PREFERRED STOCK FINANCING

by

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We accept this thesis as conforming
to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

24 April 1989

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This paper uses the multinomial logit model to investigate the corporate financing choice among bonds, preferred stock, and common stock. The empirical evidence suggests that firms issuing preferred stock are characterized by a number of financial attributes. Compared to firms that issue bonds, firms that issue preferred stock are smaller, less liquid, and riskier. Compared to firms that issue common stock, firms that issue preferred stock are bigger, less liquid, riskier, and having larger growth opportunities. In addition, the results suggest that an industry difference exists in the choice between common stock and preferred stock. Utilities tend to favor the use of the former.

The results also lend partial support to the financial distress hypothesis which holds that financially distressed firms are more likely to issue preferred stock. In addition, the empirical evidence is also consistent with the solution to adverse investment incentives hypothesis which states that firms can use preferred stock to eliminate the over- and under-investment incentives caused by common equity and debt financing. Although the results are generally mixed, they do provide some valuable information about the characteristics of the firms that issue preferred stock.
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To my mother, Yee-Chun Chan,

and to the memory of my father, Mai-Kai Wong,

for the inspiration they gave and sharing their respect for knowledge.
I. INTRODUCTION

Preferred stock has long been a subject ignored in the area of corporate financing. Most of the literature on capital structure is directed to the problem of choice between debt and equity. It is typical that preferred stock is excluded from the analysis. The relatively little attention drawn to the subject of preferred stock may be attributed to a number of reasons. First, the traditional view that preferred stock is a hybrid security implies that it is nothing but a composite security. In other words, preferred stock tends to possess characteristics that are intermediate between bonds and common stock. It follows that the properties of preferred stock can be inferred by studying those of bonds and common stock. Second, preferred stock has at most played a modest, if not minor, role in the financing of most corporations in the U.S., although it has been frequently used by public utilities and is gaining popularity among banks. In fact, preferred stock had once come close to extinction. In the late 1950s, preferred stock was in a position of lesser importance as a source of long-term capital. This was clearly manifested in the decline in both the sale of new issues of preferred stock and in the outstanding amount in relation to the other major sources of long-term capital. Despite this decline in popularity, preferred stock has not faded out and become extinct but remained a long-term source of funds.

In the U.S., corporate investors, particularly insurance companies and non-financial corporations, constitute the major buyers of preferred stock because they can exclude from taxable income 85 percent of the dividends received on preferred stocks [see, for example, McInnis and Puglisi (1980) and Brealey and Myers (1980).]
By contrast, the tax motive for individuals to hold preferred stock is comparatively weaker. They may only exclude up to the first $100 of the dividends received from taxable income.

While it is clear that the favorable tax treatment of dividend income for corporations constitutes the principal driving force of much of the corporate demand for preferred stock, the motivations that account for its use by firms to raise outside capital are somewhat vague and less obvious. Until the recent work by Heinkel and Zechner (1988), virtually no theoretical work has been done to throw light on the role of preferred stock in the financing of corporations. An early argument for the use of preferred stock originates from Donaldson (1962), who hypothesizes that preferred stock is primarily attractive to firms having financial difficulties. The attractiveness of preferred stock to these financially distressed firms lies on its dividend flexibility which allows them to pass up preferred dividends without penalty. The reduced risk of bankruptcy in the event that the firm fails to distribute preferred dividends provides an incentive for the use of preferred stock.

In a different manner, Heinkel and Zechner (1988) consider using the privilege of

---

1Recent changes in the U.S. tax code (the Tax Reform Act of 1986) have reduced the corporate dividend exclusion from 85 percent to 80 percent.

2It should be noted that common stock also offers the same tax advantages as preferred stock. One different motive for corporations to hold preferred stock rather than common stock is that it provides a steady stream of dividends with smaller price fluctuations than common stock. This is attractive to those seeking stable income from their investments.

3It can be argued that common stock is also an attractive alternative in this regard. When a firm is having financial distress, it may well cut or suspend common dividends without assuming any risk of going bankrupt. As will be discussed later, the notion of pecking order [see, among others, Myers (1984)] helps shed some light on the preference for preferred stock over common stock.
deferring preferred dividends for funding positive-NPV projects. They develop a two-period model in which preferred stock can be used as a solution to eliminate the adverse investment incentives that arise from information asymmetry about project quality. Their model provides some important empirical implications of which some are tested in this study.

Despite the apparent difference in the underlying motivation for the omission of preferred dividends, both rationales provide insights in understanding the value and use of preferred stock in the financing of corporations. This paper explores a number of questions related to the use of preferred stock as a source of long-term financing. In particular, the paper is directed to the following two principal objectives:

1. to find a relationship between a set of financial attributes that describes an individual firm and the probability that it chooses to issue preferred stock instead of other instruments, and

2. to investigate Donaldson’s (1962) and Heinkel and Zechner’s (1988) hypotheses regarding the use of preferred stock as long-term capital.

To these ends, a multinomial logit model which incorporates the three financing choices, namely, bonds, common stock, and preferred stock, is used. The evidence based on a sample of security offerings over the period 1977 to 1986 shows that firms that are smaller, riskier and less liquid are more likely to issue preferred stock vis-a-vis bonds. Also, firms that are bigger, riskier, less liquid, and have larger growth opportunities are more likely to issue preferred stock vis-a-vis common stock. Last but not least, utilities tend to favor the use of common stock in a decision
between common and preferred stock.

The paper is organized in the following format. Section II discusses some of the characteristics of preferred stock and its use in corporate financing in the U.S. Section III summarizes the literature on preferred stock and describes some empirical studies on corporate financing choice on which the model used in this study is based. Section IV outlines and describes the hypotheses on the use of preferred stock as a financing vehicle and their respective predictions. Section V presents the statistical model used and provides rationales for the use of multinomial logit model. Section VI describes the variables in the model and their empirical proxies. Section VII describes the sample and the sources of data. Section VIII reports the empirical findings and their interpretations. Section IX discusses the limitations of the study. The paper concludes with a summary and some remarks.
II. PREFERRED STOCK

A. THE HYBRID NATURE OF PREFERRED STOCK

Preferred stock has traditionally been viewed as a hybrid security which combines some of the features of bonds and some of the attributes of common stocks.

Legally speaking, preferred stock represents a portion of ownership of the issuing corporation and is thus similar to common stock [Francis (1986), chapter 20]. Nevertheless, it is exceedingly rare to find that preferred stockholders enjoy full voting privileges and thus control of the corporation as common stockholders do. Hence, from the point of view of common stockholders, preferred stock offers the advantage of avoiding the dilution of control that results from a common stock issue. On the occasion when dividend payments are not regularly made, a voting right is nearly always granted to preferred stockholders to elect a minority representation to the board of directors. Nonvoting preferred stockholders may also be given the rights to vote when questions affecting relative priorities within the preference section arise. Such circumstances include mergers, consolidations, increases in prior preferred stock, authorization of a new bond or stock issue, and the like. Returns on preferred stock come mainly in the form of cash dividends which, like common dividends, are not a tax-deductible expense like interest payments. In the distribution of dividend payments, preferred stockholders take precedence over common stockholders. This stipulates that no dividends can be paid on the common stock until the preferred dividend has been paid. In the event of liquidation, preferred stockholders usually have a prior claim on assets to common
stockholders. Most preferred stock issues carry a cumulative dividend clause which provides their holders with the possibility of recovering omitted dividends in a future period. In other words, if a corporation misses a preferred dividend, or any part of it, the dividend is not lost but must be made up in a later year before any dividend can be paid to the common stock.

Preferred stock also shares some of the characteristics of bonds. In its simplest form, preferred stock is like a perpetual bond and does not have a final repayment date. Known as a fixed-income security, it pays its holders fixed annual contractual payments as a typical bond does. Preferred stock contracts often contain features that bond contracts normally have. Such features, for instance, include a general redemption provision, conversion option, and so on. The general redemption provision is designed to permit issuers to call, and retire, typically at a premium, all or a portion of an outstanding preferred stock through either a sinking fund or purchase fund. Under a sinking fund arrangement, a specific dollar amount is set aside each year to redeem a certain number of preferred shares by open market purchase or call of lots. Under the purchase fund arrangement, a purchase fund provides an element of market support for the price of the preferred. In this case, the firm is periodically obligated to purchase a certain number of shares from investors each year in the market as long as the stock is at or below a stipulated price, usually the original issue price. Sinking-fund preferred stocks are thus very close to bonds that have sinking fund requirements. But they differ in at least

Based on a sample of non-convertible preferred stock issues for the period 1950 to 1965, Fischer and Wilt (1968) report that all preferred stock investigated are cumulative. The cumulative feature is one of the essential elements in building the Heinkel-Zechner model of capital structure choice (1988) which will be discussed in detail later.
three important aspects. First, preferred dividends can be omitted if the corporation is unable to pay all or a portion of them whereas any default on interest payments would result in forced bankruptcy. Second, bondholders' claims on the business's assets rank before the preferred stockholders' in the event of liquidation. Third, there is a differential tax treatment of preferred dividends and interest at both the corporate and investor level (in the U.S.). At the corporate level, interest payments on debt are tax deductible but preferred dividends are not. At the investor level, interest income is fully taxable for both individual and corporate debtholders. By contrast, individual taxpayers and corporations may respectively exclude up to the first $100 and 85 percent of dividends income from taxable income.\footnote{5}

These traditional thoughts about preferred stock are further supported by empirical evidence. Bildersee (1973) uses an analytical approach to examine this hybrid security in a risk-return framework by employing the market model from portfolio theory. He concludes that high-quality preferreds (i.e. with low betas relative to the common stock index) behave more like bonds in the market while low-quality preferreds (i.e. with higher betas) perform primarily like common stocks in the market.

**B. OMISSION OF THE PREFERRED DIVIDEND**

In spite of its much emphasized "hybrid" nature, preferred stock does carry some peculiar features of its own. In particular, that the issuing corporation can omit preferred dividends without penalty distinguishes preferred stock from bonds. There

\footnote{5see footnote 1.}
has been an allegation that, for practical purposes, preferred dividends are regarded by responsible management as fixed charges like bond interest, and should be paid when due. A failure to declare an anticipated preferred dividend might have unfavorable repercussions such as weakening investors' confidence and deteriorating the firm's credit rating. However, when the issuing firm is facing prospects of cash inadequacy and insolvency, the difference in the risk of preferred stock and bonds would become important. A failure to pay preferred dividends does not bring the corporation into bankruptcy whereas any omitted bond interest may lead to forced bankruptcy initiated by creditors. On the other hand, some people even go further and argue that corporations in need of investment funds may defer preferred dividends. This type of omission, as will be discussed later, forms the basis for the hypothesis that preferred stock can be used as a solution to the adverse investment incentives of the firm. Regardless of the motivation underlying the omission of preferred dividends, this distinctive feature has been central to many theories advanced on preferred stock.

C. TAX TREATMENT OF PREFERRED STOCK DIVIDEND IN THE U.S.

At the corporate level, preferred dividends, like common dividends, are paid out of after-tax earnings. For the holders, corporate preferred stockholders qualify for an 85 percent tax deduction on dividends received. This deduction substantially reduces the effective tax rate for corporate investors and provides an incentive for them to hold preferred stocks. There is no such favorable tax treatment of preferred stock dividend income for noncorporate investors. Possibly as a result of the differential

As mentioned earlier, recent changes in the U.S. tax code have reduced the corporate dividend exclusion from 85 percent to 80 percent.
tax treatment, one would expect that majority of the buyers of preferred stock come from the corporate sector [see, among others, McNish and Puglisi (1980) and Brealey and Myers (1984)], particularly from the insurance industry [see, for example, Sorensen and Hawkins (1982) and McDaniel (1984)].

D. PREFERRED STOCK FINANCING IN THE U.S.

In the U.S., preferred stock does not play a major role in the financing of most corporations, with the exception of public utilities. Table I shows that preferred stock was constantly in a position of lesser importance as a source of corporate capital. In most of the years over the period 1968 to 1987, preferred stock accounted for only about three to five percent of the dollar amount of corporate securities offered. A commonly-used explanation for the low level of preferred stock offerings is that preferred stock does not have the tax advantage that bonds do [see, among others, Donaldson (1962) and Sorensen and Hawkins (1981)]. Also noteworthy in Table I is that the volume of preferred stock offerings rose sharply since 1982. The majority of the growth was accounted for by the introduction and growing acceptance of floating-rate preferred stock. Within the equity class itself, the ratio of preferred stock to common stock (expressed in percentage) varied from year to year. The ratio reached a peak of 56 percent in 1974 and hit a low of only 7.6 percent in 1981. In recent years, the ratio has stabilized at about 20 percent since 1982, indicating that the rapid growth of floating-rate preferred stock was made at the expense of other more traditional types of preferred stock.

