The accounting for convertible debt

Charles Brooks Handy

Iowa State University

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THE ACCOUNTING FOR CONVERTIBLE DEBT

by

Charles Brooks Handy

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Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

Head of Major Department

Signature was redacted for privacy.

Dean of Graduate College

Iowa State University
Ames, Iowa

1970
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<th>Title</th>
<th>Page</th>
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<td>96</td>
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</tbody>
</table>
CHAPTER I. INTRODUCTION

Satyrs and Fauns of the World of Finance

Greek and Roman mythology has given us creatures with strange names such as satyr and faun. These followers of the god of wine were distinctive in that they were part man and part goat or horse. With the head and arms of a human, they galloped through the ancient woods. The world of finance has its parallel. Convertible securities can be thought of as being part common equity and part senior security. Generally they are debt or preferred stock that grants the holder the right to exchange such senior security for common stock of the same company. Although the option to convert may, in certain isolated cases, be retained by the issuing corporation, ordinarily such privilege rests only with the holder. On the other hand, the issuing corporation usually has a call privilege and sets the length of the conversion period. Also, it is possible, if the issue so stipulates, that conversion may be from one senior security into another or into the senior or equity security of another company. However, the previously presented general case most frequently prevails, conversion running from senior security to common equity of the same company.
Relative Importance of Convertibles

This strange creature of the finance world is not a modern device. Pilcher (14) refers to their use in England as early as 1600. He goes on to tell how they were used frequently in the United States during the nineteenth and early twentieth century to help finance the expansion of our railroad network. Use spread into the industrial complex during the latter part of that period. Pilcher reported that a survey of all industrial corporate bonds issued during the decade 1914-1924 found 13 percent had the conversion privilege. In a study of all public utility and industrial bonds and preferred stocks advertised in the New York Times from June 1928 to January 1929, 27 percent of those issued were convertibles.

Recent years have seen a revival of convertible popularity. As reported in the Finance Section of the August 13, 1966, issue of Business Week, corporate acquisitions necessitate the right amount of cash stock and other securities. They have resulted in many new issues of tailor-made securities - debentures, notes and convertible securities. Table I.1, page 3, contains data developed by Pinches. Although preferred stock is not a major portion of total corporate securities issued, convertible preferred is certainly a significant portion of total preferred issued during this period. As Pinches (15) points out, during 1966 and 1967 convertible preferred stock became more popular in financing corporate
Table I.1. Cash security offerings of U. S. corporations: 1960-1967*  
(Millions of dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total corporate securities issued (i)</th>
<th>Total preferred stock issued (i)</th>
<th>Convertible preferred stock, issued (b)</th>
<th>Convertible as a per cent of total corporate securities (i)</th>
<th>Convertible as a per cent of total preferred securities (i)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>$10,154</td>
<td>$409</td>
<td>$74</td>
<td>0.7%</td>
<td>18.1%</td>
</tr>
<tr>
<td>1961</td>
<td>$13,165</td>
<td>450</td>
<td>194</td>
<td>1.5%</td>
<td>42.1%</td>
</tr>
<tr>
<td>1962</td>
<td>$10,705</td>
<td>422</td>
<td>220</td>
<td>2.1%</td>
<td>52.1%</td>
</tr>
<tr>
<td>1963</td>
<td>$12,211</td>
<td>343</td>
<td>97</td>
<td>0.8%</td>
<td>28.3%</td>
</tr>
<tr>
<td>1964</td>
<td>$13,957</td>
<td>412</td>
<td>133</td>
<td>1.0%</td>
<td>32.3%</td>
</tr>
<tr>
<td>1965</td>
<td>$15,992</td>
<td>725</td>
<td>276</td>
<td>1.7%</td>
<td>38.1%</td>
</tr>
<tr>
<td>1966</td>
<td>$18,074</td>
<td>574</td>
<td>228</td>
<td>1.3%</td>
<td>39.7%</td>
</tr>
<tr>
<td>1967</td>
<td>$24,798</td>
<td>885</td>
<td>328</td>
<td>1.3%</td>
<td>37.1%</td>
</tr>
</tbody>
</table>

Total: $119,056 $4,220 $1,550


\(b\) Data for 1960-1965 was obtained by subtracting non-convertible preferred stock as estimated by Fischer and Wilt (6, p. 612) from total preferred stock. The data for 1966-1967 were gathered by the author.

*Source: (15, p. 54).
mergers. During 1966 convertible preferreds were employed in 4.6 percent of all mergers; this figure increased to 7.3 percent during 1967.

Even more significant than the preferred picture is that presented by bonds and notes. Table 1.2, page 5, reveals that from 1966 through 1969 bonds and notes amounted to 79.33 percent of all corporate issues. Averaging 12.41 percent of total bonds and notes for the 14 year period, convertible bonds and notes hit a peak of 22.02 percent during 1969. Finally, Table 1.3, page 7, illustrates the extensive use of convertible bonds in manufacturing as compared to other industries.

Objective of the Study

The aforementioned data points up, especially for bonds, the popularity of convertible issues. In recent years certain accounting questions concerning convertible bonds have risen. One of these concerns itself with the proper accounting and financial presentation of convertible debt. Many accountants feel that a portion of the proceeds from sale of convertible debt should be attributed to the convertible feature. Traditional accounting treatment does not provide for this. At this writing the traditional treatment still prevails. Consequently, it will be the objective of this study to look into underlying reasons for supply as well as demand for convertible debt. The information thus derived can help justify continued use of the traditional accounting method, or form the basis for
<table>
<thead>
<tr>
<th>Year</th>
<th>$ All Issues</th>
<th>$ Total Bonds &amp; Notes</th>
<th>Total Bonds and Notes as % of All Issues</th>
<th>$ Convertible Bonds &amp; Notes</th>
<th>Convertible Bonds and Notes as % of Total Bonds and Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956</td>
<td>$10,939</td>
<td>$8,002</td>
<td>73.15</td>
<td>$925</td>
<td>11.56</td>
</tr>
<tr>
<td>1957</td>
<td>12,884</td>
<td>9,957</td>
<td>77.28</td>
<td>1,064</td>
<td>10.69</td>
</tr>
<tr>
<td>1958</td>
<td>11,558</td>
<td>9,653</td>
<td>82.52</td>
<td>1,147</td>
<td>11.88</td>
</tr>
<tr>
<td>1959</td>
<td>9,748</td>
<td>7,190</td>
<td>73.76</td>
<td>628</td>
<td>8.72</td>
</tr>
<tr>
<td>1960</td>
<td>10,154</td>
<td>8,081</td>
<td>79.58</td>
<td>462</td>
<td>5.72</td>
</tr>
<tr>
<td>1961</td>
<td>13,165</td>
<td>9,420</td>
<td>71.55</td>
<td>710</td>
<td>7.54</td>
</tr>
<tr>
<td>1962</td>
<td>10,705</td>
<td>8,969</td>
<td>83.78</td>
<td>465</td>
<td>4.96</td>
</tr>
<tr>
<td>1963</td>
<td>12,237</td>
<td>10,872</td>
<td>88.85</td>
<td>357</td>
<td>3.28</td>
</tr>
<tr>
<td>1964</td>
<td>13,957</td>
<td>10,865</td>
<td>77.85</td>
<td>425</td>
<td>3.91</td>
</tr>
<tr>
<td>1965</td>
<td>15,992</td>
<td>13,720</td>
<td>85.79</td>
<td>1,264</td>
<td>9.21</td>
</tr>
<tr>
<td>1966</td>
<td>18,075</td>
<td>15,561</td>
<td>86.09</td>
<td>1,872</td>
<td>12.03</td>
</tr>
<tr>
<td>1967</td>
<td>24,798</td>
<td>21,954</td>
<td>88.53</td>
<td>4,475</td>
<td>23.38</td>
</tr>
<tr>
<td>1968</td>
<td>21,966</td>
<td>17,383</td>
<td>79.14</td>
<td>3,291</td>
<td>18.87</td>
</tr>
<tr>
<td>1969</td>
<td>26,744</td>
<td>18,348</td>
<td>68.61</td>
<td>4,041</td>
<td>22.02</td>
</tr>
<tr>
<td>Total</td>
<td>$212,922</td>
<td>$169,975</td>
<td>79.33</td>
<td>$21,096</td>
<td>12.41</td>
</tr>
</tbody>
</table>

aSource through 1967: (20).

Note: These figures should be the same as that shown by Pinches (Table I.1) under the caption "Total corporate securities issues". However, there is a slight discrepancy in 1963 and 1966 between Pinches and the source used by the author.

bSource: (21, p. 15).
Table 1.3. Uses of new convertible bonds & notes offered for cash (United States)\textsuperscript{a} ($ Millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Mfg. \textsuperscript{b}</th>
<th>Ext. \textsuperscript{b}</th>
<th>E.G. \textsuperscript{b} &amp; \textsuperscript{c}</th>
<th>RR \textsuperscript{b}</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956</td>
<td>$ 925</td>
<td>$ 713</td>
<td>$ 19</td>
<td>$ 2.05 $ 63</td>
<td>$ 6.81</td>
</tr>
<tr>
<td>1957</td>
<td>1,064</td>
<td>679</td>
<td>33</td>
<td>3.10 232</td>
<td>21.80</td>
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<tr>
<td>1958</td>
<td>1,147</td>
<td>291</td>
<td>14</td>
<td>1.22 43</td>
<td>3.75</td>
</tr>
<tr>
<td>1959</td>
<td>628</td>
<td>242</td>
<td>34</td>
<td>5.41 104</td>
<td>16.56</td>
</tr>
<tr>
<td>1960</td>
<td>462</td>
<td>180</td>
<td>27</td>
<td>5.84 45</td>
<td>9.74</td>
</tr>
<tr>
<td>1961</td>
<td>710</td>
<td>445</td>
<td>5</td>
<td>.70 31</td>
<td>4.36</td>
</tr>
<tr>
<td>1962</td>
<td>445</td>
<td>273</td>
<td>25</td>
<td>5.62 4</td>
<td>.90</td>
</tr>
<tr>
<td>1963</td>
<td>357</td>
<td>203</td>
<td>14</td>
<td>3.92 0</td>
<td>0</td>
</tr>
<tr>
<td>1964</td>
<td>425</td>
<td>207</td>
<td>18</td>
<td>4.24 0</td>
<td>0</td>
</tr>
<tr>
<td>1965</td>
<td>1,264</td>
<td>546</td>
<td>7</td>
<td>.55 79</td>
<td>6.27</td>
</tr>
<tr>
<td>1966</td>
<td>1,872</td>
<td>1,097</td>
<td>5</td>
<td>.27 81</td>
<td>4.33 4</td>
</tr>
<tr>
<td>1967</td>
<td>4,475</td>
<td>2,704</td>
<td>123</td>
<td>2.75 45</td>
<td>1.01</td>
</tr>
<tr>
<td>1968</td>
<td>3,281</td>
<td>1,353</td>
<td>148</td>
<td>4.51 71</td>
<td>2.16</td>
</tr>
<tr>
<td>1969</td>
<td>4,041</td>
<td>1,659</td>
<td>195</td>
<td>4.83 23</td>
<td>.57</td>
</tr>
</tbody>
</table>

Total $21,096 $10,592 50.21 $667 3.16 $821 3.89 $4 .02

\textsuperscript{a}Source: (21, p. 15). (Note: Total figures supplied by source is occasionally in slight disagreement with detail due to rounding.)

