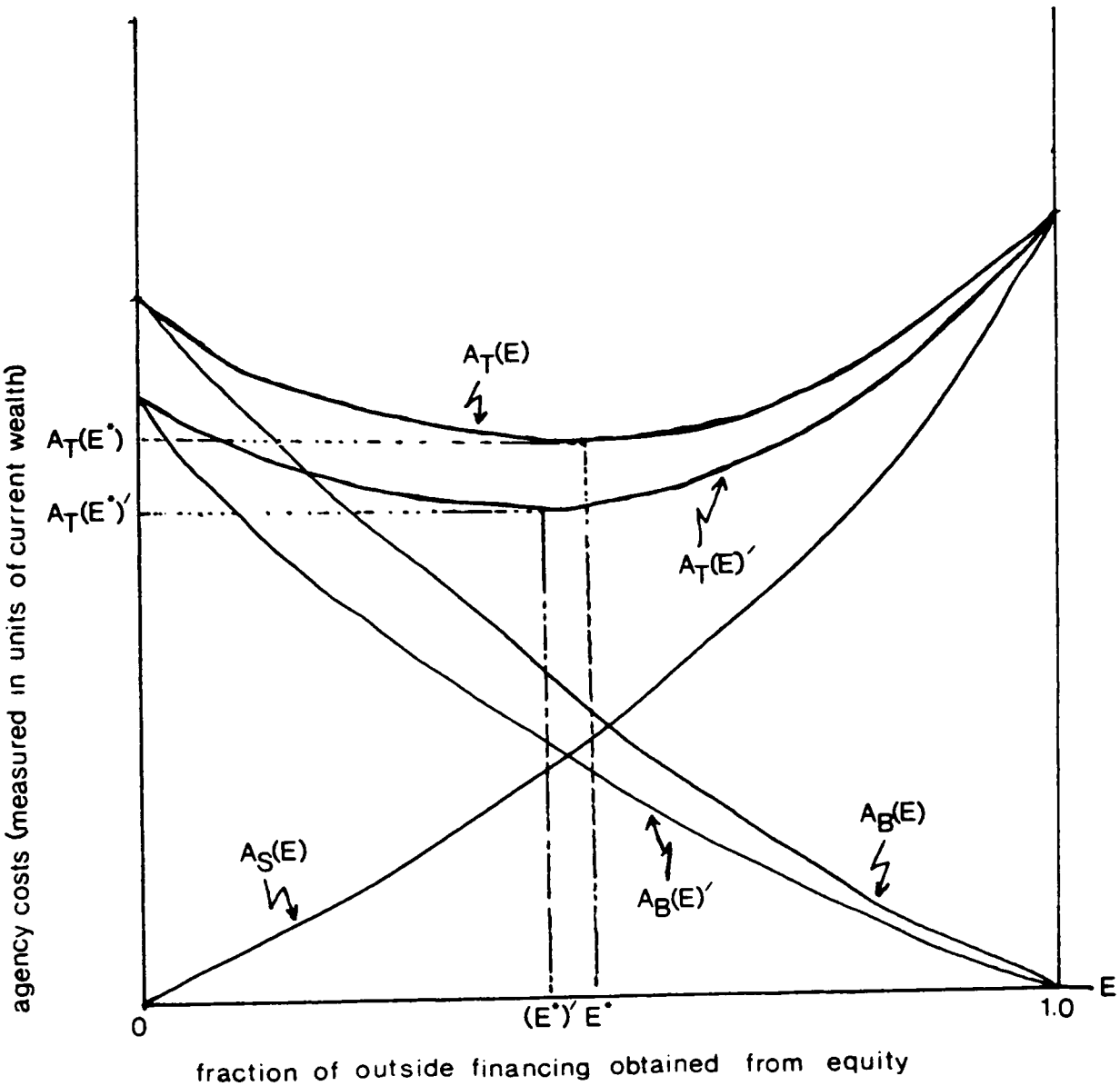

Figure 3.1. Illustration of Convertible Debt as a Mechanism for Agency Cost Reduction.

As stated above, increases in externally held debt should, according to curve $A_B(E)$, cause increases in debt agency costs due to the increasing propensity of equityholders to expropriate wealth from debtholders. However, the issuance of *convertible* debt (or, perhaps, units of debt with *warrants*) serves to shift curve $A_B(E)$ down to $A_B(E)'$, rather than to move the firm leftward along curve $A_B(E)$. Thus, the issuance of equity-linked debt securities causes a change in the fundamental agency cost structure of the firm. An offering of straight debt, conversely, simply results in the firm moving *within* the existing agency cost structure. The shift to $A_B(E)'$ causes total agency costs to be represented by $A_T(E)'$; note that debt agency costs should be decreased when convertibles or units are issued. Chapter 5 will discuss evidence concerning whether the market views equity-linked debt securities as a solution to agency problems.

Agency costs of debt are not directly observable, but several proxy variables have been proposed in the finance literature. Long and Malitz [1985] hypothesize that a firm's agency costs of debt are related to growth-promoting costs such as advertising expenses (ADV) and research and development expenses (R&D). It is postulated that firms with comparatively high levels of *ADV* and *R&D* are likely to be companies with numerous growth opportunities. The existence of an attractive opportunity for growth in the presence of risky debt is at the heart of the underinvestment problem developed by Myers [1977].[50] Risky debt is introduced into the problem, because the possibility of firm default is important to Myers' analysis.

Titman and Wessels [1988] hypothesize that firms with a large proportion of intangible assets relative to fixed assets will be less able than other firms to use assets to collateralize debt. Firms with large proportions of fixed assets will be able to issue secured debt, and the

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[50] Recall from Chapter 2 that Myers' analysis shows how a firm with risky debt outstanding has the incentive, under some states of nature, to pass up an investment in a project having a positive net present value. This so-called "underinvestment problem" is an agency cost of debt.

underinvestment aspect of the agency cost problem is solved. Thus, Titman and Wessels postulate an inverse relationship between agency costs and fixed assets divided by total assets. Unity minus this ratio represents intangible assets as a fraction of total assets, and firms with a high level of intangible assets are vulnerable to the underinvestment problem. To include debt agency costs in the study, the present analysis uses Long and Malitz's proxy for growth opportunities (the authors use the firm's sales level as a scaling factor), and Titman and Wessels' intangible assets measure. The first two debt agency cost proxies (DAGENCY1 and DAGENCY2) are defined as:

$$\text{DAGENCY1} = \frac{\text{ADV} + \text{R\&D}}{\text{Sales}} \tag{3.16}$$

and

$$\text{DAGENCY2} = 1 - \frac{\text{Fixed Assets}}{\text{Total Assets}} \tag{3.17}$$

Torregrosa [1988] finds another debt agency cost proxy to be significant when evaluating whether long-term leasing can be viewed as a means of reducing agency problems. He uses an equity market-to-book value ratio, with the justification being the same as that given above for DAGENCY2. Book value of equity represents an accounting value of tangible firm assets, but the market price captures the value of intangible assets as well as expected future growth opportunities.[51] The variable DAGENCY3, then, is included in the cross-sectional regressions as

$$\text{DAGENCY3} = \frac{\text{Market Value of Common Stock}}{\text{Book Value of Equity}}. \tag{3.18}$$

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[51] Under circumstances such as a recent acquisition by the issuer, the firm's book value may reasonably approximate its market value. But for many other firms, assets have never been revalued by the market through merger activity. Though the present study does not include any book value correction for recent asset purchases, it is recognized that the sample may contain some amount of cross-sectional variability in this regard.

Black [1976] explains that another agency cost of debt is the concern that the firm will pay a liquidating dividend, leaving the bondholders with worthless debt securities. Smith and Warner [1979] point out that firms often include as indenture provisions a limitation on the amount of the dividend that can be paid to common stockholders. Convertibles can be effective financial tools for lessening the dividend-related debt agency cost. If a large or liquidating dividend is declared, debtholders can convert into stock prior to the ex-dividend date and receive the payment. It is hypothesized here (and tested in Chapter 5) that units afford their holders the same opportunity.

A problem arises in attempting to measure the agency cost associated with the payment of large dividends. Because Black has noted that a firm could exploit debtholders by paying out the value of total assets as a dividend, the variable DAGENCY4 attempts to capture the relationship between the most recent dividend and total assets. This factor is included in the analysis with the understanding that the level of dividends might actually be *negatively* related to the debt agency problem. As the dividend payout rises, the firm's earnings growth rate should fall, possibly leading to a decrease in the potential for Myers' underinvestment problem. The fourth agency cost variable is

$$\text{DAGENCY4} = \frac{\text{Total Dividend}}{\text{Total Assets}}. \tag{3.19}$$

The agency cost hypothesis to be tested is as follows:

H_0^7 : The average abnormal return upon the issuance of a unit or convertible bond is negatively related to proxy measures of the issuer's potential agency costs of debt (DAGENCY1, DAGENCY2, DAGENCY3 and DAGENCY4).

It is recognized that if all four agency proxy variables are used simultaneously, multicollinearity problems could result. However, the factors are intended to measure dif-

ferent facets of the debt agency problem, and hence, all remain in the model. A test for multicollinearity is presented later.

3.3.6 Purpose of Issue and its Effect on Leverage

As noted in Chapter 2, Masulis and Korwar [1986] find a large, negative average abnormal stock return around the time a firm announces a pending common stock issue, and Eckbo [1986] notes an average abnormal return that is not significantly different from zero. Dann and Mikkelson [1984] and Eckbo report average abnormal announcement returns for convertible issuers that appear to be less severe than the results for the common stock case, but more severe than those associated with a straight debt issue. This result appears logical, because convertible debt is a mixture of debt and equity. Unfortunately, a consistently reliable technique to reveal the exact debt and equity proportions within convertible debt is unavailable. Dann and Mikkelson address the topic of whether the issuance of convertible debt is, on average, leverage-increasing or leverage-decreasing. Noting that their sample of convertible issuers' pre-issuance median debt/equity ratio is .52,[52] they conclude that convertibles would have to be at least two-thirds equity to be leverage-decreasing. Though Dann and Mikkelson do not attempt to measure directly the proportions of debt and equity, they contend that it is unlikely that a convertible bond consists of as much as two-thirds equity.

When units are issued, the debt and warrant issue proceeds are recognized, for accounting purposes, as representing the proportions of debt and equity, respectively. Thus, if all the proceeds of a unit issuance are used to retire existing debt, there will be a net de-

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[52] The book value of debt divided by the market value of equity.

crease in leverage. If none of the issue proceeds are used to retire debt, then it is unclear whether leverage is increased or decreased by the unit issuance. Security prospectuses frequently mention the intended use of the issue proceeds, and hence can provide information about whether an offering is leverage-increasing or leverage-decreasing. Eckbo regresses debt-issuing firms' announcement period excess returns on a dummy variable representing the reason for issuance, and he finds all coefficients to be insignificant. Masulis and Korwar compare abnormal returns for common stock issuers, stratifying the sample according to the reason for issuance, and they find no significant differences among groups. Despite the lack of an *a priori* reason to believe that the results would be different if either of the above tests was applied to a sample of unit offerings, it is important to hold constant for the purpose of the unit issuance when evaluating excess returns across issuers. Myers and Majluf [1984] predict a nonpositive return for the issuer whenever new funds are raised, due to the market's perception that the offered security is probably overvalued. Presumably, the refinancing of existing debt would result in insignificant abnormal returns. It is for this reason that the hypothesis concerning the reason for issuance is stated as:

H_0^8 : The average abnormal return on a portfolio of unit-issuing firms' common stock for days −1 and 0 relative to the date of the *Wall Street Journal* announcement of a planned unit offering is lower when the proceeds are to be used to refund existing debt than when the planned use of the funds is for an alternative purpose.

3.4 Determinants of the Choice among Issuing Various Corporate Securities

3.4.1 Introduction

An important aspect of the capital acquisition process is the firm's choice of which type of security to issue. This section contains an examination of the characteristics of firms that

issue straight debt, common stock, convertible bonds, and units of debt with warrants. It is expected that the results of the logistic regression analysis will reveal an association between firm-specific factors and the probability of the issuance of a given security type. However, as with any regression study, it should be understood that association does not necessarily imply causality. Thus, it will remain unclear whether the firm-specific factors drawn from financial theory actually *influence* the choice made by managers.

The purpose for using logit analysis is to replicate the context in which managers make financing decisions. That is, the multivariate framework associated with logit allows the researcher to consider the effect of one factor on the predicted probability of issuance, while holding constant for a number of other relevant considerations. The analysis will reveal the extent to which the presence of a given firm-specific or environmental characteristic is associated with the probability that a firm will choose to issue one security rather than another. Environmental characteristics include the conditions prevailing in the debt and stock markets around the time of a security issuance.

3.4.2 Choice of a Financing Source: Issuing Firm Characteristics

This section broadens Marsh's [1982] and Billingsley, Lamy, and Thompson's [1988] analysis further by including units of debt with warrants in the issuing firm's opportunity set. A global hypothesis is given below.

It is unclear why the dollar amount of convertible issues was four times greater than the value of units issued over the period 1981-1985. Finnerty [1986, p. 81] suggests that during the early 1980's, the market had not yet learned of the tax advantages of units versus convertibles. This explanation runs contrary to the predictions of semi-strong form market effi-

ciency. Finnerty also speculates that unit issues tend to be of smaller size than are convertible issues, because units are floated primarily by smaller, comparatively risky firms. The idea that larger, less risky firms tend to choose convertibles over unit offerings has not yet been tested. As will be discussed in the following subsections, there is reason to believe that unit and convertible issuers may differ significantly in other ways, as well. This leads to a global hypothesis, which can be stated as follows:

H_0^9 : There are systematic differences among firms that issue common stock and various types of debt securities.

The following subsections present an analysis of numerous firm-specific and environmental factors that may explain the choice of a financing source. As an aid in more fully describing the subsamples, univariate tests are specified to determine whether there are differences in the means of factors related to issuers of various types of securities. The final subsection discusses the logistic regression technique in general, and the specific logit function that will test the hypotheses specified. The logit procedure is more powerful than the univariate approach, because it provides a multivariate framework in which to draw inferences about the relationship between the variables of interest and the predicted probability of an event's occurrence. Each hypothesis listed in the following sections assumes that other relevant factors in managers' decision to raise capital are held constant.

3.4.2.1 Leverage

Because firms usually issue debt or equity in large quantities, Marsh [1982] describes the typical debt or equity issuance process as being characterized by "lumpiness." In the process of raising funds, firms seem willing to alter radically their pre-existing financing mix. This observation apparently contradicts the idea that firms follow target debt ratios. One

explanation for the observed behavior is that it is costly to bring an issue to market, so the presence of fixed flotation-related costs[53] necessitates that the capital-raising firm issue securities in a relatively large amount. This saves on long-run flotation costs, but causes a deviation from the firm's long-term target capital structure. Hence, it is possible that firms weigh the costs of driving the capital structure far away from the perceived optimum against the transaction costs of making frequent trips to the capital market.

A problem arises in attempting to measure the equity portion of the unit. At the time of issuance, the equity component is reflected by the value of the warrants. Firms may see the warrant portion of a unit more as *potential* equity than as current equity, because equity will expand when warrants are exercised into common stock. The question then becomes one of whether to consider the current equity component or the potential equity component of a unit. Depending upon the level of the warrant exercise price, there could be a significant difference between the dollar value of warrant *issue* proceeds versus the value of warrant *exercise* proceeds. Additionally, the type of warrant exercise scrip used has an impact on the unit's relative proportions of debt and equity. If cash is used as scrip, then the unit will ultimately possess debt *and* equity components. If debt only is used, however, the unit will consist of equity alone if the warrant is exercised. In practice, it is virtually impossible to determine which type of scrip actually is employed for exercise by the unitholder. The presence of contemporaneous, unrelated changes in the debt and equity accounts over time prohibit the researcher from using balance sheet data to ascertain the type of scrip being used.

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[53] A portion of flotation costs is not dependent upon the size of the securities issue. Thus, from a transactions cost perspective, firms will want to minimize their frequency of issuance.

Smith [1977, p. 276] notes the following categories of costs related to a securities offering: "...(1) compensation received by investment bankers for underwriting services, (2) legal fees, (3) accounting fees, (4) engineering fees, (5) trustee's fees, (6) listing fees, (7) printing and engraving expenses, (8) Securities and Exchange Commission registration fees, (9) Federal Revenue Stamps, and (10) state taxes."

Marsh (p. 131) objects to the idea of using historical average debt-to-equity ratios as a proxy for a target ratio, for the following reasons: 1) issuances are characterized by "lumpiness," 2) short-term market conditions rather than debt ratio targets may have had the greater impact on some issues, and 3) management's debt-to-equity ratio targets may change over time, but in directions unknown to investors. Thus, as proxies for the desired ratio, Marsh uses variables that he feels are determinants of the unobservable target. These include measures of company size, risk, and asset composition.

Chapter 2 reviews Hoffmeister's [1977] finding that the stated motives of the firms making convertible bond issuances changed somewhat during the decade following Brigham's [1966] study. The newer data suggested that issuers were approximately equally divided between those firms that added a conversion feature to lower the interest cost of a straight debt issue, and those that issued convertibles as "delayed equity" financing. Splitting his sample, Hoffmeister notes that convertible bond issuers with debt-to-total asset ratios above the sample mean tended to float their debentures as delayed equity. Firms with lower than average debt-to-total asset ratios stated that they intended to issue straight debt, but the conversion feature resulted in a reduced interest cost and improved the marketability of the security. Thus, among convertible debt issuers, those that are highly levered tend to undertake actions that increase equity capital, and those with lower debt levels have a preference for debt over equity. Hoffmeister's results raise the possibility that the level of leverage a firm carries is a distinguishing characteristic between unit and convertible debt issuers. However, given the apparent change in issuer motives during the years between Brigham's and Hoffmeister's studies, we cannot be certain now, over a decade later, that Hoffmeister's conclusions are consistent with currently prevailing attitudes.

Finnerty [1986] shows that it is possible to create a unit that can replicate the cash flows of a convertible bond. But it is not clear whether units *are* structured as synthetic convertible debt. Jones and Mason [1986] point out that, at issuance, units usually possess a disproportionately larger debt component than is necessary to exercise all the warrants (and thus, to synthesize a convertible debenture). However, most debt components of units carry sinking funds, so the quantity of the usable security[54] decreases over time. *Ceteris paribus*, the average unit may be considered to be more debt-intensive than the average convertible debenture, and on the basis of Hoffmeister's evidence, should be more likely to be offered by firms whose pre-issuance debt ratios are below a target debt ratio. Following Marsh (p. 131), the present study uses the deviation from the firm's 10-year average debt/equity ratio as a proxy for the target debt/equity ratio. For the multivariate setting, the appropriate null hypothesis is:

H_0^{10} : The probability of the issuance of a debt-intensive security is negatively related to DEV1, the present debt/equity ratio minus the firm's target debt/equity ratio.

