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The Yield Spread Between New and Seasoned Corporate Bonds, 1952–63

Joseph W. Conard and Mark W. Frankena

I. Introduction and Summary of Findings

Recorded data indicate that in the period since the 1951 Accord there has generally been a substantial excess of yields on new corporate bond issues offered to the market above the average yield on ap-

NOTE: We are indebted to many people for their aid in providing data and suggestions for this study. We especially want to thank Sidney Homer of Salomon Brothers and Hutzler, who provided us with hypotheses to test, much of the basic data, and invaluable information without which the study would not have been possible. Also, we thank Moody's Investors Service for permitting us to use their series and to work with the data underlying their published series. Mortimer Kaplan of the Federal Housing Administration has likewise been generous in providing data underlying his *Journal of Finance* article of March 1962, and William H. White of the International Monetary Fund has kindly sent us some of his unpublished material in addition to providing useful suggestions and criticisms. Ronald Bodkin of the University of Western Ontario, Jacob Mincer of the National Bureau of Economic Research, and Robert Summers of the University of Pennsylvania have given needed advice on statistical procedures, and Geoffrey H. Moore of the National Bureau and Roger F. Murray of the Teachers Insurance and Annuity Association discussed many of our problems with us. Eleanor Barr's assistance in collecting data, carrying out statistical tests, and preparing charts in the early stages of this study was invaluable.

An article prepared by William H. White in 1957 and published in the March 1962 *Staff Papers* of the IMF, after our hypotheses were formulated and testing had been begun but before the initial draft of this study was completed, suggested several general conclusions that are strikingly similar to ours. Since our work and his were independent up to that stage and used somewhat different procedures—White concentrating on cross sections rather than time series—this seems to lend substantial support to many of the conclusions reached.

parently comparable bonds already outstanding.[1] The average new-seasoned yield spread as recorded by Moody's for Aa corporate bonds for the period from 1952 through 1963 was 16.7 basis points. During extended periods in this interval appreciably higher returns could be earned on new Aa corporates than on seasoned A-rated bonds, and on occasion the new Aa's yielded more than seasoned Baa's. Yet, the size of the new-seasoned yield spread is extremely variable, and on some occasions new issues sold below the average yield on seasoned bonds with the same quality rating.

There are a number of reasons for special interest in the determinants of the yield spread between newly issued and seasoned bonds. Lending institutions are concerned with the spread as an indication of profit opportunities. Economists are mainly interested in the implications yield spreads may have for the efficiency of capital markets and perhaps for the effectiveness and incidence of monetary policy. Monetary policy can affect economic activity through new issue yields (the "cost of funds effect") or through seasoned yields (the "availability" or "lock-in" effect). The behavior of spreads could shed light on the relative importance of these channels.

This study is an attempt to explain those yield spreads. Three major hypotheses were tested: (1) The spreads reflect differences between the yield-determining characteristics of the bonds used in the new and seasoned yield averages. (2) The spreads are a result of the underwriters' pricing policies and arise out of their attempt to minimize the risk of capital losses on new issues. (3) The spreads are due to transaction costs and imperfections in the capital market which cause yields in the seasoned market to lag behind those in the new issue market.

Our major efforts were devoted to studying the behavior of new-seasoned yield spreads for Aa corporate bonds. The analysis included series prepared by Moody's Investors Service, The Bankers Trust Company, Mortimer Kaplan of the Federal Housing Administration, and Sidney Homer of Salomon Brothers and Hutzler.

A major conclusion of this study is that differences between the average coupon rate on the bonds used in the new issue and seasoned issue series accounted for roughly half the recorded new-seasoned yield spread. Over the 1952–63 period as a whole, it was found that the average coupon rate on the new issues exceeded that on seasoned

[1] The term "seasoned" will be used to indicate bonds which have been outstanding for a period of months or years. The yield spread is measured as the yield on newly issued bonds minus the yield on seasoned bonds; hence, it is positive when the former is greater than the latter.

issues by .70 per cent in the Moody series and 1.29 per cent in the Homer series. Bonds with higher coupon rates carry higher yields because the danger that they will be called for refunding is greater and the possibility of capital gains is more limited at times of declining interest rates. Nevertheless, even after adjustment for coupon rate, it was found that the average new-seasoned yield spread was approximately 9 basis points in both the Moody and the Homer series.

The bonds in the new issue and seasoned issue series also differed with respect to other yield-determining characteristics, such as industrial classification, term to maturity, average length of refunding deferment, and sinking fund provisions. These variables appear to have relatively little effect on yield spreads, however. The spread on individual new issues tends to disappear within two or three months after the issue is released from syndicate price-maintenance agreements, indicating that the spread remaining after correction for coupon rate differences is not due to systematic differences in other yield-determining characteristics.

Using series which were specially constructed so that coupon rate was held constant, it was found by multiple regression analysis that the change in new issue yields for each of the twelve months preceding the month of the observation explained 60 to 70 per cent of the remaining variance in yield spread.[2] It was also found that the greater was the rise in yields, particularly in the recent past, the larger was the spread. This influence of the change-in-yield variables is consistent with either the hypothesis concerning underwriters' pricing policies or that concerning market imperfections, or a combination of the two.

According to the former hypothesis, if underwriters anticipate a rise in yields and a fall in bond prices, they will be reluctant to hold new issues for fear of suffering capital losses. In order to assure that new issues would sell quickly, underwriters could be expected to increase their yield, thus increasing the new-seasoned yield spread. If rising yields in the recent past generate a fear on the part of underwriters that yields will continue to rise in the near future, the expectation may cause new-seasoned spreads to increase. This would explain the positive correlation of the change-in-yield variables with the spread. It follows that the explanatory power of the change-in-yield variables might be interpreted as support for the hypothesis that the new issue spread remaining after correction for coupon differences is due to the pricing policies of the underwriters distributing new issues.

[2] See the text, Section IV, for an explanation of our reservations on this finding.

The hypothesis that spreads are the result of market imperfections provides an alternative explanation for the effect of the change-in-yield variables on the yield spread. If forces determining interest rates operate more directly and immediately on yields in the new issue market and if yields in the seasoned market adjust to their equilibrium level only with a lag, rising new issue yields in the past would then lead to an increase in yield spreads because of the failure of yields in the seasoned market to adjust immediately to the new higher levels.

Both of the above hypotheses are supported by other types of evidence. Institutional evidence and the tendency for the yield spread of individual bonds to be eliminated two or three months after they have been issued both support the capital-market imperfections hypothesis. Also, in months when new issue yields fell but remained above outstanding yields, the latter more often than not rose, suggesting a lagged response. Finally, the correlation between changes in seasoned yields in a given month and changes in new issue yields in the previous month was high, while the correlation between changes in new issue yields in a given month and changes in seasoned yields in the previous month was negligible.

On the other hand, there is evidence that underwriters underprice new issues, at least during periods of rising yields. Yields on recent issues often decline after the issues have been released from syndicate even when new issue yields are rising. If new-seasoned yield spreads were due entirely to the lagging of the seasoned market, the yields on actively traded, recent new issues should rise along with the yields on current new issues. Our conclusion, therefore, is that both the hypothesis concerning the pricing policy of underwriters and that concerning market imperfections are important in explaining the new-seasoned yield spread.

Several variables besides coupon difference and past changes in yields were tested in the regression equations. It was hypothesized that because of underwriting risks, the new-seasoned yield spread would increase if there was a larger volume of new issues competing for investment funds. This hypothesis received moderate but not conclusive statistical support when we used the volume of corporate securities issued during the three months preceding the observation of yield spread as the independent variable.

It was also hypothesized that when new issues have been selling slowly, underwriters would guard against a further inventory build-up by bidding lower for new issues to permit their distribution at attractive prices below those on comparable seasoned issues. This would suggest

that the new-seasoned yield spread would be positively correlated with the proportion of slow-moving new issues in the recent past. However, no statistical support was found for this hypothesis.