\textsuperscript{b}Mfg. = manufacturing.
Ext. = extractive.
E.G. & \textsuperscript{c} & \textsuperscript{d} = electricity, gas and water.
RR = railroad. (Continued on following page.)
<table>
<thead>
<tr>
<th>Year</th>
<th>O.T.</th>
<th>%</th>
<th>Comm.</th>
<th>%</th>
<th>F. &amp; R.E.</th>
<th>%</th>
<th>C. &amp; O</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956</td>
<td>$47</td>
<td>5.08</td>
<td>$51</td>
<td>5.51</td>
<td>$18</td>
<td>1.95</td>
<td>$13</td>
<td>1.41</td>
</tr>
<tr>
<td>1957</td>
<td>7</td>
<td>.66</td>
<td>49</td>
<td>4.61</td>
<td>6</td>
<td>.56</td>
<td>58</td>
<td>5.55</td>
</tr>
<tr>
<td>1958</td>
<td>40</td>
<td>3.49</td>
<td>721</td>
<td>62.86</td>
<td>11</td>
<td>.96</td>
<td>27</td>
<td>2.35</td>
</tr>
<tr>
<td>1959</td>
<td>114</td>
<td>18.15</td>
<td>0</td>
<td>0</td>
<td>31</td>
<td>4.94</td>
<td>102</td>
<td>16.24</td>
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<tr>
<td>1960</td>
<td>39</td>
<td>2.44</td>
<td>12</td>
<td>2.60</td>
<td>71</td>
<td>15.37</td>
<td>87</td>
<td>18.83</td>
</tr>
<tr>
<td>1961</td>
<td>35</td>
<td>4.93</td>
<td>4</td>
<td>.56</td>
<td>62</td>
<td>8.73</td>
<td>127</td>
<td>17.89</td>
</tr>
<tr>
<td>1962</td>
<td>1</td>
<td>.23</td>
<td>5</td>
<td>1.12</td>
<td>58</td>
<td>13.03</td>
<td>79</td>
<td>17.75</td>
</tr>
<tr>
<td>1963</td>
<td>68</td>
<td>19.05</td>
<td>11</td>
<td>3.08</td>
<td>15</td>
<td>4.20</td>
<td>46</td>
<td>12.84</td>
</tr>
<tr>
<td>1964</td>
<td>79</td>
<td>18.59</td>
<td>10</td>
<td>2.35</td>
<td>77</td>
<td>17.75</td>
<td>34</td>
<td>8.06</td>
</tr>
<tr>
<td>1965</td>
<td>129</td>
<td>10.21</td>
<td>3</td>
<td>.24</td>
<td>355</td>
<td>28.10</td>
<td>144</td>
<td>11.39</td>
</tr>
<tr>
<td>1966</td>
<td>494</td>
<td>26.39</td>
<td>62</td>
<td>3.31</td>
<td>34</td>
<td>1.82</td>
<td>94</td>
<td>5.02</td>
</tr>
<tr>
<td>1967</td>
<td>619</td>
<td>13.83</td>
<td>69</td>
<td>1.54</td>
<td>100</td>
<td>2.23</td>
<td>816</td>
<td>18.23</td>
</tr>
<tr>
<td>1968</td>
<td>231</td>
<td>7.04</td>
<td>153</td>
<td>4.66</td>
<td>598</td>
<td>18.23</td>
<td>727</td>
<td>22.16</td>
</tr>
<tr>
<td>1969</td>
<td>451</td>
<td>11.16</td>
<td>73</td>
<td>1.81</td>
<td>779</td>
<td>19.28</td>
<td>860</td>
<td>21.28</td>
</tr>
<tr>
<td>Total</td>
<td>$2,0354</td>
<td>11.16</td>
<td>$1,223</td>
<td>5.80</td>
<td>$2,215</td>
<td>10.50</td>
<td>$3,214</td>
<td>15.24</td>
</tr>
</tbody>
</table>

(Continued from previous page.)

O.T. = other transportation.
Comm. = communication.
F. & R.E. = financial and real estate (excluding investment companies.)
C. & O = commercial and other.
an alternative procedure.

Keeping the above objectives in mind, this paper will first investigate the characteristics of convertible debt. This will be followed by a comprehensive statement of the accounting problem as well as certain suggested solutions. Next, demand for and supply of convertible debt will be examined. From this latter study certain conclusions will be drawn relative to the question at hand.

The data being used are primarily from the world of finance; the question pursued is one of accounting; the methodology and analyses employed are those of economics and industrial engineering. Hopefully, the conclusions reached will make a constructive contribution to all of the disciplines involved in the study.
CHAPTER II. CHARACTERISTICS OF CONVERTIBLE DEBT

A general definition of convertible securities has already been given. Convertible debt is one breed, and an important one, of this species. In the usual case it can be thought of as a bond plus the option to convert to common stock equity. As such, it has certain important elements or characteristics that should be thoroughly understood.

Market Value

Like many other securities, convertible debt has a value determined in the market place. This value shall henceforth be termed Market Value (MV) and will form an integral part of the study.

Conversion Value and Related Characteristics

Convertible bonds also have a value called Conversion Value (CV). CV is the product of the number of common shares for which a bond may be exchanged times the market price per share of the stock. Thus Apco Oil Corp. 5% convertible subordinate debentures issued in July of 1968 were designed so that originally approximately 27.777 common shares were to exchange for one $1,000 debenture (13, p. 520). If the common per share market value were $30 then the CV amounted to $833.31 ($30 x 27.777). Obviously, at original issue CV is set lower than MV. If this were not true immediate arbitrage
Conversion ratio and conversion price

Conversion ratio is the number of shares of common stock that would be exchanged for one bond; conversion price multiplied by the conversion ratio equals the $1,000 par value. Thus for Apco:

\[ \text{Conversion price} = \frac{\text{Par Value}}{\text{Conversion Ratio}} \]

\[ \$36 = \frac{\$1,000}{27.777} \]

Investment Value

At time of issue, convertible bonds ordinarily have a lower yield than straight debt. The latter, of course, lacks the conversion privilege. The price that casts a convertible in the yield framework of straight debt is known as investment value (IV). Thus Teledyne, Inc., Convertibles, issued in June of 1957, were priced for public subscription at 100 or $1,000. This resulted in a current and maturity yield of 3.5%. At the same time, based on prevailing bond yield

---

1Corporate bond prices are quoted at a given amount per $100 par value. If a $1,000 par value bond is quoted at 100 the price of the bond is 10 times 100 or $1,000.
levels, Moody's Bond Survey estimated straight debt value of
the debentures to be about 66 7/8, equivalent to a maturity
yield of 5.9% (12, pp. 435-436).

From a theoretical standpoint, investment value can be
thought of as the present value of the convertible's future
cash flow discounted at the yield rate on comparable straight
debt. The following equation demonstrates this point:

$$ IV = \frac{I}{i} + \frac{M}{(1+i)^n} $$

where:

- $IV$ = the convertible bond's value as a straight-
debt investment at time $t$
- $i$ = the market rate of interest on equivalent-
risk, pure-debt issues
- $I$ = dollars of interest paid each year
- $M$ = the bond's redemption value at maturity
- $n$ = the number of years remaining to maturity.

In actual practice the computation ordinarily calls for a
competent security analyst who determines the quality of the
convertible by noting such things as the issuing company's
current and prospective earning power, risks of the business
and overall capitalization. At the same time, the analyst
notes the yield on similar quality straight-debt yields.
Finally, he relates this yield to the convertible in the above
equation form.
Premium

A convertible bond carries with it a conversion privilege. In order to secure this privilege the purchaser ordinarily pays a premium. There seems to be some dispute about measurement of the premium. Writing on the topic *Premiums on Convertible Bonds* (22) Weil, Segall and Green (WSG) state that premium is the difference between market value (MV) of the bond and its conversion value (CV). Meyer (10), however, describes premium as the difference between bond market value and the higher of its investment value or conversion value.

It seems logical to assume that a convertible bond will not sell for less than the higher of its conversion or investment values. The higher of the two serves as a floor below which the market value of the bond will not move (IV ≤ MV ≥ CV). Some thoughtful examination will verify these statements. Suppose that MV < CV; this would almost immediately lead to arbitrage. Purchasers would buy at the market value of the bond and immediately convert to stock. Action of the market would tend to drive MV up to CV. On the other hand, if IV > MV there would be no market for the convertible, and people would turn to straight debt issues. If the market for a certain stock were to decrease so that CV falls below IV, IV serves as a floor below which MV will not fall. Since there is a built-in guarantee of a certain cash return, the
IV floor will be fairly stable. In this situation CV should become less and less important. Many believe the salability of the bond is more dependent on IV than CV\(^2\). As a result, premium is measured from IV rather than the lower CV. On the other hand, if MV > CV > IV it is logical to assume that CV rather than IV has the greatest impact on the price paid for the convertible, and consequently the premium is measured by the difference between MV and CV. The Meyer version shall be called premium and the WSG variety conversion value premium.

Other Characteristics

In addition to the previously-described features, convertible bonds have other characteristics that should be noted. Par value represents the eventual maturity value of the bond, generally set at 100. Most bonds have a call provision and are callable at any time upon 30-60 days notice. Generally the call price is periodically reduced over the life of the bonds. It is quite common to find an optional or mandatory redemption from a sinking fund starting at a date well into the future. Consider the S.S. Kresge Company Convertible Subordinate Debenture, 4-1/8\%, due 6/15/92 and issued 6/13/67 (11, p. 473). The call provision reads:

\[\text{When this situation does take place there is usually little trading in the security. This writer believes that trading in bonds with low CV is due to expectations concerning the stock the bond converts to, not IV.}\]
Callable at any time, as a whole or in part, upon 30-60 days notice, at 104-1/8 to 6/14/68; 103-7/8 to 6/14/69; premium continuing to decline 1/4 of 1% annually to 100-7/8 on 6/15/80 to 6/14/81, then down 1/8 of 1% annually to 100 on 6/15/87, etc. Also for the sinking fund (optional, beginning 6/15/73, and mandatory, beginning 6/15/78) at 100 and accrued interest.

As the name of the Kresge Convertibles indicates, these bonds are subordinate debentures. This means they are unsecured and subordinate to all other senior debt of the company, another general characteristic of convertible debt. Finally, as Catlett (5) said:

The various restrictions on working capital, on the required ratios, on leasing, on the acquisition of property, etc. are not nearly as restrictive as for a comparable type of debt without the conversion privilege.

A Hypothetical Model and Empirical Evidence

Figure II.1, page 16, is a hypothetical model of a convertible bond as presented by Brigham. The reader will note that \( MM' \) represents the MV of the convertible. Over time \( MM' \) approaches \( CV \), depicted as \( CC_t \). Brigham (6) gives three reasons for this taking place. First, and probably most important, many companies have a policy of calling convertible when they feel eventual conversion is inevitable. As \( CV \) increases above par the possibility of conversion becomes more likely. Both the holder and possible purchaser of a convertible recognize this fact. \( MV \) is driven toward \( CV \) to minimize any possible loss due to call. Secondly, as \( MV \)
Figure II.1. Hypothetical model of a convertible bond
increases over time the spread between \( MV \) and \( IV \) increases. This spread represents, barring a change in company straight debt rates, the greatest possible loss the holder of a convertible could suffer. At high values of both \( MV \) and \( CV \) the loss potential increases, causing any premium attributable to loss protection to decrease. In other words, any premium paid for \( IV \) protection tends to decrease as \( MV \) and \( CV \) rise above \( IV \). Finally, the spread between \( MV \) and \( CV \) decreases because growing stock prices usually mean growing dividends while interest payments on convertible bonds are fixed.

Call price, depicted by \( VM \) is gradually decreasing over time. \( IV \), shown as line \( BM \), approaches the constant par value (\( MM \)) as the bond nears maturity.

Figure II.2, page 19, showing the previously-mentioned S.S. Kresge 4 1/8% convertible bonds, serves as empirical support for the Brigham Model. In comparing the two figures it can be noted that the Kresge bonds have \( CV > IV \) at issue date. The Brigham Model shows \( IV > CV \) at that particular point in time. This is not considered a discrepancy since the relationship at issue is due to design of the bonds. Further examination reveals that occasionally Kresge has \( MV < CV \). This is a temporary situation because, as previously pointed out, demand for the bond will drive up \( MV \).

\[^3\]There is also the strong possibility that bond and market quotations were not taken simultaneously. A simultaneous observation would probably find \( MV \geq CV \).
Figure II.2. Empirical evidence - S.S. Kresge Company 4 1/8% convertible bonds (due 6/15/92)

Source: See Appendix
It will also be noted that the Kresge Bonds show a downward sloping IV line during the observation period while the hypothetical case depicts a monotonically increasing IV which reaches par value at maturity. Obviously the empirical case will coincide with the hypothetical at maturity. During the interim, however, there may well be deviations. Since interest rates were increasing at a steady rate during the observation period it seems likely that the discount rate used for the Kresge Bonds increased at such a rate that a downward sloping IV line was the result. Finally, the call provision for the Kresge issue, shown on page 14, is consistent with the hypothetical case. In both cases values gradually return to par.