The present debt/equity ratio is defined as the pre-issuance debt outstanding plus the amount of the issue, divided by the firm's book equity, pre-issuance. Thus, each issue is assumed to be debt for purposes of calculating this factor. This is a way of incorporating the issue size (and hence, the magnitude of the firm's financing needs) into the analysis.

Though DEV1 expresses the relationship between the firm's sources of long-term capital, it fails to capture the proportion of short-term debt used to finance assets. Thus, the present study includes another of Marsh's factors, DEV2, to measure the amount of debt on

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[54] Recall that *usable security* refers to the debt portion of a unit when debt may be used as warrant exercise scrip.

the firm's balance sheet that is short-term in nature. This variable, like DEV1, also is in the form of a deviation-from-target, and likewise assumes that the offering being made is debt. Though the present discussion offers no specific hypothesis concerning DEV2, the factor is included so as not to allow information it might contain to get incorporated in the coefficients of other variables. Marsh and Billingsley, Lamy and Thompson [1988] find DEV2 to be a useful explanatory variable, apart from DEV1, in their studies.

In evaluating hypothesis H_0^{10}, it is necessary to define what is meant by the terms "debt-intensive" and "equity-intensive" securities. Generally, a continuum can be developed, with securities reflecting "pure debt" at one end and those reflecting "pure equity" at the other end. On average, the relative positions of the various sources of capital are as follows:

A.) At Issuance:

STRAIGHT DEBT	UNITS OF DEBT WITH WARRANTS	CONVERTIBLE BONDS	COMMON STOCK

DEBT ——————————————————————— **EQUITY**

Depending upon whether convertible debt has been converted or warrants have been exercised, as well as the nature of warrant exercise scrip, the continuum above might be violated prior to the maturity of the debt component. On or just prior to the maturity date, the relative average proportions of debt and equity would look as follows:

B.) At Maturity:

Assumption: No exercise or conversion has occurred.

CONVERTIBLE BONDS		
STRAIGHT DEBT	UNITS OF DEBT WITH WARRANTS	COMMON STOCK

DEBT ——————————————————————— **EQUITY**

C.) At Maturity:

Assumption: Exercise or conversion has occurred, and the unit of debt with warrants holders use cash as exercise scrip.

		CONVERTIBLE BONDS
STRAIGHT DEBT	UNITS OF DEBT WITH WARRANTS	COMMON STOCK

DEBT ——————————————————————— **EQUITY**

3.4.2.2 *Firm Size and Operating Risk*

Finnerty [1986] provides anecdotal evidence that smaller and riskier firms are the most likely issuers of units of debt with warrants (as opposed to firms offering convertibles), with their primary intention being the flotation of straight debt. Thus, units are not issued as "delayed equity," but the warrant is used as a "sweetener" that can help lower the total interest cost of debt to the issuing firm. The size and risk levels could well be strongly negatively related,[55] but both variables are included in the present analysis.

FIRM SIZE

Hoffmeister [1977] presents sketchy evidence on firm size and convertible debt issuance, finding that large firms tend to use convertibles as a "sweetener," and that smaller companies issue convertibles as "delayed equity." Marsh [1982] indicates that no consistent relationship has been found between debt ratios and firm size, but the weight of evidence suggests that smaller firms tend to issue bonds of shorter maturity than the debentures of larger firms. This is due to the presence of greater imperfections (e.g., flotation costs and illiquidity) in the long-term debt market, and presumably, smaller companies are subject to these impediments to a greater extent than are larger firms. Marsh's results suggest that firms that issue more debt-like securities appear to be larger than those issuing equity-like securities. According to Jones and Mason [1986, p. 50], the average straight debt component of a unit is of shorter maturity than the average convertible bond. The available evidence apparently leads to contradictory predictions; smaller firms should prefer equity-like issues, suggesting that large firms should be the primary unit issuers. However, small firms should prefer short-term issues, a fact that lends support to the idea that smaller firms

[55] The correlation among variables will be evaluated later.

should be the main purveyors of units. Consistent with this statement, the following hypothesis leads to a test of Finnerty's postulate about smaller firms tend to issue units. The null hypothesis is stated as follows:

H_0^{11} : On average, the probability that a firm will issue a debt-like security instead of a less debt-like security is negatively related to the size of the issuing firm.

Thus, it is postulated that, on average, unit offerings tend to be used by smaller firms, whereas convertible bonds are issued by larger firms.

Variable Used

To test the foregoing hypothesis, the book value of total assets (TA) will be used to measure firm size. The variable will be altered using a logarithmic transformation, suggesting that the influence of total assets on the probability of a given security issuance increases at a decreasing rate for larger values of total assets. While Marsh uses the logarithm of total capital employed, he notes that the logarithm of total assets or the logarithm of equity market capitalization are equally effective measures of firm size. The firm's sales level also is a valid size measure, and the correlation among the various gauges of firm size is likely to be close to 1.0.

FIRM OPERATING RISK

Marsh [1982] and Billingsley, Lamy, and Thompson [1988] generally find a positive relationship between firm risk (operating risk and financial risk) and the probability of issuing an equity-like security versus a debt-like security. Notwithstanding the previous evidence, and in keeping with Finnerty's statements about unit issues, the following relationship is postulated between firm risk and the decision to offer units versus convertible bonds: On

average, unit offerings tend to be used by riskier firms, whereas convertible bonds are issued by less risky firms. A generalization is given in hypothesis H_0^{12}.

H_0^{12} : On average, the probability that a firm will issue a debt-like security instead of a more equity-like security is positively related to the firm's level of operating risk.

Variable Used

In examining whether risky firms tend to issue units rather than convertibles, a satisfactory index of firm risk must be determined. The rating of a firm's most recent debt offering might proxy for operating (as well as financial) risk, as might the equity beta. But both measures, according to Titman and Wessels [1988], are somewhat related to the level of debt the firm carries. Thus, there is a potential multicollinearity problem between these risk measures and the debt-to-total assets ratio used in subsection 3.4.2.1. Titman and Wessels use the volatility of net operating income as a proxy for risk. Marsh examines four different measures of firm risk, including the standard deviation of scaled EBIT changes, for which the scaling factor is total assets. This is the only one of his four risk variables that measures operating risk rather than total firm risk.

When stating that "riskier" firms offer units, Finnerty does not discriminate between operating risk and financial risk. Operating and financial risk are considered separately in the present study. The operating risk measure is the standard deviation of the previous ten years' EBIT, and this variable gives a gauge of the systematic part of risk inherent in a firm's business. Another risk measure will be presented, along with factors related to taxes, in the next subsection.

3.4.2.3 *Static Trade-off Framework: Taxes and Financial Risk*

Jones and Mason [1986, pp. 53-54] and Finnerty [1986, pp. 75-77] suggest that units are a better financing source than convertible bonds, from a tax perspective, due to the amortization of the discount from par of the unit's debt component.[58] Thus, the hypothesis for this subsection is that firms with comparatively heavy tax burdens should issue units, and those with lighter tax burdens should issue convertibles. But a value-maximizing company will always choose the lowest after-tax cost financing source, regardless of whether, like debt, it has a special *tax* advantage over other forms of capital. Still, it stands to reason that firms with heavy tax burdens are more likely to perceive that the tax shield benefits of a marginal dollar of debt outweigh the associated potential bankruptcy costs than are firms with lighter tax liabilities.

Modigliani and Miller [1963] show that, under several simplifying assumptions, the optimal financing strategy is for the firm to carry as much leverage as possible due to the tax deductibility of interest payments. As a firm's level of debt financing rises, there is an increasing probability that future operating income will be unable to cover the required debt service payments. Hence, there is an increase in expected bankruptcy costs in the form of legal fees, lost managerial time, lost sales, and other costs. The "static trade-off" theory of financial structure contends that a firm's optimal debt/equity mix occurs at the point where the marginal tax advantage of debt equals the marginal cost of defaulting on debt service payments. The firm's expected future cash flows represent its capacity to meet debt service

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[58] Convertible bonds are usually offered at or near par value, so there is typically no original issue discount. With units, the I.R.S. treats the entire issue as debt. Units are usually floated at par, but the warrant component constitutes a portion of the total value. For tax purposes, then, the debt portion may be viewed as selling at a discount. The I.R.S. allows this discount to be amortized over the life of the bond, which provides the firm with a tax benefit. The negative side of this tax provision is that the investor who purchases a unit is required to pay taxes on the original issue discount.

payments with a bond outstanding. Thus, the pre-issuance risk level of the offerer is likely to be important in determining which type of security to issue.

Though Marsh includes the bankruptcy risk proxy for the likelihood of firm default, he fails to incorporate the other facet of the static trade-off framework, namely, the corporate tax advantage of debt. If the static trade-off framework is correct, then firms take into account both ramifications of increasing the debt burden. Note the following postulate pertaining to financial risk.

H_0^{13} : On average, the probability that a firm will issue a debt-like security instead of a less debt-like security is negatively related to the (financial) riskiness of the issuing firm.

Because of the tax deductibility of interest expense, firms with heavy tax burdens have a greater potential gain from the issuance of debt than do firms with small tax burdens. The corresponding hypothesis is stated formally below:

H_0^{14} : On average, the probability that a firm will issue a debt-like security instead of a less debt-like security is positively related to the average tax rate of the issuing firm.

Variables Used

In order to represent the determination of financial structure as viewed by the static trade-off approach, two factors are specified; one is a financial risk measure, and the other is a gauge of the potential tax advantage of debt. To measure the likelihood of default, Marsh [1982] and Billingsley, Lamy, and Thompson [1988] use a variable that Marsh refers to as a "bankruptcy risk measure," computed as

$$\text{Bankruptcy Risk} = \frac{\text{Interest Expense} - \text{EBIT}}{\sigma(\text{EBIT})}, \tag{3.20}$$

where $\sigma(EBIT)$ is the standard deviation of the firm's net operating income for the past ten years. This risk measurement variable is unusual in that, for profitable firms, its value will be negative. The less risky is the firm, the greater in magnitude will be the negative number. The variable is designed in this manner to facilitate the interpretation of its regression coefficient relative to other risk measurement variables. Though bankruptcy costs are likely to vary across industries and time, this variable provides information regarding the probability that a firm will be able to meet its debt service obligations. Billingsley, Lamy, and Thompson find this variable to be of marginally significant use in determining the probability of an issuer making a straight debt or convertible offering. Convertible debt issues appear to be associated with riskier firms than are debt issues.

To provide a measure of the tax side of the static trade-off framework, and to test the hypothesis that more highly-taxed firms tend to issue more debt-intensive securities, the variable to be used is the firm's five-year average effective tax rate, computed as

$$\text{Average Effective Tax Rate} = 1 - \frac{\text{Net Income (5-year average)}}{\text{Earnings Before Taxes (5-year average)}}. \quad (3.21)$$

Though the firm's marginal tax rate is the relevant rate in the static trade-off framework, this variable is not observable. Thus, the average effective tax rate is used as a proxy for the marginal tax rate. A five-year period is used to help eliminate the effects of changing tax laws over the years. By using more than one year of data, it is hoped that the effect of a year of non-recurring tax benefits or other abnormal occurrences will be lessened. However, if the interval used is too long, then the effect of tax regimes that prevailed in years prior to the issuance decision will exert undue influence on the analysis.

3.4.2.4 Non-debt Tax Shields

The last subsection introduced the possibility that a firm's tax status could influence the choice of the type of security that a firm offers. However, finance theory suggests that the present study should hold constant for at least one additional aspect of the corporate tax picture.

DeAngelo and Masulis [1980] contend that, when considering debt- and non-debt tax shields in the financing decision, the firm should lever itself only up to the point where its operating income is fully sheltered from taxes. Hence, there is no marginal benefit from seeking additional debt or non-debt tax shields if the firm's effective tax rate is already zero; generally, redundant tax shields should be of no value. It is expected that the issuance of more equity-like securities will be favored by firms with relatively high levels of non-debt tax shields. Such firms are less likely to be able to derive any marginal benefit from the tax deductibility of debt. Consequently, it is hypothesized that firms with higher levels of non-debt tax shields should prefer convertible bonds, regardless of their marginal tax rate, and firms with comparatively lower levels of non-debt tax shields should prefer units over convertibles. The hypothesis is formally stated as follows:

H_0^{15} : On average, the probability that a firm will issue a debt-like security instead of a more equity-like security is negatively related to the level of non-debt tax shields of the issuing firm.

Variable Used

The variable employed to test hypothesis H_0^{15} is very similar to a factor used by Bradley, Jarrell, and Kim [1985], which is found to be significant in the determination of debt ratios of industrial firms. The variable used in the present study is the sum of tax shields including

depreciation expense (DEPR), investment tax credits (ITC), depletion expense (DEPL), and amortization expense (AMORT). The tax shields will be scaled by dividing by the firm's earnings before depreciation expense, depletion expense, amortization expense, interest expense (INT), and taxes (TAX). Thus, the variable measuring nondebt tax shields (NONDSHIELD) is computed as

$$\text{NONDSHIELD (5-year average)} = \frac{\text{DEPR} + \text{DEPL} + \text{AMORT} + \text{ITC}}{\text{EBIT} + \text{DEPR} + \text{AMORT} + \text{DEPL}}, \qquad (3.22)$$

where all of the variables on the right side of the equal sign are pre-issuance, five-year averages. The justification for the five year interval is the same as that given in the subsection introducing the average effective tax rate variable.

3.4.2.5 Agency Costs

As was explained in subsection 3.3.5, adding a conversion feature to a debenture can be a useful means by which to lessen the agency problems associated with corporate debt. Also, though the payment of cash dividends is one dimension of the agency cost picture, current evidence indicates that the dividend payout ratio is unrelated to the probability of a firm issuing one type of security versus another. Neither Marsh [1982] nor Billingsley, Lamy, and Thompson [1988] find any association between a firm's dividend payout ratio and the choice of financing in either univariate or multivariate tests.

Jones and Mason [1986] note that if bonds only are usable as warrant exercise scrip, the bond portion of a unit is usually more than sufficient to exercise all the warrants. Thus, if debt agency cost minimization is one of the reasons for a firm's issuing convertibles rather than straight debt, then convertible debt accomplishes the objective more completely than

even the unit of straight debt with warrants. This is because the owner of a unit will be left holding debt even after all warrants are exercised, and will still be vulnerable to the agency costs of debt.[57] Hence, theoretically, firms with high agency costs of debt should be more likely to issue convertible debt than units, and more likely to issue an equity-linked debt security than straight debt. At the extreme, firms with agency costs of debt that are high enough to induce prospective bondholders to require unusually restrictive indenture covenants would be more likely to issue equity. Hence, the higher are agency costs of debt, the more equity-like will be the security issued. On the basis of this discussion, the following hypothesis is made:

H_0^{16} : On average, the probability that a firm will issue a debt-like security instead of a more equity-like security is negatively related to the level of debt agency costs of the issuing firm.

For the testing of this hypothesis, agency costs of debt are measured in the same way as in the evaluation of the agency hypothesis in section 3.3.5.

3.4.2.6 Stock Market Returns and Stock Issuances

Marsh [1982] finds that the probability of a new common stock issue is positively associated with the recent price history of the stock market. Also, he notes that there is a positive serial correlation between the monthly quantity of issuances made. Using the same model with U. S. data, Billingsley, Lamy and Thompson [1988] provide similar evidence for convertible bonds. Thus, as market prices rise to a relatively high level, shares of stock as

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[57] It can be argued that, since the owner of the unit becomes a stockholder and remains a bondholder, when the warrant portion is exercised, agency costs of debt are significantly reduced. This reduction results from the influence the stockholder will be able to exert on the investment policy of the firm. In other words, it is not certain that the bondholder needs to relinquish all debt in order to mitigate substantially the agency costs of debt.

well as debt securities with equity participation become lower cost sources of funds than straight debt. The probability that the firm will choose to issue stock or convertibles rather than straight bonds thus tends to increase. The hypothesis for the logit analysis is:

H_0^{17} : On average, the probability that a firm will issue a debt-like security instead of a more equity-like security is negatively related to the forecasted dollar value of new common stock issues.

Variable Used

In his study of factors related to a firm's choice between issuing debt versus equity, Marsh uses a simple model that serves as a monthly forecast of the dollar amount of primary equity issuances, E_t, as follows:

$$E_t = \alpha_{0t} + \alpha_{1t} E_{t-1} + \alpha_{2t} M_{t-1} + \alpha_{3t} M_{t-2} + \varepsilon_t. \quad (3.23)$$

In this equation, E_{t-1} is the dollar value of primary market equity issues in month t-1, and M_{t-1} and M_{t-2} are the CRSP equally-weighted stock market returns for months t-1 and t-2, respectively, and ε_t is a stochastic error term.

3.4.2.7 Issuer-specific Stock Performance

Marsh [1982] cites his own work (Marsh [1977]) suggesting that the offerer's pre-issuance stock price performance might be significantly related to the probability of a firm floating debt or equity. Marsh observes that, for companies on the London Stock Exchange, during the year preceding the offering, the common stock of equity issuers typically outperforms the stock of debt issuers. Consistent with this finding, the hypothesis is:

H_0^{18} : On average, the probability that a firm will issue a debt-like security instead of a more equity-like security is negatively related to the offerer's pre-issuance stock price performance.

Variable Used

The variable used to measure the issuer's stock price performance is the market model residual for the year prior to issuance. The market model approach is used because it nets out the effect of the aggregate equity market, which is included in hypothesis H_0^{17}.

3.4.2.8 Interest Rates and Debt Issuances

As was the case with the equity market, Marsh [1982] also includes a variable for forecasting the monthly dollar amount of new debt issues. He and Billingsley, Lamy, and Thompson [1988] confirm that this factor is related significantly to the probability of a firm issuing debt versus equity. Because prior empirical evidence suggests that the inclusion of a debt market forecast variable probably is appropriate, the following hypothesis is specified:

H_0^{19} : On average, the probability that a firm will issue a debt-like security instead of a more equity-like security is positively related to the forecasted dollar value of new debt issues.

Variable Used

Just as the equity market forecast is developed above, the present study also borrows Marsh's specification of a model designed to provide a debt market forecast, given as:

$$D_t = \alpha_{0t} + \alpha_{1t} D_{t-1} + \alpha_{2t} Y_{t-1} + \alpha_{3t} Y_{t-2} + \varepsilon_t, \tag{3.24}$$

where D_{t-1} is the dollar value of new corporate debt issues in month t-1, and Y_{t-1} and Y_{t-2} are the yields on 10-year constant maturity U. S. Treasury issues for months t-1 and t-2, respectively, and ε_t is a stochastic error term.