Table II gives the breakdown of preferred stock offerings by utilities and
Table 1


<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Preferred Stock</th>
<th>Preferred as a Percent of Total</th>
<th>Common Stock</th>
<th>Common as a Percent of Total</th>
<th>Preferred as a Percent of Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>21,966</td>
<td>637</td>
<td>2.90</td>
<td>3,946</td>
<td>17.96</td>
<td>16.14</td>
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<tr>
<td>1969</td>
<td>26,744</td>
<td>682</td>
<td>2.55</td>
<td>7,714</td>
<td>28.84</td>
<td>8.84</td>
</tr>
<tr>
<td>1970</td>
<td>38,944</td>
<td>1,390</td>
<td>3.57</td>
<td>7,240</td>
<td>18.59</td>
<td>19.20</td>
</tr>
<tr>
<td>1971</td>
<td>44,914</td>
<td>3,679</td>
<td>8.19</td>
<td>9,236</td>
<td>20.56</td>
<td>39.83</td>
</tr>
<tr>
<td>1972</td>
<td>40,787</td>
<td>3,373</td>
<td>8.27</td>
<td>9,689</td>
<td>23.76</td>
<td>34.81</td>
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<tr>
<td>1973</td>
<td>33,391</td>
<td>3,372</td>
<td>10.1</td>
<td>7,750</td>
<td>23.21</td>
<td>43.51</td>
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<td>1974</td>
<td>38,313</td>
<td>2,253</td>
<td>5.88</td>
<td>3,994</td>
<td>10.42</td>
<td>56.41</td>
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<tr>
<td>1975</td>
<td>53,619</td>
<td>3,458</td>
<td>6.45</td>
<td>7,405</td>
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<td>46.70</td>
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<tr>
<td>1976</td>
<td>53,488</td>
<td>2,803</td>
<td>5.24</td>
<td>8,305</td>
<td>15.53</td>
<td>33.75</td>
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<tr>
<td>1977</td>
<td>53,792</td>
<td>3,916</td>
<td>7.28</td>
<td>7,861</td>
<td>14.61</td>
<td>49.82</td>
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<tr>
<td>1978</td>
<td>47,230</td>
<td>2,832</td>
<td>6.00</td>
<td>7,526</td>
<td>15.93</td>
<td>37.63</td>
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<td>1979</td>
<td>51,533</td>
<td>3,574</td>
<td>6.94</td>
<td>7,751</td>
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<td>46.11</td>
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<td>1980</td>
<td>73,694</td>
<td>3,631</td>
<td>4.93</td>
<td>16,858</td>
<td>22.88</td>
<td>21.54</td>
</tr>
<tr>
<td>1981</td>
<td>70,441</td>
<td>1,797</td>
<td>2.55</td>
<td>23,552</td>
<td>33.44</td>
<td>7.63</td>
</tr>
<tr>
<td>1982</td>
<td>84,638</td>
<td>5,113</td>
<td>6.04</td>
<td>25,449</td>
<td>30.07</td>
<td>20.09</td>
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<td>1983</td>
<td>120,149</td>
<td>7,213</td>
<td>6.00</td>
<td>44,366</td>
<td>36.93</td>
<td>16.26</td>
</tr>
<tr>
<td>1984</td>
<td>132,531</td>
<td>4,118</td>
<td>3.11</td>
<td>18,510</td>
<td>13.97</td>
<td>22.25</td>
</tr>
<tr>
<td>1985</td>
<td>201,269</td>
<td>6,505</td>
<td>3.23</td>
<td>29,010</td>
<td>14.41</td>
<td>22.42</td>
</tr>
<tr>
<td>1986</td>
<td>374,980</td>
<td>11,514</td>
<td>3.07</td>
<td>50,316</td>
<td>13.42</td>
<td>22.88</td>
</tr>
<tr>
<td>1987</td>
<td>354,700</td>
<td>10,123</td>
<td>2.85</td>
<td>43,228</td>
<td>12.19</td>
<td>23.42</td>
</tr>
</tbody>
</table>


non-utilities. Before 1982, public utilities contributed over 70 percent of the total preferred stock offered. The stronghold in utilities may be attributed to the regulatory requirements for minimum capital imposed on utilities and that preferred stock is treated as an equity. Since 1982, non-utilities started to increase the use of preferred stock as a source of long-term capital. They comprised more than 70 percent of the total over the period 1982 to 1986. A large portion of the increase came from the financial sector.
### Table II

Preferred Stock Offerings by Utilities and Non-Utilities in the U.S., 1968-1986 (in millions of U.S. dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Preferred Stock Issued</th>
<th>Utilities</th>
<th>Utilities as a Percent of Total</th>
<th>Non-Utilities</th>
<th>Non-Utilities as a Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>637</td>
<td>481</td>
<td>75.51</td>
<td>156</td>
<td>24.49</td>
</tr>
<tr>
<td>1969</td>
<td>682</td>
<td>491</td>
<td>71.99</td>
<td>191</td>
<td>28.01</td>
</tr>
<tr>
<td>1970</td>
<td>1,390</td>
<td>1,243</td>
<td>89.42</td>
<td>147</td>
<td>10.58</td>
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<tr>
<td>1971</td>
<td>3,679</td>
<td>3,302</td>
<td>89.75</td>
<td>377</td>
<td>10.25</td>
</tr>
<tr>
<td>1972</td>
<td>3,373</td>
<td>2,818</td>
<td>83.55</td>
<td>555</td>
<td>16.45</td>
</tr>
<tr>
<td>1973</td>
<td>3,372</td>
<td>2,955</td>
<td>87.63</td>
<td>417</td>
<td>12.37</td>
</tr>
<tr>
<td>1974</td>
<td>2,253</td>
<td>1,941</td>
<td>86.15</td>
<td>312</td>
<td>13.85</td>
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<tr>
<td>1975</td>
<td>3,458</td>
<td>2,552</td>
<td>73.83</td>
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<tr>
<td>1976</td>
<td>2,803</td>
<td>2,126</td>
<td>75.85</td>
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<td>1977</td>
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<td>2,102</td>
<td>53.68</td>
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<td>46.32</td>
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<td>1978</td>
<td>2,832</td>
<td>2,182</td>
<td>77.05</td>
<td>650</td>
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<td>1979</td>
<td>3,574</td>
<td>2,709</td>
<td>75.80</td>
<td>865</td>
<td>24.20</td>
</tr>
<tr>
<td>1980</td>
<td>3,631</td>
<td>3,370</td>
<td>65.27</td>
<td>1,261</td>
<td>34.73</td>
</tr>
<tr>
<td>1981</td>
<td>1,797</td>
<td>1,304</td>
<td>72.57</td>
<td>493</td>
<td>27.43</td>
</tr>
<tr>
<td>1982</td>
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<td>2,534</td>
<td>49.56</td>
<td>2,579</td>
<td>50.44</td>
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<tr>
<td>1983</td>
<td>7,213</td>
<td>2,143</td>
<td>29.71</td>
<td>5,070</td>
<td>70.29</td>
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<td>23.99</td>
<td>3,130</td>
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<tr>
<td>1985</td>
<td>6,505</td>
<td>755</td>
<td>11.61</td>
<td>5,750</td>
<td>88.39</td>
</tr>
<tr>
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</tbody>
</table>

Source: Moody's Public Utility Manual

In general, preferred stock financing in the U.S. has the following pattern: straight fixed-rate preferreds are issued by utilities; convertible fixed-rate preferreds are issued by industrial firms; and floating-rate preferreds are issued by financial corporations, particularly banks [Linn and Pinegar (1988)].
E. TYPES OF PREFERRED STOCK

Preferred stock can be classified according to whether it offers fixed-rate dividends or not. Fixed-rate preferred stock typically has a dividend rate expressed as a percentage of the par or stated value. Floating-rate preferred stock, as its name implies, has its dividend rate adjusted periodically to recognize changes in market interest rates. Broadly speaking, there are two types of floating-rate preferred stock, namely, the adjustable rate preferred stock and the dutch auction rate preferred stock. They were both introduced in the early 1980s in the wake of drastic movements in interest rates. The primary difference between them centers around the frequency and method of resetting the amount of the dividend payout.7

There are other variants of preferred stock as well, such as convertible preferred stock and sinking-fund preferred stock. Despite the variations, all the different types of preferred stock possess some elements in common. For example, preferred stockholders' claims on the assets of the business always rank ahead those of common stockholders and behind those of bondholders. Another common but important feature is that omission of preferred dividends is permissible without causing the issuing firm to go bankrupt.

7For the adjustable rate preferred stock, the dividend rate is usually adjusted quarterly in accordance with a specified spread from the maximum current rate of interest paid on short-, intermediate-, or long-term government debt. For the dutch auction rate preferred stock, the dividends are reset every seven weeks by means of the dutch auction process where bids are initiated above the eventual selling price and lowered until the market clears. For a more detailed description of these two types of floating-rate preferred stock, see Winger et al. (1986) and Alderson et al. (1987).
III. LITERATURE REVIEW

The literature review is divided into two parts. The first focuses on the subject of preferred stock whereas the second deals with previous studies on corporate financing choice. The reason for including the latter is that preferred stock in this study is analyzed in a corporate financing choice context.

A. PREFERRED STOCK

Little treatment has been allotted to the subject of preferred stock in corporate finance texts or academic literature. Noticeably, in most of the theoretical and conceptual work on preferred stock, the characteristic that preferred dividends can be omitted without bringing the corporation into bankruptcy has been central in the discussion of various aspects of preferred stock such as its use in corporate financing and its valuation. Most empirical work on preferred stock falls into three groups:

1. empirical examinations that focus primarily on particular features of preferred stock issues such as sinking funds or floating dividend rates,
2. event studies on the valuation effects of capital structure decisions that involve preferred stock, and
3. empirical investigations of the use of preferred stock as a corporate financing vehicle.

Donaldson (1962) discusses the rationale for the use of nonconvertible preferred stock in the financing of industrial corporations. He hypothesizes that firms facing
financial difficulties and the potential of negative future earnings would find the tax
deductibility of bond interest no longer important. Instead, the reduced risk of
bankruptcy in the event that preferred dividends cannot be paid would make
preferred stock an attractive financing alternative. Moyer, Marr, and Chatfield (1987)
investigate on a univariate basis this financial distress hypothesis by comparing nine
selected financial ratios for a group of 25 industrial firms that had issued preferred
stock with those for a control group of firms that had not issued preferred stock.
They conclude that the use of preferred stock may be viewed as a signal to the
financial markets that the issuing firm expects low effective future tax rates or
anticipates a deterioration in the firm's future financial condition.8

Fischer and Wilt (1968) express a somewhat pessimistic view on the future of
straight preferred stock as a financing vehicle. They conclude that as long as
preferred stock dividends are not a tax-deductible expense for the issuing firm and
there is a high federal corporate income tax, preferred stock will hold only a minor
place in the total corporate financing picture. They observe that the advantages that
a preferred stock can offer in periods when liquidity is strained have apparently not
convinced a majority of financial managers that it should be considered continuously
as a substitute for debt capital in financial plans. They finally conclude that the
outlook for the use of nonconvertible preferred stock by large and established

8Of the nine ratios examined, four are statistically significant and hence support the
hypothesis. These four ratios are: (1) market price of common stock to book value
of common stock, (2) earnings before interest and taxes to total interest, (3) retained
earnings to total assets, and (4) market value of equity to book value of total debt.
Of the remaining five ratios, two have the expected signs but are not statistically
significant. These include (1) common equity to total assets and (2) cash flow to total
debt. The other three that show opposite signs are: (1) working capital to total
assets, (2) earnings before interest and taxes to total assets, and (3) sales to total
assets.
industrial firms is not a favorable one. But it does appear that this security is assured of a secure place in the financing arsenal of small industrial firms when "sound management rules against issuance of debt". ⁹

With a view to explaining why preferred stock is issued by many corporations in spite of its apparent disadvantages, Fooladi and Roberts (1986) present a simple partial equilibrium model for the supply of, and demand for, preferred stock. Their model does not hinge on the dividend arrearage feature of preferred stock. In the presence of both corporate and personal taxes, their analysis is characterized by a positive amount of preferred stock. By examining the empirical evidence on the relative use of preferred stock in the United States and Canada, they observe that there are stronger tax incentives in Canada than in the United States to create a positive preferred stock equilibrium. This results from the existence of the dividend tax credit for individual investors and the higher dividend exclusion (100 percent) for corporate investors in Canada.

The importance of the arrearage feature of preferred stock is found in the theoretical work of Jensen and Meckling (1976), Emanuel (1983), and Heinkel and Zechner (1988). In their seminal paper on the theory of ownership structure of firm, Jensen and Meckling (1976) provide a rationale for the use of preferred stock in a world where there is no tax advantage to debt (footnote 56, p.342). They argue that if preferred stock possesses all the characteristics of debt except that the issuing firm cannot be put into bankruptcy in the event of nonpayment of preferred dividends, the use of preferred stock is justified by its associated lower agency costs.

⁹They draw their conclusion from a study of 1126 nonconvertible preferred stock issues offered by U.S. business corporations from 1950 through 1965.
costs than those associated with debt. The difference amounts to the present value of the bankruptcy costs associated with debt. Ignoring the existence of corporate and personal taxes, Emanuel (1983) develops a rigorous theory for the valuation of preferred stock in a continuous-time framework. The valuation model, as he points out, rests primarily on the assumption that all dividends on preferred stock are omitted whenever the firm value falls below a certain arbitrary level. By introducing corporate taxes as an incentive for the use of debt, Heinkel and Zechner (1988) demonstrate that preferred stock can enhance a firm’s debt capacity. They consider preferred stock as a solution to the firm’s adverse investment incentives such as the underinvestment problem found in Myers (1977) and the overinvestment problem unveiled in their two-period model. Again, their conclusion relies on the essential feature that preferred stock dividends can be deferred without penalty.

In an opinion survey, Elsaid (1969) studies financial executives’ stated reasons for the use of preferred stock as a financing instrument. In the case of nonconvertible preferred stock, he finds that the four major reasons for its use in descending order of importance are as follows:

1. to maintain a balanced capital structure,
2. to improve the borrowing base for subsequent future debt financing,
3. to take advantage of favorable market conditions, and
4. to provide secondary financial leverage.

Across industries, he notes that the relative importance of the reasons for issuing nonconvertible preferred stock varies. For example, to maintain a balanced capital

\[10\] This is a survey of 314 issues of preferred stock representing a sample of 473 preferred stock offerings over the period 1945-1965.
structure is the most important reason for utilities. By contrast, to take advantage of favorable market conditions is ranked the most important reason by manufacturing concerns.

In the case of convertible preferred stock, he finds that the five major reasons for its use in descending order of importance are as follows:

1. to use convertibility as a selling point (sweetener),
2. to improve the borrowing base for subsequent future debt financing / to raise common equity capital indirectly,
3. to maintain balanced capital structure, and
4. to take advantage of favorable market conditions.