Model of Conversion Value Premium

Conversion value premium, defined on pages 12 and 13, is illustrated in Figure II.3, page 22. In the model line $XZ$ represents $MV = CV$. At the same time, $WYZ$ is the hypothetical relation between $MV$ and $CV$. At point $Y$ $MV$ equates with $CV$ and thereafter, at least from a conceptual standpoint, a one-to-one relationship should be maintained. However, as Figure II.2 indicates, there are deviations between $MV$ and $CV$.

\footnote{The intersection at point $Y$ is the equivalent to the intersection of $MM'$ and $CC_t$ in Figure II.1.}
Figure II.3. Model of conversion value premium
CV after initial intersection. Any area between WY and XY is conversion value premium. Chapter IV will deal with the WYZ function and use this general model as a basis for examining premiums on convertible debt.

Chapter Conclusion

The material of this chapter has been presented to give the reader a basic understanding of the characteristics of convertible bonds from both a theoretical and empirical standpoint. It is now time to present a description of the problem of properly accounting for convertible debt.
CHAPTER III. THE ACCOUNTING PROBLEM

The purpose of this chapter is to describe the problem of properly accounting for convertible debt financing. Before doing so, certain background material should be examined. Specifically, this will consist of a review of the need for and functions of the Accounting Principles Board, one of the major privately formed agencies attempting to clarify modern-day accounting practice. A statement of the problem along with some suggested solutions will follow.

The Accounting Principles Board

Need for such organization

For the past few years accountants in general, and certified public accountants in particular, have come under increasing fire relative to reporting financial information to the public. A 1967 Article (23) used the expression "credibility gap" relative to the schism that has developed between accountants and businessmen on one hand and the investing public on the other. At the time of the 1967 publication there were 50 major law suits pending against the Big Eight public accounting firms (eight companies that handle about 80% of the nation's auditing business). The charges generally centered around irregularities and negligence in the preparation of financial statements. Although bringing suit does not indicate conviction, the very fact
that action has been started does indicate a certain lack of confidence.

One of the main sources of dispute seems to be the highly flexible accounting principles that govern gathering of data and preparation of financial statements. These man-made principles are broad in scope and allow alternative procedures for implementation. For instance, in accounting for depreciation, methods ranging from straight-line to the accelerated procedures may be used. It is very difficult for the investing public to understand why a company such as Westec can report 1965 earnings of 4.9 million with assets of 566 million, and then declare bankruptcy nine months later. Although Westec's favorable financial picture had been generated by some rather unusual situations, it appears that accounting rules or principles, as they were viewed at the time, were not violated. During the 1964 presidential campaign many people were surprised to find that the statement of financial position presented by President Johnson contained assets that totalled to a much smaller figure than the public had previously been led to believe. What people did not realize was that the application of the accounting "cost" principle means that assets other than cash and receivables are generally valued at cost. The accountant will only recognize a different figure when fair value or market for the asset is less than cost. Appreciation, such as had
taken place in many of the President's assets, is not generally recognized. Consequently, there is confusion not only concerning alternative application of the same principle but also about what the principle itself means.

Many accountants defend the application of current accounting principles on the theory that one set of inflexible rules, applied across the board, can lead to as much or more confusion than the current situation. However, there is an under-current of feeling that accountants have had a tendency to accommodate businessmen at the expense of the investing public. A partner of one of the Big Eight firms has stated: "Give me the books of almost any company and within a years time I can double the earnings" (23, p. 30). Chairman Leonard Spacek of Arthur Anderson and Co., has made the following statement: "If you look at the opinions of the Accounting Principles Board, you will rarely ever see the investor's point of view established" (23, p. 30).

Purpose of the Board

The faulting of the Accounting Principles Board (APB) by Mr. Spacek is a discomforting note. It is this group, organized in 1959 under the auspices of the American Institute of Certified Public Accountants, national governing board of all certified public accountants, that is to give leadership in overcoming such problems. Specifically, the APB exists to
clarify accounting principles, eliminate ambiguities and provide new accounting methods where business conditions create new problems (8). It should accomplish its goals in a completely objective manner, free of any bias or favoritism.

It could be that Mr. Spacek expects too much too soon. Rarely is progress linear. For every step forward there is often half a step back. Progress in the area of accounting practice and statement presentation is certainly no exception. There have been advances. Pronouncements of the Board concerning the accounting presentation of extraordinary items, prior years errors, and the study of leases are illustrations. On the other hand, the Board's treatment of investment credit was not exemplary. Furthermore, the number of suits against accounting firms is alarming. The purpose here is not to pass judgement on the overall progress and philosophical approach taken by the Board but is to explain why the Board exists and to take exception to one particular opinion. The first purpose has been accomplished. We shall now proceed to the second.

Accounting for Convertible Debt

During recent years the Accounting Principles Board has directed considerable attention to the proper financial reporting of convertible debt. Many accountants felt the traditional method left something to be desired. For a bond
this is the present value of maturity and interest payments using a discount factor equal to the yield rate. The traditional method follows this formula in recording convertible bond liability. Since there is a chance that any bond may be converted, thus eliminating interest payments from date of conversion as well as the maturity payment, the recording may be ultra-conservative. Also, the method fails to recognize that a portion of the proceeds from convertible sale can be attributed to the conversion feature. Apparently this latter fact made an impression with the Accounting Principles Bond as the following summary of paragraphs 8 and 9 of APB Opinion No. 10 indicates.

**APB Opinion No. 10 (1)**

Paragraph 8 of APB Opinion No. 10 states that a portion of the proceeds received on issuance of convertible debt can ordinarily be attributed to the conversion feature. This portion represents a "call" on common stock and should be accounted for as paid-in capital by a credit to equity. The balance of the proceeds represents debt and should be accounted for as a liability. Paragraph 9 goes on to say that the portion representing a "call" on common stock can ordinarily be measured as the difference between the price at which the debt was issued and the estimated price at which it would have been issued in the absence of the conversion feature. Presumably this latter price can be found by
discounting interest and bond maturity payments at a rate which straight debt, or which a bond without the conversion feature, would yield.

Example of the application of the APB Opinion No. 10

To illustrate this procedure, assume that a company issues 6 percent convertible debentures at par, that the bonds mature in 20 years, that interest is paid annually at the end of each year, and that at issue the straight debt yield for this company is 8 percent. Using the equation presented on page 11 and tables such as Smith (16, p.618) the IV (at issue) of such a convertible bond would be $803.58 per $1,000 of principal amount.

\[
803.58 = \left[ \frac{(1.08)^{20} - 1}{0.08(1.08)^{20}} \right] \cdot $60 + \left[ \frac{1}{(1.08)^{20}} \right] \cdot $1000
\]

Using the same discount rate of 8%, IV at the start of the

---

1If one adheres to the Hicks-Lutz concept relative to the term structure of interest rates the use of a constant discount rate of 8% might be in error. This concept tells us to estimate the short-term rate for each relevant period during the life of the bond. Thus, cash payments for year two might be subject to a different discount rate than those of year one due to the fact the short-term rates are different for the two periods. On the other hand, this concept also tells us that the long-term rate is a geometric mean of the future short-term rate. One could rationalize the 8% is this geometric mean -- assuming away any problems such as liquidity preference.
second year would be:

\[ \$807.94 = \left[ \frac{(1.08)^{19} - 1}{0.08(1.08)^{19}} \right] \$60 + \left[ \frac{1}{(1.08)^{19}} \right] \$1000 \]

For each year the following may be computed:

<table>
<thead>
<tr>
<th>Year</th>
<th>Present Value Beginning of Year</th>
<th>8% of Present Value</th>
<th>Interest Paid</th>
<th>Discount Amortization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$803.58</td>
<td>$64.36</td>
<td>$60.00</td>
<td>$4.36</td>
</tr>
<tr>
<td>2</td>
<td>807.94</td>
<td>64.58</td>
<td>60.00</td>
<td>4.58</td>
</tr>
<tr>
<td>3</td>
<td>812.52</td>
<td>65.10</td>
<td>60.00</td>
<td>5.10</td>
</tr>
<tr>
<td>4</td>
<td>817.62</td>
<td>65.34</td>
<td>60.00</td>
<td>5.34</td>
</tr>
<tr>
<td>5</td>
<td>822.96</td>
<td>65.82</td>
<td>60.00</td>
<td>5.82</td>
</tr>
<tr>
<td>6</td>
<td>828.78</td>
<td>66.36</td>
<td>60.00</td>
<td>6.36</td>
</tr>
<tr>
<td>7</td>
<td>835.14</td>
<td>66.80</td>
<td>60.00</td>
<td>6.80</td>
</tr>
<tr>
<td>8</td>
<td>841.94</td>
<td>67.32</td>
<td>60.00</td>
<td>7.32</td>
</tr>
<tr>
<td>9</td>
<td>849.26</td>
<td>67.98</td>
<td>60.00</td>
<td>7.98</td>
</tr>
<tr>
<td>10</td>
<td>857.24</td>
<td>68.56</td>
<td>60.00</td>
<td>8.56</td>
</tr>
<tr>
<td>11</td>
<td>865.80</td>
<td>69.26</td>
<td>60.00</td>
<td>9.26</td>
</tr>
<tr>
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<td>70.06</td>
<td>60.00</td>
<td>10.06</td>
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<td>13</td>
<td>885.12</td>
<td>70.74</td>
<td>60.00</td>
<td>10.74</td>
</tr>
<tr>
<td>14</td>
<td>895.86</td>
<td>71.72</td>
<td>60.00</td>
<td>11.72</td>
</tr>
<tr>
<td>15</td>
<td>907.58</td>
<td>72.66</td>
<td>60.00</td>
<td>12.66</td>
</tr>
<tr>
<td>16</td>
<td>920.24</td>
<td>73.52</td>
<td>60.00</td>
<td>13.52</td>
</tr>
<tr>
<td>17</td>
<td>933.76</td>
<td>74.70</td>
<td>60.00</td>
<td>14.70</td>
</tr>
<tr>
<td>18</td>
<td>948.46</td>
<td>75.82</td>
<td>60.00</td>
<td>15.82</td>
</tr>
<tr>
<td>19</td>
<td>964.28</td>
<td>77.18</td>
<td>60.00</td>
<td>17.18</td>
</tr>
<tr>
<td>20</td>
<td>981.46</td>
<td>78.54</td>
<td>60.00</td>
<td>18.56</td>
</tr>
</tbody>
</table>

\[ $1,396.42 \quad $1,200.00 \quad $196.42 \]

As the illustration continues the reader will note that discount amortization of $196.42 also represents value placed on the conversion feature.
The previous schedule forms the basis for accounting entries during the life of the bond. The following entry would be recorded in the journal of the issuer on issue date:

- Debit - Cash 1,000.00
- Debit - Bond discount 196.42
- Credit - Bond payable 1,000.00
- Credit - Paid-in capital-sale of convertible bond 196.42

At this same point in time the balance sheet would show a liability of $803.58. (Bonds payable of $1,000 less the bond discount of $196.42.) Equity would also be increased by $196.42, the amount attributed to the conversion feature and credited to paid-in capital. At the end of year one the following entry would be made relative to bond interest.

- Debit - Bond interest expense 64.36
- Credit - Bond discount 4.36
- Credit - Cash 60.00

The effect of this entry is to record interest expense at 8% of the debt liability at the start of year one. At the same time, amortization of bond discount in the amount of $4.36 increases the same debt liability to $807.94 at the start of the second year. For year two cash interest of $60.00 plus discount amortization is 8% of bond liability at the start of the same year. Thus, during the life of the bond there is a constant 8% rate of expense and the bond liability
gradually returns to par\(^3\).

To demonstrate the entry for bond conversion, assume a convertible bond with a conversion ratio of 10 and common stock with a par value of $75 per share. Assume that conversion takes place immediately after issue. (This is far from realistic but will serve as an illustration.) The entry to record conversion would be as follows:

Debit - Bond payable 1,000.00
Credit - Bond discount 196.42
Credit - Common stock (10 shares at $75 each) 750.00
Credit - Paid-in capital-conversion on bond 53.58

Note that conversion value (CV) has no bearing on the above entry. The credit to common stock is in the amount of the par value of the stock issued with the difference between bond liability and common stock par value considered an addition to paid-in capital. Also, presumably the credit to paid-in capital arising at issue date (value attached to the conversion privilege) remains in equity regardless of whether or not conversion takes place.