3.4.3 Univariate Tests

A Kruskal-Wallis test is used to determine whether there are nonzero differences among the means of various firm-specific and market factors measured for issuers of common stock, straight debt, convertible debt, and units. For a detailed description of the methodology, see subsection 3.2.3.2.

3.4.4 Multivariate Tests

3.4.4.1 Logistic Regression Analysis

The methodology for assessing how the previously specified factors are related to the probability of issuing one type of security versus another is commonly called "logit analysis." With logit analysis the dependent variable takes on only discrete values; in the present study, the regressand is restricted to values of 0 and 1. The regression coefficients, which are computed using maximum likelihood estimation, are interpreted as the sensitivity of the conditional probability of the occurrence of the event signified by the dependent variable taking on value of "1," to changes in the independent variable. If the dependent variable is not dichotomous, economic interpretation of the regression coefficients becomes difficult.

For example, a statistically significant negative regression coefficient for a pairwise comparison shows clearly the relationship between the factor involved and a predicted probability of taking the action represented by the value "1." However, in the case of a three-way logit analysis, a coefficient might prove to be statistically significant, but its interpretation would be unclear because the dependent variable is not binary. It is unclear how one could solve for the pairwise coefficients after actually running the regression that includes all possible capital choices. Thus, the format in the present study includes only the possibility of pairwise comparisons between the various types of capital. There will be a total of three pairwise comparisons performed in the analysis, featuring units being paired with each of the other types of securities.

To facilitate the interpretation of the logit coefficients, elasticities are computed, assuming that the explanatory variables are at their mean levels.

The logit model is

$$P_i = F(Z_i) = F(\underline{B}'\underline{X}) = \frac{1}{1 + e^{(\underline{B}'\underline{X})}}. \tag{3.25}$$

P_i is the probability that firm i will decide to issue a certain security, given knowledge of the vector of factors $\underline{X}$. $\underline{B}'$ is the transformed vector of regression coefficients. The variable Z is an unobservable index, which is a function of the vector $\underline{X}$, and $F(\bullet)$ is the cumulative logistic probability function. The cumulative logistic probability is similar to the cumulative normal function, except that its slope is less steep. Thus, $\log \frac{P_i}{1 - P_i} = (\underline{B}'\underline{X})$, where the left hand side is the log of the odds that the dependent variable will assume a value of 1, given the vector of independent variables $\underline{X}$. The probability that a firm will choose to issue security i is P_i. The logistic regression procedure is used because several other more basic

functional forms have serious deficiencies. For example, use of a simple linear probability model results in a violation of the data homoscedasticity assumption, as well as a chance that the dependent variable will lie outside the interval (0,1). The logistic transformation restricts predicted values of the regressand to the desired (0,1) interval. The cumulative logistic function often is used, rather than the normal density function, due to the ease of the transformation in the former case. The efficacy of the model specified in this section is analyzed in two ways: 1) the significance of the likelihood ratio test, and 2) computation of an "effective" R^2. The idea of an "effective" R^2 comes from the fact that models with binary dependent variables are, by their nature, unlikely to have R^2s close to 1. Pindyck and Rubinfeld [1981] assert that, under certain distributional assumptions, a model has an upper-bound R^2 that is far less than 1. As presented by Morrison [1972], the upper bound will be computed for the present study under the assumption that the predicted probabilities follow a beta distribution. The effective R^2 is computed by dividing the computed R^2 by the upper-bound R^2.

For this study, the form of the logit model is as follows:

$$\log \frac{P_i}{1 - P_i} = \beta_1 X_1 + \ldots + \beta_{14} X_{14}, \tag{3.26}$$

where

X_1 = debt-to-total assets ratio (deviation from 10-year average),

X_2 = short-term debt-to-total debt ratio,

X_3 = natural logarithm of total assets,

X_4 = proxy for bankruptcy risk,

X_5 = standard deviation of EBIT (10-year average),

X_6 = debt agency cost proxy #1 (ADV + R&D),

X_7 = debt agency cost proxy #2 (intangible assets),

X_8 = debt agency cost proxy #3 (market-to-book value),

X_9 = debt agency cost proxy #4 (scaled dividend size),

X_{10} = effective average tax rate (5-year average),

X_{11} = non-debt tax shields (5-year average),

X_{12} = equity market forecast variable,

X_{13} = debt market forecast variable, and finally,

X_{14} = residual stock return of issuing firm.

3.4.4.2 Test for Multicollinearity

It is recognized that the addition of four variables to Marsh's [1982] logit model increases the probability that multicollinearity has been introduced into the analysis. To test whether this problem is present, a variance inflation factor will be computed for each independent variable in the present model.

A variance inflation factor (VIF) for any variable x_i is computed by regressing x_i on the other independent variables in the model. The R-squared from the regression, R_i^2, is used in the following equation:

$$VIF_i = \frac{1}{1 - R_i^2}. \tag{3.27}$$

The higher is the VIF_i, the greater is the probability that multicollinearity is affecting the results of the logistic regression. Myers [1986] recommends the following "rule of thumb": If VIF_i is greater than 10, one should consider taking steps to deal with the association among regressor variables.

Chapter 4

Sample Description

Data for the dissertation are derived from a variety of sources. The following two sections identify the publications and data bases from which the information is obtained, as well as the requirements that a firm had to meet to be included in the samples. Also, a detailed description of the final samples is given.

4.1 Event Study and Cross-sectional Analysis

4.1.1 Data Sources

Issues of units of debt with warrants and convertibles sold between 1971 and 1986 are identified in Drexel Burnham Lambert's *Public Offerings of Corporate Securities*, *Investment Dealers Digest*, and *Institutional Investor*.

A total of 131 offerings of units is identified for the years 1971-1986. Five of the issues have warrants that are exercisable into the common stock of a firm other than the issuer, and another five issuers were subsidiaries of other firms, so these observations are omitted from consideration. For 17 issues, announcement or registration date information, as well as the identity of the exchange on which the common stock is listed, is unavailable. Presumably, most of these firms are small, because they are not listed on the University of Chicago's Center for Research in Security Prices (CRSP) tapes, including the CRSP over-the-counter tape. This leaves a sample of 104 issues of units. Next, the 34 unit offerings made by financial companies and three by regulated utilities are dropped from consideration. Such firms frequently are not pooled with industrial companies in event studies because the capital structures of banks are regulated and the earned rates of return for public utilities frequently are set by regulators. The present study considers only issues of firms listed on the CRSP daily returns tape, and hence, only companies trading on the New York Stock Exchange or American Stock Exchange are in the event study sample. The 18 offerings by firms whose equity trades over-the-counter, then, are not included in the final sample. Finally, eleven observations are omitted for miscellaneous reasons.[58] Application of these screens to the original data leaves a total of 38 unit offerings available for the event study announcement period analysis. Thirty-nine issues remain for the issuance period analysis.

A sample of convertible debt issuances as well as straight debt and common stock offerings is compiled. Once again, offerings by industrial firms whose stocks trade over-the-counter are omitted from consideration. Because of the high number of offerings of straight debt, common stock and convertible debt during the 1971-1986 period, only one of each type

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[58] Nine observations are dropped because a contemporaneous firm-specific announcement is made when the unit offering is announced. One issue is excluded because it is a secondary offering, and for another offering, the CRSP market return for the announcement date is unusable.

of issue is selected from each month of the sample period. For example, in May 1984, one straight debt issue, one equity issue, and one convertible debt issue are selected at random from *Investment Dealers' Digest*. In July 1984, however, no convertible bond issues meet the criteria for inclusion in the sample, so only common stock and straight debt offerings are selected for that month. A similar situation occurred for many months throughout the sample period. Thus, the total number of issues in the announcement period study are 104 convertible debt offerings (106 for the issue period event study), 172 (176) straight debt offerings, 38 (39) unit issues, and 122 (123) common stock offerings.

For each issuance, *The Wall Street Journal Index* is searched to determine the exact day that the announcement of the offering occurred. The date is then confirmed by reading the cited article. The intended use of the issue proceeds usually is given in the article, so *The Wall Street Journal* is the source of this information for the cross-sectional study. In the few cases for which the announcement date is unavailable, the issue registration date is identified from *Investment Dealer's Digest* or *Institutional Investor*, and this date is used as a proxy for the event date.[59] The day that the pending issue is announced in *The Wall Street Journal* is assumed to be the day following the firm's actual announcement of a pending issue. The issue date for units and convertibles is identified in the *Public Offerings of Corporate Securities*, *Investment Dealer's Digest*, or *Institutional Investor*.

All balance sheet and income statement data are obtained from the Compustat Industrial data base. Information about the terms of the specific issues, such as allowable scrip are derived from available security offering prospectuses. *Moody's Bond Record* is used to determine the magnitude of the original issue discount for units.

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[59] The announcement date is not found in *The Wall Street Journal* approximately 18 percent of the time.

4.1.2 Description of Data

Panel A of Table 4.1 gives the time distribution for the sample of units, convertibles, straight debt, and common stock. Consistent with data used in other studies of security offerings (reviewed in Sections 2.1 and 2.4), the data reflect the large number of offerings made during the 1971-1972 period, and during the 1980's. The middle- and late 1970's was a time of comparatively low activity in the U.S. primary capital markets, particularly for common stock issues and equity-linked debt securities. This is probably because the stock market was depressed during this interval. It is notable that 15 of the 39 unit offerings in the sample are made in 1983, but the reason for the clustering of issuances in this year is unclear. There is no apparent tax-related explanation for the phenomenon. Section 3.2.1 reveals how the Tax Equity and Fiscal Responsibility Tax Act of 1982 actually *lessened* one of the greatest benefits to the issuer of units, the straight-line amortization of the original issue discount. Note that other equity-related securities also were in favor in 1983, and that the requirements applied to obtain the final data set eliminated a large number of issues not made in 1983.[60] It could be that the type of security chosen to raise capital is partly a function of what is "in vogue" in the financial markets at the time.

When a security offering is announced, firms frequently state the intended use of the proceeds. Panel B of Table 4.1 summarizes the information reported in *The Wall Street Journal* concerning the issue proceeds. Reasons for issuance fall into four broad categories:

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[60] Though 15 (38.5 percent) of 39 unit issues in the event study sample are from 1983, in the total population of 131 units, only 27 (20.6 percent) of offerings were made in 1983. Appendix A contains a list of the total population of units.

Table 4.1: Time Distribution of Issues and Expected Use of Proceeds for Event Study Subsamples.

Panel A:

TIME DISTRIBUTION OF ISSUES

Units		Convertibles		Straight Debt		Common Stock	
Year	Number	Year	Number	Year	Number	Year	Number
1971	3	1971	10	1971	11	1971	10
1972	1	1972	6	1972	11	1972	7
1974	1	1973	1	1973	10	1973	6
1978	1	1974	4	1974	12	1974	4
1979	2	1975	6	1975	12	1975	8
1980	2	1976	5	1976	11	1976	6
1981	1	1977	4	1977	11	1977	5
1982	3	1978	3	1978	10	1978	6
1983	15	1979	5	1979	12	1979	11
1984	5	1980	9	1980	10	1980	8
1985	4	1981	11	1981	12	1981	8
1986	1	1982	7	1982	12	1982	7
		1983	12	1983	10	1983	11
		1984	8	1984	12	1984	8
		1985	7	1985	8	1985	9
		1986	8	1986	12	1986	9
	39		106		176		123

Panel B:

EXPECTED USE OF ISSUE PROCEEDS
(All figures are in percent.)

Stated Use	Units		Convertibles		Straight Debt		Common Stock	
	Method1[a]	Method2[b]	Method1	Method2	Method1	Method2	Method1	Method2
Refund Debt	57.1	56.4	53.7	61.5	56.9	59.5	50	60.3
Capital Expend.	17.9	20.5	20.9	31.7	24.8	32.3	25.7	33.5
Acquisition	7.1	7.7	3.0	5.8	2.7	9.9	5.4	6.7
General Purposes	17.9	30.8	22.4	39.4	15.6	40.5	18.9	36.0

[a]Method 1 computes the percentage of issues that fall into a given category. The sample includes all issuers that stated a single expected use of the offering proceeds.

[b]Many issuers reported that proceeds of offerings would be used for multiple purposes. Method 2 gives the percentage of issues in the sample for which the respective use for the funds was mentioned, even if the use in question was one of several noted.

1. Refunding of currently existing debt.
2. Funding of capital expenditures or expansion other than through merger or acquisition.
3. Financing of mergers or acquisitions.
4. General corporate purposes.

The difficulty in attempting to summarize this information is that a large number of firms give more than one intended use for the funds, so categorization becomes difficult. Hence, two methods are used to summarize the data. "Method1" involves consideration of only those firms who gave a single reason for making the security offering. Though this method significantly reduces the number of firms being considered, the information can be thought of as being relatively "pure," since the use of the proceeds is unambiguous. "Method2" retains the whole sample, and gives the percentage of all issues for which the reason in question is mentioned. For example, for an issuer who states a total of three uses for the proceeds, the issue is counted toward the total in each of the three categories.

The most noteworthy aspect of the descriptive information is the homogeneity among the four subsamples, with respect to reasons for issuance. Across the subsamples, refunding debt is obviously the most important reason for raising capital, and the funding of acquisitions is the least prevalent use of the external funds. "General corporate purposes" is mentioned frequently in conjunction with other commitments for issue proceeds, but is not often given as the sole reason for an issuance. Finally, unit offerings appear to be used less as a vehicle for financing capital expenditures than are the three other sources of capital. However, units are used equally often for acquisitions, another form of corporate expansion.

Table 4.2 gives additional descriptive information about the sample. Straight debt offerings are the largest in terms of the mean dollar amount per issue, with common stock

Table 4.2: Descriptive Statistics for Event Study Subsamples.

Characteristic	Group Mean (Median, Standard Deviation below)			
	Units	Convertibles	Straight Debt	Common Stock
Number of Issues	39	106	176	123
Issue Size ($ millions)	$69.4 ($49.9, $78.3)	$67.7 ($50, $56.2)	$109.4 ($92.5, $113.4)	$48.1 ($23.4, $64.8)
Underwriter Fee[a]	3.3% (3.3%, .8%)	2.1% (1.5%, 1.3%)	1.3% (.9%, .9%)	5.1% (5%, 1.5%)
Issue Lag[b]	19.9 days (13.5, 23.8)	24.9 days (14, 39.1)	22.5 days (14, 26.9)	21.9 days (15, 29.5)
Debt Time to Maturity	14.1 yrs. (10.5, 5.8)	22.8 yrs. (25, 3.5)	21.6 yrs. (25, 7.6)	
Warrant Time to Maturity	5.5 yrs. (5, 1.5)			
Conversion/Exercise Premium	35.9% (30.4%, 20%)	20.2% (18.2%, 14%)		
Warrant Exercise Scrip[c]				
Debt and/or Cash	79.4%			
Cash Only	20.6%			
Potential Equity[d]	$757.6 ($775, $581.5)			
Issuer Debt/Equity Ratio	1.29 (1.16, .76)	.96 (.68, .89)	.74 (.54, .82)	.67 (.49, .66)

[a]The gross spread, given as a percentage of the total value of the issue.

[b]The number of trading days between the first announcement of a pending offering and the issuance date.

[c]Figures given for warrant exercise scrip are percentage of the 34 issuers in the sample for which scrip data were available. If the "Unable to Determine" category is included, the results would be: "Debt or Cash:" 69.2%, "Cash Only:" 17.9%, "Unable to Determine:" 12.8%.

[d]The figure is in terms of a $1000 par value bond. If debt only is used as warrant exercise scrip, then, for the average issue, $757.6 of the $1000 bond would be surrendered for warrant exercise. Information on this item in the table is for units allowing debt and/or cash to be used as scrip. If "cash only" observations are included, the mean potential equity value falls to about $700.

offerings being less than half as large, on average. Units and convertibles are issued in roughly the same amounts, but they also are much smaller than straight debt offerings. Where gross underwriter fees are concerned, straight debt appears to be the least expensive form of capital to issue. The others, in order of increasing fees, are convertibles, units, and common stock. The median time lag between the announcement of a pending offering and the actual issuance is nearly identical (about 14 days) for all four types of issues. The maturity of the debt component of convertibles and of straight debt offerings averages about 22 years. For units, the mean debt maturity is only about two-thirds as long, and the median life is less than half as long. However, this is because the unit sample includes units of *bonds* with warrants and units of *notes* with warrants. The average maturity of a bond within a unit is 17.5 years (with a median of 20 years), and the mean life of a note is 9.0 years (median of 10 years). The prevalence of notes and bonds within units is about equal.

The implicit warrant component in a convertible is, of course, identical to the maturity of the convertible bond. The warrant portion of a unit, on the other hand, averages only about 5 years until maturity. The lack of equality between the maturities of the debt and warrant components of units casts serious doubt on whether convertibles and units can be viewed as substitutes. Additional evidence to this effect is revealed in the sample information concerning allowable warrant exercise scrip. To be perfect substitutes for convertibles, units should allow debt only to be used as warrant exercise scrip, and should contain warrants such that the exercise of all warrants exactly extinguishes all the debt. Apparently, units that allow debt only to be used as warrant exercise scrip are nonexistent. About 80 percent of units in the sample allow cash or debt to be used as scrip, with the remainder allowing cash only. Additionally, if all warrants within a $1000 par unit are exercised using debt, about $243 of the bond will be left over after exercise. Thus, "usable securities" are typically more than adequate to fund the exercise of warrants. Another striking difference

between units and convertibles is the mean exercise or conversion premium (above the issue date stock price) at which the securities are issued. In order to equal the warrant exercise price, the average unit issuer's stock value would have to increase by 35.9 percent, but the average convertible issuer's would need to rise by only 18.2 percent. Though the *potential* equity within the average unit is significant, the high exercise premium, *ceteris paribus*, suggests that the eventual transition to equity is relatively unlikely. It becomes even less likely in light of the comparatively short life of the warrant portion of the average unit.

One final piece of information is included in Table 4.2, and this is not issue-specific. Due to the potential capital structure implications of the issuance of the four security types, the firm's pre-offering debt-to-equity ratio is presented. Though the means and medians for this factor appear to vary significantly, the rankings, by subsample, are preserved regardless of which statistical measure is considered. Recall from Chapter 3 that Dann and Mikkelson note, for their sample of convertible issuers, that the median debt-to-equity ratio is .52. For the present study, the finding of a similar (.68) median ratio reinforces Dann and Mikkelson's statement that a convertible bond would have to be at least two-thirds equity in order to be leverage-decreasing. Since unit issuers appear to have significantly larger debt-to-equity ratios, however, the equity component of the median unit would need to be just over 46 percent[61] of the total issue to have a leverage-decreasing effect on the issuer.