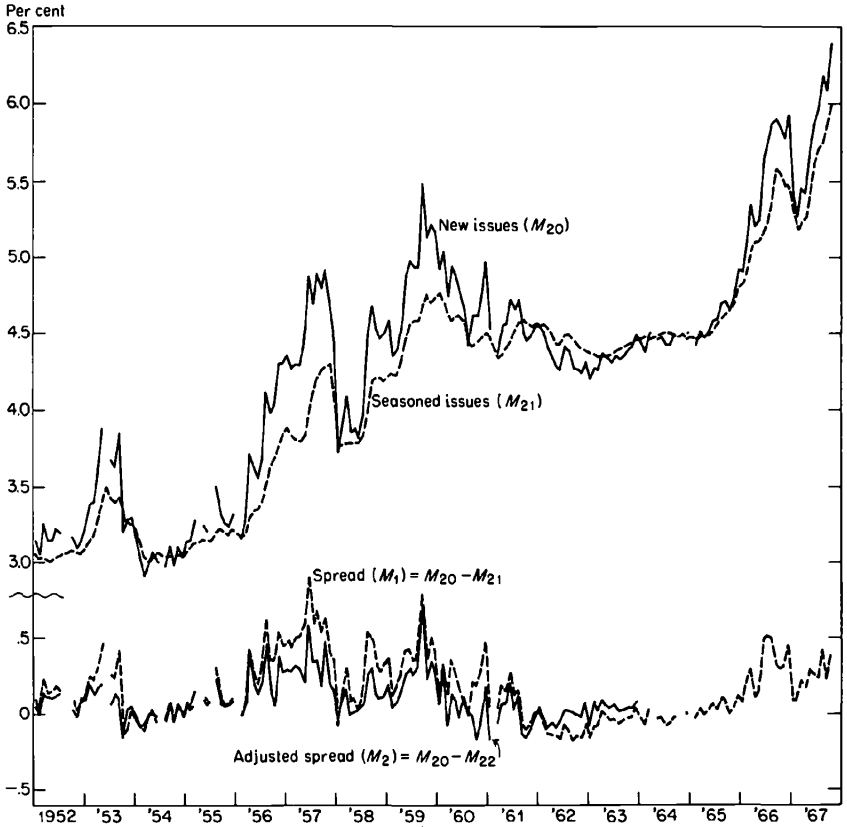
The hypothesis that a tight money market would increase the cost and difficulty of underwriting new issues and, hence, contribute to a new-seasoned yield spread suggested use of the Treasury bill rate as an explanatory variable. Again, this hypothesis received no statistical support.

II. The Yield Spread Between New and Seasoned Corporate Bonds, 1952–63

DESCRIPTION OF THE PROBLEM. Chart 5-1 shows the Moody series for yields on new and seasoned Aa corporate bonds for the period from 1952 through 1963. It is apparent at once that the spread between these series is often substantial. In June 1957 it equaled 90 basis points, which was almost one-fourth of the yield on the seasoned issues. In every month from April 1956 through December 1957, the investor could have obtained a higher yield on new Aa corporates than on seasoned A-rated corporates; his average gain, in addition to securing the higher grade bond, would have been 33.5 basis points. Yet in 1962–63 the average spread for the Moody series was negative, reaching a low of −19 basis points. These dates have obviously been selected to emphasize the extremes to which the spread between new and seasoned issue yields as recorded by Moody's has moved. Yet the spread between new and seasoned yields on Moody's Aa corporates averaged a substantial 16.7 basis points even for the full period from 1952 through 1963, despite periods of negative spread.

The major purpose of this study was to discover and analyze the determinants of this yield spread. We first attempt to discover factors, such as differences between the bonds used in the two series or the existence of uncertainty and risk in the underwriting process, which could explain the existence of the substantial new-seasoned yield spread without implying market imperfections. We then examine the extent to which this spread is due to imperfections or frictions which could restrict the flow of funds to the most profitable channels. A study of the spread between the yields on new and seasoned issues, and particularly changes in the spread, leads inevitably to a consideration of some of the differences between the markets for new and seasoned bonds.

CHART 5-1. Moody New and Seasoned Aa Corporate Bond Yields and Yield Spreads



NOTE: M_{22} is yield on seasoned issues with coupon rate equal to that on new issues.

DESCRIPTION OF THE DATA. Most of our work covers the 1952–63 period, although some of the tests use data through 1966. It begins after the 1951 Accord when Federal Reserve support of long-term government bond prices was discontinued. The study uses five different series for the yields on new issues, three series for the yields on seasoned issues, and modifications of two of the seasoned issue series. The yield spreads for which an explanation was sought were measured as the difference between an appropriate combination of one of the new issue and one of the seasoned issue yield series. Our method was primarily multiple regression analysis in which the

variable to be explained was the new-seasoned yield spread.

Because the series are quite different in their manner of construction and because each has certain advantages and disadvantages, a description of the data and some of the problems they present is necessary before going on to the statistical tests. The shortcomings of the series stem primarily from a lack of homogeneity in the bonds used to derive the new and seasoned yield averages. As a result, the size and variation in the new-seasoned yield spread between any two of the series may be influenced in part by differences or changes in the bonds represented in the averages. For each new issue series, we describe the seasoned issue series which was used with it to derive the new-seasoned yield spread.

The Appendix explains the symbols used for the variables in the multiple regressions, giving an exact definition of each of the series and listing the data sources. The actual yield series and much of the other data used in the study are shown in the Appendix.

Moody's Aa Corporate Yield Series. Moody's Investors Service has compiled monthly series for the average yields on both new and seasoned bonds by quality rating for the period since January 1951.[3] The averages are based on individual public utility, industrial, and railroad bonds. Convertible bonds, issues with warrants, serial bonds, equipment trust certificates, and the obligations of finance, real estate, steamship, and foreign companies are excluded. The series are broken down by quality rating for bonds rated from Aaa to Baa. This study made use of the Aa series, which has a more uniform quality than the series for bonds with lower ratings and a larger number of new issues than the series forAaa bonds.

The series for new issues is a monthly average of offering yields, weighted by the size of the issue, and includes all newly issued corporates as described above regardless of size of issue and call price or refunding provisions. The number of new issues included in the Moody average, as in all of the new issue averages, was very small; there are eight months during the 136-month period from 1952 to 1963 when no Aa bonds were issued and twenty-six months when only a single issue was offered.

Moody's series for seasoned Aa corporate yields is normally based on about ten industrials, ten utilities, and a half-dozen rails. Yields are monthly averages of daily quotations obtained from dealers and are

[3] Published in *Moody's Bond Survey,* February 9, 1959, and subsequent issues, usually the first weekly edition of each month.

computed on the basis of a price midway between the bid and asked quotations.[4]

Because our study indicated that a large part of the new-seasoned yield spread was caused by differences in the average coupon rate of the bonds in the two yield series, we constructed a special monthly series for the yield of seasoned bonds with coupon rate equal to the average coupon rate of new issues for the month. The new-seasoned yield spread measured as the excess of new issue yields over yields in this series is therefore free of the influence of differences in coupon rate; we refer to it as the new-seasoned yield spread corrected for coupon.

This series was constructed on the basis of the yields on the individual bonds in Moody's series for seasoned Aa corporates. Since there were a number of months in which there were no seasoned bonds in Moody's average with a coupon rate equal to the average on new issues for the month, a linear interpolation or extrapolation of yields at available coupon rates was used. When the procedure required only interpolation between actual observations, it presented no real problem. However, at times when new issue yields were reaching unprecedented peaks and, hence, new issues had very high coupon rates, there were no seasoned bonds with comparable or higher coupon rates, making it necessary to extend the estimates beyond the range of actual observations. Such extrapolation had to be employed in 39 of the 136 months during 1952–63.

Bankers Trust Company Grade 2 Public Utility Yield Series. The Bankers Trust Company compiles a monthly series for new "Grade 2"[5] public utility bonds which differs in several respects from the Moody series. The average is based on the yields at which Grade 2 utility bonds are *successfully placed* (rather than offered) during the month. The series thus tends to be somewhat higher than if it were based solely on offering yields. For an issue to be included at the offering yield, at least 90 per cent of the issue must have been placed at the offering yield in the month in question. Issues which were initially offered in the previous month but which did not sell at that time may be included in the average for the current month. If a syndi-

[4] A spot check by Andrew Brimmer covering the 112 issues used in all Moody indexes of seasoned issues in September 1958 indicated average differentials of about 9 basis points between the yields calculated from the bid and asked prices. Andrew F. Brimmer, "Credit Conditions and Price Determination in the Corporate Bond Market," *The Journal of Finance*, September 1960, p. 363.