Likewise, there are different priorities of reasons for issuing convertible preferred stock across industries. For electric, gas, and water utilities, to raise common equity indirectly and to improve the borrowing base are the two most important reasons. For manufacturing corporations, the two most important reasons are to raise common equity capital indirectly and to use convertibility as a sweetener. It is worth noting that the survey results are consistent with the theoretical implication of Heinkel and Zechner's (1988) model that preferred stock can enhance a firm's debt capacity.

On the valuation effects of capital structure changes induced by preferred stock offerings, Mikkleson and Partch (1986) find a marginally negative stock price effect in response to the announcement of the offerings. They document a two-day average announcement period return of -0.26% in response to preferred stock
offerings. This is based on a sample of 14 industrial firms which had issued preferred stock during the period 1972-1982. When the subsample of clean events, that is, the subsample that is not contaminated by contemporaneous events, is examined, they find a statistically insignificant average two-day announcement period return of 1.53% based on a subsample of 6 industrial firms. No definite and clear explanations for these responses have been given. The authors implicitly treat preferred stock as a hybrid security which has price reaction lying somewhere between bonds and common stock.

In a study of pure exchange offers, Masulis (1980) finds that the announcements of preferred-for-common exchange offers are accompanied by a significant average two-day period return of 3.34% whereas the announcements of preferred-for-debt exchange offers are accompanied by a significant average two-day announcement period return of -14.29%. While the valuation effects of preferred-for-common exchange offers are based on a sample of 47 announcements, the valuation effects of preferred-for-debt exchange offers are examined with a sample of only nine issues. Therefore, the negative stock reaction to the latter is far from conclusive. While Masulis (1980) attributes the stock price reactions to the corporate tax and wealth redistribution effects, Heinkel and Zechner (1988) suggest that the positive common stock price impact associated with the issuance of preferred stock is consistent with their model's empirical implication that the issuance of preferred stock coincides with the market's recognition of the existence of a growth opportunity for the issuing firm.

A recent study by Linn and Pinegar (1988) examines the valuation effects of
preferred stock offerings for different industry groups. They find that the market reaction to preferred stock issues is related to the industry characteristics of the issuing firm. Based on a sample of 308 registered preferred stock issues (220 straight fixed-rate preferreds; 59 convertible fixed-rate preferreds and 29 adjustable-rate preferreds), they observe that, in general, utilities issue predominantly straight fixed-rate preferred stock; industrial firms issue most of the convertible fixed-rate preferred stock; and financial corporations issue the majority of the adjustable-rate preferred stock. The corresponding two-day announcement period returns are as follows: an economically insignificant return of 0.178% for utilities that issued straight fixed-rate preferreds; a statistically significant negative return of -2.015% for industrials that issued convertible fixed-rate preferreds; and a marginally significant (at the 0.10 level) return of 1.138% for financials. Linn and Pinegar (1988) argue that the differences in market responses to preferred stock offerings across industry groups reflect differences in industry operating environments. Since utilities are regulated and information about their future fund acquisitions is always kept current, their issues are typically anticipated, yielding an insignificant stock price impact. Industrial firms, on the other hand, are not restricted by any regulatory process. Any new industrial preferred stock issues reveal information about the firm's prospects. Finally, the positive abnormal returns for financial issues result largely from the capture of tax benefits.

\[\text{\textsuperscript{11}Although the average abnormal return of 0.178\% for utility issues is statistically significant at the 0.05 level, the authors argue that it is difficult to conclude that this return is economically significant given its size.}\]


B. CORPORATE FINANCING CHOICE

There have been a number of models of financing choice put forward to analyse firms' choice between debt and equity. These include the ones developed by Baxter and Cragg (1970), Taub (1975), and Marsh (1982). One of their aims is to identify the financial characteristics that distinguish firms that issue debt from those that issue equity. Marsh (1982) also aims to examine the traditional views on optimal capital structure that a firm's choice of financing instruments depends primarily upon the difference between its current and target debt-to-equity ratios. Their investigations provide evidence that firms appear to make their choice of financing instrument as if they have target debt-to-equity ratios in mind. The evidence provided by Marsh (1982) indicates that these ratios are themselves a function of firm size, bankruptcy risk, and asset composition. One drawback of these models is that they use an optimal debt ratio which fluctuates from time to time. Worse still, viewing observed debt ratios as optimal would lead to bias due to "noises". Fischer, Heinkel, and Zechner (1989) argue that an optimal debt ratio range is a more relevant and appropriate measure for a firm's dynamic debt policy. Their empirical evidence suggests that firms with large debt ratio ranges have a low effective corporate tax rate, a high variance of the asset value, a small asset base, and low bankruptcy costs. On the other hand, Martin and Scott (1974) provide evidence that the firm's current and expected financial conditions can also affect the choice between debt and equity. By using multiple discriminant analysis, they show

\footnote{They also include convertible, preferred, and combined issues in their statistical models. The sample consists of 131 debt, 33 equity, 38 convertible, 5 preferred, and 23 combined issues. Because of the small sample size, the parts of their models dealing with the convertible, preferred, and combined issues are far from conclusive.}
that certain financial conditions areas such as profitability and liquidity have an impact on the choice between debt and equity. Finally, it has been observed that companies are heavily influenced by market conditions and the past history of security prices in choosing debt and equity. Baxter and Cragg (1970), Taggart (1977), and Marsh (1982) provide empirical evidence on this respect. In brief, a firm's choice of financing instrument depends on the following three factors:

1. the deviation from its target debt-to-equity ratio,
2. its current and expected financial conditions, and
3. the prevailing market conditions.
IV. HYPOTHESES

One of the objectives of the study is to examine the financial characteristics of the firms that issue preferred stock. Thus, the first and foremost hypothesis to be examined is whether preferred stock issuing firms are defined by a set of financial attributes that differentiates them from non-preferred stock issuing firms. It goes without saying that the competing hypothesis is that preferred stock issuing firms do not possess characteristics that differentiate them from firms that issue common stock or bonds. Some of these characteristics can also provide information about the motivation of using preferred stock as a source of funds. With regard to the explanation for the choice of preferred stock financing, two hypotheses that are based on the discussions by Donaldson (1962) and Heinkel and Zechner (1988) are developed. As discussed below, both of these hypotheses are based on the dividend flexibility offered by preferred stock. However, the two hypotheses differ in the underlying motivation for passing up preferred dividends. The first hypothesis views that omission of preferred dividends occurs as a result of cash inadequacy or other financial distress related factors. This hypothesis (referred to as the financial distress hypothesis) predicts that preferred stock is primarily issued by firms experiencing current or imminent financial difficulties. The second hypothesis claims that some types of firms can increase value by issuing preferred stock in anticipation of future investment projects with positive NPV's. This hypothesis (referred to as the solution to adverse investment incentives hypothesis) holds that the arrearage feature of preferred stock is central to its use as a means of enhancing a firm's debt capacity. The hypothesis also predicts that firms with very low or no growth opportunities do not issue preferred stock. Also firms with very
large growth opportunities do not issue preferred stock, but firms with moderate growth opportunities do use preferred stock.¹³

In the analysis which follows, the two hypotheses are developed as possible explanations of different motives for issuing preferred stock. The predictions on the attributes of preferred stock issuing firms are also presented. It is worth noting that although the two hypotheses rely on different motivations for the omission of preferred dividends, they are not necessarily mutually exclusive and thus not competing with each other. Because of this, it is difficult to separate one from the other. None of these hypotheses can completely explain the observed characteristics of the firms that issue preferred stock.

**A. THE FINANCIAL DISTRESS HYPOTHESIS**

As mentioned earlier in the literature review, Donaldson (1962) hypothesizes that preferred stock is primarily issued by firms facing financial distress. He made this hypothesis when preferred stock had been declining substantially in popularity as a source of funds. The financial distress hypothesis recognizes the inability of distressed firms to raise funds by selling common stock at a good price or issuing debt on reasonable terms. It is usually the cash inadequacy that arises from poor earnings performance and the like that leads the firm to financial difficulties. When such a state happens, the firm may have difficulty in servicing debt payments and meeting contractual obligations. It may have to forgo positive-NPV projects or

¹³It should be noted that the logit analysis used in this study does not deal with the prediction that the use of preferred stock is to enhance the firm's debt capacity. In addition, it only serves as an "indirect" test of the predicition on the relationship between the firm's preferred-to-stock ratio and its growth opportunities.
disinvest to fund the interest payments. With the use of preferred stock, these problems can simply be avoided by suspending the preferred dividends if financial distress occurs. There are also greater chances that the firm cannot fully utilize the tax advantage accompanying debt financing because of the lower level of earnings. All these make preferred stock more attractive as the firm would not end in bankruptcy should it fail to pay the preferred dividends out. Thus, preferred stock provides flexibility to the firm when it has problems meeting its financial obligations.

If debt cannot be issued on reasonable terms when the firm is in financial distress, why does preferred stock have advantages over common stock as a source of financing? From a practitioner's point of view, common stock financing has a number of shortcomings under such circumstances. First, common stock prices may be traded in a depressed state such that common stock offerings would be costly to the firm. Second, from the point of view of investors, preferred stock is more appealing as its holders are given senior claims on the firm's assets to common stockholders in the event of liquidation. Third, common stock offerings would create the problem of dilution of control which some firms do not like to happen. Last but not least, the emphasis on more active and effective management of idle cash in recent years has given rise to Preferred Dividend Rollover programs which encourage corporate investors to hold stocks, be it preferred or common, for a short period of time. The associated risk is correspondingly reduced.

Preferred Dividend Rollover is a cash management investment strategy designed to take advantage of the 85 percent (or more accurately 80 percent), dividend exclusion on stock held by corporation. In Preferred Dividend Rollovers, the corporate cash manager engages in an active trading strategy designed to acquire preferred stock shortly before the ex-dividend date and sell it on or after the ex-dividend date, and continually roll over the proceeds into other preferred stocks about to go ex-dividend.
From a theoretical point of view, the preference for preferred stock over common stock is consistent with the work by Myers (1984), Myers and Majluf (1984), and Narayanan (1988). Specifically, these authors suggest that firms tend to rely on internal sources of funds, and to prefer less risky securities to equity if external financing is sought. In other words, corporate financing behavior tends to follow a pecking order where common equity is always considered as a last resort. Therefore, when a financially distressed firm finds the issuance of debt less attractive, it would first turn to preferred stock before common stock.

In sum, preferred stock is hypothesized to be a good candidate for firms facing financial distress and requiring external funds. Compared to debt, preferred stock does not have the problem of forced bankruptcy if things turn sour. When the firm has low or even negative current and expected earnings, the tax advantage of debt becomes unimportant to the firm. Compared to common stock, preferred stock can help preserve the control of the existing shareholders over the firm and avoid the problem of selling common stock at a depressed price. In this view, firms that have higher bankruptcy risk, lower profitability, strain in liquidity, and low effective income tax are more likely to issue preferred stock.

B. THE SOLUTION TO ADVERSE INVESTMENT INCENTIVES HYPOTHESIS

In contrast to the more traditional financial distress hypothesis, the solution to adverse investment incentives hypothesis lays much of its ground on a different motivation of having preferred dividends go into arrears. It is assumed that the arrearage feature of preferred stock enables the firm not to pay out the preferred
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dividend but to invest it in a risky project. The hypothesis is based on the empirical implications of the capital structure model developed by Heinkel and Zechner (1988), who consider a two-period model that incorporates asymmetric information about investment project quality. They argue that an all-equity financed firm has an overinvestment problem that can be solved with previously-issued senior debt. The tax advantage to debt, however, leads the firm to make additional debt issues that would cause Myers' (1977) underinvestment problem. The overinvestment incentive of preferred stock due to its dividend flexibility can help eliminate the suboptimal investment behavior and allow the issuance of additional debt. But why does the firm prefer to use preferred stock rather than common stock to improve its borrowing base? Like preferred stock, common stock can also create an overinvestment incentive and carries the flexibility to cut or suspend common dividends for investment purpose. Heinkel and Zechner (1988) reason that preferred stock is a more efficient means to create an overinvestment incentive than common stock to offset the underinvestment incentive caused by debt financing. In specific terms, the solution to adverse investment incentives hypothesis claims that firm value can be increased by using preferred stock and omitting the preferred dividends later to fund investment projects.

If preferred stock does play a role in solving the adverse incentive problem of the firm, a number of empirical implications follow. First, preferred stock can enhance a firm's debt capacity. Second, there is a negative relationship between growth opportunities and the firm's preferred-to-debt ratio. Firms with very low or no growth opportunities do not issue preferred stock at all because of the absence of lucrative investment projects. Without new profitable investments, large scale debt
financing is less probable and the likelihood of having an underinvestment problem is remote. The incentive for the use of preferred stock is therefore reduced. Firms with very large growth opportunities will have little or no preferred stock. This results from the inverse relationship between growth opportunities and the preferred-to-debt ratio derived in their paper [equation 22]. Firms with moderate growth opportunities will therefore have the highest preferred-to-debt ratios. Heinkel and Zechner (1988) further suggest that banks and utilities are two classes of firms that have moderate growth opportunities and thus make extensive use of preferred stock. An underlying intuition for this negative relationship can be developed from Myers (1977), who points out that it is rather difficult to fund growth opportunities with debt. Therefore, firms with large growth potential find it easier and less costly to raise less debt-like securities. With less debt issued, preferred stock would lose its attractiveness as a means to offset the underinvestment incentive of debt.

If a firm has an optimal preferred-to-debt ratio in mind, it is more likely to issue debt vis-a-vis preferred stock when it has a higher growth opportunity. This follows from an inverse relationship between the ratio and the growth opportunity [Heinkel and Zechner (1988), equation 22]. In other words, the firm will sell bonds, given the need to raise outside capital, to maintain a lower preferred-to-debt ratio if growth opportunities rise.