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[61] A median debt-to-equity ratio of 1.16 means that the ratio-preserving proportion of equity within the median issuer's unit must be $1 - \frac{1.16}{1 + 1.16} = 1 - .537 = .463$, or 46.3 percent.

4.2 Logistic Regression Analysis

4.2.1 Data Sources

The financial data for the logistic regression model are obtained from the Compustat Industrial data base. The Compustat Price Dividends and Earnings data base is the source of information on the firms' residual stock return. Data on the monthly dollar volume of debt and equity offerings, used for market condition forecasts, is from the Securities and Exchange Commission's *Monthly Statistical Review*. Stock returns for the equity market forecast are taken off the CRSP monthly returns tape, and the interest rate data needed for the debt market forecast are from *Federal Reserve Statistical Release H.15: Selected Interest Rates*. For the logit portion of the analysis, unit issues made by firms whose stock trades over-the-counter were included.

4.2.2 Description of the Data

In almost all instances, the unit, convertible, straight debt and common stock issue data for the logit subsamples appear similar to those in the event study subsamples. Panel A of Table 4.3 gives the time distribution of issues for the four subsamples, with the pattern remaining much like that described in the event study case. In all cases except unit issues, the number of offerings in the analysis is diminished significantly. This is a result of numerous firms not having 10 years of historical data listed on the Compustat tapes, a requirement for inclusion in the logit study. Data concerning the stated reason for issuance are found in Panel B of Table 4.3. Again, the information appears to be quite similar to that

Table 4.3: Time Distribution of Issues and Expected Use of Proceeds for Logit Study Subsamples.

Panel A:

TIME DISTRIBUTION OF ISSUES

Units		Convertibles		Straight Debt		Common Stock	
Year	Number	Year	Number	Year	Number	Year	Number
1971	4	1971	5	1971	6	1971	5
1972	2	1972	2	1972	5	1972	4
1978	1	1973	3	1973	6	1973	7
1979	1	1974	2	1974	10	1974	3
1980	2	1975	2	1975	8	1975	5
1981	1	1977	2	1977	9	1977	4
1982	4	1978	3	1978	6	1978	8
1983	12	1979	2	1979	11	1979	9
1984	7	1980	7	1980	9	1980	10
1985	5	1981	9	1981	11	1981	7
1986	3	1982	5	1982	6	1982	9
		1983	7	1983	7	1983	6
		1984	6	1984	11	1984	4
		1985	9	1985	8	1985	10
		1986	7	1986	7	1986	8
	42		71		120		99

Panel B:

EXPECTED USE OF ISSUE PROCEEDS
(All figures are in percent.)

Stated Use	Units		Convertibles		Straight Debt		Common Stock	
	Method1[a]	Method2[b]	Method1	Method2	Method1	Method2		
Refund Debt	59	56.3	57.4	62.3	50	54.8	38.5	53.9
Capital Expend.	12.8	15.1	21.3	33.3	28.3	34.8	30.7	39.3
Acquisition	10.3	21.6	0	1.4	3.8	8.7	7.7	12.4
General Purposes	17.9	25.8	21.3	36.3	17.9	34.8	23.1	43.8

[a]Method 1 computes the percentage of issues that fall into a given category. The sample includes all issuers that stated a single expected use of the offering proceeds.

[b]Many issuers reported that proceeds of offerings would be used for multiple purposes. Method 2 gives the percentage of issues in the sample for which the respective use for the funds was mentioned, even if the use in question was one of several noted.

in Table 4.1. In no cases are the percentages radically different for the logit subsamples relative to those for the event study subsamples.

Table 4.4 contains additional data on security offerings in the logit subsamples. The only noticeable differences between data for the event study and logit study is the smaller unit mean and median issue size and potential equity amounts. The reason for the smaller issue size documented in Table 4.4 is twofold. First, several firm making large unit offerings do not meet the criterion (10 years of historical financial data for inclusion in the final sample. Second, the logit subsample includes units issued by firms whose stock trades over-the-counter. Such companies -- and, presumably, their capital requirements -- are smaller than firms listed on the major exchanges, on average. The potential equity variable is smaller for the logit sample because a few of the offerings in the event study with high amounts of potential equity do not pass through the screen requiring 10 years of past data.

Table 4.4: Descriptive Statistics for Logit Study Subsamples.

Characteristic	Group Mean (Median, Standard Deviation below)			
	Units	Convertibles	Straight Debt	Common Stock
Number of Issues	42	71	120	99
Issue Size ($ millions)	$49.4 ($32.5, $47.2)	$64.9 ($50, $64.6)	$121.7 ($100.0, $128.2)	$44.4 ($24.1, $52.3)
Underwriter Fee[a]	3.6% (3.3%, 1.4%)	2.1% (1.4%, 1.4%)	1.3% (.9%, 1.0%)	5.1% (4.9%, 1.4%)
Issue Lag[b]	20.3 days (17, 15.7)	25.2 days (16, 27.5)	21.9 days (12, 31.2)	25.1 days (17, 33.9)
Debt Time to Maturity	13.7 yrs. (10.1, 6.2)	22.6 yrs. (25, 3.6)	21.7 yrs. (25, 7.7)	
Warrant Time to Maturity	5.3 yrs. (5, 1.1)			
Conversion/Exercise Premium	32.7% (29.1%, 15.0%)	18.4% (14.9%, 14.3%)		
Warrant Exercise Scrip[c]				
Debt and/or Cash	70.6%			
Cash Only	29.4%			
Potential Equity[d]	$702.9 ($567, $641.1)			
Issuer Debt/Equity Ratio	1.17 (1.13, .81)	.93 (.74, .86)	.68 (.59, .85)	.63 (.53, .67)

[a]The gross spread, given as a percentage of the total value of the issue.

[b]The number of trading days between the first announcement of a pending offering and the issuance date.

[c]Figures given for warrant exercise scrip are percentage of the 34 issuers in the sample for which scrip data were available. If the "Unable to Determine" category is included, the results would be: "Debt or Cash:" 57.1%, "Cash Only:" 23.8%, "Unable to Determine:" 19.0%.

[d]The figure is in terms of a $1000 par value bond. If debt only is used as warrant exercise scrip, then, for the average issue, $757.6 of the $1000 bond would be surrendered for warrant exercise. Information on this item in the table is for units allowing debt or cash to be used as scrip. If "cash only" observations are included, the mean potential equity value falls to about $700.

Chapter 5

Empirical Results

5.1 Introduction

This chapter presents results of the tests described in Chapter 3. Section 5.2 reports findings for the event study, including announcement and issuance period abnormal returns, results of Bartlett's test and a nonparametric difference of means procedure. Results of cross-sectional regressions are presented in Section 5.3. Two-day abnormal returns for unit and convertible issuers are regressed on factors hypothesized to influence the market's response to the offering. The final section gives evidence concerning how issuer-specific and market related factors are associated with the probability of a firm issuing one type of security rather than another. The specific logistic regression coefficients are presented, along with significance levels and elasticity coefficients.

5.2 Event Study

5.2.1 Abnormal Returns

The following subsections report the results of tests to determine the valuation consequences of securities issuances. Tables 5.1-5.8 contain detailed results of each test. A summary of these tables, as well as the findings from nonparametric tests, are found in Panel A of Table 5.9.

5.2.1.1 Announcement Period

Announcement period abnormal returns for the sample of 38 firms issuing units are found in Table 5.1. On average, stockholder wealth is not significantly affected by the announcement of a pending unit offering, as indicated by a two-day average abnormal return (AAR) of -.33 percent, with a *t*-statistic of -.445. Due to the relatively small sample size, a Wilcoxon sign-rank (nonparametric) test is performed on the two-day unit-issuer abnormal returns. The null hypothesis of $AAR_{-1\&0,udw} = 0$ is not rejected, with a *p*-value of .451. Table 5.2 reports that, in contrast, the announcement of planned convertible debt offerings are associated with significant negative abnormal returns. Consistent with Dann and Mikkelson [1984] and Eckbo [1986], in the present study announcing firms experience average abnormal returns of -2.04 percent ($t = -7.015$). Results for the analysis of announcement period abnormal returns for issuers of straight debt are given in Table 5.3. Shareholders of these firms earn abnormal returns not significantly different from zero during the event period, a result that concurs with Eckbo's findings. Table 5.4 indicates that the sample of common

Table 5.1: Unit Offerings: Announcement Period Abnormal Returns.

Day	Average Abnormal Return	Cumulative Abnormal Return	1 Day t	2 Day t	Percent Negative
-20	0.13	0.13	0.253	0	52.6
-19	-0.13	-0.01	-0.264	-0.007	63.2
-18	-0.61	-0.61	-1.205	-0.990	68.4
-17	-0.47	-1.08	-0.941	-1.446	60.5
-16	0.15	-0.94	0.296	-0.435	55.3
-15	-0.26	-1.20	-0.523	-0.153	55.3
-14	-0.14	-1.34	-0.275	-0.538	60.5
-13	0.02	-1.32	0.042	-0.157	52.6
-12	-0.26	-1.57	-0.509	-0.314	60.5
-11	-0.08	-1.65	-0.153	-0.446	55.3
-10	0.42	-1.22	0.843	0.465	51.4
-9	-0.42	-1.65	-0.838	0	65.8
-8	-0.08	-1.73	-0.168	-0.678	57.9
-7	-0.70	-2.43	-1.396	-1.054	71.1
-6	-0.02	-2.45	-0.042	-0.969	57.9
-5	0.62	-1.84	1.225	0.797	50.0
-4	0.33	-1.51	0.653	1.265	50.0
-3	-0.32	-1.83	-0.638	0.010	65.8
-2	-0.01	-1.84	-0.021	-0.444	52.6
-1	-0.56	-2.40	-1.115	-0.765	57.9
0	0.23	-2.17	0.454	-0.445	47.4
1	-0.46	-2.64	-0.923	-0.316	65.8
2	0.31	-2.32	0.626	-0.200	42.1
3	0.70	-1.62	1.390	1.358	50.0
4	-0.03	-1.65	-0.061	0.895	50.0
5	0.57	-1.08	1.132	0.722	60.5
6	0.21	-0.87	0.423	1.048	57.9
7	0.79	-0.09	1.564	1.339	36.8
8	-0.36	-0.44	-0.714	0.573	63.2
9	0.38	-0.06	0.760	0.031	39.5
10	0.05	-0.01	0.104	0.582	55.3
11	0.22	0.21	0.430	0.360	55.3
12	0.09	0.30	0.185	0.415	47.4
13	0.22	0.52	0.445	0.424	36.8
14	0.63	1.15	1.245	1.138	39.5
15	-0.56	0.59	-1.111	0.090	68.4
16	0.24	0.83	0.478	-0.426	36.8
17	-0.27	0.56	-0.544	-0.044	60.5
18	0.95	1.51	1.897	0.912	47.4
19	-0.06	1.45	-0.116	1.200	55.3
20	-0.48	0.97	-0.957	-0.723	65.8

Table 5.2: Convertible Offerings: Announcement Period Abnormal Returns.

Day	Average Abnormal Return	Cumulative Abnormal Return	1 Day t	2 Day t	Percent Negative
-20	0.35	0.35	1.600	0	42.3
-19	0.32	0.67	1.442	2.311	52.9
-18	0.14	0.81	0.652	1.591	45.2
-17	-0.32	0.49	-1.462	-0.615	59.6
-16	0.18	0.68	0.831	-0.479	45.2
-15	0.01	0.68	0.026	0.651	51.0
-14	-0.22	0.46	-0.994	-0.736	55.8
-13	-0.22	0.24	-1.012	-1.524	57.7
-12	0.11	0.35	0.497	-0.392	52.9
-11	-0.15	0.20	-0.675	-0.136	53.8
-10	0.55	0.75	2.502	1.388	43.3
-9	0.13	0.88	0.595	2.353	51.9
-8	-0.11	0.78	-0.479	0.088	51.9
-7	0.04	0.82	0.193	-0.217	57.7
-6	0.09	0.91	0.390	0.443	50.0
-5	-0.03	0.88	-0.116	0.208	55.8
-4	-0.07	0.81	-0.321	-0.332	57.7
-3	-0.10	0.70	-0.474	-0.604	50.0
-2	0.12	0.83	0.556	0.062	50.0
-1	-1.09	-0.26	-4.936	-3.328	75.0
0	-0.95	-1.21	-4.296	-7.015	71.2
1	-0.10	-1.31	-0.464	-3.616	56.7
2	-0.45	-1.76	-2.054	-1.913	63.5
3	0.04	-1.72	0.185	-1.420	52.9
4	0.15	-1.58	0.662	0.643	51.9
5	-0.18	-1.75	-0.795	-0.101	54.8
6	-0.12	-1.87	-0.548	-1.020	47.1
7	-0.03	-1.91	-0.150	-0.530	56.7
8	-0.21	-2.12	-0.960	-0.843	56.7
9	-0.15	-2.26	-0.661	-1.231	46.2
10	-0.05	-2.31	-0.213	-0.664	45.2
11	-0.15	-2.46	-0.659	-0.662	57.7
12	-0.14	-2.60	-0.634	-0.982	53.8
13	0.14	-2.45	0.653	0	42.3
14	0.25	-2.20	1.154	1.373	48.1
15	0.09	-2.11	0.393	1.175	51.0
16	0.06	-2.05	0.261	0.497	51.0
17	-0.18	-2.24	-0.830	-0.432	57.7
18	0.11	-2.13	0.507	-0.245	50.0
19	0.24	-1.88	1.106	1.225	42.3
20	-0.33	-2.21	-1.481	-0.285	56.7

Table 5.3 Straight Debt Offerings: Announcement Period Abnormal Returns.

Day	Average Abnormal Return	Cumulative Abnormal Return	1 Day t	2 Day t	Percent Negative
-20	-0.17	-0.17	-1.210	0	55.2
-19	0.11	-0.06	0.807	-0.274	49.4
-18	-0.15	-0.21	-1.084	-0.188	51.2
-17	-0.01	-0.22	-0.047	-0.769	47.7
-16	-0.12	-0.34	-0.887	-0.635	58.7
-15	-0.22	-0.56	-1.547	-1.655	56.1
-14	-0.11	-0.67	-0.812	-1.604	47.7
-13	0.10	-0.57	0.731	-0.055	48.3
-12	-0.01	-0.58	-0.076	0.445	54.1
-11	0.05	-0.52	0.391	0.214	52.3
-10	0.29	-0.24	2.032	1.648	44.8
-9	0.08	-0.16	0.576	1.774	51.7
-8	0.24	0.08	1.713	1.556	43.6
-7	0.00	0.08	0	1.149	57.0
-6	0.04	0.12	0.309	0.195	52.9
-5	0.01	0.13	0.063	0.253	50.0
-4	-0.06	0.07	-0.411	-0.236	50.0
-3	-0.11	-0.04	-0.781	-0.810	54.7
-2	0.06	0.03	0.448	-0.227	47.7
-1	-0.05	-0.02	-0.363	0.057	51.7
0	-0.13	-0.16	-0.935	-0.883	58.7
1	0.04	-0.12	0.276	-0.448	50.0
2	0.00	-0.12	0	0.177	51.7
3	0.06	-0.06	0.446	0.293	47.7
4	-0.20	-0.26	-1.443	-0.677	56.4
5	0.29	0.03	2.038	0.405	50.0
6	-0.05	-0.02	-0.368	1.135	55.8
7	-0.26	-0.28	-1.833	-1.497	59.3
8	0.14	-0.14	1.021	-0.552	49.4
9	-0.35	-0.49	-2.492	-1.001	55.8
10	0.27	-0.22	1.902	-0.401	50.0
11	-0.03	-0.25	-0.190	1.164	52.3
12	-0.30	-0.55	-2.134	-1.580	59.3
13	-0.13	-0.68	-0.945	-2.093	57.0
14	-0.15	-0.83	-1.044	-1.352	57.0
15	-0.03	-0.85	-0.189	-0.838	57.0
16	0.12	-0.73	0.871	0.464	55.8
17	-0.10	-0.83	-0.687	0.125	50.0
18	0.04	-0.79	0.252	-0.296	48.8
19	0.04	-0.75	0.306	0.380	50.0
20	0.03	-0.72	0.223	0.360	55.8

Table 5.4: Common Stock Offerings: Announcement Period Abnormal Returns.

Day	Average Abnormal Return	Cumulative Abnormal Return	1 Day t	2 Day t	Percent Negative
-20	-0.09	-0.09	-0.379	0	54.9
-19	0.14	0.06	0.623	0.163	45.5
-18	-0.35	-0.29	-1.509	-0.594	59.8
-17	-0.02	-0.31	-0.081	-1.067	57.4
-16	0.05	-0.27	0.206	0.084	53.3
-15	0.10	-0.17	0.430	0.426	52.5
-14	0.15	-0.02	0.624	0.707	51.6
-13	0.33	0.31	1.429	1.377	43.4
-12	0.05	0.36	0.201	1.093	54.9
-11	-0.22	0.14	-0.935	-0.493	52.5
-10	0.00	0.14	0	-0.641	53.3
-9	-0.02	0.12	-0.071	-0.061	49.2
-8	0.00	0.12	0	-0.044	54.9
-7	-0.29	-0.17	-1.252	-0.836	55.7
-6	-0.06	-0.23	-0.278	-1.026	59.8
-5	0.08	-0.15	0.346	0.046	54.9
-4	-0.11	-0.26	-0.476	-0.087	55.7
-3	-0.27	-0.53	-1.159	-1.096	55.7
-2	-0.53	-1.06	-2.270	-2.300	61.5
-1	-2.30	-3.36	-9.910	-8.171	76.2
0	-0.92	-4.28	-3.943	-9.294	63.9
1	-0.32	-4.60	-1.392	-3.579	51.6
2	0.16	-4.44	0.700	-0.464	51.6
3	0.36	-4.08	1.568	1.521	45.1
4	-0.24	-4.32	-1.051	0.347	56.6
5	-0.02	-4.34	-0.066	-0.750	56.6
6	-0.10	-4.44	-0.449	-0.346	58.2
7	-0.01	-4.45	-0.045	-0.331	54.1
8	-0.16	-4.62	-0.707	-0.504	60.7
9	0.00	-4.62	0	-0.489	49.2
10	-0.19	-4.81	-0.809	-0.557	54.9
11	-0.36	-5.17	-1.557	-1.587	59.8
12	-0.20	-5.37	-0.873	-1.630	54.9
13	-0.18	-5.55	-0.782	-1.110	57.4
14	0.13	-5.43	0.538	-0.163	54.9
15	-0.39	-5.82	-1.695	-0.776	59.0
16	-0.24	-6.06	-1.013	-1.816	58.2
17	0.33	-5.73	1.414	0.269	51.6
18	0.15	-5.58	0.644	1.381	52.5
19	-0.06	-5.64	-0.249	0.265	45.9
20	-0.20	-5.84	-0.872	-0.752	54.9

stock issuers suffered a loss of shareholder wealth during the announcement period averaging -3.20 percent (t= -9.234). As noted above, Masulis and Korwar [1986] find a similar valuation effect.