[5] Grade 2 is approximately equivalent to Moody Aa.

cate terminates before 90 per cent of the issue has been placed, the yield used is calculated from the mean between the bid and asked prices at the time the syndicate terminates. The averages are based on the yields of individual bond issues weighted by the size of the issue.

Some of the circumstances which may cause a modification of this basic approach for the calculation of the averages are: (1) When no Grade 2 issues are offered during the month, an estimate of the yield is made. (2) When there are not enough offerings of Grade 2 bonds over the whole month to reflect a representative cross section of yields, an adjustment in the average yield may be made. (3) When there is a distortion of traditional relations, e.g., Grade 2 yields lower than Grade 1 yields, an adjustment is made. (4) Telephone bonds are included when their yields are at the level of Grade 2 yields, despite the fact that telephone bonds are rated Grade 1.

The seasoned issue series used along with the Bankers Trust new issue series is Moody's Aa public utility series, which is basically the same as the Moody's Aa series described above except that it covers only the ten public utility issues, excluding the industrials and rails.

Kaplan Recently Issued Aa Corporate Yield Series. In contrast to the Moody series which is based on unadjusted offering yields, and the Bankers Trust series which is based on offering yields but with an upward adjustment for issues that do not sell well, the series compiled by Mortimer Kaplan of the Federal Housing Administration [6] is designed to measure market yields to investors on recent issues *after* they have been released from price-maintenance agreements among members of the underwriting syndicate and are actively traded in a free market. Weekly yield series are compiled for each quality rating by averaging the yields to maturity for recently issued corporate bonds (excluding obligations of finance companies and convertible bonds). This is done by using the mean of the bid and asked quotations for each Friday as reported in the *Commercial and Financial Chronicle.* For Aa issues the average number of bonds used was six, each bond was used for an average of eight weeks after being released from syndicate, and the average maturity of the bonds used was thirty years. We converted Kaplan's weekly Aa series into a monthly series by taking an unweighted average of the yields for each Friday in the calendar month.

[6] Mortimer Kaplan, "Yields on Recently Issued Corporate Bonds: A New Index," *The Journal of Finance,* March 1962, pp. 81–109, and supplementary data supplied directly to us.

The seasoned issue yield series used with the Kaplan recent issue series was Moody's series for seasoned Aa corporates, described above.

Homer Aa Public Utility Yield Series. The fourth series used was constructed by Sidney Homer of Salomon Brothers and Hutzler.[7] The yields are Homer's estimates of the going rate for new callable Aa utilities as of the first day of each month. (The other three series discussed above include bonds with call deferments, generally of five years.) The yields are derived, in most cases, directly from the offering yield on the new callable Aa utility issue offered closest to the first of the month; most of the bonds used were issued within a week either way of that date. Where no callable Aa utility issue was offered close enough to the first of the month, the yield is derived by interpolation between the yields of the last bond issued in the previous month and the first bond of the current month, or by an upward adjustment of the yield on an Aaa issue or a bond with a refunding deferment. Some slight upward adjustments in new issue yields were made to correct for issues which did not sell well, on the assumption that their offering yields did not accurately reflect market conditions. This, however, was done only if the issue was not offered within a week of the first of the month.

The seasoned issue series used with the Homer new issue series was based on six to eight callable Aa and Aaa public utility bonds with coupon rates of $2\frac{3}{4}$ and $2\frac{7}{8}$ per cent. Like the new issue series, the seasoned series pertains to the first of the month. The yields were calculated from the asked price listed on the daily dealer quotation sheets of Salomon Brothers and Hutzler and The First Boston Corporation. The series used was constructed by Sidney Homer for 1952 through 1956 and by Frankena for 1957 through 1963.[8]

As in the case of the Moody series, we also constructed a monthly series covering Aaa and Aa callable seasoned public utility bonds with coupon rate equal to that on new issues. This series was designed to be used with the Homer new issue series in order to derive a second measure of the new-seasoned yield spread, one which was free of the influence of differences in coupon rates between the two series. The series for 1952–56 was constructed by Homer and ourselves while the

[7] "An Analytic Record of Yields and Yield Spreads," available from Salomon Brothers and Hutzler, Wall Street, New York.

[8] Homer's series is in "An Analytic Record of Yields and Yield Spreads," *ibid.*, and Frankena's is in his paper "The Influence of Call Provisions and Coupon Rate on the Yields of Corporate Bonds," NBER, (forthcoming).

series for 1957–63 was prepared by Frankena.[9] As in the case of the Moody series, a linear interpolation and extrapolation was used when there was no observation for a seasoned bond with a coupon rate equal to that on new issues. However, such interpolation and extrapolation was required less frequently in the case of the Homer-Frankena series because the combined number of bonds used in their series for seasoned yields was larger and covered a wider range of coupon rates than was the case for the Moody series for seasoned Aa corporates.[10]

Cohan Aa Utility Thirty-Year Mortgage Bonds. The fifth new issue series used was a quarterly series constructed by Avery B. Cohan.[11] After running multiple regressions for a series of cross sections during the period from 1935 through 1958, Cohan concluded that five variables in addition to the date of offering significantly affected new issue yields: quality rating, industrial classification, maturity, type of bond, and type of transaction with the underwriter. Holding all five of these variables constant, Cohan constructed quarterly series by quality rating covering new public utility thirty-year mortgage bonds bought by underwriters in competitive bidding.

The Cohan series was not used in the multiple regressions but was compared to other new issue series which do not hold the above five factors constant.

BOND CHARACTERISTICS WHICH INFLUENCE YIELDS. For a number of reasons each of the series discussed above may misstate the "true" new-seasoned yield spread, i.e., the spread between bonds which are identical except for the length of time they have been outstanding. In part this is unavoidable because the number of new corporate issues each month is too small to permit the construction of a monthly series for new issues which is homogeneous from month to month or identical to seasoned issues in all important respects.

Other studies have indicated that certain characteristics of bonds may have a significant influence on yields, at least in some periods. Those are chiefly quality-rating, industrial classification, term to maturity, type of bond (mortgage bond, debenture, collateral trust

[9] *Ibid.*

[10] There were eighteen months when extrapolation was used in the Homer-Frankena series and thirty-nine in the Moody series.

[11] Avery B. Cohan, "Yields on New Underwritten Corporate Bonds, 1935–1958," *The Journal of Finance,* December 1962, p. 585 *ff.*, and supplementary data supplied directly to us.

bond, etc.), type of transaction with underwriter (whether the sale of an issue was negotiated between underwriters and the issuer or was by public sealed bidding), period of refunding deferment, coupon rate, call price, size of issue, and sinking fund provision.

Not all of these characteristics could be held constant in this study at the same time. Consequently, some of the average spread could be due to systematic differences between the bonds used in the new and seasoned issue series, and some of the variability in the size of the spread could be due to random changes in the characteristics of the bonds used. However, by using four different series and modifications of two of them, the most important of these characteristics could be held constant for one or another of the series. Table 5-1 provides a summary of the yield-determining characteristics which are held strictly constant in each of the five new issue series used.

TABLE 5-1. Yield-Determining Characteristics Held Constant in the New Issue Series

Yield-Determining Characteristic	Moody (1)	Bankers Trust (2)	Kaplan (3)	Homer (4)	Cohan (5)
Quality rating	X	X	X	X	X
Industrial classification		X		X	X
Term to maturity					X
Type of bond					X
Type of transaction with the underwriter					X
Callability				X	
Coupon rate					
Call price					
Size of issue					
Sinking fund provision					

The same characteristics are held constant in the seasoned series corresponding to the first four new issue series, except that the type of transaction with the underwriter is not relevant and quality is not held strictly constant in the Homer-Frankena series, which includes Aa and Aaa rated bonds. The characteristics checked in Table 5-1 are thus not responsible for any of the new-seasoned yield spread, except possibly for some spread caused by quality-rating differences in the Homer-

Frankena series. In addition, for the modified Moody and Homer-Frankena series, the effect of the coupon rate on the spread is eliminated because the new issue and seasoned issue series carry the same coupon rate.