At first blush, one might throw doubt on the reality of the assumption that preferred dividends are used as a source of financing. Although Emanuel (1983) argues that management in normal circumstances feels obliged to honor dividend commitments to preferred shareholders and failure to do so would deteriorate the
firm's creditworthiness which would hamper future attempts by the firm to issue capital in the marketplace, omitting preferred dividends essentially means that the firm does not have to sell off assets to fund the dividend payments (which is equivalent to investing), or that it has a cheaper source of funds than issuing securities. Hence, the assumption is valid in this regard.
V. MODEL AND METHODOLOGY

One of the objectives of this study is to find the relationship between a set of attributes that describes an individual firm and the probability that the firm will issue preferred stock instead of common stock or bonds. To this end, the study synthesizes the previous empirical models on corporate financing choice to investigate the factors leading to the choice of preferred stock. Of the models developed by Baxter and Cragg (1970), Taub (1975), and Marsh (1982), the framework used by Marsh (1982) comes closest to the model used in this study.

When a firm requiring new finance has decided to make a capital issue, it can meet its needs in a number of ways. These include selling long-term bonds, issuing preferred stock, and offering common equity. The firm should issue equity if its debt ratio is above its target and issue debt otherwise. With no transaction costs, the firm would adjust its debt ratio instantaneously and continuously. However, in reality where transaction costs are present and significant, the firm is forced to accept temporary divergence from its optimal debt ratio until the transaction costs are outweighed by the cost of not making the new issue. It is for this reason that firms tend to make infrequent lumpy issues with their debt ratios fluctuating around the targets over time. The degree of fluctuation is related to the costs of adjustment. Fischer, Heinkel, and Zechner (1989) find that even small recapitalization costs lead to wide swings in a firm's debt ratio over time. They therefore refine the meaning of optimal debt ratio and argue that any debt ratio lying within a set of boundaries is optimal.
For simplicity, it is assumed that the three financing alternatives, namely, common stock, preferred stock, and bonds, constitute the choice set facing the firm requiring new finance and are mutually exclusive. In other words, multiple issues, that is, issues which have more than one type of security offered in a particular period (one fiscal year in our study), are excluded from the analysis.

As previously discussed, a firm’s choice of financing instrument is hypothesized to be a function of (1) the deviation from its target debt ratio, (2) its current and expected financial conditions, and (3) the prevailing capital market conditions. Denote by m the number of types of financing instruments available (m=3 in our case). Suppose firm i decides to issue security j (j=1,2,3; 1=bonds, 2=common stock, 3=preferred stock) to raise external capital. The functional form of the ith firm’s choice at time t can be written in the following way:

\[
\text{Prob}(Z_{it} = j) = f( D*_{it} - D_{it}, F_{it}, M_{it})
\]

where

- \( Z_{it} \): the long-term financing choice of firm i among debt, preferred stock, and common stock at time t,
- \( D*_{it} \): the target debt-to-equity ratio of firm i at time t,
- \( D_{it} \): the actual debt-to-equity ratio of firm i at time t,
- \( F_{it} \): the set of financial conditions of firm i at time t, and
- \( M_{it} \): the set of market conditions facing firm i at time t.

The decision to issue any one type of security is characterized by the fact that sales of bonds or equity tend to occur at discrete intervals and in relatively large
amounts. Because of the costs of adjustment and the infrequent use of external financing, firms planning new issues would consider future as well as current debt ratios. The nature of this decision-making and the exclusion of multiple issues from the analysis justify the use of a discrete choice model. In this study, the multinomial logit is employed to model a firm's corporate financing behavior. In the subsection to follow, a general description and specification of the model are presented.

A. THE MULTINOMIAL LOGIT MODEL

The multinomial logit is one of the two most widely used discrete choice models to analyze qualitative dependent variables which take on more than two values. Another commonly used model is the multinomial probit. While these two models are based on different assumptions about the the distributions of their random error terms, they usually give similar results and it is difficult to distinguish them statistically [Amemiya (1981), p.1502]. However, the multinomial logit model offers a computational advantage over the multinomial probit and involves much less computational cost. Because of this, multinomial logit is used in this study to analyze the corporate financing choice behavior.

Footnote: Both the multinomial logit and multinomial probit are derived from the random utility model in which the utility of an alternative to an individual is specified as a linear function of the characteristics of the individual and the attributes of the alternative, plus an error term. The probability that a particular individual will choose a particular alternative is given by the probability that the utility of that alternative to the individual is greater than the utility to that individual of all other available alternatives. If the random error terms are assumed to be independently and identically distributed as a Weibull distribution, the multinomial logit model results. If the random error terms are assumed to be distributed multivariate-normally, the multinomial probit model results.
The model specification of the multinomial logit is as follows. Suppose an individual is faced with \( m \) mutually exclusive alternatives. Let \( P_1, P_2, \ldots, P_m \) be the probabilities associated with these \( m \) alternatives. Suppose the probability for choosing an alternative \( j \) \((j=1,2,\ldots,m)\) by the individual depends on a vector of individual-specific attributes \( x \) as follows:

\[
P_j(x) = \frac{\exp[\beta_j'x]}{D} \quad (j=1,2,\ldots,m)
\]

where \( \beta_j \) is a column vector of unknown parameters;

and \( D \) is such that

\[
\sum_{j=1}^{m} P_j(x) = 1
\]

and hence

\[
D = \sum_{j=1}^{m} \exp[\beta_j'x]
\]

Evidently, \( \beta_j \)'s are not identifiable since any arbitrary vectors may be added to all of them without affecting the probabilities at all. This requires normalizing \( \beta_m = 0 \) (i.e. \( m \) is chosen as the base alternative). With the above normalization \( \beta_m = 0 \),

\[
P_m(x) = 1 / D \quad \text{since} \exp[\beta_m'x]=1. \quad \text{(for the base alternative \( m \))}
\]
B. THE LOGIT MODEL OF CORPORATE FINANCING CHOICE

In our case of corporate financing choice, there are \( m = 3 \) mutually exclusive alternatives facing firm \( i \) which requires external long-term source of financing. These include bonds, common stock, and preferred stock. As preferred stock is the focus of analysis in the paper, it is natural to have it as the base alternative such that comparisons of it with bonds and common stock can be made directly. Following the model specification as described in the previous subsection, the probability that firm \( i \) will choose to issue bonds (\( j = 1 \)) or common stock (\( j = 2 \)) at time \( t \) is

\[
P_j(x_{it}) = \text{Prob}(Z_{it} = j) = \frac{\exp[\beta_j' x_{it}]}{D} \quad (j = 1, 2)
\]

and the probability that firm \( i \) will choose preferred stock (\( j = m \)) is

\[
P_m(x_{it}) = \text{Prob}(Z_{it} = m) = \frac{1}{D} \quad (m = 3)
\]

where \( D \) was defined in the previous subsection with \( m = 3 \). The vector \( x_{it} \) is the column vector of observations on independent variables (i.e., firm-specific attributes) pertaining to firm \( i \) at time \( t \) and \( \beta_j \) is the corresponding vector of coefficients pertaining to alternative \( j \). Expressed in the form of odd ratio with the probability of choosing preferred stock as the denominator (i.e., divide (1) by (2)),

\[
\frac{P_1(x_{it})}{P_3(x_{it})} = \frac{\exp[\beta_1' x_{it}]}{\exp[\beta_3' x_{it}]}
\]

and
\[ \frac{P_2(x_{it})}{P_3(x_{it})} = \exp[\beta_2 x_{it}] \]

Taking logarithms on both sides, the expressions become

(3) \[
\log \left[ \frac{P_2(x_{it})}{P_3(x_{it})} \right] = \log \left[ P_2(x_{it}) \right] - \log \left[ P_3(x_{it}) \right] = \beta_1 x_{it}
\]

and

(4) \[
\log \left[ \frac{P_2(x_{it})}{P_3(x_{it})} \right] = \log \left[ P_2(x_{it}) \right] - \log \left[ P_3(x_{it}) \right] = \beta_2 x_{it}
\]

where subscripts 1, 2, and 3 represent bonds, common stock, and preferred stock respectively. Therefore, \( \beta_j \) can be expressed as the odds in favor of alternative \( j \) \((j=1,2)\) over the base alternative \( j=3 \).

It is directly verified from (3) and (4) that the logit coefficient, \( \beta_j \), is the derivative of the log-odd ratio, \( \log[P_j/P_m] \), with respect to the independent variable. Thus, the elasticity of the odd ratio with respect to an independent variable is \( \beta_j x_{it} \).

The vector of coefficients, \( \beta_j \), can be estimated by the method of maximum likelihood. Denote by \( y_{ijt} \) a dummy variable which equals 1 if firm \( i \) chooses alternative \( j \) at time \( t \) and 0 otherwise. Let there be \( n \) observations in the sample. Since the \( i \)th firm is faced with \( m=3 \) alternatives, the likelihood function of the sample is

\[ L = \prod_{t} \prod_{i} \prod_{j} P(x_{ijt})^{y_{ijt}} \]
Hence, the log-likelihood function is

\[ \log L = \sum_{t} \sum_{i} \sum_{j} y_{ijt} \log \{ P_j(x_{it}) \} \]

Maximization of the above log-likelihood function will produce maximum likelihood estimates of \( \beta_j \). This method guarantees consistent parameter estimates and the attractive large sample properties for the sample statistics.
VI. EMPIRICAL SPECIFICATIONS

The corporate behavior in choosing among bonds, preferred stock, and common stock has just been discussed and modeled. This section turns to the description of the empirical procedures and the presentation of variables to be used.

A. EMPIRICAL PROCEDURES

In this study, the variables used in the logit regressions are selected because they have been claimed to be important in previous related empirical studies. Before coming up with the variables for use in the logit model, a broad list of candidate variables will be first constructed for univariate analysis. For the sake of model simplicity and the reduction of multicollinearity, only those candidate variables that are highly significant in the univariate analysis are included in the final model for the multivariate analysis.

The candidate variables fall into four broad categories:
1. deviation from the target ratio, \( D - D^* \),
2. determinants of the optimal target debt ratio, \( R^* \),
3. the firm's financial conditions, \( F \), and
4. the market conditions, \( M \).

It is assumed that

\[ R^* = f(\text{firm size}, \text{asset composition}, \text{bankruptcy risk}, \text{growth} \]
opportunities, tax),
\[ F = f(\text{profitability, liquidity}), \] and
\[ M = f(\text{level of new issues, return on investment as a whole}). \]

B. DEVIAITON FROM THE TARGET RATIO

The deviation from the target debt ratio is simply defined as the difference between the firm's current debt ratio and its target value (DEV). It is expected that firms with positive deviations from the targets are more likely to issue equity whereas firms with negative deviations from the targets are more prone to use debt. Since a sale of either preferred or common stock will affect the after-issue deviation in the same direction, no prediction is made with regard to the preference between preferred and common stock if preferred stock is considered as an equity. The average of the firm's debt ratios over the ten years before the issue is used to measure the actual target ratio of the firm. This historical average, however, as Marsh (1982) points out, only provides a crude estimate of the actual target level. First, the discrete and lumpy nature of new issues coupled with the semi-automatic effect of retentions of earnings on the book value debt ratio over time may make the ten-year estimate misleading. Second, the tendency of selling securities to take advantage of favorable market conditions may result in temporary departures from the long-run target. Finally, the target itself may have changed over time.

An accompanying problem with the measurement of the debt ratio is the use of book values rather than market values. While the theory of capital structure suggests
the use of market values, accounting and many managerial finance texts prescribe
the use of book values. Marsh (1982) argues that the debt ratio should be
measured in book value terms as book value ratios accord more closely with those
used by corporate managements. He cites a survey study by Stonehill et al. (1973)
that corporate treasurers tend to think in terms of book rather than market values.
He further justifies the use of book values with Myers' (1977) view that book
values only refer to assets already in place but do not account for the present
value of future growth opportunities. Titman and Wessels (1988) later provide
evidence that suggests that many firms do in fact use book value target
debt-to-equity ratios. Because of these reasons and the difficulty in obtaining market
values, especially for debt, we use book value ratios in this study.

Ambiguities arise when we come to the definition of the firm's debt-to-equity ratio.
Because of its hybrid nature, preferred stock has sometimes been treated as equity
and sometimes debt in the computation of the debt ratio. Marsh (1982) argues that
preferred stock should be classified as debt as it is normally regarded by
management as a debt. However, some other authors such as Bradley, Jarrell, and
Kim (1984) and Titman and Wessels (1988) do not include preferred stock in the
debt category. From the point of view of common stockholders, preferred stock,
particularly that with sinking fund or call provisions, is a debt-like security. On the
other hand, preferred stock provides a layer of equity cushion to increase debt
capacity, as suggested by the utilities. Because both reasons have their own
grounds, preferred stock is arbitrarily treated as an equity in this study.\footnote{Redefining the debt-equity ratio as the ratio of long-term debt plus preferred
stock to common equity (i.e. preferred stock is viewed as similar to debt) makes
little difference to the results.}

\footnote{Redefining the debt-equity ratio as the ratio of long-term debt plus preferred
stock to common equity (i.e. preferred stock is viewed as similar to debt) makes
little difference to the results.}
C. Determinants of the Optimal Debt Ratio

Different theories of capital structure (both static and dynamic) have suggested a number of attributes that may affect the firm's optimal debt target. These attributes are denoted firm size, asset composition, bankruptcy risk, growth opportunities, and tax.