The evidence lends credibility to the idea that the market does not view units and convertibles as perfect substitutes. This is despite Hoffmeister's [1977] report that many convertible issuers consider units to be a viable alternative.

The most striking aspect of these results is not just that the market judges issuers of units and convertibles differently. Chapter 4 has shown that, although units and convertibles are similar in structure, there exist important differences in the terms of the issues as they are actually brought to market. The finding of an insignificant abnormal return for unit issuers gives unit offerings the distinction of being the only method of raising, albeit delayed or only potential, common equity that is not associated with a stock value penalty to the issuer. As noted above, on average, convertible debt and common stock offerings are associated with significant value reductions in the issuer's common stock. The specific differences among the abnormal returns for the four subsamples are discussed in subsection 5.2.2.

5.2.1.2 Issuance Period

Tables 5.5 through 5.8 present abnormal returns for four types of securities offerings for the 41 days surrounding the issuance date. Day ID-1 is the actual issuance date, and day ID is the date of *The Wall Street Journal* announcement of a completed offering. Table 5.5 gives issuance period results for units. Consistently, the abnormal returns are insignificant, the

Table 5.5: Unit Offerings: Issuance Period Abnormal Returns.

Day	Average Abnormal Return	Cumulative Abnormal Return	1 Day t	2 Day t	Percent Negative
-20	-0.75	-0.75	-1.573	0	66.7
-19	0.16	-0.59	0.341	-0.848	51.3
-18	0.58	-0.01	1.214	1.070	51.3
-17	-0.13	-0.14	-0.272	0.648	48.7
-16	0.43	0.29	0.905	0.436	46.2
-15	0.44	0.73	0.917	1.254	56.4
-14	-0.34	0.39	-0.705	0.146	53.8
-13	-0.65	-0.26	-1.372	-1.429	64.1
-12	0.73	0.47	1.526	0.106	59.0
-11	-0.59	-0.13	-1.248	0.191	61.5
-10	-0.48	-0.61	-1.008	-1.552	66.7
-9	1.00	0.40	2.111	0.758	43.6
-8	0.08	0.48	0.175	1.572	51.3
-7	0.51	0.99	1.073	0.859	43.6
-6	0.18	1.17	0.370	0.993	51.3
-5	-0.82	0.35	-1.728	-0.935	69.2
-4	0.58	0.92	1.211	-0.356	41.0
-3	0.39	1.31	0.821	1.398	39.5
-2	-0.32	0.99	-0.683	0.095	59.0
-1	0.74	1.73	1.562	0.605	53.8
0	-0.26	1.47	-0.555	0.693	61.5
1	-0.02	1.45	-0.035	-0.406	61.5
2	0.31	1.75	0.641	0.417	46.2
3	0.70	2.45	1.464	1.448	41.0
4	-0.05	2.40	-0.100	0.938	51.3
5	-0.13	2.27	-0.273	-0.257	48.7
6	-0.46	1.81	-0.968	-0.854	69.2
7	-0.13	1.68	-0.273	-0.854	43.6
8	-0.08	1.61	-0.159	-0.297	56.4
9	-0.12	1.49	-0.245	-0.278	51.3
10	-0.50	0.99	-1.048	-0.890	61.5
11	-0.27	0.72	-0.562	-1.108	56.4
12	0.59	1.31	1.235	0.463	46.2
13	0.00	1.31	0	0.846	59.0
14	0.17	1.48	0.362	0.246	43.6
15	-0.55	0.93	-1.151	-0.543	71.8
16	0.29	1.22	0.607	-0.375	51.3
17	0.05	1.28	0.112	0.494	66.7
18	-0.76	0.52	-1.594	-1.019	61.5
19	-0.03	0.49	-0.059	-1.137	53.8
20	0.84	1.33	1.756	1.168	38.5

Table 5.6: Convertible Offerings: Issuance Period Abnormal Returns.

Day	Average Abnormal Return	Cumulative Abnormal Return	1 Day t	2 Day t	Percent Negative
-20	-0.03	-0.03	-0.120	0	54.7
-19	0.12	0.09	0.543	0.298	51.9
-18	-0.43	-0.34	-1.984	-1.015	57.5
-17	0.14	-0.20	0.639	-0.947	57.5
-16	0.14	-0.06	0.630	0.894	54.7
-15	0.05	-0.02	0.211	0.592	57.5
-14	0.21	0.20	0.990	0.846	55.7
-13	-0.27	-0.07	-1.237	-0.174	55.7
-12	-0.13	-0.20	-0.614	-1.303	51.9
-11	0.07	-0.14	0.313	-0.211	48.1
-10	-0.19	-0.32	-0.869	-0.391	58.5
-9	0.35	0.03	1.630	0.536	46.2
-8	-0.48	-0.45	-2.214	-0.411	63.2
-7	-0.06	-0.51	-0.267	-1.747	53.8
-6	-0.08	-0.59	-0.365	-0.445	59.4
-5	-0.07	-0.66	-0.340	-0.496	53.8
-4	-0.19	-0.85	-0.889	-0.865	52.8
-3	-0.29	-1.14	-1.341	-1.570	52.8
-2	-0.19	-1.33	-0.868	-1.556	55.7
-1	-0.65	-1.98	-3.009	-2.731	65.1
0	-0.37	-2.35	-1.704	-3.319	55.7
1	-0.22	-2.57	-1.025	-1.922	51.9
2	-0.02	-2.59	-0.076	-0.775	50.0
3	0.34	-2.25	1.569	1.051	46.2
4	0.24	-2.01	1.118	1.892	41.5
5	0.20	-1.81	0.927	1.440	48.1
6	0.14	-1.67	0.629	1.096	50.0
7	-0.04	-1.71	-0.197	0.304	56.6
8	0.02	-1.70	0.085	-0.079	50.0
9	-0.05	-1.74	-0.216	-0.093	55.7
10	-0.14	-1.88	-0.654	-0.613	52.8
11	0.01	-1.87	0.052	-0.423	50.9
12	-0.18	-2.05	-0.810	-0.533	50.9
13	0.03	-2.02	0.145	-0.468	50.5
14	0.18	-1.83	0.852	0.702	50.0
15	0.18	-1.65	0.837	1.189	50.9
16	-0.09	-1.74	-0.409	0.301	57.5
17	0.22	-1.52	1.003	0.419	44.3
18	-0.40	-1.92	-1.842	-0.590	62.3
19	-0.32	-2.24	-1.497	-2.351	60.4
20	-0.10	-2.35	-0.482	-1.393	60.4

Table 5.7: Straight Debt Offerings: Issuance Period Abnormal Returns.

Day	Average Abnormal Return	Cumulative Abnormal Return	1 Day t	2 Day t	Percent Negative
-20	0.27	0.27	1.807	0	46.6
-19	0.18	0.46	1.213	2.311	43.2
-18	0.25	0.70	1.639	2.182	44.9
-17	0.16	0.86	1.076	2.077	50.6
-16	-0.07	0.80	-0.436	0.489	54.5
-15	-0.06	0.74	-0.399	-0.639	57.4
-14	0.09	0.83	0.599	0.153	48.3
-13	0.01	0.84	0.060	0.504	53.4
-12	-0.11	0.73	-0.746	-0.525	51.1
-11	0.04	0.77	0.268	-0.366	50.0
-10	-0.11	0.66	-0.697	-0.328	51.1
-9	-0.21	0.46	-1.360	-1.574	58.0
-8	-0.10	0.36	-0.655	-1.542	56.3
-7	-0.21	0.15	-1.397	-1.570	50.0
-6	-0.21	-0.06	-1.380	-2.125	59.7
-5	0.11	0.05	0.747	-0.485	50.6
-4	0.17	0.22	1.136	1.441	46.0
-3	0.47	0.69	3.120	3.256	50.0
-2	0.15	0.84	0.967	3.127	49.4
-1	-0.19	0.64	-1.291	-0.248	58.0
0	-0.05	0.59	-0.328	-1.239	55.7
1	0.06	0.66	0.422	0.072	46.6
2	-0.08	0.58	-0.518	-0.073	56.3
3	-0.15	0.43	-0.991	-1.155	54.5
4	-0.04	0.39	-0.284	-0.975	51.1
5	-0.05	0.34	-0.314	-0.457	57.4
6	-0.08	0.26	-0.519	-0.637	57.4
7	0.09	0.35	0.611	0.071	50.0
8	-0.04	0.31	-0.297	0.240	51.7
9	-0.05	0.26	-0.341	-0.488	54.0
10	-0.25	0.01	-1.639	-1.515	58.0
11	-0.43	-0.42	-2.860	-3.443	64.2
12	-0.19	-0.61	-1.277	-3.166	55.7
13	0.22	-0.40	1.438	0.123	49.4
14	-0.27	-0.67	-1.785	-0.266	55.7
15	-0.12	-0.78	-0.764	-1.951	55.7
16	-0.12	-0.90	-0.814	-1.208	55.1
17	0.07	-0.83	0.493	-0.246	49.4
18	0.00	-0.83	0	0.386	46.6
19	0.07	-0.76	0.448	0.351	50.6
20	-0.22	-0.98	-1.476	-0.786	54.9

Table 5.8: Common Stock Offerings: Issuance Period Abnormal Returns.

Day	Average Abnormal Return	Cumulative Abnormal Return	1 Day t	2 Day t	Percent Negative
-20	0.04	0.04	0.174	0	48.0
-19	-0.39	-0.35	-1.688	-1.030	55.3
-18	-0.27	-0.62	-1.155	-1.933	51.2
-17	-0.10	-0.72	-0.416	-1.068	50.4
-16	0.11	-0.60	0.487	0.049	47.2
-15	0.00	-0.61	0	0.317	50.4
-14	-0.17	-0.78	-0.733	-0.513	52.0
-13	-0.36	-1.14	-1.559	-1.559	56.1
-12	0.23	-0.92	0.971	-0.400	52.8
-11	-0.15	-1.07	-0.664	0.209	52.8
-10	-0.54	-1.61	-2.312	-2.024	59.3
-9	-0.22	-1.83	-0.964	-2.228	55.3
-8	-0.78	-2.61	-3.340	-2.927	68.3
-7	0.22	-2.39	0.959	-1.619	48.8
-6	-0.32	-2.70	-1.364	-0.275	61.8
-5	0.09	-2.61	0.401	-0.656	56.9
-4	-0.45	-3.06	-1.933	-1.042	58.5
-3	-0.24	-3.30	-1.048	-2.027	60.2
-2	-0.20	-3.51	-0.879	-1.310	53.3
-1	-0.10	-3.60	-0.417	-0.881	58.5
0	0.10	-3.51	0.422	0	49.6
1	-0.09	-3.60	-0.383	0.027	51.2
2	-0.21	-3.81	-0.905	-0.876	61.0
3	-0.47	-4.27	-2.008	-1.982	63.4
4	0.30	-3.98	1.271	-0.501	44.7
5	0.18	-3.80	0.759	1.381	50.4
6	-0.17	-3.97	-0.744	0.011	56.1
7	0.25	-3.72	1.077	0.227	50.8
8	-0.27	-4.00	-1.177	-0.068	59.8
9	0.12	-3.88	0.502	-0.459	51.6
10	-0.23	-4.11	-0.993	-0.334	54.9
11	0.24	-3.87	1.030	0.025	47.5
12	0.11	-3.77	0.452	1.008	54.1
13	0.23	-3.54	0.970	0.967	50.0
14	-0.06	-3.60	-0.249	0.491	55.7
15	0.03	-3.56	0.149	-0.068	51.6
16	0.00	-3.57	0	0.095	52.5
17	0.27	-3.30	1.161	0.784	50.0
18	-0.52	-3.82	-2.257	-0.745	51.6
19	0.02	-3.80	0.081	-1.480	52.5
20	0.15	-3.65	0.634	0.486	48.4

Day ID-1 value being +.74 percent with a *t*-statistic of 1.562, and the ID abnormal return being -.26 percent (t=-.555).[62] Results for convertibles in Table 5.6 support Dann and Mikkelson's [1984] findings of negative, statistically significant abnormal returns around the issuance day. Note that the cumulative abnormal returns also are negative throughout the period. Abnormal returns for Day ID-1 average -.65 percent, with a significant *t*-statistic of 3.009. Day ID abnormal returns are -.37 percent, with a *t* statistic of -1.704. The two-day *t*-value, -3.319, is statistically significant.

In the present study, the magnitude and significance of straight debt issuers' abnormal returns around the issuance date agree with the findings of Mikkelson and Partch [1986]. Abnormal returns for both days of interest are slightly negative and insignificant, with a two-day *t*-value of -1.239. On the other hand, Mikkelson and Partch (p. 46) find significantly negative abnormal returns on the issue date ("ID-1" here) of -.70 percent. The present study does not support this observation, with Day ID-1 abnormal returns of -.19 percent (t=-1.291) and Day ID abnormal returns of -.05 percent, with a *t*-value of -0.328.

The results presented here concur with those reported by Asquith and Mullins [1986, p. 85]. The two-day average abnormal return is 0 percent, indicating that information associated with the issuance of common stock is fully discounted by the market prior to the offering date.[63] These results of statistically insignificant abnormal returns for all three categories foreshadow conclusions from the cross-sectional portion of the study, in which abnormal returns are regressed on dummy variables representing the reason for issuance.

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[62] A Wilcoxon sign-rank test on the issuance period unit sample yields the same result as for the announcement period sample. The null hypothesis of a two-day abnormal return equal to zero is not rejected, with a *p*-value of .939.

[63] This is a *cumulative* average abnormal return. The average abnormal return for day ID-1 is -.10 percent, and for day ID is +.10 percent.

Table 5.9 Summary of Event Study Results, Including by Use of Proceeds of Unit Issuance.

Panel A:

SUMMARY OF EVENT STUDY RESULTS

ANNOUNCEMENT PERIOD AVERAGE ABNORMAL RETURNS (in percent, with t-statistics in parentheses)

Units of Debt with Warrants [n = 38]				Convertible Debt [n = 104]				Straight Debt [n = 172]				Common Stock [n = 123]			
AD -1	AD	2-Day	WSR[a]	AD -1	AD	2-Day	WSR	AD -1	AD	2-Day	WSR	AD -1	AD	2-Day	WSR
-.56	+.23	-.33	.4508	-1.09	-.95	-2.04	.0001	-.05	-.13	-.18	.1432	-2.28	-.92	-3.20	.0001
(-1.115)	(.454)	(-.445)		(-4.936)	(-4.296)	(-7.015)		(-.363)	(-.935)	(-.883)		(-9.808)	(-3.943)	(-9.234)	

ISSUANCE PERIOD AVERAGE ABNORMAL RETURNS (in percent, with t-statistics in parentheses)

Units of Debt with Warrants [n = 39]				Convertible Debt [n = 106]				Straight Debt [n = 176]				Common Stock [n = 123]			
ID -1	ID	2-Day	WSR	ID -1	ID	2-Day	WSR	ID -1	ID	2-Day	WSR	ID -1	ID	2-Day	WSR
+.74	-.26	+.48	.9388	-.65	-.37	-1.02	.0012	-.19	-.05	-.24	.2853	-.10	+.10	0	.7884
(+1.562)	(-.555)	(+.693)		(-3.009)	(-1.704)	(-3.319)		(-1.291)	(-.328)	(-1.239)		(-.417)	(+.422)	(0)	

Panel B:

UNIT ISSUER AVERAGE ABNORMAL RETURNS BY USE OF ISSUE PROCEEDS

Reason for Issuance	n	2-day ABRET	2-day t	% negative
Refund Debt	21	.02%	.023	42.9%
Corporate Expansion[b]	8	.07%	.045	37.5%
General Purposes	7	-.98%	-.673	57.1%

[a] "WSR" refers to the *p*-value for the Wilcoxon sign-rank test, which is used to evaluate H_0: *2-Day average abnormal return = 0.*

[b] This category includes both capital expenditures and acquisitions.

5.2.2 *Differences of Means*

The results of the event studies presented above lead one to suspect that the mean announcement period abnormal returns, as well as those for the issuance period, differ across the four subsamples. A Kruskal-Wallis test is used in lieu of analysis of variance (ANOVA), because the ANOVA procedure assumes that subsample sizes must be equal, and that subsample variances must be homogeneous.[64]

5.2.1.3 *Unit Sample Stratified According to Use of Proceeds*

The 36 unit issuers who stated only a single reason for bringing an offering to market are divided into subsamples according to which reason is given. The event study is again performed, and results are given in Table 5.9, Panel B. Note that both reasons reflecting corporate expansion, "Capital Expenditures" and "Acquisitions," are grouped together as one category. The findings are not qualitatively different from those reported for the entire unit sample, with all two-day announcement period abnormal returns being statistically insignificant.

5.2.2.1 *Announcement Period*

For the announcement period subsamples, the value for the H-statistic in the Kruskal-Wallis test is 55.28. The rejection region, then, is $55.28 > \chi^2_{\alpha,k-1} = 7.815$, where $\alpha = .05$ and

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[64] Bartlett's test for homogeneity of variances is conducted to determine if the equality of variances condition prevails. For the announcement period, the b-statistic described in subsection 3.1.3.2 is .7058. The rejection region is where b is less than a value derived from the Bartlett's distribution, and the distribution value for the 1 percent significance level is .9679. Thus, the hypothesis of equal announcement period variances is rejected. For the issuance period, the b-value and critical value are .7650 and .9679, respectively, so the null hypothesis again is rejected.

k-1 = 3. Hence, the null hypothesis of equal means is rejected. Next, the relevant question is precisely *which* announcement period abnormal returns differ. A standard differences of means test (adjusted for unequal variances and firm sizes among samples) is used to assess this issue, and Table 5.10 presents findings for the pairwise comparisons.