\(^3\)From a practical standpoint the discount could be amortized straight line over the 20 year period. This would mean $9.82 per year during the first 19 years and $9.84 in year 20. It would also mean that the effective rate of interest would exceed 8 percent during the early years of the asset life and be less than 8 percent in later years.
Reaction to APB Opinion No. 10

Reaction to Opinion No. 10, at least in the case of convertible debt, was not completely favorable. Questions raised ranged from the effect of imputed interest expense on reported earnings to the practical problems involved in implementing the entire procedure. As a result, paragraph 11, Accounting Principles Board Opinion No. 12 (2) of December 1967 temporarily suspended the effectiveness of paragraph 8 and 9 of Opinion No. 10 retroactively to their effective dates.

APB Opinion No. 14 relative to convertible debt (3)

Opinion No. 14 was issued in March of 1969. During the period between the issuance of Opinion No. 12 and 14 - the Board attempted thorough research on the subject of convertible debt and debt with stock purchase warrants.

The Board felt the most important reason given for the accounting for convertible debt solely as debt lay in the inseparability of the debt and conversion option. The holder cannot sell one right and retain the other, nor can they both be consummated. The holder either converts to common stock or receives cash for the bond.

A second reason found for accounting for convertible debt solely as debt was the fact that investment value (IV) is strictly an estimate, it is not established in the market place. At the same time, value of the conversion feature is
complicated by such things as the uncertain duration of the rights to obtain stock, and uncertainty as to future value of the stock obtained upon conversion. The Board also found evidence of a feeling that valuation of a convertible without the conversion feature is difficult because such debt would still contain features that differ from straight debt. Usually convertibles are less restrictive on the issuer and less protective of the holder than nonconvertible debt.

A recent article by Imdieke and Weygandt (7) note two additional problems encountered in giving the conversion privilege a dollar value. One is the non-deductibility for tax purposes of imputed interest\(^4\), and the other is the theoretical question of whether conversion discount represents a cost to the business.

The Board found, of course, a contrary view - a view that inseparability of the debt and conversion option is a false

\(^4\)There appears to be some doubt about the validity of this argument. An August 1967 Arthur Andersen & Co. Subject File Rider directed to all audit partners and managers was concluded with the following paragraph:

The foregoing discussion assumes that amortization of the imputed discount is not deductible for tax purposes. There is some uncertainty and difference of opinion on this point. Accordingly, if a client wishes to claim amortization of the discount for tax purposes, the tax effect might be reflected in the company's annual income tax provision. The effect that this would have on our opinion on the financial statements would necessarily be decided on a case-by-case basis, considering the individual facts, our appraisal of the tax situation then existing, and the materiality of the tax reduction reflected in income.
issue. Accountants are faced with a similar problem when the lump-sum acquisition of fixed assets and goodwill necessitate allocation of the purchase price. Capitalization of a long-term lease also involves a separation of interest and principal elements.

Many people believe that the difficulties of implementation are not insurmountable. There are experts available to help determine investment value. They also argue that if a comparable nonconvertible debt security could not be sold at an acceptable price, then the value of the conversion option is of such significance that it must be recognized.

It appears that if one recognizes two transactions -- sale of a bond and sale of a conversion privilege -- then the bond is sold like any discounted debt instrument. It would seem that the amortization of conversion discount is theoretically sound. The deductibility or nondeductibility of imputed interest argument is practical but lacks theoretical or conclusive underfooting and raises the question of whether the tax tail should wag the accounting dog.

Board opinion

The Board found that no portion of the proceeds from the sale of convertible debt should be recognized as a value of the conversion privilege. In doing so they stated that the inseparability argument carried the greatest weight.
Another Possible Solution

The aforementioned article by Imdieke and Weygandt suggests an alternative treatment for convertible debt. Citing the fact that there are two primary reasons why corporate enterprises issue convertible debt -- desire to raise equity capital or desire to "sweeten" the debt issue\(^5\) -- they suggest the traditional accounting procedure in the latter case but outline a new approach where management purpose is to raise equity capital.

**Procedure where management intends to raise equity capital**

Borrowing heavily from Professor Eugene F. Brigham (6), Imdieke and Weygandt conclude that the liability resulting from issue of convertible debt should be based on the present value of interest payments to date of conversion. Professor Brigham has stated that this depends on the issuer's call policy or the investor's cash-out policy. The latter is the length of time the investor is willing to hold the security. This in turn depends on the interest-dividend relationship, the investor's willingness to risk a stock price decline and willingness to hold securities providing a low current yield. If investors are willing to hold convertibles longer than the

\(^5\)Chapter V will contain a detailed discussion of corporate or management interest relative to the issue of convertibles.
firm (issuer) is willing to let them ride, the time to forced conversion can be predicted by the company call policy. Brigham has developed the following mathematics relative to such policy:

\[ C = P_0(1+g)^N/R \]

Where:  
- \( C \) = CV at which management will call or force conversion  
- \( P_0 \) = share price of stock at convertible issue date  
- \( g \) = growth rate of stock  
- \( M \) = price paid for bond (usually par)  
- \( P_C \) = conversion price  
- \( R = N/P_C \)  
- \( N \) = years to call  

\( N \) or time to call or forced conversion can be solved after conversion to logarithmic form:

\[ N = \frac{\log P_C - \log P_0 + \log C - \log M}{\log(1+g)} \]

Using the above, Imdieke and Weygandt illustrate the recording of a $1,000,000 5% convertible issue. There is an anticipated 6% average market growth rate of company common stock. Call point is set at 20% premium of \( C \) over \( M \). If each bond is issued at $1,000, \( C \) will be $1,200. Finally \( P_C \) is set at $50 and \( P_0 \) at $45.
\[ N = \frac{\log \$50 - \log \$45 + \log \$1,200 - \log \$1,000}{\log (1.06)} \]

\[ N = \frac{1.6990 - 1.6532 + 3.0792 - 3.00}{.0253} = 5 \text{ years} \]

Since time to call or forced conversion is estimated to be five years, Imdieke and Weygandt feel that the actual convertible liability should be present value of interest payments for the five year period. Discount rate to be used is company straight debt yield. In their illustration this is set at 6\% so the present value of $50,000 per year in interest payments for each of five years is computed to be $210,610. Thus the entry at issue date is:

- **Debit** - Cash \( 1,000,000 \)
- **Credit** - Liability for interest on convertible debentures \( 210,610 \)
- **Credit** - Paid-in capital -- convertible debt \( 789,390 \)

The interest payment entry for the first year can be summarized as follows:

- **Debit** - Interest expense \( 50,000 \)
- **Debit** - Liability for interest on convertible debentures \( 37,363 \)
- **Credit** - Cash \( 50,000 \)
- **Credit** - Paid-in capital -- convertible debt \( 37,363 \)

Operations is charged with cash interest expense of $50,000 while the reduction in liability represents the present value
of $50,000 received five years hence. At the end of five years the liability will have been reduced to zero and paid-in capital will have a credit of $1,000,000, equal to the par value of the common stock issue on conversion.

In the event that the actual growth of stock differs materially from the anticipated rate, direct adjustments to the liability and paid-in capital accounts are appropriate.

The Imdieke-Weygandt approach has appeal. An important ingredient is management or supplier intent. This should certainly have some bearing on the accounting plan. Management decides if it is issuing debt or selling equity via convertible debt. If management decides on the latter the assumption has to be made that the bondholder is willing to hold the convertible longer than the supplier will let him do so. This enables management to exercise call policy to force conversion and thus control their own destiny.

The procedure calls for a growth rate that must be estimated. In addition, the use of a discount factor to find the present value of future interest payments is subject to the same criticism that has been leveled toward the traditional method.

---

6 Many companies do not depend on call policy to force conversion but use interest-dividend differential instead. This plan is based on the idea that as dividends on common stock overtake and exceed interest on convertibles, the bondholder is less interested in holding debt. Of course, this procedure leaves less control in the hands of management.
As pointed out, management intent is important but investor intent cannot be ignored. Why do investors purchase convertibles? Will they be the dupes of management relative to the holding period? Can we assume that a called convertible results in equity? What about the companies that issue convertible convertibles with no preference as to purpose? They are interested in both "sweetening" the straight debt issue and selling equity. Before falling back on call policy as a control factor even Imdieke and Weygandt admit that management intent plays a minor role after issue. There are too many unanswered questions to merely accept the plan at face value.

Chapter Summary and Conclusion

The recommendation of APB Opinion No. 10 was rejected by APB No. 14. Major reasons given were inseparability and difficulty in determining IV. The former should not present a problem since accountants are trained to deal with lump sum transactions. However, estimation of IV could lead to violation of the accounting principle of objectivity7.

7This principle tells us that the recording of accounting transactions should be based on objective evidence. Although this does not rule out an estimate based on judgment, the estimate should be one that more than one competent expert would agree to.
The Imdieke-Weygandt approach has certain practical limitations and many unanswered questions. The search must go on.
CHAPTER IV. THE DEMAND FOR CONVERTIBLE DEBT

Investors demand for convertible debentures goes back to two significant characteristics of convertibles - CV and IV. Convertible bonds have a determinable conversion value and owners are free to exercise the conversion privilege. IV represents the present value of a guaranteed return associated with such investments. The purpose of this chapter is to show that CV appears to be more important to the investor.

The above purpose will be accomplished through a regression study of premium. If it can be determined why investors are willing to pay an amount greater than either CV or IV then a significant part of demand will be explained. Although premium has already been defined in two different ways, it is felt that the purpose of this study can best be accomplished by concentration on the difference between MV and CV or conversion value premium. Findings of this chapter will be used to help support an accounting procedure for convertible debt. Such a procedure would be implemented at issue date when, for most convertible bonds CV > IV\(^1\).

\(^1\)An analysis of 80 convertible bonds issued in 1967 and 1968 revealed that Moody's Bond Survey scored CV > IV at issue date in 78 of the 80 cases. In the other two cases CV was only slightly less than IV.
A regression study of conversion value premium is not new. The Weil, Segall and Green (WSG) study, cited on page 12, investigated the spread between MV and CV. As they interpreted the literature, such premium could be explained by the following factors:

1. Transaction costs
2. Income differences
3. Financing costs
4. Anti-dilution clause
5. Price floor
6. Volatility of price
7. Duration.

Of these seven, they were persuaded to disregard or defer consideration in the case of financing costs, anti-dilution clauses, volatility of price and duration.

Reasons for omitting possible explaining variables

At the time of the WSG article Federal Reserve Board margin requirements permitted borrowing of only 30 percent of the cost of a stock purchase, while banking practices allowed borrowing 70 to 90 percent of the cost of a bond purchase. Under such circumstances some writers believe convertible bonds deserve a premium because of additional borrowing capacity. Despite the above, WSG did not include financing
costs in their study. They recalled that in the past, changes in margin requirements have had little impact on stock prices. Their mathematics show that financing cost differences are nearly always proportional to the premium they wish to explain. WSG conclude that this gives excellent but uninteresting results.

To protect convertible bondholders' interest from dilution and security cheapening, indenture agreements frequently contain anti-dilution clauses. Such clauses vary with the individual security. Theoretically the more complete the anti-dilution coverage the higher the premium. While stating that such clauses are relatively unimportant in explaining premiums, WSG admit it might be helpful to quantify such data. However, they cite high costs and difficulty in determining the correct form of the variables as deterrents. Consequently, a variable for anti-dilution clauses does not appear in the WSG regression.

---

2: WSG points out the following as examples of dilution or security cheapening:
   a. the sale of common stock below market price
   b. the payment of stock dividends (a particular form of (a) where the sale price is zero)
   c. the distribution of "capital" in the form of large dividends or partially liquidating dividends, and
   d. the issuance of options, rights, warrants, or other convertible securities.
Price volatility expresses the variance in price movements of stock the bond converts to. The larger the prospective upward price movement, the more valuable the conversion option and the larger the premium. WSG felt such reasoning is faulty. They stated that it is correct to regard stock prices as the present value of a future income stream, and that an allowance for volatility is included in the stock price. If the bond price is influenced mainly by the price of the stock it converts to, and they feel it is when convertibles are selling well above IV, then an allowance for volatility is incorporated in the bond price. WSG admit that where convertible bonds are selling at a price near IV, conversion value premium is probably the greatest for the most volatile stocks; however, their regression is confined to a range in which MV is considerably greater than IV. They were thus persuaded to exclude price volatility from their regression.