1. Firm Size

It is well known that the leverage of a firm is related to its size. Baxter and Cragg (1970), Martin and Scott (1974), and Taub (1975) provide evidence that small firms are more likely to issue equity. Fischer and Wilt (1968) suggest that preferred stock is more attractive to small industrial firms when sound management rules against issuance of debt. Marsh (1982) and Titman and Wessels (1988) find that small firms tend to use significantly more short-term debt than large firms do. To account for the observed difference between small and large firms, most authors attribute this size effect to the impact of size on a firm's ease of access to the capital markets and the associated flotation costs. As larger firms are usually found in older and more mature industries, as indicated by Logue and Merville (1972), and enjoy a greater scope with respect to potential financing media, they have less difficulty in marketing long-term debt issues than small firms do. Bankruptcy costs also play a role in the positive relationship between leverage and size. Warner (1977) and Ang, Chua, and McConell (1982) provide evidence that direct bankruptcy costs appear to constitute a larger proportion of a firm's value as that value decreases. It is also argued that firms with larger assets tend to be more diversified.
and less prone to bankruptcy. Larger firms may have greater resources to fall back on in case of adversity. Another interpretation of the impact of firm size is related to the costs of recapitalization. Fischer, Heinkel, and Zechner (1989) show that firms with higher recapitalization costs have a larger debt ratio range and a lower debt ratio. As small firms incur larger proportional transactions costs than larger firms, small firms are expected to have a wide range of debt ratios and a lower optimal debt ratio after recapitalization. All these arguments suggest that larger firms are more highly leveraged. The choice between preferred stock and common stock is less clearcut. Without theoretical ground, we assume that firms are somewhat indifferent with the use of preferred stock and common stock.

The indicator variable for this attribute is proxied by the natural logarithm of total assets (SIZE1) and the natural logarithm of sales (SIZE2). The logarithmic transformation reflects the view that firm size affects mainly the very small firms.

2. Asset Composition

The distribution of assets owned by a firm may in some way affect its capital structure choice. A recent study by Fischer, Heinkel, and Zechner (1989) provides evidence that firms with a higher variance of their underlying assets are more likely to have a wider debt ratio range and a lower optimal debt ratio after recapitalization. A higher composition of fixed assets implies a higher operating leverage and in turn a higher variance of asset value. Therefore, the likelihood of a debt issue should be negatively related to the proportion of fixed assets.
As to the choice between common stock and preferred stock, virtually no theory has been advanced to predict the choice conditional on a firm's asset composition. It is therefore more appropriate not to include a prediction on the choice between common stock and preferred stock.

The measure of asset composition is taken as the ratio of fixed to total assets (both figures net of depreciation) (ASSCOM).

3. Bankruptcy Risk

The traditional view of tax-advantage-and-bankruptcy-costs tradeoff suggests that expected costs of bankruptcy increase with the level of debt. Fischer, Heinkel, and Zechner (1989) show that firms with low bankruptcy costs have, on average, higher debt ratio range than firms with very high bankruptcy costs. For low levels of bankruptcy costs, increasing bankruptcy costs makes it optimal to lower the initial debt ratio after recapitalization. Bankruptcy risk consists principally of two components, namely, financial risk and operating risk. The former is customarily measured by the firm's debt ratio of which its determinants are our concern here. Two of the four measures of operating risk experimented in Marsh (1982) are used in our model. The first risk variable is the "bankruptcy risk" measure developed by White and Turnbull (1974) (RISK1), namely,

    \[
    \frac{\text{fixed charges} - \text{earnings before interest and tax (EBIT)}}{\text{estimated standard deviation (past ten years) of earnings}}
    \]
The order in which the difference expression is arranged in the numerator is different from the convention that fixed charges should be deducted from EBIT has an advantage of same alignment of sign with the other risk proxies used. In other words, the larger the value of the risk proxy, the larger is the bankruptcy risk of the firm. The second risk variable, which is taken from Brealey, Hodges, and Capron (1976), is measured by the standard deviation of scaled EBIT, where the scaling factor is the total assets (RISK2). Along with these two risk measures, a third variable, which is taken from Titman and Wessels (1988) and defined as the standard deviation of the percentage change in operating income (RISK3), is added. It is expected that the likelihood of issuing debt is negatively related to the risk variables.

If the financial distress hypothesis holds, firms with higher bankruptcy risk are expected to have a preference for preferred stock over both common stock and bonds. Issuing bonds would only aggravate the financial situations and increase the odds of going under. Although these increased costs of bankruptcy can be avoided by issuing common stock, the firm might have to accept a depressed stock price due to the financial distress. Alternatively, Myers’ (1984) pecking order theory may help account for the use of preferred stock rather than common stock. The pecking order theory holds that, if external finance is required, firms issue debt first, then possibly hybrid securities such as convertible bonds and preferred stock, then perhaps equity as a last resort. Therefore, when a financially distressed firm finds it costly to issue debt due to the increasing risk of bankruptcy, it would turn to preferred stock before common stock.
4. Growth Opportunities

In an agency cost context where firms are viewed as nexuses of contracts, Myers (1977) shows that it is more difficult for firms to fund growth opportunities with debt borrowings. Others argue that growth opportunities are intangible and thus cannot be collateralized. Financing growth opportunities with debt is therefore very difficult, if not impossible. For these reasons, we would expect a negative relation between debt and growth opportunities. The relationship between preferred stock and growth opportunities is less straightforward. Heinkel and Zechner (1988) find a negative relationship between the firm’s growth opportunities and its preferred-to-debt ratio. In other words, given an increase in growth opportunities, we would expect that the firm tends to issue debt and retire preferred stock. When common stock and preferred stock come into play, it is expected that firms with higher growth opportunities are more likely to use common stock as the issue of preferred stock is not in line with the solution to adverse investment incentive hypothesis.

The proxies for growth opportunities, albeit imperfect, include the growth of assets measured by the percentage change in total assets (GROW1) and the difference between the market value and book value of common equity scaled by total assets (GROW2).
5. Tax

In the theory of optimal capital structure, tax provides an incentive for the use of debt by generating tax shields. Raising corporate tax rate should result in an increase in the use of debt. However, few studies have included tax in their analyses due mainly to the fact that there have been virtually no variation in statutory tax rates for the past couple of decades or so. Taub (1975) reports a significantly negative relation between statutory tax rate and the firm's debt-to-equity ratio. This is contrary to the theory and Taub (1975) ascribes the wrong sign to some unknown factors that are closely correlated to the tax rate as well as the small variation in tax rate over his period of study.

In fact, most researchers have overlooked the discrepancy that exists between the statutory and effective tax rates for debt finance. In the U.S., most corporations face the same statutory corporate tax rate but their effective tax rate can vary widely across industries and firms. Cordes and Sheffrin (1983) present estimates of the effective tax value of incremental interest deductions. They attribute the significant variation in the effective tax rate across firms to a number of reasons, such as the progressive tax system, limitations on the use of investment tax credits and tax loss carry-back, other non-debt tax shields, etc. Bearing this important discrepancy in mind, Fischer, Heinkel, and Zechner (1989) find that a higher effective corporate tax rate causes a smaller optimal debt ratio range and a higher initial optimal debt ratio.

In view of this encouraging result, we include a tax variable in our model. The
variable is the firm's effective tax rate defined as the ratio of income tax to EBIT (EFFTAX). For negative earnings or negative income tax (which might represent a tax refund or subsidy), the effective tax rate is arbitrarily set equal to zero. As a matter of fact, effective tax rate acts as a proxy for the expected effective tax rates for the ensuing few years. We argue that the expected effective rates for the coming "few" years rather than for a longer period of time matter as the firm's major concern is survival and it may well refinance preferred stock after it regains financial strength if it finds the preferred stock financing expensive.

According to the financial distress hypothesis, firms anticipating low effective future tax rates are more likely to offer preferred stock as a financing device vis-a-vis bonds and common stock. The attractiveness of preferred stock is derived from its associated lower risk of bankruptcy and at the same time no loss of tax advantage due to the financial distress. Again, Myers' (1984) pecking order theory may help account for the preference for preferred stock over common stock. For a financially distressed firm, common stock offers the same above two advantages that preferred stock does. However, the firm would consider the use of preferred stock first. Common stock is the last resort according to the pecking order theory.

D. THE FINANCIAL CONDITIONS OF THE FIRM

We examine the effect of the firm's financial conditions on its long-term financing choice from two aspects, namely, profitability and liquidity. Martin and Scott (1974) argue that a higher level of profitability is associated with debt-issuing firms. They rationalize the relationship on the basis of direct relationship between cash
generating ability and profitability. The better the ability to generate cash, the more confident and comfortable the management feel with debt financing. On the other hand, higher profitability means higher amount of earnings available for retentions. Therefore, borrowing can be increased to the extent that the higher earnings lead to a decrease in book value debt-to-equity ratio. In other words, the likelihood of issuing debt increases with the level of profitability. This is consistent with Ross (1977) that debt offerings signal good prospects for the firm to the market. When firms anticipate low or even negative future earnings, they would find preferred stock more attractive. This is basically Donaldson’s (1962) financial distress hypothesis. In the absence of simple means to identify a firm’s expectations about its profitability, current earnings is used as a proxy. Two measures of profitability are used. These include the ratios of operating income over sales (PROF1) and net income over total assets (PROF2).

The impact of the firm’s liquidity is less clear. All we can say about it is that the greater the firm’s existing and projected liquidity posture, the greater its debt capacity. Nevertheless, we include in our model two liquidity variables as measured by the ratio of current assets to current liabilities (LIQ1) and the ratio working capital to total assets (LIQ2) to test if there is any impact of the firm’s liquidity on its choice of long-term financing instrument.

E. MARKET CONDITIONS

The notion of market efficiency clearly rules out the possibility of gaining from timing security offerings. However, it is not uncommon, for example, to find equity
issues preceded by periods of large positive excessive returns. Brealey, Hodges, and Capron (1976), Taggart (1977), and Marsh (1982) indicate that equity issues tend to follow market rises. In addition, Taggart (1977), Marsh (1982), and Asquith and Mullins (1986) indicate that equity issues also tend to follow periods of unusually high abnormal returns on the company's stock. Taggart (1977) and Marsh (1982) provide evidence that the level of interest rates is an important determinant of the level of long-term debt issues. Elsaid (1969) finds that one of the main reasons for issuing preferred stock is to take advantage of the favorable market conditions. For all these reasons, we include in our model three market condition and timing variables to provide a reasonable description of reality. These three variables are designed to reflect the general equity (preferred stock and common stock) and bond market conditions. Following Marsh (1982), we use the following model to forecast the equity market:

$$E_t = a_{0t} + a_{1t}E_{t-1} + a_{2t}E_{t-2} + a_{3t}M_{t-1} + a_{4t}M_{t-2} + u_t$$

where $E_t$, $E_{t-1}$, and $E_{t-2}$ are the level of new equity issues in months $t$, $t-1$ and $t-2$, and $M_{t-1}$ and $M_{t-2}$ are the returns on the equity market in months $t-1$ and $t-2$. The parameters of the model, $a_{0t}$, $a_{1t}$, $a_{2t}$, $a_{3t}$, and $a_{4t}$ are estimated for each issue using all available information from month $t-61$ up to month $t-1$ (i.e. using a sixty month period). The bond market model is basically the same with the explanatory variables redefined as the monthly level of new corporate bonds and yield on the ten-year U.S. Treasury Bonds.
F. INDUSTRY CLASSIFICATION

The security offerings statistics in the United States suggest that preferred stock has a stronghold in the financing of utilities, and recently, banks. Zechner and Heinkel (1988) also suggest that firms in the regulated industries, such as utilities and banks, are frequent users of preferred stock. In view of this, a dummy variable (IND) is included to examine if there is an industry effect on the choice of preferred stock vis-a-vis bonds and common stock. The dummy is equal to one for utilities, banks and other financial institutions as defined in the Compustat Utilities and Banks Files and zero otherwise.17

G. SUMMARY OF PREDICTIONS

To summarize, the probability of a firm's long-term financing choice is assumed to depend on three broad factors. These include (1) the deviation from its debt target, (2) its financial conditions, and (3) the current market conditions. No precise measures for these factors are available and a number of possible proxies for them have just been suggested. Table III contains the list of these three determinants as well as the definitions of the variables actually used in univariate and multivariate analyses. With the exception of the market forecasts which use monthly data, all other variables are measured as of the start of the fiscal year in which the issue occurred.

Table IV summarizes the predicted effects of the firm’s attributes on its choice of

17 The SIC’s for the utilities are 4911, 4912, 4923, 4924, 4931. The SIC’s for the banks and financial institutions are 6000-6700.
Table III
Variable Definitions

<table>
<thead>
<tr>
<th>Types of Variables</th>
<th>Proxies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure of Deviation from Target</td>
<td>current debt-to-equity ratio(^a) - ten-year average of the ratio (DEV)</td>
</tr>
<tr>
<td>Firm Size</td>
<td>1. logarithm of total assets (SIZE1)</td>
</tr>
<tr>
<td></td>
<td>2. logarithm of sales (SIZE2)</td>
</tr>
<tr>
<td>Asset Composition</td>
<td>fixed assets/total assets (ASSCOM)</td>
</tr>
<tr>
<td>Bankruptcy Risk</td>
<td>1. ((\text{Interest} - \text{EBIT})/\sigma(\text{ten-year EBIT})) (RISK1)</td>
</tr>
<tr>
<td></td>
<td>2. (\sigma(\text{EBIT/total assets})) (RISK2)</td>
</tr>
<tr>
<td></td>
<td>3. (\sigma(\text{percentage change in operating income})) (RISK3)</td>
</tr>
<tr>
<td>Tax</td>
<td>tax/EBIT (EFFTAX)</td>
</tr>
<tr>
<td>Growth Opportunities</td>
<td>1. percentage change in total assets (GROW1)</td>
</tr>
<tr>
<td></td>
<td>2. ((\text{market value of common equity - book value of common equity})/\text{total assets}) (GROW2)</td>
</tr>
<tr>
<td>Profitability</td>
<td>1. operating income/sales (PROF1)</td>
</tr>
<tr>
<td></td>
<td>2. ((\text{EBIT} - \text{tax})/\text{total assets}) (PROF2)</td>
</tr>
<tr>
<td>Liquidity</td>
<td>1. current assets/current liabilities (LIQ1)</td>
</tr>
<tr>
<td></td>
<td>2. working capital/total assets (LIQ2)</td>
</tr>
<tr>
<td>Bond Issue Forecast</td>
<td>forecasting model(^b) (BONFOR)</td>
</tr>
<tr>
<td>Common Stock Issue Forecast</td>
<td>forecasting model(^b) (COMFOR)</td>
</tr>
<tr>
<td>Preferred Stock Issue Forecast</td>
<td>forecasting model model(^b) (PFDFOR)</td>
</tr>
</tbody>
</table>

\(^a\) Equity is measured as the sum of book values of preferred stock and common stock.