It is clear that, though the average abnormal returns for all four subsamples have negative signs, three classes of security issuances have significantly different impacts on the common stock value of the offering firm. The market appears to view straight debt and unit issues less negatively than it does a convertible issue. News of the pending flotation of common stock is taken even more unfavorably by the market than the announcement of a planned convertible offering. This result confirms prior findings, and adds to the body of evidence to support the idea that the more equity-like is the security being offered, the more hostile is the market's reaction to the news. Hence, the available evidence on security issuances is consistent with the financial "pecking order" described by Myers [1984]. He bases the discussion on the observation that firms generally prefer to use internal financing sources, then debt, and finally, if needed, equity securities.

5.2.2.2 *Issuance Period*

As with the announcement period abnormal returns, the Kruskal-Wallis procedure is applied to the issuance period data for the four subsamples. Since the value for H[65] is 8.39, the rejection region is $8.39 > \chi^2_{\alpha,k-1} = 7.815$, and the null hypothesis of equal means is rejected. Statistical Analysis System (SAS) gives the p-value for the test to be .0387.

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[65] See subsection 3.2.3.2 in Chapter 3 for a discussion of how the value for H is determined.

Table 5.10: Results of the t-Tests for Differences of Mean Returns for Issuers of Four Capital Types.

ANNOUNCEMENT PERIOD RESULTS

(p-values in parentheses)[a]

Common Stock		Convertible Bonds		Unit of Debt with Warrants		Straight Debt
-3.22%	$\neq$	-2.04%	$\neq$	-0.33%	=	-0.18%
	(.017)		(.009)		(.776)	

ISSUANCE PERIOD RESULTS

(p-values in parentheses)[b]

Convertible Bonds		Common Stock		Straight Debt		Unit of Debt with Warrants
-1.03%	$\neq$	-0.25%	=	+0.01%	=	+0.48%
	(.014)		(.459)		(.223)	

[a]The results from a Wilcoxon rank-sum test (the two-sample version of the Kruskal-Wallis test) agree with the findings of the t-tests, except that the test of the null hypothesis of equality of convertible issuer and common stock issuer announcement period abnormal returns has an associated p-value of .0581, indicating only marginally significant rejection of H_0 by the rank-sum test.

[b]The Wilcoxon rank-sum test confirms the relationship among issuance period mean abnormal returns for all subsamples.

Evidence in Table 5.10 for the issuance period pairwise analysis shows that the issuance of convertibles decreases shareholder wealth significantly more than the flotation of straight debt, common stock, or units. There is no statistically significant difference among abnormal returns for the latter three types of offerings. There remains no readily apparent reason why abnormal returns to convertible issuers should be negative relative to returns to other capital-raising firms. Units, like convertibles, usually have their final terms set on or around the issuance date. The resolution of uncertainty surrounding the terms of units is not associated with statistically significant abnormal returns. Thus, Dann and Mikkelson's [1984] explanation for the negative abnormal returns around convertible bond issuances probably is in error.

5.3 Cross-sectional Analysis of Abnormal Returns

One problem in designing a cross-sectional study is determining the proper form of the model to be used. That is, one wonders whether the hypothesized explanatory factors should be examined independently, or as a group. It is possible that a given variable that has a significant coefficient in a simple regression will appear as insignificant in a multiple regression framework. The coefficient's sign may even change from model to model. This observation begs the question, "If a coefficient is significant in a simple regression and insignificant in a multiple regression, what should be the general conclusion about the usefulness of the variable?". The financial literature gives little guidance on this issue, as some researchers (Asquith and Mullins [1986]) run simple regressions, and others (Eckbo [1986]) use a multivariate analysis. Though Tables 5.11 and 5.12 present simple and multiple regressions for the sake of completeness, it is the multiple regression results that are most useful.

Simple regressions carry the implicit assumption that no factors other than the present variable are useful in explaining changes in the regressand. Thus, the significance of such a potentially underspecified model is called into question, because the explanatory variable may be picking up information that is more relevant to other factors. The factors used in the present study are carefully developed, based on the predictions of financial theory, and are hypothesized to *simultaneously* influence observed abnormal returns. For example, the inclusion of only DAGENCY1 in a model assumes away the idea that other aspects of agency problems, the level of the OID and the nature of warrant scrip might be influential as well. Thus, for inferential purposes the multivariate approach is most effective, and simple regression results are presented for informational reasons only. The subsections that follow contain the results of cross-sectional investigations of unit- and convertible issuers' abnormal stock returns.

5.3.1 Unit Offerings

The attempt to explain announcement period abnormal returns for issuers of units yields generally disappointing results. In several cases, signs of the regression coefficients are as predicted, but the factors are only marginally statistically significant, at best. The results are found in Table 5.11, and are discussed below.

5.3.1.1 Original Issue Discount

Table 5.11 shows the results of a regression of the issuance period average abnormal return on the magnitude of the original issue discount (SCALED OID), scaled by the market value of equity, a dummy variable (JUL82OID) reflecting the tax laws in place after July 1,

Table 5.11: Results of Cross-sectional Regressions of Issuance Period Abnormal Returns for Unit Issuers.

Regressor Variable[a]				Model
Name	Parameter Estimate	t	p	
INTERCEPT	-0.1928	-0.167	.8685	$\bar{R}^2$ .0668
SCALED_OID	0.7946	1.712	.0987	n: 27
INTERCEPT	-3.7616	-1.801	.0843	$\bar{R}^2$ .1357
SCALED_OID	1.5961	2.130	.0437	F: 2.413
JUL82OID	4.9635	2.011	.0557	p: .0915
SCALED_OID*JUL82OID	-1.1628	-1.244	.2255	n: 27

[a]The dependent variable in both cases is the issuer's two-day issuance period abnormal return.

1982, and an interaction term (SCALED OID * JUL82OID). Both the SCALED OID and JUL82OID have regression coefficients that are significantly different from zero. Thus, the market apparently agrees with Jones and Mason's [1986] and Finnerty's [1986] assertions that the benefits of unit financing are significantly related to the presence of (and implicitly, the size of) the OID. However, the positive dummy variable coefficient is inconsistent with the positive sign of the SCALED OID coefficient. Though the OID is apparently viewed favorably by the market, the changes brought about by the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) also are seen as positive. This is a curious result, since TEFRA introduced an unfavorable accounting treatment of the OID. Perhaps there is some other provision or set of provisions within TEFRA that causes it to be considered positively by the market. The insignificance of the interaction term indicates that the importance of the OID apparently has not changed as a result of TEFRA.

5.3.1.2 Warrant Exercise Scrip

A dummy variable reflecting whether the allowable warrant exercise scrip is debt or cash (0) or cash only (1) is included in a regression with AAR. Hypothesis H_0^5 predicts a positive relationship, but the slope coefficient is insignificant, with a p-value of .1467. Thus, the market's reaction to the security appears not to be influenced by the nature of warrant exercise scrip. This leads to speculation as to whether it matters at all that units allow scrip other than debt only, as is implicitly the case with convertibles. Thus, perhaps it is not so much the exact nature of the scrip that should affect the substitutability of units and convertibles, but the warrant time to maturity relative to that of the debt, and other determinants of whether exercise or conversion will occur.[66]

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[66] Results of tests concerning the effect of these determinants on unit issuers' abnormal returns are presented in subsection 5.3.1.6.

5.3.1.3 *Issue Size*

Prior research indicates that the issuer's equity abnormal returns are negatively related to the dollar amounts of common stock and convertible debt issues. This possibly is due to the magnitude of the ownership claim dilution that is engendered by such offerings. As noted in Chapter 4, the potential equity portion of the average unit offering also is quite large, about $750. Hence, unit offering size is used as an explanatory variable for issuer abnormal returns.

The results of the cross-sectional regressions indicate that the abnormal returns of the issuer are not significantly related to the size of the unit offering. The sign of the coefficient is negative, which is consistent with the predictions of hypothesis H_0^s, but the p-value of the coefficient is .3002. It is possible that the equity portion of the average unit is not sufficient to induce a hostile reception by the market. Hence, the issue size would not affect the market's view of the offering. Subsection 5.3.1.6 reviews whether equity portion-related variables are associated with abnormal returns.

5.3.1.4 *Agency Costs*

In Chapter 3 it was suggested that units have properties that make them potentially useful in mitigating the issuer's agency costs of debt. Four debt agency cost proxy variables were specified to test the hypothesis that the issuer's abnormal returns should be positively related to the agency factor. Generally, the findings suggest that the agency status of the issuer is not associated with abnormal returns, and the results even more strongly suggest that units are ineffective vehicles for alleviating debt agency problems.

The variable DAGENCY1 is designed to measure growth-promoting costs, advertising expenses and research and development expenses, scaled by total assets. The hypothesis that this proxy for a firm's debt agency problem is positively related to announcement period abnormal returns to unit issuers is rejected. The regression coefficient is statistically insignificant. Another variable that might serve to gauge the firm's debt agency situation is the level of intangible assets divided by total assets. Like DAGENCY1, DAGENCY2 is associated with the likelihood of the firm encountering the underinvestment problem, as described by Myers [1977]. It is the presence of risky debt that is crucial to Myers' argument. DAGENCY2 describes the proportion of assets that cannot serve as collateral to secure debt. Table 5.12 reveals that the market apparently does not view units as a solution to this aspect of the debt agency problem. The coefficient on DAGENCY2 is statistically insignificant.

Though DAGENCY2 deals with book measures of intangible assets, DAGENCY3 incorporates the market's current view of the value of intangible assets and future growth opportunities. DAGENCY3 is the issuer's pre-offering common stock market-to-book value, and again the results are not as expected. The regression coefficient is marginally significant (p-value = .0693) in the simple regression, but the sign is negative. The more useful multivariate analysis reveals that DAGENCY3 is insignificant, again rejecting the hypothesis that units alleviate debt agency costs. A similar result is obtained when the dividend, scaled by total assets (DAGENCY4), is used as a regressor. The coefficient is statistically insignificant.

In summary, the attempt to explain unit abnormal returns using a debt agency cost hypothesis is largely unsuccessful. Only one of the four proxy variables is positively related to abnormal returns, and insignificantly so. It is possible that, with a sample size of only 38 unit issuances, the insignificant coefficients can be attributed in part to the small number of

Table 5.12: Results of Cross-sectional Regressions of Announcement Period Abnormal Returns for Unit Issuers.

Regressor Variable[a]				Model
Name	Parameter Estimate	t	p	
INTERCEPT	0.0838	0.126	.9007	$\bar{R}^2$: .0376
SCRIP	-2.1215	-1.490	.1467	n: 31
INTERCEPT	0.5055	0.599	.5536	$\bar{R}^2$: .0229
ISSIZE	-4.0854	-1.304	.2023	n: 36
INTERCEPT	-2.2209	-7.059	.0001	$\bar{R}^2$: -.0038
DAGENCY1	0.3731	0.813	.4185	n: 31
INTERCEPT	-0.1210	-0.092	.9275	$\bar{R}^2$: -.0322
DAGENCY2	-0.4862	-0.183	.8557	n: 31
INTERCEPT	1.7459	1.435	.1621	$\bar{R}^2$: .0786
DAGENCY3	-1.4536	-1.887	.0693	n: 30
INTERCEPT	0.2772	0.376	.7098	$\bar{R}^2$: .0197
DAGENCY4	-143.1441	-1.266	.2157	n: 30
INTERCEPT	-0.6011	-0.530	.5993	$\bar{R}^2$: -.0420
DEBTRFND	0.6221	0.452	.6543	F: .254
EXPANSN	-0.4062	-0.230	.8195	p: .7770
				n: 37
INTERCEPT	2.3303	0.774	.4484	$\bar{R}^2$: -.0328
ISSIZE	-7.4953	-1.065	.3002	F: .901
DEBTRFND	1.7818	0.986	.3364	p: .5431
EXPANSN	1.1144	0.461	.6500	n: 28
SCRIP	-2.0567	-1.104	.2833	
JUL82OID	-0.1231	-0.071	.9439	
DAGENCY1	-0.3451	-0.205	.8394	
DAGENCY2	0.9966	0.256	.8004	
DAGENCY3	-1.1479	-1.059	.3029	
DAGENCY4	-190.1676	-1.311	.2056	

[a]The dependent variable in all cases is the issuer's two-day announcement period abnormal return.

degrees of freedom. Also, since agency costs are not directly measurable, the agency proxy variables might not be appropriately measuring the issuer's debt agency problem.

5.3.1.5 Reason for Issuance

For the regression in which the two-day abnormal return is regressed on dummy variables reflecting the expected use of proceeds of a unit offering, results confirm the findings of the data stratification in subsection 5.2.1.3. Hypothesis H_0^8 predicts a more unfavorable market response to an issuance of units for reasons other than debt refinancing. The regression reveals no significant influence by the stated reason for offering on abnormal returns. This finding corroborates evidence from subsection 5.2, which contains the conclusions of separate event studies of unit issuers, according to the use of the issue proceeds. In both cases, the results indicate an insignificant market response.

5.3.1.6 Other Explanatory Factors

As discussed in Chapter 4, units posses, on average, a smaller potential equity component than convertible bonds. One possible reason that the average unit issuer exhibits statistically insignificant abnormal returns when announcing a pending offering is that the equity portion of a unit is too small to provoke a *perceptible*, negative market reaction. Still, this is not to say that the market welcomes the equity component. Perhaps those units with significant equity portions are associated with negative abnormal returns, but those negative returns are lost in the averaging process. Consistent with this idea, several equity-related variables are introduced, some of which proxy for the likelihood that warrant exercise will occur. These factors are:

1. Potential Equity = Number of Warrants Per Unit x Warrant Exercise Price

Tables 4.2 and 4.4 give summary statistics for the potential equity within the average unit. The hypothesis is that potential equity and abnormal returns are negatively related. The potential equity variable given above is in terms of a single unit. In order to provide a scaled measure, "Potential Equity" is multiplied by the number of units in the issue, and the result is divided by the pre-issuance market value of the issuer's common stock.

2. $$\text{Exercise Premium} = 1 - \frac{\text{Warrant Exercise Price}}{\text{Stock Price}}$$

From option pricing theory, the probability of exercise of a call option or warrant occurring is negatively related to the price of the firm's stock minus the contractual warrant exercise price. *Ceteris paribus*, a larger exercise premium decreases the likelihood that the unit will ultimately become equity, and should increase the issuer's announcement period abnormal stock return. The variable above is scaled by multiplying it by the dollar amount of the unit offering and dividing by the market value of the issuer's common stock.

3. $$\text{Relative Warrant Life} = \frac{\text{Warrant Time to Expiration (Years)}}{\text{Bond Maturity (Years)}}$$

The value of the warrant is positively related to the amount of time remaining before it expires. The value of the equity component of a unit, then, should be a function of the number of years in the life of the warrant relative to the life of the debt portion. It is hypothesized that the abnormal return for unit issuers is negatively related to the

"Relative Warrant Life" variable, since the factor is positively associated with the unit's equity.

Results

Unit issuer announcement period abnormal returns are regressed on the three variables discussed above, individually and collectively. The results are not consistent with abnormal returns being influenced by the amount of equity within a security. It is unlikely that this is due to the fact that *no unit* possesses a significant potential equity component, because several issues have potential equity values of $1,000 per unit, and others contain warrants that have 10-year lives.

It is possible that market participants do not concern themselves with the relative debt/equity proportions in a unit. Rather, it may be that the stock price reaction is largely a function of *whether* an issue is a unit versus another type of security. Evidence to support this is given by Mikkelson and Partch [1986], who find in their cross-sectional results that the strongest influence on the issuer's stock price is the *type* of security offered. The dissertation's findings are consistent with the idea that the market considers units to be in the straight debt category, with an insignificant equity component.

5.3.2 Convertible Bond Offerings

It has been established that units and convertibles (as issued) are different in many respects. However, the financial "building blocks" (debt and warrants) are the same for the two capital types. There is a significant amount of literature suggesting that units and convertibles may be used for similar purposes, such as agency cost reduction. For pur-

Table 5.13 Results of Cross-sectional Regressions of Announcement Period Abnormal Returns for Convertible Debt Issuers

Regressor Variable[a]				Model
Name	Parameter Estimate	t	p	
INTERCEPT	-2.3793	-4.691	.0001	$\bar{R}^2$: -.0042
ISSIZE	2.7585	0.791	.4313	n: 92
INTERCEPT	-2.2209	-7.059	.0001	$\bar{R}^2$: -.0038
DAGENCY1	0.3731	0.813	.4185	n: 90
INTERCEPT	-1.1989	-1.449	.1508	$\bar{R}^2$: .0069
DAGENCY2	-1.8408	-1.276	.2054	n: 89
INTERCEPT	-1.9090	-5.361	.0001	$\bar{R}^2$: -.0057
DAGENCY3	-0.04466	-0.696	.4881	n: 91
INTERCEPT	-2.6634	-5.569	.0001	$\bar{R}^2$: .0214
DAGENCY4	52.0407	1.728	.0874	n: 91
INTERCEPT	-2.7132	-2.760	.0071	$\bar{R}^2$: .0653
ISSIZE	8.8621	2.145	.0349	F: 2.215
DAGENCY1	0.1897	0.219	.8269	p: .0599
DAGENCY2	-2.6564	-1.765	.0814	n: 87
DAGENCY3	-0.0607	-0.828	.4103	
DAGENCY4	91.1510	2.731	.0077	

[a]The dependent variable in all cases is the issuer's two-day announcement period abnormal return.

poses of comparison with the cross-sectional results of unit issuers in the previous subsection, findings for convertible issuers are presented below.

5.3.2.1 Issue Size

The variable measuring the scaled size of the offering (ISSIZE) is the dollar amount of the issue divided by the market value of the firm's common stock. The expectation is that the ISSIZE factor should be negatively related to abnormal returns, given evidence provided elsewhere (e.g., Eckbo [1986], Mikkelson and Partch [1986]). Nonetheless, Table 5.13 shows that, in the present study, the coefficient on the ISSIZE variable is positive and insignificant. It is unclear why this surprising finding is obtained. Perhaps the result is sample-specific. For example, Mikkelson and Partch's sample of 25 convertible offerings is taken from 1972-1982. Data for the present study go through 1986. Perhaps convertible issuances made before 1983 contain a larger equity component, on average, resulting in a more negative market reaction. Unfortunately, there exists no generally accepted method of accurately decomposing the debt/equity mix within a convertible bond.