WSG felt that duration of the conversion privilege is quite important in explaining premium but fail to come up with an operational measure of the variable. For this reason, it was omitted from their study.

The larger the price movement the more likely a gain through an upward movement in prices. At the same time, downside protection is afforded through bond investment value.
Variables incorporated in the study and the results achieved

WSG used three variables - transaction costs, income differences and the price floor - to explain conversion value premium. The use of transaction costs is due to the fact that broker commissions are lower on bonds than on stock. Broker fee for the purchase of a $1,000.00 par value bond was increased during 1970 from $2.50 to $5.00 per bond. The fee for purchase of a common stock varies with market value of the stock and is generally much more than an equivalent bond purchase. WSG felt the bond deserved a premium to reflect this saving.

A second variable included in the WSG model was income differences. If the present value of the expected bond stream exceeds the present value of the expected stock stream, the bond deserves a premium for that difference. The difficulty of implementing stock income expectations is obvious. WSG used the difference in current income streams - bond interest less dividends on stock - as the explaining variable.

Finally WSG used the difference between MV and IV as an explanatory variable. Since IV is considered a floor relative to downside risk, the name floor variable was incorporated into

\footnote{For listed stocks, if the market value of the stock traded is less than $100 the commission is mutually agreed on. Above $100 fees are on a varying scale subject to a minimum of $6 and a maximum of $75. At this writing there is also a surcharge of $15 per trade or 50% of the regular commission, whichever is less.}
their model. Since IV serves as a buffer its importance should increase as MV nears the floor, and decrease as MV moves away from IV. WSG hypothesized that conversion value premium is a monotonically decreasing function of the floor variable. Their study suggested a variable in the form $1/F^2$ with F representing the floor variable or the spread between MV and IV.

The general form of their equation was as follows:

$$\frac{MV - CV}{MV} = a \frac{1}{MV} + b \frac{1}{F^2MV} + c \frac{Yd}{MV} + d \frac{T}{MV}$$

where

$MV$ and $CV$ are as previously defined

$F =$ floor variable, spread between $ MV$ and $IV$

$Yd =$ difference in current income streams; bond income less stock income

$T =$ transaction cost difference. Cost to buy the stock into which the bond converts less cost to buy the bond including all transfer taxes.

As WSG explain, to reduce the effect of measurement error and put all measurements on the same basis, all variables were divided by $MV$.

Limiting their data to bonds that have an $CV$ greater than par$^5$. WSG results can be summarized in the following manner.

$^5$In this range WSG felt they would be working with convertibles having relatively small premiums as compared to a complete cross section of such bonds. In the latter case premiums on convertibles can be quite large and this, in turn, may be due to difference in issuing terms rather than differences in asset form. By working with smaller premiums the impact of happenstance of issue terms will be reduced.
The floor variable did nothing to explain conversion value premium while Yd and T were statistically significant. The sign of the Yd variable was hypothesized positive, and this proved correct. However, the sign of the transaction cost variable (T) was negative. That is, premium apparently decreases as the transaction cost advantage for bonds increased. This is contrary to the basic theory used by WSG in incorporating the variable. Finally, $R^2$'s achieved in securing coefficients for the above equation ranged from .50 to .57. The latter figure resulted from the use of dummy variables which made a distinction between bonds of different periods relative to the intercept term.

In assessing their results, WSG appear to suspect the reason for a negative transaction cost coefficient. As they state in a footnote, from a theoretical standpoint there is a strong inverse relationship between the price of the bond and conversion value premium. As the price of the already outstanding bond increases the premium decreases. This means, of course, that CV follows MV. Since broker fees on stocks vary with market value of the stock, transaction cost differences may only indicate that the higher the bond price the lower the premium. Thus the WSG model resulted in increasing transaction costs as premiums decreased. In view of this WSG

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WSG also attempted to predict premiums on a portion of their data. When this was done $R^2$'s dropped to a range from .35 to .37.
rested their case on \( Y_d \) and concluded that the determination of premium depends on the difference in income streams between bonds and stocks.

**Comments on and criticism of the WSG study**

Of the seven explanatory variables, WSG chose to omit four. Their rationale concerning the omission of financing costs and anti-dilution clauses seems reasonable. The former appears unimportant while the latter would be costly and difficult to quantify. However, this writer believes that both duration of the conversion privilege and price volatility can add something to the study. The fact that bonds may be called must have an effect on the premium buyers are willing to pay. WSG felt that volatility was already incorporated in the bond and stock prices. The use of a volatility variable is one way to investigate the validity of that view.

WSG did admit that price volatility might play some part in explaining conversion value premiums where \( MV \) is close to \( CV \). However, they abandon that investigation by confining their data to those cases where \( CV \) is greater than par and \( MV \) is well above IV. This brings another criticism into focus. WSG felt that limiting their data eliminated premiums due strictly to terms of issue. If this problem does exist there is no assurance it has been eliminated. Presumably WSG would classify anti-dilution clauses as part of the terms of issue group. It seems reasonable that such clauses could
affect premiums in any range. In fact, limiting their data to a range where premiums are normally quite small could create another problem; unless there is a simultaneous observation of the bond and the stock the bond converts to, a chance of measurement error exists. When premiums are small they may be entirely due to such error. Possibly much of the WSG data does not result in true conversion value premium, but rather is a result of non-simultaneous measurement of bond and stock prices.

WSG used three explanatory variables plus an intercept term in their model. In the end they found only one of three, income differences, to be of value in explaining premium. It is this writer's belief that price volatility and duration of the conversion privilege should also play a part in shaping premiums. It is also most difficult to imagine any model involving bonds that does not include money market conditions or interest rates. In addition, it is speculated by Meyer (10) that the nearness of CV to IV leads to premium maximization. Meyer made his observation relative to the design of new convertible preferred stock issues. It was based on premium defined as the difference between MV and the higher of CV and IV. The author believes that the CV-IV relationship can be tested effectively in an analysis of convertible bonds in which premium is limited to the conversion variety.

The next section of this chapter will be concerned with a new model, developed by the author, in an attempt to provide
a more complete explanation of premium and the demand for convertible debt.

The New Model

In explaining their model, WSG presented seven factors that might have effect on conversion value premium. Two new ones have been added. The new model variables were selected from among these nine factors.

Omission of possible explanatory variables

Financing costs, anti-dilution clauses and transaction costs were not incorporated in the new model. The rationale presented by WSG concerning non-inclusion of the first two in their model seemed valid. Financing costs appear unimportant relative to explaining premiums while anti-dilution clauses would be costly and difficult to quantify. At the same time, the validity of transaction costs as an explaining variable is very questionable. As previously stated, transaction cost differences (stock transaction costs less bond transaction costs) have an inverse relationship with conversion value premium and only show that high bond prices are associated with low premiums.

Rationale for including the remaining variables

The WSG conclusion was based entirely on income differences. This alone would be sufficient reason for including the
variable in any new study. The form of the variable was: dividends on stock the convertible converts to less coupon interest on the convertible bond. When bond interest exceeds stock dividends the bond deserves a premium. If this rationale is valid, the form of the variable will dictate a negative coefficient.

One of the factors that must have an effect on any type of convertible debt premium is duration of the conversion privilege. Many companies have a practice of initiating call when they feel certain conversion will eventually take place. As discussed in a previous chapter, this is probably one of the circumstances that drives $MV$ toward $CV$, thus reducing premium. Call price represents the amount issuing companies would have to sacrifice if bonds were called and conversion did not take place. $CV$ represents the conversion sacrifice. In many cases the desire to call is directly related to the difference between $CV$ and call price. From a theoretical standpoint there should be an inverse relationship between premium and the spread between $CV$ and call price.

It is hypothesized, for testing purposes, that bonds converting into volatile stocks command a larger premium than debt instruments relating to more conservative equities.

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$^7$WSG used interest less dividends, and this resulted in a positive coefficient.
Price/earnings ratio will represent this variable. There should be a positive relationship between a high price/earnings ratio and conversion value premium.

The theory concerning premium when CV > IV has been mentioned on page 50. It is based on the idea that values of both CV and IV are protected if the two are equal or nearly equal. Meyer states that if CV greatly exceeds IV the latter loses its significance; the investor is less likely to pay a premium for the floor protection afforded by IV. If IV greatly exceeds CV the value of the conversion privilege is lost to security purchases. This theory will be tested in a regression confined to observations where CV > IV. There should be an inverse relationship between premium and the nearness of CV to IV. If observations include situations in which CV < IV there should still be an inverse relationship. It is reasonable to hypothesize that conversion value premium will increase as the sign of the CV less IV relationship goes from positive to negative.

The form of the floor variable used by WSG dictated the form to be used in the new model. To achieve the purpose of this chapter the value of IV relative to explaining premium must be secondary to that of CV. As explained on page 47, the significance of the floor or IV was tested by a variable in the form of 1/F^2. WSG results indicate the floor variable, and thus IV, was not helpful in explaining premiums. These findings should be examined in any new model.
Interest rates were incorporated as a final explanatory variable. As the next section of this chapter indicates, data for the regression study were gathered during a period of rising interest rates. The prime rate rose from 5.5 to 8.5 percent (19) and average corporate straight debt on industrials from 5.7 to 7.29 percent (17, 18). Since all bonds in the test data were selected at the start of the period, it was imperative that the change in rates be included. It seems logical that a group of convertible bonds, set at yields characteristic of one point in time, will tend to sell at smaller and smaller premiums during periods of rising interest rates. This theory was tested by noting the spread between corporate straight debt yields on industrials\(^3\) and convertible coupon interest, relative to premium. This should result in an inverse relationship.

**Formation of the data**

Data were gathered on 48 randomly selected convertible bonds reported in *Moody's Bond Survey*. The test period extended over 24 months starting July 1967 and ending with the same month in 1969. Observations were taken every 2 months.

---

\(^3\) Most of the convertibles in the regression, as well as most convertibles on the market, are issued by companies classified as industrial. However, the average corporate straight debt, prime interest rate or any rate that reflects a directional movement of market yields could have been used.
Assuming all 48 bonds were actively traded during the test period, it would have been possible to make 624 observations. Frequently, however, there was no trading in a bond and no market quotation was available. In a limited number of cases, bonds were called. The result was an initial total of 463 observations. Of these, 174 were bids rather than completed transactions. In the end 289 remained.

The 289 valid observations represent each two-month period. There is no point in time blocked out because of thin trading. The writer does not believe that announced call affected regression data. Every effort was made to collect representative and unbiased data.

The tests

The regression study will be broken into two sets. In the first part all 289 observations are to be used. This will be followed by the use of data where \( CV > IV \). There are 203 observations in this category.

The general form of the regression equation was:

\[
\frac{MV-CV}{MV} = a + b \frac{CV-CP}{MV} + c \frac{Yd}{MV} + d \frac{PE}{MV} + f \frac{CV-IV}{MV} + g \frac{1}{F^2_{MV}} + h \frac{Im-1}{MV}
\]

---

\(^9\)See the Appendix for a discussion concerning source and description of the data.
where:

MV, CV, and IV are as previously defined

CP = call price

Yd = difference in current income stream: it consists of current dividends per share multiplied by the number of shares the bond converts to less bond coupon cash interest

PE = price/earnings ratio of the stock the bond converts to

F = floor variable

Im = corporate straight debt yield on industrial bonds

I = bond coupon cash interest rate.