\(^b\) The variable is taken as the logarithm of the market forecast.

financing instrument. The attributes of bond issuing firms and common stock issuing firms are compared to those of preferred stock issuing firms to examine the
hypothesis that preferred stock issuing firms do possess some characteristics different from the other two types of issuers. In addition, some of the attributes are used to reflect the impacts of the two previously mentioned hypotheses on the use of preferred stock. The financial distress hypothesis can be tested by examining the effects of profitability, liquidity, bankruptcy risk, and tax on the financing choice across the three groups of issuers. The solution to adverse investment incentives hypothesis can be tested (indirectly) by noting the impact of growth opportunities on the choice of financing instrument across the three groups of issuing firms. The differential qualitative predictions described in Table IV are important for the interpretations of the empirical results.
### Table IV

Predicted Effects of Firm Attributes on Corporate Financing Choice Among Bonds, Common Stock, and Preferred Stock (As Compared With Preferred Stock)

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Bonds (^a)</th>
<th>Common Stock (^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation from Target</td>
<td>Negative</td>
<td>None (37) (^c)</td>
</tr>
<tr>
<td>Firm Size</td>
<td>Positive</td>
<td>None or Negative (39)</td>
</tr>
<tr>
<td>Asset Composition</td>
<td>Negative</td>
<td>None (40)</td>
</tr>
<tr>
<td>Bankruptcy Risk</td>
<td>Negative</td>
<td>Negative (41)</td>
</tr>
<tr>
<td>Tax</td>
<td>Positive</td>
<td>Positive (44)</td>
</tr>
<tr>
<td>Growth Opportunities</td>
<td>Positive</td>
<td>Positive (43)</td>
</tr>
<tr>
<td>Profitability</td>
<td>Positive</td>
<td>Positive (45)</td>
</tr>
<tr>
<td>Liquidity</td>
<td>Positive</td>
<td>Positive (45)</td>
</tr>
<tr>
<td>Bond Issue Forecast</td>
<td>Positive</td>
<td>None (46)</td>
</tr>
<tr>
<td>Common Stock Issue Forecast</td>
<td>None</td>
<td>Positive (46)</td>
</tr>
<tr>
<td>Preferred Stock Issue Forecast</td>
<td>Negative</td>
<td>Negative (46)</td>
</tr>
</tbody>
</table>

\(^a\) Positive effect indicates that an increase in the explanatory variable would increase the probability of issuing bonds vis-a-vis preferred stock.

\(^b\) Positive effect indicates that an increase in the explanatory variable would increase the probability of issuing common stock vis-a-vis preferred stock.

\(^c\) The number refers to the page on which the predicted effects of the variables are discussed.
VII. SAMPLE AND SOURCES OF DATA

A. THE SAMPLE

The discrete corporate financing choice model, which was detailed in the previous two sections, is estimated using data associated with a sample of public security offerings made by U.S. corporations during the period 1977 through 1986. The sample was drawn from the population of all public issues of bonds, common stocks, and preferred stocks that were identified in various issues of Institutional Investors' Financing Record. The sample was formed by imposing the following selection criteria:

1. Multiple issues within the same fiscal year were excluded. In other words, firms that publicly issued both bonds and stocks, be they common or preferred, within the same accounting year were eliminated because one of the restrictions of the logit model is that the alternatives be mutually exclusive.

2. Firms having an incomplete history of accounting and financial data for the ten year period prior to the issue were excluded. The data was available on the Annual Compustat Industrial Files.

The Financing Record of Institutional Investors reports SEC registered public negotiated and competitive offerings in the U.S. on a monthly basis. The report includes offerings of $2 million or more for the period January 1977 through October 1982, offerings of $10 million or more for the period November 1982 through April 1983, and offerings of $25 million or more for the period May 1983 through December 1984. For the period January 1985 through December 1986, the Financing Record only includes negotiated debt of $50 million or more and all other categories of a minimum of $25 million. This imposes a limitation on data availability and may cause a selection bias in the formation of the "population" of issuers. Therefore, interpretations of the results obtained from the logit regressions should be handled with caution.
3. The common stock of the firms had to be listed on the New York Stock Exchange for a period of no less than sixty months prior to the issue.

4. Secondary distributions of common stock where no change in capital structure occurred were also ruled out.

The resulting sample contained 964 issues, of which 429 were common stock offerings, 455 were bond issues, and the balance of 80 were preferred stock offerings.¹⁹

An intrinsic difference exists between how the sample used in this study is generated and the way the samples of other similar studies are created. In most other studies, the sample is usually drawn from a population of firms and their financing history is observed over a given period of time. The total number of capital issues made by these selected firms then constitute the sample. This method has the shortcoming of having a small sample size for those less frequently used financing vehicles such as preferred stock. This is exactly the case found in Baxter and Cragg (1970) where there are only five preferred stock issues in their sample. This problem of small sample size is a major concern in the estimation of the multinomial logit, which requires large sample to guarantee asymptotic properties. In this study, the problem is remedied by focussing on issues instead of firms. Only those issues that do not meet the sample selection criteria are eliminated.

¹⁹A total of more than 3,500 public security issues made for the ten-year period 1977 through 1986 were reported on the Financing Record. Approximately half of them were multiple issues which were offered mainly by public utilities and banks. Roughly 400 of the remaining had their issuers identified as American Stock Exchange (AMEX) listed firms. As the CRSP tape does not contain monthly stock returns data for firms listed on the AMEX, these firms were also excluded.
Table V and VI show the breakdown by year and by industry for each type of the security. It is interesting to note that almost half of the preferred stock issues included in the sample come from the period 1983 to 1986. The two major groups of preferred stock issuers are the group of transportation, communication, electric, gas and sanitary services firms (two-digit SIC range: 40-49), and the group of manufacturing concerns (two-digit SIC: 20-39). (two-digit SIC range: 60-67).

B. SOURCES OF DATA

The data associated with the sample of firms that had publicly offered either bonds, preferred stock, or common stock during the period 1977 through 1986 were collected from a variety of sources. The financial and accounting data for the sample firms were obtained from the Annual Compustat Industrial Files. Monthly stock returns were taken from the Center for Research in Security Prices (CRSP) Monthly Index File. Volumes of monthly new security issues were collected from various issues of Federal Reserve Bulletin's Financial and Business Statistics. Preferred stock and bond yields were obtained from the 1988 edition of Standard and Poor's Security Price Index Record.

20 Only public sales of debt figures were taken because of the non-availability of privately placed bond issues in most of the issues.
21 The preferred stock yield indexes were based upon ten high-grade non-callable issues with the yield for each being determined and the average of the four median yields representing the group yield. The bond yields were represented by the yields on U.S. Government Bonds with intermediate maturities, that is, maturities of more than six years but less than nine years.
Table V

Sample of Bond, Common Stock, and Preferred Stock Issues by Year

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>Bond Issues</th>
<th>Common Stock Issues</th>
<th>Preferred Stock Issues</th>
<th>Total Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>29</td>
<td>36</td>
<td>5</td>
<td>70</td>
</tr>
<tr>
<td>1978</td>
<td>22</td>
<td>47</td>
<td>4</td>
<td>73</td>
</tr>
<tr>
<td>1979</td>
<td>32</td>
<td>39</td>
<td>7</td>
<td>78</td>
</tr>
<tr>
<td>1980</td>
<td>50</td>
<td>57</td>
<td>4</td>
<td>111</td>
</tr>
<tr>
<td>1981</td>
<td>29</td>
<td>50</td>
<td>6</td>
<td>85</td>
</tr>
<tr>
<td>1982</td>
<td>41</td>
<td>55</td>
<td>6</td>
<td>102</td>
</tr>
<tr>
<td>1983</td>
<td>42</td>
<td>82</td>
<td>13</td>
<td>137</td>
</tr>
<tr>
<td>1984</td>
<td>43</td>
<td>11</td>
<td>9</td>
<td>63</td>
</tr>
<tr>
<td>1985</td>
<td>73</td>
<td>22</td>
<td>9</td>
<td>104</td>
</tr>
<tr>
<td>1986</td>
<td>94</td>
<td>30</td>
<td>17</td>
<td>141</td>
</tr>
<tr>
<td>All Years</td>
<td>455</td>
<td>429</td>
<td>80</td>
<td>964</td>
</tr>
</tbody>
</table>
### Table VI

**Sample of Bond, Common Stock, and Preferred Stock Issues by Industry**

<table>
<thead>
<tr>
<th>Two-Digit SIC Range</th>
<th>Industrial Group</th>
<th>Bond Issues</th>
<th>Common Stock Issues</th>
<th>Preferred Stock Issues</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-09</td>
<td>Agriculture, forestry, and fishing</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10-14</td>
<td>Mining</td>
<td>15</td>
<td>13</td>
<td>10</td>
<td>38</td>
</tr>
<tr>
<td>15-17</td>
<td>Construction</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>20-39</td>
<td>Manufacturing</td>
<td>219</td>
<td>154</td>
<td>30</td>
<td>403</td>
</tr>
<tr>
<td>40-49</td>
<td>Transportation, communication, electric, gas and sanitary services</td>
<td>134</td>
<td>187</td>
<td>32</td>
<td>353</td>
</tr>
<tr>
<td>50-59</td>
<td>Wholesale and retail trade</td>
<td>62</td>
<td>45</td>
<td>4</td>
<td>111</td>
</tr>
<tr>
<td>60-67</td>
<td>Finance, insurance, and real estate</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>70-89</td>
<td>Services</td>
<td>18</td>
<td>26</td>
<td>1</td>
<td>45</td>
</tr>
<tr>
<td>All Industries</td>
<td></td>
<td>455</td>
<td>429</td>
<td>80</td>
<td>964</td>
</tr>
</tbody>
</table>

**Note:** The classification of the above eight major industrial groups is adopted from the 1986 Standard and Poor's Register of Corporations, Directors and Executives, Vol III.
The empirical results fall into two categories. The first involves a univariate analysis of the independent variables based on one-way analysis of variance among different group means and Duncan's multiple range test. The second category comprises a multivariate analysis based on the maximum likelihood estimation of the multinomial logit model.

A. UNIVARIATE ANALYSIS

Before any meaningful multivariate analysis is carried out, it is instructive to examine on a univariate basis the differences among the three groups of issuers, namely, bond, common stock, and preferred stock issuers. The univariate analysis not only provides insights into the effects of individual independent variables on the corporate choice among the three given financing alternatives, but also serves as a means to select variables for inclusion in the final logit model. Table VII gives the group means for each of the independent variables that are included in the logit regression model. (A more comprehensive description of the distributions for all the variables including those that are excluded from the final model is given in Appendix I.) It is interesting to note that majority of the mean values for the group of preferred stock issuers do not fall between the mean values for the bond issuing group and the common stock issuing group. Only two out of the eleven variables listed in Table VII have their mean values for the group of preferred stock issuers lying between the values for the other two groups. These include the size variable (SIZE2) as measured by the logarithm of sales and the bond market
Table VII

<table>
<thead>
<tr>
<th>Type of Variable</th>
<th>Variable</th>
<th>Bonds</th>
<th>Common Stock</th>
<th>Preferred Stock</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation from Target</td>
<td>DEV</td>
<td>-0.027</td>
<td>-0.004</td>
<td>-0.028</td>
<td>-0.017</td>
</tr>
<tr>
<td>Determinants of Target</td>
<td>SIZE2</td>
<td>7.36</td>
<td>6.07</td>
<td>6.89</td>
<td>6.75</td>
</tr>
<tr>
<td></td>
<td>ASSCOM</td>
<td>0.54</td>
<td>0.58</td>
<td>0.62</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>RISK1</td>
<td>-2.55</td>
<td>-2.34</td>
<td>-1.44</td>
<td>-2.36</td>
</tr>
<tr>
<td></td>
<td>EFFTAX</td>
<td>0.44</td>
<td>0.45</td>
<td>0.41</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>GROW2</td>
<td>0.17</td>
<td>0.37</td>
<td>0.055</td>
<td>0.25</td>
</tr>
<tr>
<td>Financial Conditions</td>
<td>LIQ1</td>
<td>1.66</td>
<td>1.63</td>
<td>1.40</td>
<td>1.63</td>
</tr>
<tr>
<td></td>
<td>PROF2</td>
<td>0.071</td>
<td>0.075</td>
<td>0.056</td>
<td>0.072</td>
</tr>
<tr>
<td>Market Conditions</td>
<td>PFDVOL</td>
<td>5.86</td>
<td>5.74</td>
<td>5.90</td>
<td>5.81</td>
</tr>
<tr>
<td></td>
<td>BONVOL</td>
<td>8.59</td>
<td>8.13</td>
<td>8.49</td>
<td>8.38</td>
</tr>
<tr>
<td></td>
<td>COMVOL</td>
<td>7.45</td>
<td>7.29</td>
<td>7.56</td>
<td>7.39</td>
</tr>
<tr>
<td>Number of Observations</td>
<td></td>
<td>455</td>
<td>429</td>
<td>80</td>
<td>964</td>
</tr>
</tbody>
</table>

forecast (BONVOL) as measured by the logarithm of the bond issue forecast. This suggests that firms that issue preferred stock do possess some characteristics not lying between those of bond and common stock issuers.