5.3.2.2 Agency Costs

The proxies designed to measure debt agency costs do not explain convertible issuers' abnormal returns with much more effectiveness than they do for unit issuers. The regression coefficients on DAGENCY1 and DAGENCY3 are insignificant, with the DAGENCY2 variable being only marginally significant. The coefficient of DAGENCY2 is negative. These results oppose the hypothesis that the market views convertibles as a solution to debt agency costs. Another possible conclusion is that the variables specified do not accurately

reflect a firm's agency problems; that is, DAGENCY1, DAGENCY2 and DAGENCY3 may be poor proxies. However, previous research lends credence to the view that these are appropriate proxy variables. The coefficient on the final explanatory agency variable, DAGENCY4, is highly significant in the multiple regression, with the expected (positive) sign. Thus, the higher is the dividend as a percentage of assets, the higher is the convertible issuer's announcement period abnormal return. Though this conclusion is consistent with convertible debt being helpful in mitigating debt agency costs, the variable DAGENCY4 also might be a proxy for the level of equity agency costs. The dividend amount can be viewed as being negatively related to agency costs of equity. A way to control managerial exploitation of stockholders is for the firm to pay a large dividend. This is a curious result if one puts aside the agency argument. It is improbable that current stockholders should be pleased to share the dividend with potential equityholders in the future, particularly if the current payout is a large one. However, if the dividend size is viewed as an agency problem, and convertibles as a possible solution, the positive coefficient makes sense. Still, the significance of this single variable is but scant evidence in support of the agency cost reduction hypothesis.

5.4 Analysis of the Choice Among Security Types

In Chapter 3, fourteen factors are hypothesized to be useful in describing the choice that capital-raising firms make before issuing securities. The subsections that follow present the results of univariate and multivariate tests of the hypotheses specified.

5.4.1 *Univariate Analysis*

Differences between the average magnitudes of variables for unit offerers and the issuers of other securities are evaluated using *t*-tests. Table 5.14 reveals that, for seven of the 14 factors, levels for unit issuers are found to be insignificantly different from those of firms floating convertibles, straight debt, or common stock. The required statistical significance benchmark is $\alpha = .05$.

The variable DEV2 measures a firm's short-term debt relative to total debt. It is in deviation-from-target form, with the average for the 10 preceding years proxying for the target amount. A negative value for the factor means that the current short-term debt is a greater-than-target fraction of total debt. Unit issuers have larger negative deviations than do common stock and straight debt issuers.

Tests on the variable LASSETS indicate that unit and common stock issuers are of approximately equal size, on average. However, firms offering convertibles and straight debt are significantly larger than unit issuers.

Firms floating common stock and straight debt have significantly lower levels of financial risk, as measured by the BANKRPTCY variable, than do unit issuers. Issuers of units also appear to be riskier where operating risk is concerned, with straight debt and convertible offerers being significantly safer firms in this regard.

Table 5.14 Results of Univariate Tests for Factors Used in the Logit Analysis

Variable	Mean for Unit Issuer	Relationship (.05 level)	Mean for Issuer of ...	Security
DEV1	-.0862	=	-.2747	Straight Debt
		=	-.0924	Convertible
		=	-.0034	Common Stock
DEV2	-.0874	≠	.0039	Common Stock
		≠	.0399	Straight Debt
		=	.0781	Convertible
LASSETS	5.5798	=	6.0486	Common Stock
		≠	6.5015	Convertible
		≠	7.4684	Straight Debt
BANKRPTCY	-1.6869	≠	-2.6394	Common Stock
		≠	-2.6090	Straight Debt
		=	-2.3408	Convertible
OPRISK	.0719	≠	.0322	Straight Debt
		≠	.0395	Convertible
		=	.0464	Common Stock
D	2212.1	=	1977.3	Common Stock
		=	1963.0	Straight Debt
		=	2071.1	Convertible
E	746.88	≠	646.40	Straight Debt
		≠	671.72	Common Stock
		=	770.71	Convertible
RESIDUAL	-0.138	=	-.0113	Common Stock
		=	.0065	Convertible
		=	.0109	Straight Debt
DAGENCY1	.2486	=	.1987	Common Stock
		=	.2378	Straight Debt
		=	.2704	Convertible
DAGENCY2	.4672	=	.4476	Straight Debt
		=	.5020	Common Stock
		=	.5126	Convertible
DAGENCY3	1.4751	=	1.3132	Straight Debt
		≠	2.0290	Common Stock
		≠	2.5161	Convertible
DAGENCY4	.0039	≠	.0129	Convertible
		≠	.0143	Common Stock
		≠	.0193	Straight Debt
EFFTAXRT	.5240	=	.4473	Straight Debt
		=	.4742	Common Stock
		=	.9973	Convertible
NONDSHLD	.2632	=	.2012	Common Stock
		=	.2439	Straight Debt
		=	.2654	Convertible

As will be discussed later, the level of predicted debt market offerings helps to explain the choice between issuing units and straight debt. However, the predicted amounts are not significantly different around offerings of the four types of securities, as judged at the 5 percent significance level. Values for predicted equity market issuances around securities offerings vary a great deal between unit issuances and common stock offerings, as well as between units and straight debt. Units are issued primarily when this factor indicates that the equity market is at an "unusually" high level.

Finally, levels of two debt agency cost proxy variables are significantly different between unit issuers and common stock issuers, and between unit issuers and straight debt issuers. The DAGENCY3 factor, measuring market-to-book value, is lower for offerers of units than for firms floating straight debt or common stock. The DAGENCY4 variable, the company's scaled dividend, is lower for unit issuers than for issuers of the other three forms of capital. This is not surprising, given that about half of unit issuers pay no dividends. Re-running the tests with non-dividend-paying unit offerers omitted results in a similar conclusion of inequality for the DAGENCY4 factor. Thus, even those unit issuers that pay dividends tend to pay them at low levels.

5.4.2 Logistic Regression Analysis

The logistic regression (logit) study contains four separate sub-analyses. The first model incorporates all of the four possible types of security issues in the firm's opportunity set. The next three models analyze the pairwise choice between issuing units versus the other three security types, in turn. The value of a four-way comparison is that all four of the

Table 5.15 Results of Four-way Logistic Regression

Variable	β	χ^2	p	*VIF*
α_1	3.7470	16.44	.0001	0
α_2	3.1047	11.44	.0007	0
α_3	2.0483	5.07	.0243	0
DEV1	0.2799	3.45	.0631	1.1484
DEV2	-2.7031	8.66	.0033	1.1710
LASSETS	-0.5246	32.99	.0000	1.5412
BANKRPTCY	0.1163	3.30	.0694	1.3528
OPRISK	-2.6113	.09	.3291	1.3273
D	0.0001	0.39	.5318	1.1100
E	0.0004	0.52	.4698	1.0853
RESIDUAL	-1.5935	2.28	.1307	1.0981
DAGENCY1	-0.2448	0.67	.4132	1.3413
DAGENCY2	0.3649	0.43	.5129	1.3475
DAGENCY3	0.2721	12.30	.0005	1.2314
DAGENCY4	-0.5257	0.00	.9548	1.2557
EFFTAXRT	0.0339	0.52	.4709	1.2795
NONDSHLD	-0.5903	1.99	.1584	1.1506
Model χ^2	78.52			
p-value	.0000			
Computed R^2	.0576			

securities are considered simultaneously, a condition that is more realistic than a pairwise analysis. However, regression coefficients in the four-way analysis cannot be easily interpreted in terms of the effect single variable on the predicted probability of the issuance of a given type of security. The pairwise analysis provides a structure that facilitates interpretation of the regression parameters. The drawback to the pairwise structure, though, is that two types of security offerings are omitted (and information is lost) from the analysis. It is typical in logit studies to use a holdout sample to document the tested model's predictive capabilities. However, the small number of unit offerings available does not afford this opportunity to the present study.

5.4.2.1 Four-way Logit Model: Straight Debt vs. Units vs. Convertibles vs. Common Stock

The four-way model is set up so the associated hypotheses could be easily evaluated. The most debt-like security, straight debt, is assigned a value of "0," units are represented by "1," and convertible debt, an even more equity-like category of securities, is given a value of "2." At the far end of the debt-equity continuum, common stock is assigned the number "3." Since the order of the continuum given in subsection 3.4.2.1 is preserved in setting up this model, interpretation of the resulting regression coefficients is facilitated in light of the hypotheses. For example, a negative logit model variable coefficient indicates that, *ceteris paribus*, an increase in the value of the individual factor is associated with a decrease in the probability of the issuance of an equity-like security versus a more debt-like security.

As can be seen in Table 5.15, four factors in the model are statistically significant. The deviation of the short-term capital structure from the target (measured as target minus

current) is significant. A negative coefficient suggests that when the current proportion of short-term debt is below the target amount, a firm is more likely to issue a debt-like security instead of one that is equity-like. This is a counter-intuitive result,because it indicates that firms that have a greater proportion of long-term debt than the target would dictate are prone to issue even more long-term debt. One might suspect, however, that the finding is explained by the relative proximity of units and convertibles in the continuum on which the model is based. Units are generally of shorter maturity than convertibles, so a negative coefficient means that firms that have short-term debt that is below the target level would issue the shorter-lived instrument. The pairwise results for the unit versus convertible case provide confirmation of this hypothesis.

Table 5.15 shows that firm size, as measured by the log of total assets, is significantly and negatively related to the probability of issuing an equity-like security. Hence, larger firms apparently are pre-disposed to issuing debt instruments. Perhaps this is because a large asset base can be only partially liquidated if operating cash flows are not sufficient to meet debt service payments. The positive and marginally significant coefficient on the variable measuring bankruptcy risk indicates that firms for which the probability of default is greatest tend to gravitate toward the issuance of a more equity-like security. Strangely, the variable is not close to being significant in any of the three pairwise tests, but it may be influenced in the four-way framework by the relative positioning of straight debt and convertibles. Billingsley, Lamy, and Thompson [1988] find that bankruptcy risk is positively related to the probability of a firm offering a convertible rather than straight debt.

The final significant factor is DAGENCY3, the only agency-related variable that appears to be significant in describing the security issuer's choice. Recall that DAGENCY3 is the issuer's market-to-book ratio, and that it is presented as a proxy for the market's view of

the future growth opportunities possessed by the firm. This factor is positively related to the probability of an equity-like security being issued, possibly indicating that when debt agency costs are high, firms tend to avoid issuing debt. However, the market model residual is designed to more directly gauge recent price performance, and its coefficient is insignificant (and signed negatively). Variance inflation factors presented in Table 5.15 indicate that neither variable suffers from a multicollinearity problem, so they apparently are not proxies for the same economic phenomena.

5.4.2.2 *Pairwise Logit Models*

Three pairwise analyses are conducted, featuring units versus straight debt, convertibles, and common stock, respectively. Table 5.16 gives the results. The model specified significantly explains the choice among security types in all three cases, as judged by the model χ^2s. Note that the model χ^2 is highest for the unit versus straight debt case, as is the effective R^2. This suggests that the model is best able to differentiate between issuers of these two securities.

Further results from Table 5.15 show that the deviation-from-target variables are both important in the convertible versus unit comparison, with negative signs. This means that the greater is the excess of the current debt-to-equity ratio over the target, the greater is the probability of a firm issuing convertibles, a more equity-like security than units. The coefficient on the second deviation measure shows that the greater is the positive deviation from the target short term debt-to-total debt ratio, the more likely is a convertible rather than a unit issuance. This stands to reason, because convertibles average a longer maturity than units. The coefficient in the common stock versus unit comparison indicates that

Table 5.16 Results of Pairwise Logistic Regressions

	STD = 0, UDW = 1			CONV = 0, UDW = 1			CS = 0, UDW = 1		
Variable	β	χ^2	p	β	χ^2	p	β	χ^2	p
α_1	3.9583	3.04	.0812	4.5126	3.08	.0795	-0.8723	0.20	.6583
DEV1	0.7122	2.24	.1345	-0.2110	3.78	.0520	-0.0538	0.29	.5886
DEV2	-4.2068	1.78	.1822	-5.4759	4.76	.0292	4.3016	4.78	.0287
LASSETS	-1.0531	12.57	.0004	-0.6144	5.33	.0210	-0.0269	0.02	.8996
BANKRPTCY	0.2631	1.37	.2410	-0.0622	0.16	.6912	-0.1088	0.58	.4464
OPRISK	16.3276	3.97	.0464	18.3033	4.18	.0410	8.8162	2.98	.0842
D	0.0013	12.45	.0004	0.0003	0.92	.3374	0.0002	0.35	.5567
E	0.0019	1.74	.1868	0.0010	0.40	.5254	0.0027	4.50	.0340
RESIDUAL	-0.0116	0.00	.9962	1.2595	0.44	.5058	3.1965	1.41	.2350
DAGENCY1	-0.1491	0.05	.8159	0.6193	1.03	.3095	0.3819	0.47	.4911
DAGENCY2	-1.9633	1.24	.2654	-0.8574	0.34	.5624	-0.5896	0.25	.6177
DAGENCY3	0.3537	0.41	.5237	-1.0998	8.47	.0036	-1.2800	9.34	.0022
DAGENCY4	-159.9242	14.07	.0002	-136.3482	11.47	.0007	-139.7323	11.57	.0007
EFFTAXRT	.0036	0.00	.9963	-0.0724	0.22	.6355	0.3854	0.63	.4288
NONDSHLD	-0.0907	0.00	.9628	-0.1771	0.03	.8725	1.1437	2.23	.1354
Model χ^2	104.24			61.62			60.54		
p-value	.0000			.0000			.0000		
Computed R^2	.4108			.2256			.1892		
Upper-bound R^2	.7660			.5938			.5581		
Effective R^2	.5364			.3799			.3391		

the larger is the deviation from the short term-to-total debt target ratio, the greater is the probability of a unit issuance rather than a common stock offering.

The factor measuring firm size shows that smaller firms tend to gravitate toward offering units rather than convertibles or straight debt. However, the coefficient is insignificant in the equity versus units comparison. Operating risk, though, is a significant determinant of security choice in all three analyses. In every case, firms with lower levels of operating risk choose to issue securities other than units. This brings up the possibility that units are viewed by the market as a security offered by weak firms. Still, the event study results do not support such a signalling hypothesis.

Results concerning the market forecasting factors show statistical significance for the debt market forecast in the unit versus straight debt case. As the level of predicted debt issuances rises, the probability of issuing a unit increases. In the units versus equity analysis, the equity market forecast variable is interpreted in a similar manner. When the number of equity market issuances is high, firms tend to offer units rather than common stock. It is possible that, *ceteris paribus*, the financial markets may not care to absorb units at other times. This might be considered as additional evidence that units are, in some sense, "inferior" securities. Finnerty [1986] quotes investment bankers as saying that the warrant portion of a unit is present largely in order to make a low-quality debt offering more palatable to the market. It could be that issuers of units have difficulty obtaining external funds except when the capital market outlook is particularly favorable.

Two of the debt agency cost proxy variables, DAGENCY3 and DAGENCY4, are significant. The latter has a negative sign in all three comparisons, indicating that higher-dividend-paying firms do not tend to issue units instead of either of the other three forms

Table 5.17 Elasticity Coefficients for Pairwise Logistic Regressions

Variable	STD = 0 UDW = 1	CONV = 0 UDW = 1	CS = 0 UDW = 1
DEV1	-0.0415	0.0087	0.0006
DEV2	-0.0566	-0.2058	0.0532
LASSETS	-1.8942	-1.7446	-0.0689
BANKRPTCY	-0.1606	0.0601	0.1109
OPRISK	0.1786	0.4346	0.2059
D	0.7072	0.3011	0.1488
E	0.3394	0.3352	0.8129
RESIDUAL	-0.0000	-0.0053	-0.0166
DAGENCY1	-0.0092	0.0749	0.0353
DAGENCY2	-0.2289	-0.1959	-0.1255
DAGENCY3	0.1235	-1.0796	-1.0335
DAGENCY4	-0.6308	-0.5994	-0.6797
EFFTAXRT	0.0004	-0.0274	0.0816
NONDSHLD	-0.0058	-0.0274	0.1087

of capital. DAGENCY3, the market-to-book ratio, is not important in the straight debt versus units case. However, the coefficient is negative and significant for the other two comparisons, meaning that issuers for which the market adds the greatest premium over the book value are likely to avoid units and choose to offer convertibles or common stock instead.

Table 5.17 reports the elasticities for the logit model explanatory variables. These values facilitate the interpretation of regression results. Several of the signs of the elasticities differ from those of the underlying logit coefficients. This is because the elasticities are scaled with respect to the mean of the underlying variables, the sign of which is negative in some cases.

Chapter 6

Summary and Conclusions

This chapter summarizes the contribution that the dissertation makes to the literature in finance. The conclusions are given in list form, with supporting discussion following each point. Limitations of the analysis also are discussed.

1.) Units are not structured as synthetic convertible debt.

Finnerty [1986] demonstrates that a synthetic convertible bond can be created by combining a straight bond with common stock purchase warrants. An important component of his illustration is that the warrants must be exercised through the surrender of the security's debt portion. About eighty percent of warrants in this study's sample do allow for extinguishment of the debt in such a manner, but cash is also permissible as scrip in 100 percent of the cases. For those units that permit debt and/or cash to be used, the debt portion of the security is usually much larger (about 50 percent) than is necessary to exercise all of the warrants. Conversely, with convertible debt the bond is fully extinguished

when conversion occurs. In all cases, the warrants within a unit are separable from the debt portion, and often trade in different markets.

In a convertible bond, conversion typically is allowed until the maturity date of the security. Despite the fact that the debt component of the average unit has a life of over 10 years, the warrant portion is usually exercisable for only half that long. As will be discussed further below, this fact contributes to units' relatively small debt component.

Though one of the initial goals of the study was to assess whether the issuance of synthetic convertible debt is a superior strategy to offering conventional convertible bonds, it is virtually impossible to determine this by examining units. Though the two securities possess obvious similarities, the terms do not mirror each other precisely enough to allow one to draw conclusions about units as synthetic convertibles. While it is unclear whether units are *intended* by firms to be issued as synthetic convertible debt, it is apparent that the two types of offerings differ in a number of significant ways. As noted in conclusion 5 below, unit offerers are riskier and smaller, on average, than issuers of other forms of debt. Also, logistic regression results suggest that units are floated primarily when predicted future activity in the financial markets is high. The indicates that the market may not care to absorb units when the outlook for market activity is relatively "pessimistic."

2.) Units are a "penalty-free" equity issuance, but the level of equity within the average unit is relatively small.

The finance literature is replete with information about the valuation consequences of managers taking various actions. This study fills one of the outstanding gaps pertaining to securities issuances, by providing the first evidence concerning the reaction of a firm's common stock to the decision to issue units of debt with warrants. For a sample of 39 unit

offerings made between 1971 and 1986, the net market response to such an event is statistically insignificant. This conclusion holds for the period around the announcement of a plan to offer (-.33 percent average abnormal return) as well as the time around the actual issuance (+.48 percent average abnormal return). The market's reaction to a unit's issuance is significantly less hostile than the response to a convertible debt or a common stock offering, and about the same as that associated with the flotation of straight debt. Thus, despite the presence of an equity component in units, the market apparently views the securities to be more like straight debt than like convertible bonds.