Quality rating was held constant in all series except the one for seasoned yields constructed by Homer and Frankena, where Aaa rated bonds were used along with Aa rated bonds. There was generally no very noticeable yield difference between callable Aa's and Aaa's with the same coupon rate. Also, telephone bonds were rated Aa until the late 1950's, when they were raised to Aaa.[12]

Industrial classification was not held constant by the Moody or Kaplan series, which include industrials, utilities, and rails, but it was by the Bankers Trust and Homer series, which used only public utilities.

Maturity was held strictly constant only in the Cohan series, but the bonds covered by all the series were relatively long-term. In Moody's seasoned series maturity was held within the range of twenty-five to twenty-nine years during the 1950's (the range during 1960–63 was not examined). In the Homer-Frankena seasoned series, maturities declined steadily from 1952 to 1963; the lack, in this period, of new bonds having coupons of $2\frac{3}{4}$–$2\frac{7}{8}$ per cent prevented the replacement of older bonds in the average with newer ones having longer maturities. By 1963, some of the bonds in this average had a maturity of only sixteen years. In the Homer-Frankena "current coupon rate" series maturity could be held roughly constant on seasoned bonds because more recently issued bonds were available to replace the older ones. Average maturity varied much more within all the new issue series, except Cohan's, than it did in the seasoned series because of the smaller number of bonds in the new issue series. For the Kaplan series average maturity varied between about twenty-five and thirty-seven years during the period from 1951 to 1960.

There is a fairly systematic tendency for the new issue series to have a longer average maturity than the seasoned issue series. The difference, however, is generally not more than a few years, and the relevant sector of the yield curve is typically fairly flat.[13] There is no reason

[12] It should be noted that part of the yield spread between the Moody series with different quality ratings was probably due to differences in the average refunding deferment on new issues and to differences in the average coupon rate on seasoned issues in the series; the lower quality series have a lower proportion of deferments and higher average coupon rates, which raise their yields.

[13] It should be noted that at least part of the observed slope of the corporate yield curve is due to systematic differences in the coupon rate of bonds of different maturities.

to believe that it plays any significant role in the new-seasoned yield spread.

In order to get a rough idea of how the new issue yield series is affected by the failure to hold constant industrial classification, term to maturity, type of bond, and type of transaction with the underwriter, we compared the Cohan series (which holds these four variables constant) with three other new issue Aa series which do not hold all of them constant. The other series were Moody's new issue public utility series, Moody's new issue corporate series, and Bankers Trust new issue utility series. Since the Cohan series is quarterly, we used quarterly averages for the other series. Table 5-2 presents the four quarterly series and the average difference between the Cohan series and the others. In only two quarters was the difference larger than 8 basis points. In the other quarters the differences were of the same order of magnitude as the differences between the Bankers Trust and Moody's corporate series, shown in the last column. It was concluded that variability in term to maturity, type of bond, and type of transaction did not systematically distort the new-seasoned yield spread in any serious way.

Some work by Frankena indicates that call protection in the form of refunding deferments significantly reduces yields on high coupon bonds. The reason is that such protection makes the bonds more attractive to investors.[14] Since low coupon bonds are unlikely to be called in any case, call restrictions do not influence low-coupon bond yields to the same degree. The Homer new issue series and the Homer-Frankena seasoned issue series exclude bonds with call deferments. For new issues included in the other three series, call deferments were more common and covered a longer period than in the seasoned issue series to which they were compared, thus reducing the new-seasoned yield spread. Call deferments came into common use only after 1957, however; by and large, it was only in 1959–61 that new issue coupons were high enough for the market to place any appreciable value on such protection. Our estimate is that in late 1959–61 the new issue series and hence the new-seasoned spreads (apart from Homer's) averaged about 5 basis points below what they would have been if only callable issues had been used.[15]

One of the findings of this study and an independent study by Wil-

[14] Frankena study.

[15] Frankena's study indicates that refunding deferments reduced yields on new issues by roughly 15 basis points relative to yields on comparable freely callable issues in this period and that about one-third of new issues had such call protection.

TABLE 5-2. Comparison of the Cohan Series With Three Other New Issue Yield Series

Quarter	Cohan Series	Moody Utility	Moody Corporate	Bankers Trust	Mean Differential Between Cohan Series and Other Series		Bankers Trust Less Moody Corporate
					Algebraic	Absolute	
1952 I	3.22		3.15	3.28	.5	6.5	13.0
II	3.17		3.17	3.19	−1.0	1.0	2.0
III	3.18		3.19	3.25	−4.0	4.0	6.0
IV	3.13		3.13	3.22	−4.5	4.5	9.0
1953 I	3.35		3.34	3.34	1.0	1.0	0
II	3.69		3.74	3.79	−7.5	7.5	5.0
III	3.68		3.72	3.67	−1.5	2.5	−5.0
IV	3.33		3.26	3.35	2.5	4.5	9.0
1954 I	3.06		3.04	3.09	−.5	2.5	5.0
II	3.02		3.02	3.03	−.5	.5	1.0
III	3.02		3.04	3.06	−3.0	3.0	2.0
IV	3.03		3.03	3.05	−1.0	1.0	2.0
1955 I	3.15		3.19	3.19	−4.0	4.0	0
II	3.23		3.22	3.24	.0	1.0	2.0
III	3.32		3.41	3.37	−7.0	7.0	−4.0
IV	3.30		3.27	3.30	1.5	1.5	3.0
1956 I	3.24	3.20	3.21	3.28	1.0	3.7	7.0
II	3.58	3.63	3.63	3.60	−4.0	4.0	−3.0
III	3.96	4.01	3.93	4.00	−2.0	4.0	7.0
IV	4.25	4.25	4.21	4.27	.7	2.0	6.0
1957 I	4.37	4.36	4.31	4.36	2.7	2.7	5.0
II	4.58	4.53	4.53	4.67	.3	6.3	14.0
III	4.79	4.82	4.79	4.87	−3.7	3.7	8.0
IV	4.72	4.71	4.68	4.73	1.3	2.0	5.0
1958 I	3.96	3.91	3.91	3.91	5.0	5.0	0
II	3.87	3.86	3.85	3.93	−1.0	3.0	8.0
III	4.18	4.29	4.39	4.40	−17.7	17.7	1.0
IV	4.47	4.50	4.50	4.54	−4.3	4.3	4.0
1959 I	4.49	4.46	4.45	4.54	.7	4.0	9.0
II	4.85	4.87	4.82	4.86	.0	2.0	4.0
III	4.86	5.11	5.11	5.07	−23.7	23.7	−4.0
IV	5.15	5.16	5.16	5.24	−3.7	3.7	8.0
1960 I	4.90	4.90	4.90	5.01	−3.7	3.7	11.0
II	4.85	4.86	4.86	4.88	−1.7	1.7	2.0
III	4.60	4.55	4.56	4.61	2.7	3.3	5.0
IV	4.80	4.80	4.78	4.80	.7	.7	2.0

liam H. White [16] is that differences in coupon rate are responsible for a large part of the new-seasoned yield spread as measured by series like Moody's. This study takes account of coupon rate differences in two ways. First, the difference in average coupon rate between the new issue and seasoned issue series is used as an independent variable in explaining the new-seasoned yield spread. Second, as explained above, two additional seasoned issue series were constructed having the same coupon rate as those on the Moody and the Homer new issue series. The influence of the coupon rate on yield spreads is examined further in Section III.

Call price was not held constant in any of the series nor was it used as a variable in the multiple regressions. In general, new issues probably have more call protection in the form of higher call prices (although not in the form of coupon rates) than do seasoned issues, and, on this count, the new issues would tend to have lower yields. However, part of the impact of the call price on yields will be picked up by the coupon rate, which is positively correlated with the call price. This implies, of course, that the effect of the coupon rate on yields is underestimated when call price is not taken into account.