As in the case of the WSG model, all variables were divided by MV. The primary reason for doing so was to put all measurements on the same basis. In doing preliminary work the regression was run on all 289 observations without the use of an MV denominator. An R-bar squared \( (R^2)^{10} \) of .59 achieved through this procedure was considerably inferior to results from use of a regression equation divided by MV.

\[ \bar{R}^2 = 1 - (1-R^2) \frac{N-1}{N-K-1} \]

where

\( N \) = Observations

\( K \) = Variables

Thus, \( \bar{R}^2 \) is \( R^2 \) adjusted for degrees of freedom.
Regression results

Results of the study using 289 observations are shown on page 59. All signs, with the exception of the floor variable and income differences are as hypothesized. Neither the floor variable nor the variable expressing the CV-IV relationship proved statistically significant. In fact, dropping both increased the already significant t-value of duration (CV-CP) and interest rates (Im-I)\(^{11}\). Finally, the variable expressing the difference in income flows (Yd) was also eliminated. The sign of this variable, different from that hypothesized, implies that greater premiums are paid where dividend income increases relative to bond cash interest. Perhaps the basic theory is wrong and investors pay a premium to be able to convert into a stock with increasing yield. However, in view of the relatively low t-value where 289 observations were used and, as the reader will soon note, the very insignificant results when used with only 203, Yd was eliminated. There was no real loss in efficiency in doing so. It would appear that over its entire range, conversion value premium is a

\(^{11}\)It is very likely that dropping CV-IV helps CV-CP and dropping 1/F^2 helps Im-I. In the former case both express a spread between CV and another price or value that is fixed or semi-fixed. In the latter situation the floor is IV which in turn is based on current interest rates.
function of duration, price volatility and interest rates\textsuperscript{12}. Results of the regression (page 60) using only 203 observations do not change the conclusions concerning important explaining variables. The drop in $R^2$ does not come as a complete surprise. It seems quite likely that measurement error exists in the test observations. Part of this is probably due to non-simultaneous price observations of bonds and related stocks. This type of error is particularly material in the upper ranges of the $\bar{MV}$-$CV$ relationship where premiums become smaller, and any error in premium is magnified. In fact, the 203 observations contain all the negative premiums ($CV > \bar{MV}$) present in the 289 observations. See Figure IV.1, page 63, where all points to the right of line $XZ$ represent negative premiums. It is argued that this magnification of premium error reduces regression efficiency as \textsuperscript{12}Use of dummy variables due to a possible shifting intercept was considered. However, their use only slightly improved WSG results so they were not implemented.
Results of Regression  
(Using 289 Observations)

1. \[ \frac{MV-CV}{MV} = a + b \frac{CV-CP}{MV} + c \frac{Yd}{MV} + d \frac{PE}{MV} + f \frac{CV-IV}{MV} + g \frac{1}{F^2 MV} + h \frac{Im-I}{MV} \]

2. \[ \frac{MV-CV}{MV} = a + b \frac{CV-CP}{MV} + c \frac{Yd}{MV} + d \frac{PE}{MV} + h \frac{Im-I}{MV} \]

3. \[ \frac{MV-CV}{MV} = a + b \frac{CV-CP}{MV} + d \frac{PE}{MV} + h \frac{Im-I}{MV} \]

Regression Coefficient  
(t-values)

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<td></td>
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<td>(2.51)</td>
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<tr>
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<td></td>
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<td>(6.63)</td>
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<td>CV-IV/MV</td>
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<td></td>
<td>(.15)</td>
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<tr>
<td>1/F^2 MV</td>
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<td>(.37)</td>
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<tr>
<td>Chow</td>
<td>1.28</td>
<td>.32</td>
<td>.45</td>
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Results of Regression
(Using 203 Observations)

1. \[ \frac{MV-CV}{MV} = a + b \frac{CV-CP}{MV} + c \frac{Yd}{MV} + d \frac{PE}{MV} + f \frac{CV-IV}{MV} + g \frac{1}{F^2MV} + h \frac{Im-I}{MV} \]

2. \[ \frac{MV-CV}{MV} = a + b \frac{CV-CP}{MV} + d \frac{PE}{MV} + g \frac{1}{F^2MV} + h \frac{Im-I}{MV} \]

3. \[ \frac{MC-CV}{MV} = a + b \frac{CV-CP}{MV} + d \frac{PE}{MV} + h \frac{Im-I}{MV} \]

Regression Coefficient
(t-value)

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<td>( PE/MV )</td>
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<td>Chow</td>
<td>2.18</td>
<td>2.14</td>
<td>2.51</td>
</tr>
</tbody>
</table>
opposed to the situation where all observations were used\textsuperscript{13}.

Results of the smaller regression (203) are detailed differently than those of the all-inclusive study. Since Yd was completely insignificant it was immediately dropped. The second equation retained $1/F^2$ instead\textsuperscript{13}. After all eliminations, efficiency was not materially reduced as compared to equation 1. The previous conclusion concerning duration, price volatility and interest rates still stands\textsuperscript{14}.

Regression Conclusion

It was the purpose of this chapter to show that convertible bonds receive greater utility or value via their equity

\textsuperscript{13}Significance of $1/F^2$ in the 203 observation range is probably another result of negative premiums. Referring once again to Figure IV.1 it will be noted that much of this type of premium appears in the middle to lower range of the MV-CV relationship. It is probable that this promotes a situation giving an illusion of slightly increasing premiums where $F$, the spread between MV and IV, increases.

\textsuperscript{14}The test statistic due to Chow yields different results for the two sets of regressions. The smaller regression always shows a higher figure. This is probably due to elimination of nearly a third of the observations in the larger regression. All such eliminations are from one end of the function. The remaining 203 contain large premiums as well as all negative premiums. The concentration of large premiums and negative premiums for these 203 in the first sub-period is such that the regression line has a higher intercept than that of the later time or second sub-period. It is believed that this is less a shift in the structure than the fact that large premiums are associated with the lower money market rates of the earlier period and negative premiums are measurement error. Also, the results for the smaller regression are still well below critical values at the 5% level.
Figure IV.1. Plot of $MV$ and $CV$ Relationship
(289 observations)
rather than debt characteristics. Regression analysis has been used to demonstrate that premium is paid because the bond can be converted into equity and is not because it has a floor or investment value. Because the eventual goal is to tie chapter findings to an acceptable method of recording convertibles the analysis has been confined to conversion value premium. Rationale for this approach springs from the fact that premium for new bond issues is generally measured from conversion value.

Although the significance of an interest rate variable mainly points to rational behavior on the part of the investor, this chapter is prompted by the other results. Significance of the duration variable is consistent with the idea that investors buy convertible bonds with the hope of prospective gain through conversion. Investors are willing to pay a premium for this opportunity but are less inclined to pay a premium as the chance of call becomes more probable. Significance of the PE ratio suggest that investors look to the stocks that bonds convert to in determining where to pay a premium. Finally, a variable used to explain the value of IV in the eyes of the investor did not prove important in explaining premium. Investors do buy convertible bonds to convert to equity, the insurance value of a debt is secondary at best.
CHAPTER V. THE SUPPLY OF CONVERTIBLE DEBT

It is generally recognized that there are two basic and continuing reasons for issuing convertible bonds: (1) to substitute for straight debt, or (2) to raise common equity on a delayed basis. It is the purpose of this chapter to show that the latter is the more important in the eyes of most issuing companies.

In the past, various corporate executives have been asked which of the above reasons had the greatest bearing on his decision to issue convertible bonds. The author has found that executives generally declare the latter reason to be more important. Two surveys will be reviewed. In addition, a regression study will be reviewed which gave results somewhat in conflict with the chapter goal. This study will be answered by additional regression analysis.

The results of this chapter, along with analysis of convertible demand, will be used to support the accounting procedure to be presented in Chapter VI.

Reasons for Issuing Convertible Debt

In a letter\(^1\) Mr. C. A. Conrad, Assistant Treasurer of the American Telephone and Telegraph Company (AT&T), explained the

\(^1\)Private communication to the author in November of 1969.
rationale behind his company's post-World War II issues of convertible bonds. During the 1946-1958 period, AT&T experienced a period of growth that required financing in excess of the sum of its internal and straight debt sources. At the same time, the company was faced with low annual earnings which made equity financing difficult. To meet the problem, AT&T floated a series of convertible debentures.

Conrad explained that in these circumstances convertibles allowed AT&T to tap a wide market, running from those who normally didn't buy bonds to those who normally didn't or couldn't buy equities. He concluded by saying that convertibles with the characteristics used by AT&T resulted in fairly rapid conversion and debt ratio reduction.

Conrad's remarks summarize the two major reasons companies turn to convertibles and conclude by indicating what most issuers anticipate - conversion. Companies may "sweeten" the straight debt issue because of a lack of straight debt sources or because of high interest rates. Other companies investigate the possibility of issuing equity but find that low earnings or low stock values make this a difficult method of financing, and then turn to convertible bonds. Pilcher (14) has described individual motives ranging from a shortage of venture capital as a substitute for equity, to the use of convertible bonds because they are more fashionable than straight debt. However, the two overriding reasons appear to be debt "sweetening" and equity substitution.
Two empirical surveys

Pilcher's comprehensive study of convertibles includes a survey of seventy-five corporations issuing convertible securities from 1948 through 1953. In each case the corporate president was asked which of two purposes played the more important role in the decision of the company to issue convertibles: (1) desire to "sweeten" the straight debt issue; or (2) to raise common equity on a delayed action basis. In cases where bonds were issued, 82 percent of the replies indicated a desire to raise common equity. The balance of the replies were equally divided between a desire to "sweeten" a senior security and no definite preference between the two. Finally, in several cases a company indicated a preference for one of the two motives but nevertheless considered the other an important factor. In other words, one motive does not always preclude the other.

A similar survey was conducted by Brigham (6). The results indicated that 16 of the 22 firms replying were primarily interested in obtaining equity when issuing convertibles.

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2At a speaking engagement during 1968, E. R. Hoffman, Controller of General Mills, Inc., was asked which of the two motives his company considers the more important. He indicated no definite preference.

3Brigham's results did indicate that 15 of the 16 sold convertibles because they provided a way of selling common stock above the existing market. The other one was interested in preventing an earnings per share dilution.
The debt impetus ran a poor second with 6. Brigham's results also revealed that in 3 cases there was interest in appealing to special investor groups. This latter point is consistent with the approach taken by American Telephone and Telegraph.

Brigham indicates that his survey consisted of relatively large corporations. The same sample bias probably applies to Pilcher's survey. The effect of this bias is offset by the observation that large corporations generally issue the bulk of convertibles. Brigham points out that during 1961 to 1963, 215 convertible bonds having a value of $1,080,000,000 were sold to the public. Of this total, $820,000,000 or 76 percent were sold by 42 companies.

The Pilcher and Brigham results point to the equity impetus as the main reason for issuing convertibles. In view of this it is surprising that a regression study conducted by McKenzie (9) limited explaining variables to debt related factors. The author feels it is necessary to answer the McKenzie study with an expanded model. However, before doing so the McKenzie approach will be reviewed.

The McKenzie Report

McKenzie explains new convertible issues as substitutes for straight debt using three independent variables to do so.

---

4Brigham's 22 replies came from these 42. He had sent questionnaires to all the firms, and thus only 52 percent of the firms replied. Pilcher had success in 71 percent of the cases attempted.
One variable is termed a yield index, the ratio of average interest rate on straight debt to average interest rate on convertibles\(^5\). A second variable is plant and equipment expenditures, while the third is dollar volume of straight debt issues.

McKenzie hypothesized that as the yield index increases companies turn from straight debt to less expensive convertible debt as a means of financing expanding plant and equipment demands. Using quarterly data from the fourth quarter of 1955 through 1966, the following regression equation and results were developed:

\[ I_{ti} = -21.564 + 19.030 R_{ti} + 0.111 P_{ti} - 0.123 D_{ti} \]

\[ (7.766) \quad (0.063) \quad (0.074) \]

Multiple correlation coefficient -.508\(^6\); t-value in parenthesis; where:

---

\(^5\)McKenzie constructed his own convertible bond yields. Presumably data were taken from Moody's Convertible Bonds using the following rules:

1. each issue used in a given quarter had to appear in either the index of the preceding or those of a succeeding quarter;
2. conversion value of the bond had to be between 60 and 100 with market price of related stock less than 90 percent of the conversion price;
3. price of convertible had to be between 70 and 100;
4. exercise of judgment when unusual market price and yields appeared.

\(^6\)McKenzie did not give an \(R^2\) or \(\bar{R}^2\). His reported results would give a low \(R^2\) of .258 and \(\bar{R}^2\) of .206.
I = quarterly issues of convertibles (billions of dollars)\(^7\)

\[ t_i = \text{time} \]

R = yield index

P = plant and equipment expenditures (billions of dollars)

and

D = straight debt issues (billions of dollars).

Although the R variable was statistically significant and coefficients of P and D had the correct signs, the multiple correlation coefficient was quite low. The latter fact points to an absence of other explaining variables. In view of the above results the author feels compelled to develop a new and more complete model.

A New Model

Using monthly data from March, 1955, through September, 1968 the author will regress dollar convertible issues on McKenzie's independent variables and add several additional ones.