To examine if the group means are different from each other, both the one-way analysis of variance and Duncan's multiple range test are used. Table VIII reports the results of the one-way analysis of variance. The overall F-test indicates that all except two variables have significantly different means at the five percent level of significance. The two exceptions are the deviation from target (DEV) and the effective tax rate (EFFTAX). In other words, the three groups of issuers are not
Table VIII

Univariate Tests of Significance: Analysis of Variance

<table>
<thead>
<tr>
<th>Variable</th>
<th>F-Value</th>
<th>Prob&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation from Target (DEV)</td>
<td>0.21</td>
<td>0.8070</td>
</tr>
<tr>
<td>Firm Size (SIZE2)</td>
<td>97.47</td>
<td>0.0001</td>
</tr>
<tr>
<td>Asset Composition (ASSCOM)</td>
<td>6.53</td>
<td>0.0015</td>
</tr>
<tr>
<td>Bankruptcy Risk (RISK1)</td>
<td>20.01</td>
<td>0.0001</td>
</tr>
<tr>
<td>Tax (EFFTAX)</td>
<td>0.81</td>
<td>0.4446</td>
</tr>
<tr>
<td>Growth Opportunities (GROW2)</td>
<td>18.22</td>
<td>0.0001</td>
</tr>
<tr>
<td>Liquidity (LIQ1)</td>
<td>3.93</td>
<td>0.0200</td>
</tr>
<tr>
<td>Profitability (PROF2)</td>
<td>10.89</td>
<td>0.0001</td>
</tr>
<tr>
<td>Preferred Stock Market Forecast</td>
<td>11.36</td>
<td>0.0001</td>
</tr>
<tr>
<td>Bond Market Forecast</td>
<td>44.54</td>
<td>0.0001</td>
</tr>
<tr>
<td>Common Stock Market Forecast</td>
<td>9.08</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

significantly different from each other on the basis of deviation from target and effective tax rate. On the other hand, there are significant differences among the bond, common stock, and preferred stock issuers in terms of firm size, asset composition, bankruptcy risk, growth opportunities, liquidity, and profitability. However, the origin of the variation in group means cannot be identified with the overall F-ratios. It is not known if the variation originates between any one of the possible sets of pair-wise comparisons or among the three groups of issuing firms.

In view of the shortcoming of the overall F-test, Duncan's multiple range test\(^2\) is

\(^2\)Duncan's multiple range test basically involves two steps: first, the group means are ranked from the highest to the smallest; second, two group means are tested for equality each time, starting with the pair of the largest and the smallest. Their difference is then compared to a tabled critical point whose value depends on the range of the ranks of the two tested means: the larger the rank difference, the
used to address the question of individual differences among groups. Table IX contains the results of Duncan's multiple range test. At a five percent level of significance, the test is consistent with the analysis of variance test and indicates a general difference among the bond, common stock, and preferred stock issuing firms. In only one instance, namely, the firm size (SIZE2), the variation in the group means originates among the three groups of issuers. In all other cases, the variation originates between only two rather than three groups of issuing firms. In four instances, the group mean for preferred stock issuing firm is statistically different from the means for the other two groups. These include firm size (SIZE2), bankruptcy risk (RISK1), liquidity (LIQ1), and profitability (PROF2). The last three variables are actually variables used to examine the financial distress hypothesis.

These results further indicate that firms that issue preferred stock do have some attributes of their own. In the remaining four instances, namely, deviation from target (DEV), asset composition (ASSCOM), effective tax rate (EFFTAX), and growth opportunities (GROW2), preferred stock issuers are non-distinguishable from the bond or common stock issuers. While the univariate analysis shows that the three groups of issuers differ from each other in most cases, it is encouraging that the group of preferred stock issuers appears to be distinct from the other two groups in some of the cases. The results suggest that firms that issue preferred stock have some attributes that are different from firms that issue the other two types of financing, that is, bonds and common stock.

2^2 (cont'd) larger the tabled critical point. Refer to Freund and Littell (1981) for a description of the test (pp.57-63).
Table IX

Univariate Tests of Significance: Duncan's Multiple Range Test

(Alpha = 0.05)

<table>
<thead>
<tr>
<th>Deviation from Target (DEV)</th>
<th>Common = Bond = Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Size (SIZE2)</td>
<td>Bond Preferred Common</td>
</tr>
<tr>
<td>Asset Composition (ASSCOM)</td>
<td>Preferred = Common Common = Bond</td>
</tr>
<tr>
<td>Bankruptcy Risk (RISK1)</td>
<td>Preferred Common Bond</td>
</tr>
<tr>
<td>Tax (EFFTAX)</td>
<td>Common = Bond = Preferred</td>
</tr>
<tr>
<td>Growth Opportunities (GROW2)</td>
<td>Common Bond = Preferred</td>
</tr>
<tr>
<td>Liquidity (LIQ1)</td>
<td>Bond = Common Preferred</td>
</tr>
<tr>
<td>Profitability (PROF2)</td>
<td>Common = Bond Preferred</td>
</tr>
<tr>
<td>Preferred Stock Market Forecast (PFDVOL)</td>
<td>Preferred = Bond Common</td>
</tr>
<tr>
<td>Bond Market Forecast (BONVOL)</td>
<td>Preferred = Bond Common</td>
</tr>
<tr>
<td>Common Stock Market Forecast (COMVOL)</td>
<td>Preferred = Bond Common</td>
</tr>
</tbody>
</table>

Note: The three types of financing are arranged in descending order of their mean values. The equal sign indicates that the two types of financing are not statistically significantly different.

B. MULTIVARIATE ANALYSIS

Multivariate Analysis involves the estimation of the multinomial logit coefficients. Clearly, it is not appropriate to include all the variables in the regression model despite the fact that more relevant variables may add information and explanatory power. Having a large number of variables in the final model would not only result in a bulky model but also a model with high degree of multicollinearity. The latter problem arises from the fact that some determinants of corporate financing choice are measured by a number of proxies which are in principle correlated with each other.
According to the model specification, the number of equations to be run in a multinomial logit model equals the number of alternatives minus one as one of the alternatives has to be chosen as the referent. In our case, preferred stock is designated as the base alternative to which bonds and common stock are compared. Thus, the resulting model consists of two equations with the first one dealing with the choice between bonds and preferred stock and the second one dealing with the choice between common stock and preferred stock.

In the final model, there are twelve variables of which the selection is based primarily on their performance in Duncan's multiple range test (except for the industry dummy, IND). These include one variable measuring the deviation from target (DEV); one measuring the industry effect (IND); five for the determinants of the target including (i) the logarithm of sales (SIZE2), (ii) the percentage of fixed assets (ASSCOM), (iii) the bankruptcy risk variable developed by White and Turnbull (1974) (RISK1), (iv) the difference between the market value and book value of common equity scaled by total assets (CROW2), and (v) the effective tax rate (EFFTAX); two proxies for the firm's financial conditions which include earnings after tax but before interest scaled by total assets (PROF2) for profitability and the ratio of current assets to current liabilities for liquidity (LIQ1); and the three market condition and timing variables. (BONFOR, COMFOR, and PFDFOR).

Table X shows the correlation matrix for all these variables except the industry dummy (IND). All except six pairs of variables show a generally low degree of correlation coefficient (i.e. <0.30). The high correlations between PROF2 and GROW2 (0.44), PROF2 and RISK1 (-0.53), ASSCOM and LIQ1 (-0.62), and among the three
Table X

Correlation Matrix for the Variables in the Model

<table>
<thead>
<tr>
<th></th>
<th>DEV</th>
<th>SIZE2</th>
<th>ASSCOM</th>
<th>RISK1</th>
<th>EFFTAX</th>
<th>GROW2</th>
<th>LIQ1</th>
<th>PROF2</th>
<th>PFDVOL</th>
<th>BONVOL</th>
<th>COMVOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEV</td>
<td>-.06</td>
<td>0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIZE2</td>
<td>-.06</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASSCOM</td>
<td>0.15</td>
<td>-.07</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RISK1</td>
<td>-.01</td>
<td>-.02</td>
<td>-.00</td>
<td>-.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFFTAX</td>
<td>-.01</td>
<td>-.21</td>
<td>-.32</td>
<td>-.15</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROW2</td>
<td>0.07</td>
<td>-.15</td>
<td>-.62</td>
<td>-.01</td>
<td>0.01</td>
<td>0.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIQ1</td>
<td>-.05</td>
<td>-.16</td>
<td>-.16</td>
<td>-.53</td>
<td>0.05</td>
<td>0.44</td>
<td>0.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROF2</td>
<td>0.05</td>
<td>0.15</td>
<td>-.13</td>
<td>0.13</td>
<td>0.01</td>
<td>0.10</td>
<td>0.07</td>
<td>-.10</td>
<td>0.67</td>
<td>0.74</td>
<td>0.70</td>
</tr>
<tr>
<td>PFDVOL</td>
<td>0.03</td>
<td>0.27</td>
<td>-.14</td>
<td>0.04</td>
<td>0.03</td>
<td>0.08</td>
<td>0.05</td>
<td>-.08</td>
<td>0.08</td>
<td>0.74</td>
<td>0.70</td>
</tr>
<tr>
<td>BONVOL</td>
<td>0.04</td>
<td>0.21</td>
<td>-.13</td>
<td>0.22</td>
<td>0.03</td>
<td>0.10</td>
<td>0.06</td>
<td>-.12</td>
<td>0.74</td>
<td>0.74</td>
<td>0.70</td>
</tr>
</tbody>
</table>

market forecast variables (0.67-0.74) indicate the presence of multicollinearity which is a matter of concern in the estimation of the multinomial logit model. There are two major symptoms of multicollinearity: (1) general inflation of the standard errors of the coefficient estimates, and (2) incorrect estimated signs. The consequence of inflated standard errors is that the resulting coefficients are unstable and may not be statistically significant even though there exists a definite statistical relationship between the dependent variable and the set of explanatory variables. Despite these potential problems, all the moderately correlated variables are retained in the final model to avoid a specification error caused by dropping variables that should not be deleted. Any specification error of the model would result in biased coefficient estimates.

Table XI presents the coefficient estimates for the multinomial logit model.\textsuperscript{2}\textsuperscript{3} It should be noted from Table VI that there are only seven security issues made by the group of finance, insurance, and real estate firms. The main reason is that most of the firms in the group, mainly banks and financial institutions, have missing data in one or more variables on the Compustat File. In view of this small sample size, care should be taken on the interpretation of the industry dummy, IND.
Maximum Likelihood Estimates for the Multinomial Logit (standard errors in parentheses)

<table>
<thead>
<tr>
<th>Variable (x)</th>
<th>Bonds ($\beta_1$)</th>
<th>Common Stock ($\beta_2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONST</td>
<td>0.1329 (2.0916)</td>
<td>8.7867 (2.1874)</td>
</tr>
<tr>
<td>DEV</td>
<td>0.1818 (0.2238)</td>
<td>0.2342 (0.2225)</td>
</tr>
<tr>
<td>SIZE2</td>
<td>0.2664 (0.1007)</td>
<td>-0.2731 (0.1020)</td>
</tr>
<tr>
<td>ASSCOM</td>
<td>-0.8062 (0.7574)</td>
<td>-0.4267 (0.7657)</td>
</tr>
<tr>
<td>RISK1</td>
<td>-0.4018 (0.1188)</td>
<td>-0.2802 (0.1199)</td>
</tr>
<tr>
<td>EFFTAX</td>
<td>-0.1497 (0.3512)</td>
<td>0.1651 (0.3388)</td>
</tr>
<tr>
<td>GROW2</td>
<td>1.0186 (0.6737)</td>
<td>2.3576 (0.6757)</td>
</tr>
<tr>
<td>LIQ1</td>
<td>0.5078 (0.2631)</td>
<td>0.4408 (0.2648)</td>
</tr>
<tr>
<td>PROF2</td>
<td>-1.0233 (5.0116)</td>
<td>-3.7770 (5.0787)</td>
</tr>
<tr>
<td>PFDVOL</td>
<td>-0.2728 (0.4822)</td>
<td>-0.4803 (0.4875)</td>
</tr>
<tr>
<td>BONVOL</td>
<td>0.3556 (0.2434)</td>
<td>-0.7679 (0.2508)</td>
</tr>
<tr>
<td>COMVOL</td>
<td>-0.3833 (0.3168)</td>
<td>0.3212 (0.3136)</td>
</tr>
<tr>
<td>IND</td>
<td>0.2726 (0.3835)</td>
<td>1.0925 (0.3823)</td>
</tr>
</tbody>
</table>

Number of Observations = 964  
Number of Bond Issues = 455  
Number of Preferred Stock Issues = 80  
Number of Common Stock Issues = 429  
Pseudo-$R^2 = 0.35$

Note: Estimates are for the coefficients of the logarithms of the odds in favor of the alternative mentioned in the column heading over the issuing of preferred stock.

a A comparison with the normal distribution table indicates that the coefficient is different from zero at the five percent level of significance.

b A comparison with the normal distribution table indicates that the coefficient is different from zero at the ten percent level of significance.

first column of the table displays the estimates for the logit regression where bonds and preferred stock are compared. The second column gives the estimates for the logit regression where common stock and preferred stock are compared. The estimated coefficients in each equation determine the effects of changes in the
explanatory variables on the logarithm of the relative probability of choosing between bonds/common stock and preferred stock. The results are mixed in terms of the expected signs and the level of significance of the coefficients. While some of the coefficient estimates are in accord with expectations, some have low reported t-values\(^2\) and even incorrect signs. The value of pseudo-R\(^2\) for the model is 0.35 which is comparable with figures obtained by Baxter and Cragg (1970), Marsh (1982), and Billingsley, Lamy, and Thompson (1988).

Among all the coefficient estimates which have the expected signs, only three in the bonds versus preferred stock equation (hereinafter referred to as the bonds equation) and half in the common stock versus preferred stock equation (hereinafter referred to as the common stock equation) have t-values significant at the ten percent level of significance. The three common variables of which the coefficients are significant in both logit equations are firm size (SIZE2), bankruptcy risk (RISK1), and liquidity (LIQ1). While the coefficients of the latter two variables are both negative in the two logit equations, the variable SIZE2 has a positive coefficient in the bonds equation and a negative one in the common stock equation. In the common stock equation, three more variables have coefficient estimates significant at the five percent level of significance. These include growth opportunities (GROW2), bond market forecast (BONVOL), and the industry dummy (IND). The results suggest

\(^2\)The t-value is defined as the ratio of the coefficient estimate to its standard error.