The size of the issue was not held constant in any of the series. However, all the series were dominated by issues with a principal of over $10 million, and we would not expect size variation to have any effect on yield.[17]

Some of the series, particularly those with industrials, include bonds with sinking funds. Sidney Homer informs us that if sinking funds accumulate more than 2–3 per cent of the issue per year, there will be a significant reduction in yield to maturity. This is due to the commitment of the borrowing company to repurchase a certain amount of the issue each year, which constitutes an additional source of demand for these bonds. Company treasurers may be most active in purchasing sinking fund issues when they can be obtained at bargain prices; and, in a thin market like that for seasoned corporate bonds, the result would be to reduce the yields on sinking fund issues. According to Homer, yield reductions of 10 to 50 basis points are not uncommon.

Two tests of this hypothesis failed to reveal any appreciable effect

[16] William H. White, "The Structure of the Bond Market and the Cyclical Variability of Interest Rates," *Staff Papers*, International Monetary Fund, March 1962.

[17] Avery Cohan found no statistically significant effect of size of issue on yield in the case of corporate bonds. Richard West concluded that "issue size has little, if any, influence on yield spreads" in the case of state and local government general obligation bonds. Richard West, "New Issue Concessions on Municipal Bonds: A Case of Monopsony Pricing," *The Journal of Business*, April 1965, p. 143.

of sinking funds on yields, but neither test was very powerful. Conard classified the bonds in the Moody Aa seasoned corporate series by industrial classification and coupon group, comparing the yields on sinking fund issues with other yields in each group, monthly from 1951 through 1961. There were no consistent differences in yield, but the number of observations was very small, and no distinction was made concerning the size of the sinking fund. The second test was by Avery Cohan.[18] Cohan's multiple regression analysis revealed sinking fund provisions to be a statistically significant influence on new issue yields in only one year (1943) between 1935 and 1958—even then significant only at the 10 per cent level. However, this negative finding could be explained largely by the fact that the period he examined was primarily one of low interest rates, while the hypothesis suggests that sinking funds would have their greatest effect on yields when interest rates were high.

Because sizable sinking funds are common in industrials but rare in utilities, they may provide a source of heterogeneity in the Moody and Kaplan series but not in the Bankers Trust or Homer series.

In summary, a great many factors may influence corporate bond yields. Some of these factors, such as quality rating or industrial classification, are held constant in one or another of the statistical series used. Other factors (such as, maturity, size of issue, or sinking funds) are not held constant in the series but evidence of various types suggested that they were neither an important nor systematic influence on the yield spread. One factor, the coupon rate, is responsible for a large part of the yield spread and is treated explicitly in the analysis.

We ran a statistical test in Section IV to assure ourselves that the differences in the bonds included in the new issue and seasoned averages, which we dismissed as unimportant, were not—even in combination—responsible for any appreciable part of the yield spread remaining after taking account of coupon rate. The spread for individual new issues was recalculated one month after the offering, two months after, and so on. If the yield spread at the time of offering is due to differences in the yield-determining characteristics of the new and seasoned bonds, the spread should persist after the issue becomes seasoned. In fact, the differential tends to decline after the issue has been released from syndicate and is eliminated entirely in two or three months.

PROBLEMS IN THE CORRECT MEASUREMENT OF THE YIELD SPREAD. One problem involved in measuring the yield spread is that some new issues

[18] Cohan, *ibid.*

are mispriced; for that reason their offering yields may not accurately reflect new issue yields. In order to estimate the significance of this problem, a series was constructed for "fast-moving" utility issues only. Fast-moving utility issues are defined as those no longer in syndicate on the first Monday after the date of their issue. In one test a regression was run between new-seasoned spreads and the level of yields, covering the period from 1951 to 1960, first using fast-moving utilities, then all utilities, for the measure of new issue yields. In a second test the correlation was between new-seasoned spreads and changes in the level of seasoned rates. Results are shown in the following table:

	Correlation Between Yield Spread and	
	Level of Yields	Change in Yields
Fast-moving securities	.597	.457
All securities	.526	.374

The fact that the correlation is improved in both cases when only fast-moving issues are used suggests, although it does not prove conclusively, that these issues may provide a better measure of new issue rates and permit the variables used in the regressions to explain more of the variance in new-seasoned spreads. This would not apply to the Bankers Trust and Kaplan series, however, since they are based on the market yields of the issues sold rather than the offering yields.

A second problem arises when measuring the yield spread of the Moody's series. Seasoned bonds in this series are calculated from a price midway between the bid and asked prices, whereas the Moody's and Bankers Trust new issue series which are used with the Moody's seasoned series are based on the asked price. This causes a downward bias in the spreads calculated from the Moody's and Bankers Trust new issue series. No such bias exists in the spread calculated from the Homer new issue series, since the seasoned series used with it is also on an asked price basis. Similarly the spread calculated from the Kaplan new issue series is not biased because both this series and the Moody's seasoned series used with it are calculated from the midpoint of bid and ask prices.

Brimmer found that in September 1958 the average difference between the yields calculated from the bid and asked prices for the bonds used in Moody's seasoned issue yield series was about 9 basis points. If this is typical it means that the bias in the spread calculated from

Moody's and Bankers Trust new issue series is about 4½ basis points. We found that the bid-asked spreads between 1957 and 1964 on the daily public utility quotation sheets of Salomon Brothers and Hutzler and The First Boston Corporation were generally between ½ and 2 points, which implied yield spreads of about 3 to 13 basis points and a bias of 1½ to 6½ basis points. Typical spreads differed between dealers and changed somewhat over time.[19] As we shall note below, however, there was no tendency for the bid-asked spread to change systematically with the direction of change of new issue yields.

A third measurement problem is that the offering yield on new issues may not fully reflect market conditions if changes occur in the underwriting spread, i.e., the difference between the new issue yield calculated from the price paid by the underwriter and the yield calculated from the offering price. A study of the behavior of the new-seasoned spread including the underwriting spread (M_4) suggested that this was not the case. We constructed a monthly series for the average underwriting spread on Aa corporate bonds, with spreads weighted by the size of the issue. The simple correlation between the underwriting spread and the new-seasoned spread was only .223. More important, the underwriting spread was small and relatively stable, averaging 4.4 basis points for the period from 1952 through 1963 with a standard deviation of only 1.4 basis points. Much of the variation was due to the fact that industrial bonds generally had a larger underwriting spread than did utilities and the proportion of industrial bonds varied between months.

A final measurement problem is that the prices on dealer quotation sheets for seasoned bonds may not reflect the current market if the bond is inactive. Thus, Sidney Homer notes that "the quotes on the great mass of seasoned issues are in their nature very different from the quotes on recent issues and revisions for seasoned issues are made more rarely."[20] Similarly, in the case of the bid-asked spread, "there is a good deal of difference between the actual bid-asked spread in the market for active utility bonds and the spread on most quotation sheets. Traders often make eighth and quarter point markets in active issues but quote them much wider on their sheets."[21] This can be viewed as a measurement problem or as an aspect of market behavior. It is discussed in the latter context in the next section.

[19] Spreads in the late 1950's were typically larger than those in the early 1960's, with few spreads being over 1 point in the period 1963–64.

[20] Sidney Homer, Letter to Mark W. Frankena, July 20, 1965.

[21] Sidney Homer, Letter to Mark W. Frankena, July 25, 1966.

III. Determinants of the New-Seasoned Yield Spread

HYPOTHESES. *Heterogeneity of Bonds: Differences in the Coupon Rate.* The only bond characteristic which is a consistently important cause of yield spreads between new and seasoned issues is the coupon rate.[22] During a period of generally rising rates, new issues will carry higher coupon rates than outstanding ones and issues with higher coupon rates carry higher yields. This is mainly because bonds with high coupon rates are more likely to be called for refunding at times of low new issue yields, and holders would have to reinvest at lower yields. Also, capital gains on high coupon bonds would be more limited in the event of a decline in yields.[23]

A borrowing company is normally able to call its bonds prior to maturity at a premium of a few points above par. Borrowers generally exercise this option at times of low new issue yields, when they can refund at a lower interest cost. Given the level of new issue yields, the primary determinants of the profitability of calling an outstanding issue are its call price and its coupon rate. The higher the coupon rate the greater is the current interest cost of the issue and the more profitable it would be to refund it at any given call price. The higher the call price the higher is the cost of call to the borrower and the less profitable refunding would be. In practice, when coupon rates on new issues increase, call prices are not increased enough to offset the greater profitability of calling the higher coupon issues. As a result, high coupon issues are more likely to be called than low coupon issues. The calling of high coupon bonds at a time of low new issue yields means a loss for the investing institution holding the bonds if it would otherwise have held them to maturity. This is because the funds repaid can be reinvested only at a lower yield, and reinvestment involves transaction costs.