The McKenzie regression failed to take into consideration one of the major reasons for issuing convertible bonds - sale of common equity on a delayed basis. The purpose of the present regression is to show that McKenzie only tells part

\(^7\)McKenzie data on quarterly issues (supplied by Moody's) does not agree with Security and Exchange statistics. A pattern explaining the discrepancy was not discernible.
of the story. The substitution of convertible debt for straight debt during periods of rising interest rates is accepted; however, it is believed that convertibles are just as frequently substituted for equity. It is also believed that the issuance of such debt may be induced by stock prices and yields as well as interest rates.

Keeping the above in mind, it is hypothesized that a drop in common stock prices will induce more convertible issues. Companies, such as AT&T, find it difficult to raise sufficient fund through direct sale of equity so they turn to convertible debt. Standard and Poor's common stock prices will serve as one independent variable.

The idea of "sweetening" the debt issue has already been discussed. This writer believes that the equity issue may also be "sweetened". Convertibles paying higher interest than current stock yields are offered to the public. The issuer can afford to pay the higher interest since it is tax deductible and dividends are not. This results in a differential\(^8\) that can be retained by the issuer. The situation would be ideal for a growth company. It is hypothesized that a decrease in common stock yields, which makes the direct purchase of equity unattractive, will result in a greater dollar volume of convertible bonds.

\(^8\)Dividends \(\rightarrow\) bond interest less taxes.
A yield index, similar to that used by McKenzie, will serve as still another variable. The reason for such a variable has already been explained. An increasing index will be accompanied by a greater dollar volume of convertibles.

It is highly probable that issuers, finding it difficult to find straight debt buyers during periods of increasing interest rates, will turn to convertibles. They will do so regardless of the size of the yield index. In other words, as rates increase any savings looms more and more important. Based on this theory average corporate straight debt rates will be included as still another variable. As they increase there should be an increase in dollar volume of convertible debt.

The McKenzie model attempted to show that convertibles replace straight debt as a means of financing plant and equipment expenditures. The expanded model will have variables showing other possible purposes or uses of convertibles. In addition to plant and equipment there will be variables for working capital, debt retirement and other purposes. The regression test is to determine if new money secured from convertibles is being used for purposes other than plant and equipment. A positive coefficient for a particular variable will point to the possibility of convertibles being used for that purpose.

---

9See Appendix for a description of the index development.
Finally, McKenzie's theory has straight debt issues decreasing as convertibles are on the increase. Companies turn to convertibles as a substitute for straight debt. The expanded model will assume convertibles as a substitute for common stock and preferred stock as well as straight debt. In each case, a negative coefficient will point to the possibility of convertible bonds being used as a substitute for the particular security form.

The regression and results

\[ I_{ti} = 316.01 + 38.303 R_{ti} - 129.831 Y_{ti} \]
\[ - 5.563 S_{ti} + 102.972 B_{ti} + .615 P_{ti} \]
\[ + .676 W_{ti} + .367 E_{ti} + .632 O_{ti} \]
\[ + .524 D_{ti} - .774 C_{ti} - .475 F_{ti} \]

\[ R^2 = .737; \quad F = 11.71; \quad t\text{-values in parenthesis;} \]
\[ \text{Durbin-Watson} = 1.637; \quad \text{Chow} = 1.577; \]

where:

I = quarterly issues of convertibles (millions of dollars)
R = yield index
Y = stock yields

\[ ^{10} \text{See the Appendix for a discussion concerning source and description of the data.} \]
In comparing the McKenzie model and the one just presented the following observations can be drawn. McKenzie found the yield index to be much more significant than did the author.  

\[ I_{t_i} = -1184.2 + 1110.23 R_{t_i} + .1288 P_{t_i} - .5402 D_{t_i} \]

(Footnote continued on following page.)
The author did get significant results when using straight debt rates as an explaining variable. This leads to the possible conclusion that issuers are more conscious of a level of rates than a spread in rates such as that depicted by the yield index.

Like McKenzie, the author found that convertibles are probably substitutes for straight debt and are used for plant and equipment additions. Further, the author found that substitution does not appear to stop with straight debt. Convertibles appear to be substitutes for common stock and regression results show the correct sign for preferred stock substitution. Uses of convertibles appear to encompass a much wider range than just plant and equipment.

Although the t-value in the new model for common stock prices and yields are low their coefficients do have the correct sign. This, combined with results concerning convertible substitution for various forms of securities and the many uses

(Footnote continued from previous page.) Multiple correlation coefficient = .452; $R^2 = .138$; t-value in parenthesis; $F = 3.09$; Durbin-Watson = 1.89.

The regression was run a second time with Securities and Exchange Commission data used as the dependent variable.

$$I_{ti} = 558.82 + 536.36 R_{ti} + .1393 P_{ti} - .4564 D_{ti}$$

(75) (3.12) (1.09)

Multiple correlation coefficient = .507; $R^2 = .195$; t-value in parenthesis; $F = 4.15$, Durbin-Watson = 2.30. McKenzie's significant t-value result for the yield index appears questionable.
of convertibles, tempers the implication of McKenzie's results. Convertibles are issued for many reasons, substituted for many security forms, and fulfill many purposes.

Mergers and Acquisitions

The possible influence of mergers and acquisitions on convertible debt issues cannot be ignored. Figure V.1, page 78, compares dollar convertible debt issues and the number of mergers and acquisitions during the same period. From 1960-1964 there is similar directional movement. This is not as true during the next four years. 1966 and 1968 show diverse movement. Also, 1967 was a big year for convertible debt issues while the relative increase in mergers and acquisitions was not nearly so great.

Like the desire to appeal to special segments of buyers, mergers and acquisitions probably do have some influence on the dollar volume of issue. The question is, what is the most important role played in their issue, the desire to "sweeten" the debt issue or to raise common equity capital?

The answer to the proposed question probably goes back to circumstances surrounding issue. In a typical merger it is not uncommon for stockholders of the selling company to receive convertible preferred stock or convertible bonds. This allows owners of the buying corporation to control the new company. In the case of a convertible bond issue there is also the
Figure V.1. Comparison of annual convertible bond issues with mergers and acquisitions, 1960-1968

Sources: Convertible Bond Issues (21, p. 15)
Mergers and Acquisitions (24)
Mergers and Acquisitions (Number)

Convertible Bond Issues ($ Million)


Year
advantage of tax deductible bond interest. At the same time, it is logical to assume that owners of the new corporation anticipate growing stock values and are therefore realistic enough to anticipate eventual conversion. In other words, they are issuing equity on a delayed basis.

Chapter Summary and Conclusion

Surveys reveal that most volume issuers of convertible bonds feel they are actively selling common stock. Regression studies point to straight debt interest rates as an inducement to issue convertible debt, but such studies also reveal that convertibles are substitutes for all types of securities. Even if a corporation issues a convertible bond as a means of "sweetening" the straight debt issue, it has to face the eventual possibility of conversion. Very few business ventures are undertaken with the idea of failure in mind.
CHAPTER VI. CONCLUSION

Catlett (5) has stated that convertible debt can be viewed in two different ways:

(1) Primarily debt with a supplemental option which may or may not be exercised; and
(2) primarily equity with a "hedge" consisting of interest with a fixed obligation.

It is the writer's opinion that the latter position correctly typifies the security. The conclusion was reached by virtue of the investigative approach taken by this dissertation. It has included examination of convertible debt supply and demand. From this investigation the following general observations may be drawn:

(1) At issue CV is ordinarily ≥ IV; therefore, the spread between MV and CV is the premium of interest for new securities.

(2) Conversion value premiums is a function of interest rates, duration of the conversion privilege, and volatility of the stock the bond converts to. The latter two factors are equity-oriented.

(3) IV does not appear important in explaining conversion value premium.

(4) Most volume suppliers of convertibles think they are issuing equity on a delayed basis.

(5) Although the level of straight debt rates may play a part in supplier decision to issue convertibles,
the latter is a substitute for many security forms and issued for many purposes.

Based on the above observations it is this writer's opinion that, as long as the conversion privilege can be exercised, a convertible bond is a quasi-equity and should be treated as such. The purchaser is primarily interested in equity features of the bond (i.e. stock the bond converts to) and pays a premium accordingly. The call on common stock or value of the conversion privilege is the difference between MV and CV, not MV and IV as proposed by APB Opinion No. 10. IV serves only as a floor relative to loss of bond market value.

The opinion is reinforced by observations concerning supply of convertible debt. Most volume issuers sell convertibles anticipating conversion and the issuance of common stock.

Treating a convertible as pure debt should be reserved for situations in which the conversion privilege has expired. Consequently, this writer would eliminate the currently-used traditional approach, which treats convertible bonds as debt and does not attempt to recognize the conversion privilege. Also, the Imdieke and Weygandt method has many subjective valuations, perhaps making it impractical. It starts with management making a subjective decision about intent of issue, continues by necessitating an estimate of common stock growth rate as well as straight debt yield for discounting purposes.
This leaves only the APB Opinion No. 10 procedure. It can be found somewhere on middle-ground. But it has been rejected by the same group that fomented the ruling.

In the end the prescribed procedure should be one that is operational from the standpoint of the accounting practitioner. An effort should be made to remove estimations and subjective evaluation. Equity aspects of the convertible sale should be emphasized. This writer believes the following procedure meets the various tests.

A Suggested Accounting Procedure

In Chapter III the application of APB Opinion No. 10 for convertible debt was illustrated. Using the same bond, it will be assumed that at issue the security converts into ten $50 par value common shares. At bond issue date common stock of the representative company is selling at $89.40 per share. This means a CV of $894.00. Making use of the equation presented on page 11 we find:

$$894.00 = \left[ \frac{(1+x)^{20} - 1}{x(1+x)^{20}} \right] 60 + \left[ \frac{1}{(1+x)^{20}} \right] 1,000$$

$x$, of course, represents the present value discount rate that equates CV and the future cash interest of the bond, assuming no conversion prior to maturity. Once again making use of tables presented in Smith (16, p. 616), the discount rate is determined to be 7%. Using this rate the following statistics can be developed:
<table>
<thead>
<tr>
<th>Year</th>
<th>Present Value Beginning of Year</th>
<th>7% of Present Value</th>
<th>Interest Paid</th>
<th>Discount Amortization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$894.00</td>
<td>$ 62.58</td>
<td>$ 60.00</td>
<td>$ 2.58</td>
</tr>
<tr>
<td>2</td>
<td>896.58</td>
<td>62.76</td>
<td>60.00</td>
<td>2.76</td>
</tr>
<tr>
<td>3</td>
<td>899.34</td>
<td>62.95</td>
<td>60.00</td>
<td>2.95</td>
</tr>
<tr>
<td>4</td>
<td>902.29</td>
<td>63.19</td>
<td>60.00</td>
<td>3.19</td>
</tr>
<tr>
<td>5</td>
<td>905.48</td>
<td>63.37</td>
<td>60.00</td>
<td>3.37</td>
</tr>
<tr>
<td>6</td>
<td>908.85</td>
<td>63.62</td>
<td>60.00</td>
<td>3.62</td>
</tr>
<tr>
<td>7</td>
<td>912.47</td>
<td>63.88</td>
<td>60.00</td>
<td>3.88</td>
</tr>
<tr>
<td>8</td>
<td>916.35</td>
<td>64.15</td>
<td>60.00</td>
<td>4.15</td>
</tr>
<tr>
<td>9</td>
<td>920.50</td>
<td>64.44</td>
<td>60.00</td>
<td>4.44</td>
</tr>
<tr>
<td>10</td>
<td>924.94</td>
<td>64.75</td>
<td>60.00</td>
<td>4.75</td>
</tr>
<tr>
<td>11</td>
<td>929.69</td>
<td>65.08</td>
<td>60.00</td>
<td>5.08</td>
</tr>
<tr>
<td>12</td>
<td>934.77</td>
<td>65.44</td>
<td>60.00</td>
<td>5.44</td>
</tr>
<tr>
<td>13</td>
<td>940.21</td>
<td>65.82</td>
<td>60.00</td>
<td>5.82</td>
</tr>
<tr>
<td>14</td>
<td>946.03</td>
<td>66.23</td>
<td>60.00</td>
<td>6.23</td>
</tr>
<tr>
<td>15</td>
<td>952.26</td>
<td>66.66</td>
<td>60.00</td>
<td>6.66</td>
</tr>
<tr>
<td>16</td>
<td>958.92</td>
<td>67.13</td>
<td>60.00</td>
<td>7.13</td>
</tr>
<tr>
<td>17</td>
<td>966.05</td>
<td>67.63</td>
<td>60.00</td>
<td>7.63</td>
</tr>
<tr>
<td>18</td>
<td>973.68</td>
<td>68.16</td>
<td>60.00</td>
<td>8.16</td>
</tr>
<tr>
<td>19</td>
<td>981.84</td>
<td>68.73</td>
<td>60.00</td>
<td>8.73</td>
</tr>
<tr>
<td>20</td>
<td>990.57</td>
<td>69.36</td>
<td>60.00</td>
<td>9.43</td>
</tr>
</tbody>
</table>

|       | $1,305.93                      | $1,200.00           | $106.00       |

1As suggested in a footnote to the Chapter III illustration, the discount could be amortized on a straight line basis.
Like the solution suggested by APB Opinion No. 10, this procedure is a middle-ground approach. However, unlike APB Opinion No. 10, it is not necessary to estimate an IV. In order to illustrate the author's suggested procedure, year one general journal entries along with the year end balance sheet presentation will be reviewed for both the author's approach and that of Opinion No. 10. No conversion will be assumed during this first year. Similarities and differences between the methods will be discussed.