All evidence offered to date reveals that the financial market is averse to the issuance of equity in any form. Units appear to be a notable exception to this general market preference. As presented in Chapter 4, the potential equity within the typical unit is significant, averaging over half of the total unit amount. Still, the word "potential" is important, because the probability that a unit's warrants will ever be exercised appears to be lower than the probability that the average convertible will be converted. For example, the issuance day mean warrant premium in this study's sample is about 50 percent higher for units than is the conversion premium for the typical convertible. Also, the short life of unit warrants leaves comparatively little time for the issuer's common stock to rise above the exercise price. This evidence suggests that the *actual* equity component is far smaller than the potential equity measure might indicate, because the probability of exercise is slight. Also, the fact that cash may be used as scrip further reduces the value of the equity portion relative to the debt component of a unit. If a warrant is exercised with cash, the debt portion of a unit remains outstanding. The proportion of equity versus debt is lower than the case if debt had been used as scrip.

The preceding observations imply that there may simply not be enough equity within the average unit for the market's reaction to be perceptible. That is, perhaps there is some critical portion of equity (in absolute terms, or relative to the issuer's capital structure mix), above which the market's reaction is discernibly negative. For equity amounts below the critical level, the market's reaction would suggest that straight debt has been issued. Units may be in the class of securities whose equity component falls below this critical value.

3.) Units, as judged by four proxy measures, are not viewed by the market as playing a major role in reducing agency costs of debt. Furthermore, convertibles also do not appear to mitigate agency problems.

There are numerous references in the finance literature extolling convertibles and warrants as vehicles by which agency costs of debt may be alleviated. This dissertation hypothesizes that convertibles are superior to units in this regard, because the convertible holder generally has the ability to obtain a greater portion of equity than does the unitholder. Four agency cost proxy variables are used to evaluate the firm's announcement period abnormal returns. The factors are designed to reflect two facets of the agency problem: underinvestment by stockholders in positive net present value projects (Myers [1977]), and the payment of "excessive" common stock dividends (Black [1976]).

Evidence from cross-sectional regressions indicates that units are apparently not employed to reduce debt agency costs. Similar results are obtained for convertibles. Only the regression coefficient on the variable measuring the issuer's scaled dividend payment (DAGENCY4) reflects a relationship, and one of only marginal significance. Also, the dividend variable possibly is picking up equity agency effects as well as debt agency costs. The results could reflect the difficulty encountered in developing appropriate proxy vari-

ables to measure all facets and sources of a firm's debt agency problem. Hence, it is not clear whether convertibles are more effective at mitigating agency problems than are units, because of the lack of evidence suggesting that *either* security plays such a role in practice.

4.) The market seems to look favorably upon the original issue discount associated with units.

The original issue discount (OID), associated with units and some other debt offerings, allows the issuer to amortize this amount over the life of the security. This amortization provides a tax shield for the issuer's income. The presence of the OID is an important element in Finnerty's [1986] argument that synthetic convertibles may be superior to conventional convertible bonds. As per Finnerty's conjecture, this study finds that the market rewards firms that issue units carrying an original issue discount. The issuer's offering period abnormal return is regressed on the level of the OID as well as a dummy variable (JUL82OID) controlling for the tax regime. The OID variable is the only one, in a cross-sectional analysis of abnormal returns, that appears to influence the direction or severity of the market response to a unit offering.

5.) Units are issued by smaller and riskier firms than are convertible bonds or straight debt.

Finnerty proposes that one reason why units are issued far less frequently than convertibles is that the former security usually is offered by smaller, riskier firms than is the latter. Thus, units are associated with less "desirable" companies than convertibles are, and for a healthy firm to issue a unit would be to send the market a negative signal.

The present study finds in a descriptive univariate analysis that firms offering units are smaller than straight debt or convertible issuers. Furthermore, unit issuers have higher

levels of operating risk, on average, than do offerers of any of the other three security types. A logit study shows that both of the aforementioned factors are important in describing the choice between issuing units, straight debt, convertibles, and common stock. Other significant factors are the deviation from target capital structure, conditions in the debt and equity markets, and the level of the issuer's dividend.

6.) Dann and Mikkelson [1984] hypothesize that significant negative abnormal returns around convertible issuances are associated with the revelation of new information about the terms of the offering. This hypothesis is rejected.

Dann and Mikkelson's observation that convertible offerers' issuance period returns are significantly less than zero has defied explanation thus far. Though Eckbo [1986] and the present study confirm Dann and Mikkelson's conclusion using cleaner[87], more comprehensive data, no convincing hypothesis is advanced to explain the results. Still, it is useful to evaluate Dann and Mikkelson's conjecture to determine whether rejection is appropriate. Their postulate is that the terms of convertible bond issues (e.g., the conversion price) are not set by the issuer until shortly before the offering goes to market. Thus, the market's reaction is a result of the surprise associated with the revelation of the specific terms. Since the number of warrants and the exercise price typically are not revealed by the unit issuer until the offering date, it is logical to expect that abnormal returns should be comparable to those observed for convertible issuers. However, this is not the case, as unit issuer offering period average abnormal returns are not different from zero. There is no reason to believe that the surprise that comes from setting the terms of units should be less

[87] The present study excludes all offerings of financial firms and public utilities, which are not "poolable" with industrials.

pleasant than that associated with the revelation of convertible terms. Thus, Dann and Mikkelson's explanation is probably incorrect.

In summary, this dissertation provides evidence that, although units may be structured as synthetic convertibles, they are not issued as such in practice. However, the non-negative abnormal returns associated with unit issuances should appeal to managers who are seeking a source of capital. There exist no other documented cases of firms making equity or equity-linked offerings and being unpenalized, on average, by the market. It is unclear why units are floated so infrequently, but these results suggest that firms raising capital should consider issuing units.

Appendix A

Unit Offerings, 1970-1988

	Date of Issue	*Amount of Issue*	*Issuing Firm*
1970			
	3/25	$12,500,000	U.S. FINANCIAL OVERSEAS, N.V.
	4/13	$1,569,327,000	AMERICAN TELEPHONE & TELEGRAPH COMPANY[68]
	6/10	$30,000,000	HOLIDAY INNS, INC[69]
	7/30	$40,000,000	NORTHERN NATURAL GAS COMPANY[70]
	9/22	$15,000,000	IOWA BEEF PROCESSORS, INC.
	10/7	$10,000,000	ASSOCIATED MORTGAGE INVESTORS
	12/9	$20,000,000	EQUITY FUNDING CORPORATION OF AMERICA
	12/15	$2,000,000	STARR BROADCASTING GROUP
1971			
	3/23	$150,000,000	AMERADA HESS CORPORATION[71]
	5/11	$1,500,000	ACETO CHEMICAL COMPANY, INC.
	5/11	$90,000,000	CHRYSLER FINANCIAL CORPORATION

[68] Rights offering.

[69] Concurrent common stock offering.

[70] Warrants are exercisable into 20 shares of Mobil Oil Corp. common stock.

[71] Warrants are exercisable into 6 shares of Louisiana Land & Exploration Company common stock.

	5/12	$5,500,000	DENVER REAL ESTATE INVESTMENT ASSOC.
	5/13	$30,000,000	WHITTAKER CORPORATION[72]
	6/14	$2,800,000	INTERSYSTEMS, INC.
	6/24	$3,000,000	WOLVERINE INDUSTRIES
	7/15	$12,225,000	DIVERSIFIED INDUSTRIES, INC.
	7/8	$30,000,000	CARRIER CORPORATION
	7/21	$30,000,000	GUARDIAN MORTGAGE INVESTORS TRUST
	8/12	$50,000,000	CITY INVESTING COMPANY[73]
	8/28	$25,000,000	ZAYRE CORPORATION
	9/16	$25,000,000	MEDIAN MORTGAGE INVESTORS[74]
	9/23	$20,000,000	BARNETT MORTGAGE TRUST[75]
	10/13	$12,500,000	WORK WEAR CORPORATION
	10/26	$5,000,000	LING TEMCO VOUGHT (LTV) CORPORATION
	11/9	$25,000,000	TELEX CORPORATION[76]
1972			
	1/11	$20,000,000	BT MORTGAGE INVESTORS
	2/10	$20,000,000	ATICO MORTGAGE INVESTORS
	3/1	$30,000,000	COUSINS MORTGAGE AND EQUITY INVESTORS
	4/15	$25,000,000	LARWIN MORTGAGE INVESTORS
	6/22	$40,000,000	AMERADA HESS CAPITAL CORPORATION
	8/9	$75,000,000	B.F. GOODRICH COMPANY[77]
	10/03	$30,000,000	CITIZENS AND SOUTHERN REALTY INVESTMENT TRUST[78]
	10/25	$10,000,000	DOMINION MORTGAGE AND REALTY TRUST[79]
	11/16	$15,000,000	TEXAS INDUSTRIES, INC.
1973			
	1/19	$32,000,000	BUILDERS INVESTMENT GROUP[80]
	2/21	$20,000,000	JUSTICE MORTGAGE INVESTORS[81]
	4/12	$25,000,000	NJB PRIME INVESTORS[82]
1974			
	3/19	$20,000,000	KOGER PROPERTIES, INC.
	6/19	$1,400,000	BEEHIVE MEDICAL ELECTRONICS
	7/31	$5,200,000	TEXSTAR CORPORATION

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72 Units offered in exchange for convertible bond issue.

73 Warrants are exercisable into General Development Corporation common stock.

74 Now a subsidiary of FMI Financial.

75 Now a subsidiary of Barnett Banks.

76 Concurrent earnings announcement.

77 Concurrent preferred stock issue.

78 Warrants are exercisable after 10/15/77 until 11/15/77.

79 Now a subsidiary of Dominion Federal S&L.

80 Now Winn Enterprises.

81 Filed for bankruptcy, 1978.

82 Now a subsidiary of Prime Motor Inns.

1975			
	5/21	$4,000,000	WENDY'S INTERNATIONAL
	6/10	$5,000,000	MODERN MERCHANDISING
1976			
	11/23	$4,000,000	RELIABLE INVESTORS CORPORATION
	12/10	$25,000,000	GLADIEUX FOOD SERVICES
1978			
	9/28	$50,000,000	CHARTER COMPANY
1979			
	6/27	$10,000,000	VOLUNTEER CAPITAL CORPORATION[83]
	8/23	$75,000,000	RESORTS INTERNATIONAL (A)
	10/3	$90,000,000	TRANS WORLD CORPORATION
1980			
	2/26	$8,000,000	NEWBERY ENERGY CORPORATION[84]
	7/17	$30,000,000	KENAI CORPORATION
	8/14	$25,000,000	CAESARS WORLD
	10/24	$20,000,000	ACKERLY, INC.
	10/30	$35,000,000	BACHE GROUP, INC.
1981			
	2/10	$14,000,000	AMERICAN COMMUNICATIONS INDUSTRIES
	2/18	$6,000,000	NAVCO CORPORATION
	6/30	$20,000,000	UNIFI
	8/21	$20,000,000	NA-CHURS PLANT FOOD[85]
	9/17	$40,000,000	HANOVER PETROLEUM[86]
	10/2	$24,000,000	TEXAS GENERAL RESOURCES
1982			
	1/28	$40,000,000	SOUTHMARK PROPERTIES
	6/16	$23,000,000	NORTEK
	8/6	$38,000,000	NCNB
	9/22	$75,000,000	CABLEVISION SYSTEMS
	10/15	$50,000,000	ZENITH NATIONAL INSURANCE CORPORATION
	10/21	$40,000,000	OXOCO, INC.
	10/29	$40,000,000	PRIME CABLE CORPORATION
	11/2	$100,000,000	TYLER CORPORATION
	11/18	$50,000,000	KIDDE, INC.
	12/22	$125,000,000	TELE-COMMUNICATIONS, INC. (A)
1983			
	1/28	$18,000,000	PENRIL CORPORATION

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[83] Now a subsidiary of Winners Corporation.

[84] Warrants are exercisable into 20 shares of Ecotech Corporation (a wholly-owned subsidiary of Newbery) common stock.

[85] A subsidiary of Canwest Capital Corp.

[86] Warrants are exercisable into 46 shares of Supron Energy Corporation common stock.

2/2	$10,000,000	COMTECH TELECOMMUNICATIONS CORPORATION
2/9	$85,000,000	PETRO LEWIS CORPORATION
3/22	$60,000,000	GENERAL TIRE AND RUBBER CORPORATION
3/25	$60,000,000	KIDDE, INC.
4/14	$400,000,000	MGM/UA ENTERTAINMENT COMPANY
4/21	$10,000,000	JACOBSON STORES
4/25	$75,000,000	MDC CORPORATION
5/5	$100,000,000	PAN AMERICAN WORLD AIRWAYS
5/6	$75,000,000	FMI FINANCIAL[87]
5/12	$202,000,000	STORER COMMUNICATIONS, INC.
5/24	$17,500,000	ELECTRONIC MEMORIES AND MAGNETICS CORP.
6/28	$35,000,000	DIGICON, INC.
6/29	$65,000,000	BEKER INDUSTRIES
6/30	$250,000,000	GOLDEN NUGGET CORPORATION
7/12	$25,000,000	PIER1 IMPORTS
7/29	$1,000,000,000	MCI CORPORATION
8/9	$10,000,000	BUCKEYE FEDERAL SAVINGS AND LOAN
8/12	$30,000,000	FPA CORPORATION[88]
8/19	$75,000,000	MC LEAN INDUSTRIES[89]
8/30	$90,000,000	TRIANGLE INDUSTIRES
9/8	$40,000,000	INTERNATIONAL BANKNOTE
10/7	$33,000,000	INTERMARK, INC.[90]
10/27	$82,000,000	GROLIER, INC.
12/6	$32,500,000	ANGELES CORPORATION
12/14	$30,000,000	COLLINS FOODS INTERNATIONAL
12/16	$25,000,000	EQUITEC FINANCIAL
12/22	$30,000,000	U.S. PLAYING CARD CORPORATION

1984

1/21	$100,000,000	MINSTAR,INC.
1/27	$49,900,000	ORION PICTURES CORPORATION
3/14	$30,000,000	SPENDTHRIFT FARM
3/30	$75,000,000	MSA REALTY[91]
4/11	$25,000,000	WEBB (DEL E.) CORPORATION
4/12	$100,000,000	HARNISCHFEGER CORPORATION[92]
4/19	$30,000,000	NAUGLES CORPORATION
5/17	$10,000,000	ICN PHARMACEUTICALS
7/18	$25,000,000	ROONEY PACE GROUP, INC.
9/27	$130,000,000	PUBLIC SERVICE OF NEW HAMPSHIRE
9/20	$100,000,000	JOHN BLAIR CORPORATION
10/30	$70,000,000	CANNON GROUP
11/16	$15,000,000	GEOTHERMAL RESOURCES INTERNATIONAL
11/20	$40,000,000	TRITON ENERGY CORPORATION

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87 Concurrent earnings announcement.

88 Concurrent common stock offering.

89 Concurrent common stock offering.

90 Warrants are exercisable into 17 shares of Square D Company common stock.

91 Concurrent initial public offering of common stock.

92 Concurrent common stock and note issuances.

	12/4	$40,000,000	STORAGE EQUITIES
1985			
	1/7	$50,000,000	ARA MANUFACTURING COMPANY[93]
	1/25	$50,000,000	CRONUS INDUSTRIES
	2/12	$35,000,000	FACET ENTERPRISES
	4/4	$199,311,000	INTERNATIONAL HARVESTOR COMPANY[94]
	4/10	$75,000,000	MDC CORPORATION
	4/12	$50,000,000	U. S. HOME CORPORATION
	4/25	$30,000,000	GIANT PORTLAND MASONRY AND CEMENT COMPANY
	5/9	$12,000,000	CENTRUST SAVINGS BANK
	5/13	$93,500,000	INTEL CORPORATION
	6/19	$80,000,000	AMERICAN CAPITAL CORPORATION
	6/26	$50,000,000	ATLAS VAN LINES
	7/31	$40,000,000	POLYCAST TECHNOLOGY CORPORATION[95]
	9/20	$30,000,000	KOCH (R. N.), INC.[96]
	10/24	$45,000,000	WILSON SPORTING GOODS[97]
	10/25	$60,000,000	RYMER COMPANY
	11/26	$100,000,000	INTERNATIONAL HARVESTOR COMPANY
	12/17	$55,000,000	ALC COMMUNICATIONS
1986			
	1/16	$70,000,000	GULFSTREAM HOUSING CORPORATION[98]
	2/14	$500,000,000	FEDERAL NATIONAL MORTGAGE
	2/20	$34,000,000	SIMPLICITY MANUFACTURING, INC.
	3/9	$200,000,000	AMR CORPORATION
	3/19	$25,000,000	WESTBRIDGE CAPITAL CORPORATION
	7/17	$300,000,000	STUDENT LOAN MARKETING ASSOCIATION
	8/8	$45,000,000	NUTRI SYSTEM, INC.[99]
	11/12	$20,000,000	MICHAEL'S STORES, INC.
	11/26	$59,800,000	FORSTMANN & COMPANY
	12/10	$35,000,000	C. BREWER ACQUISITION, INC.[100]
	12/17	$30,000,000	PUBLICKER INDUSTRIES[101]
1987			
	5/21	$125,000,000	PST HOLDINGS
	5/21	$50,000,000	PST HOLDINGS
	5/27	$15,000,000	RULE INDUSTRIES

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[93] A subsidiary of Schick, Inc.

[94] Issue is a secondary offering.

[95] Now a subsidiary of Jesup and Lamont Holding Co.

[96] A subsidiary of ARTRA Group.

[97] Now a subsidiary of PepsiCo, Inc.

[98] Unit offering associated with acquisition.

[99] Concurrent tender offer by senior management.

[100] Warrants are exercisable into shares of Buyco, Inc.

[101] Market returns not available for announcement date.

	6/23	$75,000,000	EQUITABLE RESOURCES
	12/11	$150,000,000	SIX FLAGS CORPORATION[102]
	12/15	$108,700,000	SERVICE AMERICA CORP.[103]
1988			
	3/15	$55,000,000	SPRECKELS INDUSTRIES
	3/31	$160,000,000	BROOKE PARTNERS

[102] A subsidiary of Wesray Capital Corporation.

[103] A subsidiary of American Family Corporation.

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