High coupon bonds are also less advantageous to the investor because such bonds are less likely to generate capital gains when inter-

[22] However, because of the small number of new issues each month, other differences between the bonds in the series are no doubt the source of random fluctuations in the spread. Thus, it appears that the heterogeneity of bonds may explain some of the negative spreads remaining after the adjustment of the Moody series for differences in coupon rate; negative spreads are less common for the more homogeneous Homer series.

[23] The effect of the coupon rate on bond yields is the subject of a separate study by Frankena and the discussion here is based largely on that work. See Frankena's work. See Joseph W. Conard, *The Behavior of Interest Rates: A Progress Report,* New York, NBER, 1966, pp. 120–130, for a preliminary summary.

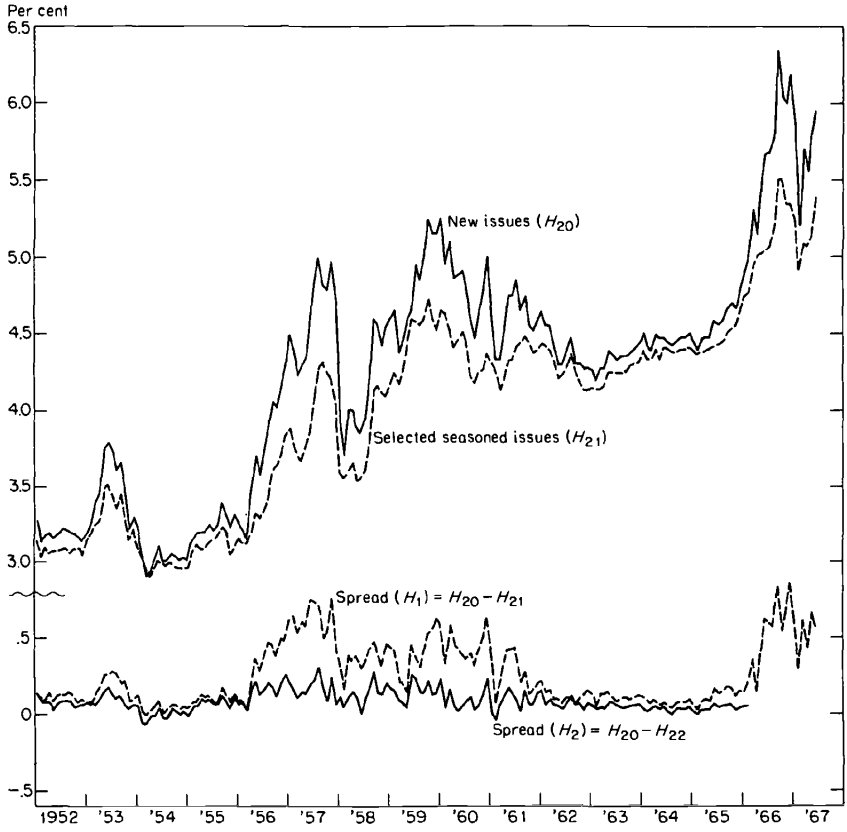
est rates fall. The market price of a bond cannot rise appreciably above the call price owing to the danger of call. As noted, the call prices on very high coupon bonds are at most only a few points higher than those on low coupon bonds. Because high coupon bonds must sell at a higher price than low coupon bonds in order to bear the same yield to maturity, the prices on the former are the first to reach the call price when market yields fall. As a result, capital gains on high coupon bonds are limited by their call price to a greater extent than are capital gains on low coupon bonds; for this reason the higher coupon bonds are less desirable. Yield differences resulting from differences in coupon rates are greatest when market yields are low, since in such circumstances the call price exercises the greatest constraint on the price of high coupon bonds. However, there is a very strong positive correlation between yields and coupon rates on individual bonds at all yield levels.

The influence of coupon rates on yields will give rise to a systematic positive new-seasoned yield spread when market yields are rising over an extended period and a negative spread when yields are falling. In times of high or rising new issue yields as in the late 1950's, seasoned bonds, issued in earlier years when new issue yields were lower, typically carry lower coupons than new issues, because of the practice of setting the coupon rate on new issues at a level approximately equal to their offering yields so that the bonds will sell near par. For this reason, the danger of call and the limitations on capital gains will be less on seasoned (i.e., low coupon) than on new (i.e., high coupon) issues, and the former will carry lower yields.[24] This is one reason the new-seasoned spreads in Charts 5-1 and 5-2 are greatest when new issue yields are high and rising.

Underwriting Risks. Another possible source of new-seasoned yield spreads is uncertainty and risk in the underwriting process. As with differences in coupon rates, this source of yield spread does not imply imperfections in the capital market. If underwriting syndicates offered new issues at yields exactly equal to those on comparable seasoned issues, there might be a lengthy period of distribution which would involve a high probability of capital loss or gain due to shifts in market conditions during the distribution period. Because they operate with a fairly thin capital position, underwriters' attitudes toward such gains and losses may be asymmetrical in the sense that they avoid exposing themselves to a risk of loss even though it is counterbalanced by an equal probability of gain. Furthermore, since their capital is limited, a

[24] White also reached this conclusion in his study, p. 126 *ff.*

CHART 5-2. Homer New Issue Aa and Homer-Frankena Seasoned Issue Aa-Aaa Utility Bond Yields and Yield Spreads



NOTE: H_{21} is yield on seasoned issues with coupon rate of $2\frac{3}{4}$–$2\frac{7}{8}$ per cent. H_{22} is yield on issues with coupon rate equal to that on new issues.

long distribution period reduces the number of issues they can underwrite. As a consequence, underwriters may bid low for new issues and, to assure rapid distribution, set yields higher than those on comparable seasoned issues.

This tendency to set relatively high yields on new issues might be accentuated if underwriters foresaw difficulties in distributing new issues, for example, if yields were expected to rise in the near future, or if the total volume of new issues to be marketed in the period were abnormally large, or if recent new issues had been selling slowly.

Other studies have indicated that expectations of yield change are

based on an extrapolation of yield changes in the recent past.[25] This can be rationalized on the grounds that there is a strong cyclical pattern in interest rate series, which are based on business conditions and monetary and fiscal policy decisions, which are themselves related to business conditions. There is, of course, an opposite tendency, basic to the Keynesian "speculative motive" for holding cash balances: When yields have been rising for some time they may be viewed as high relative to some "normal" interest rate, and the market may therefore expect yields to fall back toward normal. However, the two forces are not mutually exclusive, since when yields are rising one may expect them to keep rising in the immediate future despite the expectation that over some longer period they will return to the "normal" level.[26]

In response to our inquiry on the tendency of underwriters to extrapolate recent yield charges, Sidney Homer writes that "there is no question that in bear bond markets underwriters are timid, bid low, and aim at immediate resale, whereas in rising markets or complacent markets (protracted stability) they bid high and are content with slow sale. This is why the spreads of the seasoned market narrow in good markets, widen in weak markets. It has indeed been occasionally true that new issue bids are dropped 2 to 4 points when dealers fear a further decline in the market. . . . Protracted discouragement is evident in the wide spreads of November 1957 and October 1959." [27]

The volume of new issues might also influence the bidding and pricing policies of underwriters. When the volume of new offerings rises, the market may become congested. The difficulty of selling new issues and the competition for buyers may force sellers to provide increasing yield advantages on new over seasoned issues.