**Year one journal entries**

At time zero the following entry would be recorded on the books of the issuing company:

<table>
<thead>
<tr>
<th></th>
<th>Per APB</th>
<th>Per Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debit - Cash</td>
<td>1,000.00</td>
<td>1,000.00</td>
</tr>
<tr>
<td>Debit - Bond discount</td>
<td>196.42</td>
<td>106.00</td>
</tr>
<tr>
<td>Credit - Bond payable</td>
<td>1,000.00</td>
<td>1,000.00</td>
</tr>
<tr>
<td>Credit - Paid-in capital - sale of convertible bond(^2)</td>
<td>196.42</td>
<td>106.00</td>
</tr>
</tbody>
</table>

Interest expense for year one would be reflected in the following manner:

\(^2\)This represents value of the conversion privilege.
Debit - Bond interest expense 64.36 62.58
Credit - Cash 60.00 60.00
Credit - Bond discount 4.36 2.58

Balance sheet presentation of bonds payable at the end of year one would be as follows:

<table>
<thead>
<tr>
<th>Per APB</th>
<th>Per Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long term liability:</td>
<td>Debt securities convertible to equity:</td>
</tr>
<tr>
<td>Convertible bond payable</td>
<td>Convertible bond payable</td>
</tr>
<tr>
<td>$1,000.00</td>
<td>$1,000.00</td>
</tr>
<tr>
<td>Less: Unamortized discount</td>
<td>Less: Unamortized discount</td>
</tr>
<tr>
<td>$192.06</td>
<td>$103.42</td>
</tr>
<tr>
<td><strong>$807.94</strong></td>
<td><strong>$896.58</strong></td>
</tr>
</tbody>
</table>

Finally, the author would record an additional entry, presumably not sanctioned by the APB approach. It amounts to an adjustment to retained earnings for the "earned" portion of paid-in capital due to the conversion privilege.

Debit - Paid-in capital - sale of convertible bond 2.58
Credit - Retained earnings 2.58

Analysis of the two methods

The similarities between the two approaches are apparent. Both recognize a value of the conversion privilege and both provide for an imputed interest charge. However, there are differences. They may be enumerated as follows:
(1) The APB approach measured value of the conversion privilege as the difference between MV and IV. The author uses the difference between MV and CV. The author does not feel that premium at issue is effectively explained by IV. At the same time, IV is a subjective estimate. The real premium paid is the difference between MV and CV. The latter, of course is determined in the market place.

(2) The author feels that convertible debt is a quasi-equity and should be given a balance sheet classification that reflects this fact. It could be placed in a position just above equity and identified by a caption such as debt securities convertible to equity. Presumably the APB approach did not make any effort to segregate convertible debt from other long term liabilities.

(3) The author's method allows paid-in capital due to value of the conversion privilege to be earned in the sense that it is reapportioned to retained earnings,

---

3 Of course, if the conversion privilege expires prior to maturity of the bonds the latter could then be classified the same as straight debt.
thus making it available for dividends. This was apparently not provided for in the rejected APB approach.

In summary it can be said that the author feels the real call on common stock or value of the conversion privilege is the difference between MV and CV. The former represents dollar amount paid for the bond, the latter is what the purchaser would have paid had he purchased common shares in the amount of the conversion ratio. The author also feels that the security is closer to an equity than debt and should be treated as a quasi-equity.

Procedure to record conversion

If conversion takes place immediately following year one the entry to record the issuance of ten $50 par value shares is as follows:

---

4The assumption is made that the state allows dividends to be paid only out of retained earnings. If paid-in capital can be used for dividends then the entry is probably not necessary. Also, it is the author's opinion that any such entry constitutes a reapportionment of equity. The transaction is not the type that violates any existing ruling concerning direct charges to retained earnings.
Debit - Bond payable
Per APB: 1,000.00
Per Author: 1,000.00

Credit - Common stock
Per APB: 500.00
Per Author: 500.00

Credit - Paid-in capital - conversion of bond
Per APB: 307.94
Per Author: 396.58

Credit - Bond discount
Per APB: 192.06
Per Author: 103.42

The author would also make a second entry:

Debit - Paid-in capital - sale of convertible bond
Per APB: 103.42

Credit - Retained earnings
Per APB: 103.42

In recording the above common stock issuance both APB and the author are within the bounds of currently generally accepted theory concerning the recognition of no net gain or loss relative to the transfer from one type of security holder to another. However, the author also transfers the balance of paid-in capital due to value of the conversion privilege to retained earnings on the theory that it has been earned. The privilege to convert was offered and an acceptance took place.

Procedure if conversion privilege expires

If the bondholder chooses not to convert, and the issuer chooses not to call, then the conversion privilege will eventually die a natural death. The conversion period was not cut short by any action of the issuer, the privilege was extended and not accepted. In this case the author feels there is
every justification for transferring paid-in capital to retained earning over the life of the conversion privilege. Of course, the discount account will also have been transferred to retained earnings. This will leave bonds payable as an ordinary liability. The balance sheet should reflect a debt not a quasi-equity classification.

If bonds are called and the holder converts then the author feels that any remaining balance in paid-in capital should be transferred to retained earnings on the theory that the conversion privilege had value. It was demonstrated by the fact that conversion took place. However, if the holder chooses not to convert then any remaining balance in paid-in capital should be offset against the discount account. The conversion right has not been left open the maximum period possible and remaining value of this right could be questioned since the holder chose not to convert. This should not be considered an inconsistency with procedure presented in the previous paragraph. In both cases paid-in capital is transferred to retained earnings as long as the right to convert is extended. If the holder chooses not to convert then conversion privilege value, represented by any remaining balance in paid-in capital, is questioned. Consequently, it is offset against discount.
Bonds issued at above or below par

Frequently bonds will be issued above or below par. This will have no effect on the amount recorded as paid-in capital expressing value of the conversion privilege. It should be the difference between MV and CV under any circumstances. Of course, in the case of a sale of bonds below par the discount will be a combination of two figures - the difference between par value and MV or ordinary discount along with the difference between MV and CV or conversion value discount. However, this will not affect paid-in capital or the subsequent transfers to retained earnings.

Summary and Conclusion

The suggested accounting method can be summarized in the following manner:

(1) It recognized the value of the conversion feature as the difference between MV and CV.

(2) At issue date it sets up CV, the amount that would have been received for sale of common shares, as a quasi-equity.

(3) Like APB Opinion No. 10, it amortizes discount. This, of course, increases the effective interest rate.

(4) Transfers paid-in capital due to value of the conversion privilege to retained earnings, thus making
it available for dividends. However, if the conversion does not take place then the transfer also terminates.

There are similarities and yet differences between APB Opinion No. 10 and the approach promoted in this chapter. Both of them recognize a call on common stock or value of the conversion privilege. However, Opinion No. 10 uses the MV-IV spread while this writer suggests that the difference between MV and CV is the proper basis for measuring the particular value. In addition, the latter approach overcomes the subjective valuation criticism leveled at the use of IV. CV is determined in the market place.

APB Opinion No. 10 attempts to treat bonds payable as a liability. In this chapter an effort has been made to emphasize equity aspects of such securities. As pointed out above, they are considered quasi-equities.

The charge of inseparability has been used against APB No. 10. It can also be used against the procedure suggested by this writer. But business transactions result in other inseparable situations that have been effectively handled by the accountants.

Earlier in this dissertation a rather radical approach suggested by Imdieke and Weygandt was reviewed. It called for an estimate of the projected conversion date. The accounting procedure was based on the issuers intent. Even though the
approach was criticized as too subjective, it did take a step in the right direction. There was an effort to recognize the major reason for issuing convertibles - delayed sale of equity. This writer has attempted to recognize this same aspect of convertibles but in a more conservative manner. There is real justification for the approach. Even if the issuer does not anticipate conversion it is more or less out of his hands after issue. Purchasers buy convertibles to convert. As long as the conversion privilege exists any convertible bond can become equity.
LITERATURE CITED


The accomplishment of any task requires the assistance of many people. My graduate school experience at Iowa State University is certainly no exception. I would like to take this opportunity to acknowledge just a few who helped me along the way.

From the very beginning I have benefitted from the advice and wise counselling of Dr. Dudley G. Luckett. I owe a special debt to Dr. Gerald W. Smith. In addition to helping launch my dissertation, he and Dr. Luckett have supplied continual guidance throughout its writing. I am also grateful to Professor Joseph K. Walkup, Dr. Harold W. Davey, Dr. Harold A. Cowles, and Dr. Edward B. Jakubauskas for time spent on my behalf as both instructors and members of my committee.

Mrs. Maxine Bogue and Mrs. Dee Wallentine deserve special thanks for transforming my scribbles into a readable state. I was able to maximize the use of computer funds supplied by Iowa State University and through Dr. Luckett by having access to the programming talents of Wendell Primus and Dr. Harold Dickson.

Finally, I want to express profound appreciation to both my mother, Mrs. Laura Handy, and my wife, Donna. Their continual encouragement during the long period of my graduate study played a major role in its completion.
APPENDIX. SOURCES AND DESCRIPTION OF THE DATA
Sources and Description of the Data

Figure II.2, page 19


Chapter IV, The New Model, page 51

MV, CV, IV, CP, I: Data for these variables were secured from Moody's Convertible Bonds. The publication was previously described for Figure II.2 above.

Yd: The variable consists of stock cash dividends less bond cash interest. Stock cash dividends were computed by determining dividends per share from Standard and Poor's Stock Guide, published monthly by Standard and Poor's Corporation, New York, N.Y. Dividends per share were multiplied by the bond conversion ratio. The latter data were secured through dividing CV by stock market value. Per share market value of stock is given in Moody's Convertible Bonds. Bond cash interest rate was secured from the same source.
PE: Data on price/earnings ratios were secured from Standard Poor's Stock Guide. It was hypothesized that the prospective investor looks at ratios of previous as well as the current period. Data were gathered, at two month intervals, for six periods prior to the current period. It was also assumed that greater weight is placed on the most recent ratios. Consequently, each observation consisted of the most recent as well as six previous price/earnings ratios weighted 4-2-1-1-1-.5-.5.

Im: Figures for straight debt yields on industrial bonds were secured from Moody's Investors Service, Inc., New York as published in the Survey of Current Business. The latter is a monthly publication of the United States Department of Commerce, Office of Business Economics.

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I: Data for the dollar volume of quarterly issues were secured from the Securities and Exchange Commission. The data covers substantially all new issues offered for cash sale in the United States in amounts over $100,000 and with terms to maturity exceeding one year.

P, W, E, O, D, C and F: Data for these variables were also gathered by the Securities and Exchange Commission but published in the previously mentioned Survey of Current Business.
R: Using data developed by American Telephone and Telegraph on new convertible bond issues during the regression period, a monthly index was devised. Convertible yields on new issues were related to Moody's straight debt yields for bonds of comparable quality. Early in the regression period the number of issues were thin. In any month in which a convertible sale did not take place the yield index of the previous month was carried forward.

Y and B: Data was secured from Moody's Investors Service, Inc. as published in the Survey of Current Business. Y represents the composite stock yield and B is the average domestic corporate bond yield.

S: Standard Poor's combined index of 500 stocks was reprinted in the Survey of Current Business. Data for variable S was secured from the latter publication.