\(^5\)Pseudo-R\(^2\) is defined as:

\[
Pseudo-R^2 = \frac{1-\exp[2(L_{C_{max}}-L_{C_{a}})/N]}{1-\exp[2(L_{C_{max}}-L_{C})/N]}\]

where \(L_{C}\) is the maximum of the logarithm of the likelihood function when only the constant term is used; \(L_{C_{a}}\) is the maximum when all the variables are used; and \(L_{C_{max}}\) is the maximum possible value of \(L_{C}\) within the model. N is the number of observations. Pseudo-R\(^2\) is identical to R-squared in the multiple regression model. See Maddala (1983, pp.37-41) for a detailed discussion of the measures of goodness of fit for the multinomial logit.
that firms that issue preferred stock are characterized by some attributes proxied by all these significant variables. When preferred stock is compared with bonds, firms that are smaller, riskier, and less liquid are more likely to issue preferred stock than bonds; and when preferred stock is compared with common stock, firms that are bigger, riskier, and less liquid are more likely to issue preferred stock than common stock. Also, firms with larger growth opportunities are more inclined to issue common stock when compared with preferred stock. Finally, utilities and banks tend to favor the use of common stock over preferred stock.

For the other variables, the results are less encouraging. In particular, the coefficient estimates of the variables ASSCOM (asset composition), EFFTAX (effective tax rate), and PROF2 (profitability) are all insignificant at the ten percent level of significance. Worse still, the coefficient estimates of EFFTAX in the bonds equation and those of PROF2 in both equations yield a wrong sign (They were all supposed to have a positive sign but turn out to be all negative). Given these results, firms seem to be indifferent among the three types of financing on the basis of their asset composition, effective tax rate, and profitability.

The coefficient of DEV (deviation from target) in the bonds equation turns out to be positive yet insignificant. The positive sign implies that an increase in the deviation from target (defined as the current debt ratio prior to the security issue minus the historical average) would increase the likelihood of selling bonds. This is contrary to the theory of optimal capital structure where positive deviation from the target would increase the odds of issuing equity over debt. In fact, the result that concerns the role of this variable that measures the firm’s deviation from its debt
target is surprising. In opposition to what one would expect, the coefficients of the deviation from target (DEV) in the two logit equations are both insignificant, implying that the variable has no influence on the financing choice either between bonds and preferred stock or between common stock and preferred stock. Previous studies by Marsh (1982) and Billingsley, Lamy, and Thompson (1988) provide evidence that supports the notion of optimal debt ratio. They find that a deviation from the target ratio has an impact on the financing choice between debt and equity. The coefficients of the deviation from target (DEV) in the two logit equations are both insignificant, implying that the variable has no influence on the financing choice either between bonds and preferred stock or between common stock and preferred stock. The results are, however, not comparable due partly to the different definition of debt ratio used in Marsh (1982) and Billingsley, Lamy, and Thompson (1988). In their studies, the debt ratio is taken as the ratio which the firm would have immediately after the security issue if the firm chose to raise debt. By contrast, the ratio used in this study is taken as the one before the security issue. This unexpected result may be attributed to a number of possible reasons. As mentioned earlier, the historical average of a firm's debt ratio only provides a rough estimate for its target after the security offering. The optimal debt ratio after the issue is neither unknown nor unobservable. In addition, the notion of optimal debt ratio range may also account for the insignificance of DEV (the deviation from target). As long as the current debt ratio before and after the security issue falls within the optimal range, it is hard to predict the probability of issuing a particular security. Other factors such as favorable market conditions may be a determinant of the ultimate financing choice.
Apart from providing information about the financial characteristics of the firms that issue preferred stock, the coefficient estimates can also be used to examine the two previously stated hypotheses about the motivation for the use of preferred stock.

It can be seen that the mixed results about the coefficient estimates for the variables RISK1 (bankruptcy risk), LIQ1 (liquidity), and PROF1 (profitability) provide partial support for the financial distress hypothesis, which states that firms facing financial distress are more likely to issue preferred stock. Of all the coefficient estimates of the four variables, those of RISK1 (bankruptcy risk) and LIQ1 (liquidity) are significant at the ten percent level and have the predicted signs, implying that firms with a higher bankruptcy risk and a strain in liquidity have an increased probability of issuing preferred stock. This is consistent with the financial distress hypothesis. The variable that measures the effective tax rate is, however, less significant. It has a correctly signed yet insignificant coefficient estimate in the common stock equation. One might argue that firms with a lower effective tax rate have an increased probability of issuing preferred stock over common stock. Along with the tax variable (EFFTAX) in the bonds equation, the profitability variable (PROF2) not only has coefficient estimates not significant but are also of a wrong sign, contradicting the financial distress hypothesis. That result implies that firms that have a lower profitability and tax rate are more inclined to issue bonds than preferred stock. Also, firms with a higher level of profit tend to favor the issue of preferred stock over common stock. In sum, the empirical evidence is partly consistent and partly inconsistent with the financial distress hypothesis. One might argue that the wrong signs might be attributed to the existence of multicollinearity.
As noted above, PROF2 (profitability) and RISK1 (bankruptcy risk) are moderately correlated with a correlation coefficient of 0.53. The high significance of RISK1 may drive the less influential variable PROF2 to yield a wrong sign.

The variable used to examine the solution to adverse investment incentives hypothesis is GROW2 (growth opportunities), which is defined as the difference between the market value and book value of common equity scaled by total assets. The coefficient estimates of the variable are positive in both the bonds and common stock equations. In other words, an increase in growth opportunities would increase the probability of issuing bonds when compared with preferred stock; and issuing common stock when compared with preferred stock, although the estimate in the bonds equation is marginally insignificant at the ten percent level. This finding lends some support to the solution to adverse investment incentives hypothesis, which claims that preferred stock can be used as a means to eliminate the over- and under-investment incentive problems caused by common equity and debt financing. However, it should be emphasized that the logit model in this study only serves as an "indirect" test of the hypothesis.

The final group of variables that are worth mentioning is the group of market condition and timing variables. As expected, most of the coefficients have the predicted signs although not significant. The low level of significance is probably attributed to the presence of multicollinearity. The coefficients indicate that the likelihood of issuing a particular security is positively related to the market forecast for that security and negatively related to the other security in the logit equation. It is surprising that the coefficient of the bond market forecast in the common
stock equation is both negative and significant. This implies that an increase in the bond issue forecast would increase the likelihood of issuing preferred stock over common stock. Whether common stock or preferred stock would be offered should not be so strongly related to the bond market forecast.

To summarize, the predicted and actual effects of the variables on the choice among bonds, preferred stock, and common stock are presented in Table XII. Table XII(a) compares firms that issue bonds with firms that issue preferred stock. Table XII(b) compares firms that issue common equity with firms that issue preferred stock.
Table XII(a)

Predicted and Actual Effects of Firm Attributes on Corporate Financing Choice
Between Bonds and Preferred Stock

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted</th>
<th>Actual</th>
<th>Significant or Not</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEV</td>
<td>Negative</td>
<td>Positive</td>
<td>Not</td>
</tr>
<tr>
<td>SIZE2</td>
<td>Positive</td>
<td>Positive</td>
<td>Yes</td>
</tr>
<tr>
<td>ASSCOM</td>
<td>Negative</td>
<td>Negative</td>
<td>Not</td>
</tr>
<tr>
<td>RISK1</td>
<td>Negative</td>
<td>Negative</td>
<td>Yes</td>
</tr>
<tr>
<td>EFFTAX</td>
<td>Positive</td>
<td>Positive</td>
<td>Not</td>
</tr>
<tr>
<td>GROW2</td>
<td>Positive</td>
<td>Positive</td>
<td>Not</td>
</tr>
<tr>
<td>LIQ1</td>
<td>Positive</td>
<td>Positive</td>
<td>Yes</td>
</tr>
<tr>
<td>PROF2</td>
<td>Positive</td>
<td>Negative</td>
<td>Not</td>
</tr>
<tr>
<td>PFDVOL</td>
<td>Negative</td>
<td>Negative</td>
<td>Not</td>
</tr>
<tr>
<td>BONVOL</td>
<td>Positive</td>
<td>Positive</td>
<td>Not</td>
</tr>
<tr>
<td>COMVOL</td>
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<td>Negative</td>
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</tbody>
</table>

Level of Significance = 0.10

Table XII(b)

Predicted and Actual Effects of Firm Attributes on Corporate Financing Choice
Between Common Stock and Preferred Stock

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted</th>
<th>Actual</th>
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<td>DEV</td>
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</tr>
<tr>
<td>SIZE2</td>
<td>None or Negative</td>
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</tr>
<tr>
<td>ASSCOM</td>
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<td>Negative</td>
<td>Not</td>
</tr>
<tr>
<td>RISK1</td>
<td>Negative</td>
<td>Negative</td>
<td>Yes</td>
</tr>
<tr>
<td>EFFTAX</td>
<td>Positive</td>
<td>Positive</td>
<td>Not</td>
</tr>
<tr>
<td>GROW2</td>
<td>Positive</td>
<td>Positive</td>
<td>Yes</td>
</tr>
<tr>
<td>LIQ1</td>
<td>Positive</td>
<td>Positive</td>
<td>Yes</td>
</tr>
<tr>
<td>PROF2</td>
<td>Positive</td>
<td>Negative</td>
<td>Not</td>
</tr>
<tr>
<td>PFDVOL</td>
<td>Negative</td>
<td>Negative</td>
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</tr>
<tr>
<td>BONVOL</td>
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<td>Negative</td>
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</tr>
<tr>
<td>COMVOL</td>
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<td>Positive</td>
<td>Not</td>
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</table>

Level of Significance = 0.10
IX. LIMITATIONS

While the empirical results discussed in the previous section provide insights into the relationship between the long-term corporate financing choice and some firm-specific attributes, it is also important to understand what are the underlying limitations of the study. These limitations stem from (1) the lack of a specific theory of choice among preferred stock, bonds, and common stock, (2) the restriction of the multinomial logit model, and (3) the use of year-end accounting data.

As noted in the beginning, little attention has been devoted to the subject of preferred stock in corporate finance literature. Virtually no specific theory has shed light on the corporate financing choice among preferred stock, bonds, and common stock. This lack of theoretical underpinnings has made the predictions about the choice of preferred stock somewhat ambiguous if not imprecise. As this study is more of an exploratory nature, the results should be at best considered as suggestive and descriptive rather than explanatory.

The second limitation of the study is related to one major assumption of the multinomial logit model: the property of Independence from Irrelevant Alternatives (IIA). This assumption asserts that the relative probability of choosing between any two alternatives from a given choice set is unaffected by the presence of a third alternative. This property restricts the use of the multinomial logit model to alternatives that are not close substitutes. Otherwise, the results would be weakened. Clearly, preferred stock to certain extent is a substitute for bonds and common stock in the context of corporate financing although the degree of
substitution is unknown. As the purpose of this study is to examine if firms that issue preferred stock are characterized by a set of financial attributes and not to find out the relative probability of choosing an security, this should not be a problem of serious concern.

Finally, the use of year-end accounting figures to reflect the financial characteristics of the firm at the time of issue is in principle not appropriate. Some issues may take place any month after the end of the accounting year. Using year-end figures to measure the financial position of the firm may be out-of-date for some issues. However, little can be done to do away with this data inaccuracy problem.
X. SUMMARY AND CONCLUDING REMARKS

This paper extends Marsh's (1982) descriptive model of debt-equity choice to include the decision to issue preferred stock. Having a focus on preferred stock, the study shows that firms that issue preferred stock do carry some distinct financial characteristics. Firms that are smaller, riskier, and less liquid are more likely to issue preferred stock when compared with bonds. On the other hand, firms that are bigger, riskier, and less liquid are more likely to issue preferred stock when compared to common stock. Moreover, firms with greater growth opportunities show a greater probability of issuing preferred stock vis-a-vis common stock. Finally, utilities and banks tend to favor the use of common stock over preferred stock.

In addition, the mixed results of the multinomial logit seem to lend partial support to the financial distress hypothesis that financially distressed firms are more likely to issue preferred stock to avoid going into bankruptcy. The growth opportunities variable, measured by the difference of the market value and book value of common equity, is also consistent with the solution to adverse investment incentives hypothesis which states that preferred stock can be used to eliminate the investment incentive problems caused by common equity and debt financing.

Apparently the general lack of success in explaining the determinants of the firm's choice among preferred stock, bonds, and common stock warrants further research in the subject. The results, though not entirely conclusive, do provide useful information about the characteristics of the firms that issue preferred stock.
BIBLIOGRAPHY


J. Bildersee. "Some Aspects of the Performance of Non-Convertible Preferred Stocks." 


## APPENDIX I

### Distributions of Variables Used in the Univariate Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Name</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
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<tr>
<td>Deviation from Target</td>
<td>DEV</td>
<td>-0.02</td>
<td>-0.04</td>
<td>0.53</td>
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<td>Size of Firm</td>
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<td>6.99</td>
<td>1.49</td>
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<td></td>
<td>SIZE2</td>
<td>6.75</td>
<td>6.79</td>
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<td>-2.52</td>
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<tr>
<td></td>
<td>RISK2</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>RISK3</td>
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<td>0.21</td>
<td>0.83</td>
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<td>Growth Opportunities</td>
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<td>0.06</td>
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<td></td>
<td>GROW2</td>
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<td>0.27</td>
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<tr>
<td>Profitability</td>
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<td>PROF2</td>
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<td>0.07</td>
<td>0.03</td>
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<td>LIQ2</td>
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