Similarly, the speed with which recent new issues were sold might influence bidding and pricing by underwriters. If recent new issues have been moving very slowly and inventories are building up, underwriters might bid lower for additional issues and offer them at more attractive yields. However, we would expect both new issue volume and the rapidity with which recent issues have sold to be correlated with yield changes, so it is not altogether clear that either factor would

[25] See David Meiselman, *The Term Structure of Interest Rates,* Englewood, N.J., 1962, p. 18 and footnote.

[26] See Franco Modigliani and Richard Sutch, "Innovations in Interest Rate Policy," *American Economic Review, Papers and Proceedings,* May 1966, pp. 178–197, for a model which combines the extrapolative and regressive expectations hypotheses.

[27] Homer, July 20, 1965 Letter.

provide additional information after yield changes are taken into account.

Underwriters could also be influenced by the interest rates they pay on funds borrowed to carry new issues. Reliance on bank credit to finance bond inventories makes it more expensive and difficult in a tight money market for dealers to obtain funds for the purchase and distribution of newly issued securities. This might increase the pressure on underwriters to distribute new issues as rapidly as possible by pricing them attractively. Tightness in the money market might be measured by the level of short-term rates, the level of free reserves, or by the yield spread between long-term and short-term securities. The spread would be a rough measure of the cost to underwriters of carrying their inventories.[28]

One aspect of underwriting risks has not been considered thus far. Clearly underwriting risks are greatest on new issues, where the size of the inventories held is very large. But dealers who trade in seasoned bonds also assume a risk by holding an inventory and, by analogy to the argument concerning underwriting risks on new issues, might adjust the bid-asked price difference on seasoned bonds in response to the same factors which would make underwriters adjust their bids and offering prices on new issues.

Three spot checks were made to test the possibility that bid-asked spreads on seasoned bonds may be increased in periods of rising yields. Each check was a comparison of the bid-asked price spreads for all bonds common to the quotation sheets of a dealer on two different dates. One date in each comparison was in a period of rising yields and the other was in a period of falling yields.[29] We compared the bid-asked spreads on the quotation sheets of Salomon Brothers and Hutzler for August 1, 1957, a trading day in a period of rising yields, and January 2, 1958, a day in a period of falling yields. Out of 114 bonds common to the two sheets, 38 showed no change in bid-asked spread, 59 showed increases, and 17 showed decreases. The aggregate net change in the bid-asked spreads for all bonds taken together was an increase of $22\frac{1}{8}$ points—the equivalent of about 1 basis point in the average spread over the 114 issues.

Similarly, we compared the spreads on January 2, 1958, a day in a

[28] The cost is given by holding period yields, which equal yields to maturity only if interest rates do not change.

[29] The days chosen for this test were within broad cyclical phases of rise and decline in yields, and in each case were preceded by at least four consecutive weeks of rise or decline in weekly averages.

period of falling yields, and September 2, 1958, a day in a period of rising yields. Out of ninety-three bonds common to the two sheets, thirty-five showed no change in bid-asked spread, thirty-four showed increases, and twenty-four showed decreases. The aggregate net change in the bid-asked spreads was an increase of $4\frac{5}{8}$ points, the equivalent of less than 1 basis point in average spread.

Finally, we compared the bid-asked spreads on the quotation sheets of The First Boston Corporation for October 1, 1959, a day in a period of rising yields, and April 4, 1960, a day in a period of falling yields. Out of ninety-eight bonds common to the two sheets, forty showed no change in the size of the bid-asked spread, twenty-one showed increases, and thirty-seven showed decreases. The aggregate net change in the bid-asked spreads was a decrease of $11\frac{1}{8}$ points, again the equivalent of less than 1 basis point.

These spot checks show that bid-asked spreads do change, but the change is not related to the direction of change of yields, and the quantitative importance of the changes over any large sample of outstanding issues is very small. It appears that factors affecting underwriting risk would have a very small effect on the bid-ask spread on outstanding issues.

Imperfections in the Capital Markets: Lags in the Movement of Seasoned Yields. Finally, there are explanations for new-seasoned yield spreads which imply imperfections in the capital markets. As shall be noted later, spreads on individual new issues decline over a period of two or three months following the release of the issues from the syndicate. Neither of the two yield-spread hypotheses advanced above explains this finding. If yield spreads were based entirely on differences in the yield-determining characteristics of the bonds included in the averages, the spread on individual issues would have little tendency to decline after release from the syndicate. If yield spreads were based entirely on underwriting risk, on the other hand, market forces might be expected to eliminate yield spreads on individual issues in days instead of months.

For example, suppose a large volume of new issues forces new issue bond prices down and yields up. Why shouldn't holders of seasoned bonds immediately sell their holdings and shift into the more attractive new bonds, thereby reducing the price and increasing the yield on seasoned bonds? If holders of seasoned bonds are not fully aware of the current developments in the new issue market (which seems unlikely) or are not willing to take action, why do no arbitrageurs enter the market for new issues and immediately equalize rates on similar

new and seasoned bonds? Evidently actions of these kinds do not occur, at least not on the scale necessary to eliminate yield differentials quickly. Finally, why would any investor acquire seasoned issues at yields which are less attractive than those currently available on new issues?

Holders of seasoned bonds may not switch into new issues with slightly higher yields because of the transaction costs involved in such an operation (e.g., the dealer's commission represented by the bid-asked spread); such behavior would not imply market imperfections.[30] It is clear, however, that transaction costs do not provide a full explanation of the failure of arbitrageurs to equalize new and seasoned yields, since new-seasoned spreads for bonds with the same coupon rate are often considerably greater than recorded bid-asked spreads. Many of the other explanations for the failure to make portfolio changes can be regarded as forms of market imperfection.

Another reason holders of seasoned bonds may not switch into new issues is simply that they are not in the business of day-to-day speculation. Institutions such as life insurance companies and pension funds invest for income and usually hold to maturity. Homer writes that "the giant funds, with a few exceptions, have felt themselves to be largely frozen into their bond portfolios. They consider that their investment activity must be confined largely to the investment of their huge annual flow of new money. This problem is so stupendous that there is little room left for portfolio changes. Perhaps many smaller funds have sacrificed the advantages given them by their smaller size and have followed a similar policy of ignoring desirable portfolio changes."[31]

Because bonds are carried and amortized on the basis of cost, investors may be discouraged from a profitable switch by the reluctance to acknowledge capital losses (the "locked-in" effect). Homer writes that "one of the most powerful forces preventing arbitrage is the fact that almost all institutions carry bonds at amortized cost and, when prices are low, they would realize an enormous loss by selling. My observation is that only a tiny percentage are willing to realize these

[30] As mentioned before, Brimmer found that in September 1958 the average differential between the yields calculated from the bid and asked prices for the bonds used in Moody's seasoned issue yield series was about 9 basis points, and our examination of the public utility quotation sheets of Salomon Brothers and Hutzler and The First Boston Corporation for the period 1957–64 indicates bid-asked yield differentials of about 3 to 13 basis points on individual long-term seasoned bonds.

[31] Sidney Homer, "A Dynamic Approach to Institutional Bond Investment," Salomon Brothers and Hutzler, New York, 1961, pp. 16–17.

losses. If they did it in a substantial way, capital would be entirely wiped out for many." [32]

Another limitation on switching is that institutional investors often work under restrictions such as requirements for committee authorization and a variety of inflexible conventions and procedures.

Investors may acquire seasoned issues at yields below those on new issues because of features of specific issues. All Aas are not perfect substitutes in the eyes of individual buyers. Either diversification or concentration may be sought, and these objectives may not be satisfied by the relatively few new issues available. Homer says that "a few institutions would even buy the higher priced issue just to round out their previous holding or because they had a committee authority in the old issue and not in the new," [33] or we may add in order to average down the cost of an issue being held. Certain buyers, including those buying for pension funds, show a preference for seasoned issues which have been tested by the market as opposed to apparently comparable new issues. The difference in the size of the transactions involved in the new and seasoned market no doubt plays a role as well.

The market for seasoned bonds, furthermore, may be so thin that the attempt to sell any sizable amount would immediately wipe out the yield differential by driving down prices of seasoned issues. Homer writes that "the secondary market for most corporate bonds is not good enough to permit the portfolio manager to make every block transaction (at the quoted price) that may appeal to him. My experience is that about three-fourths of the desired switches can be made at fair prices in a portfolio when the unit of holding is 50 bonds, about half when the unit is 100–200 bonds, and a third when the unit is 500–1000 bonds. . . . For funds with blocks of $2–$10 million, the market is rarely good enough to permit switches." [34] Hence, after deducting transaction costs, the gain from arbitrage might be too small to warrant the effort.

Buyers, it has been noted, may purchase seasoned bonds at yields below those available on new issues because of a preference for specific issues. At the same time, many quotations on seasoned issues may be nominal in the sense that no transactions actually occur at the quoted rates. Indeed, particularly for inactive securities, yields on dealer quotation sheets may not be revised rapidly enough to reflect the

[32] Sidney Homer, Letter to Mark W. Frankena, November 8, 1967.

[33] Homer, July 20, 1965 Letter.

[34] "A Dynamic Approach to Institutional Bond Investment," p. 16.

yields at which transactions would actually take place if they were made. It might be that quotations based on actual transactions in sizable amounts would not show such large spreads. Homer states:

Recent issues, if sizable, enjoy a very active market from the moment the syndicate price restrictions are removed; the turnover is sometimes enormous, especially if there is a market decline. Many temporary holders get in and out; markets are usually quoted at $\frac{1}{8}$ point spreads and are good for many million bonds either way. Furthermore, many dealers in the Street participate in these large recent issues and many speculators buy them for small near-term gains. During the first two or three hours after the syndicate price restrictions are removed, a large part of the total trading has usually been done. Thereafter, the volume will taper off sharply; but for a period up to, say, three months it will continue far larger than for seasoned issues. Around that point trading activity will die out, and the issue will take its place as just one more seasoned utility. Most Street traders will forget, most speculators will be out, and only a few people will remember that it exists. It follows that true dealer markets for recent substantial issues are much more active, and the quotes are much more sensitive and narrow, than for seasoned issues. Quotes on seasoned issues tend to lag quotes on recent issues, where all the business is being done. In other words, the traders will always be changing around the quotes on active issues, while they will sometimes delay for a few days changing their largely theoretical quotes on seasoned issues. I say "theoretical" only because they are not doing very much business in them and are estimating their quotes, in the absence of real buyers, from the yield book just so the yield will line up with that of other similar issues. Therefore, the quotes on the great mass of seasoned issues are in their nature very different from the quotes on recent issues and revisions for seasoned issues are made more rarely.[35]

Richard West has concluded that in the case of state and local government bonds quite a different type of market imperfection—namely, monopsony in the underwriting and distribution of securities—

[35] Homer, July 20, 1965 Letter. This conclusion should be compared with that of White who writes that "the available evidence shows an adequately large volume of transactions in seasoned bonds by professional investors (such as pension funds and the smaller life insurance companies for whom the market's size is adequate) so that the prices of many of the larger issues of seasoned bonds can be assumed to reflect fully the conditions on the broader, new issue market. And accurate, reliable prices of seasoned bonds could emerge even if only a very minor fraction of the outstanding amount were sold during a given year. This is made plausible (although not a certainty) by the homogeneity of the various bond issues and of investors' interest in them; these homogeneities should make most holders unwilling to make transactions at the market's equilibrium price but to make very large transactions at prices that diverge appreciably from that equilibrium." William H. White, pp. 136–137.

is responsible for part of the spread between new and seasoned yields. He argues that when only one underwriting bid is made for an issue the underwriting syndicate can buy a bond at a price below the competitive level. However, to maintain its monopsony status, the bidding syndicate must share its extra-normal returns with firms which would otherwise submit competing bids. This sharing is done by reoffering the bonds at prices below the competitive level and rationing their sale to those with whom the profits are to be shared. Thus, when there is only one underwriting bid, the yield spread between new issues and comparable seasoned bonds is relatively large. West found, however, that the influence of the number of bids on the yield spread in the state and local government bond market was limited to offerings that received only one or two bids.[36] Since the number of bids received for corporate bonds is normally between two and nine, it is unlikely that this type of market imperfection explains any of the corporate yield spread. In addition, West found a virtual disappearance of yield spreads for single bid issues only two days after reoffering, making it clear that the spreads are of a different sort from those on corporate bonds, which persist for two and three months.

FURTHER IMPLICATIONS OF THE HYPOTHESES. The different hypotheses advanced to explain the new-seasoned yield spread have quite different implications for the relationship between the new and seasoned issue markets. The hypothesis based on market imperfections implies that the forces determining interest rates operate most directly and immediately on new issue yields. The hypothesis which attempts to explain the spread in terms of the pricing policy of underwriters, in contrast, does not imply that either the market for new issues or that for seasoned issues is more sensitive to changes in market conditions (although it does suggest that new issue yields will be more volatile).[37] It implies only that underwriters' expectations about future

[36] West found that on the average a single bid raised the yield spread by 13 basis points and two bids raised it by 2 basis points, as compared to issues with more than two bids. West, p. 141.

[37] The fact that the new issue series is more erratic than the seasoned issue series may be due to three things: (1) the number of issues in the new issue series is often considerably smaller than the number in the seasoned series; (2) the large role of expectational forces in determining new issue yields due to the pricing policy of the underwriters; and (3) the possibility that market forces act more directly on new issue yields, with the seasoned issue series following a distributed lag adjustment to its equilibrium level.

conditions in these markets generally cause them to be more or less concerned about assuring a rapid distribution of their inventories of new issues.

The hypotheses we have presented are nevertheless complementary rather than contradictory explanations. Even if we accept the hypothesis concerning the pricing policies of underwriters, this hypothesis cannot explain a spread which persists for a number of weeks after the termination of the syndicate. In order to explain the persistence of the spread even on issues which are similar with respect to all yield-determining characteristics, we must allow for market frictions or imperfections.

IV. Statistical Tests

VARIABLES FOR MULTIPLE REGRESSION. Multiple regression analysis is the major analytical technique used in this part of the study. The technique involves the regression of a dependent variable, which in this section will always be the new-seasoned yield spread, on independent variables which the hypotheses suggest may explain the variations in the size of the dependent variable.[38] These variables are: (1) difference in coupon rate between new and outstanding issues; (2) changes in the level of yields; (3) volume of new issues; (4) level

TABLE 5-3. Independent Variables Suggested by Each of the Major Hypotheses

Independent Variable	Coupon Difference	Underwriting Risks	Market Imperfections
Coupon difference	+		
Change in the level of yields	−	+	+
Volume of new issues	+	+	
Level of long-term yields	−	+, −	
Ratio of slow-selling to total new issues		+	
Level of Treasury bill yields		+	

[38] We have important reservations about some of the regressions run, but the results will be presented before discussing any problems of interpretation.

of long-term yields; (5) ratio of slow-selling to total new issues; and (6) level of Treasury bill yields.

Table 5-3 summarizes how each of various independent variables would be expected to influence the new-seasoned yield spread under each of the three major hypotheses regarding the cause of the yield spread. The direction of the influence is given by a plus or minus sign.

Because of intercorrelation among four of the independent variables (coupon difference, volume of new issues, level of yields, and bill rate), it was not advisable to include all of these variables in a single regression equation. For example, the level of yields and bill rates are both correlated with coupon differences. When either is added to a regression that already includes coupon difference, it takes a large negative coefficient and increases the coefficient of the coupon difference. In regressions run with data corrected for coupon, the yield level and bill rate do not show negative coefficients.[39] Similar problems pertain to the variable measuring the volume of new issues. Because of these statistical problems, the first set of regressions which will be presented include only the coupon difference and lagged yield changes as independent variables.

FINDINGS FROM FULL PERIOD REGRESSIONS. We begin with four regressions, one for each of the four monthly new issue series. All the regressions apply to the full period from 1952 through 1963, though the number of monthly observations varies as some of the series did not include observations of the new issue yield for every month. Table 5-4 summarizes the regression coefficients and their t-values when all variables are included in the regression, along with the F statistic for the addition of each variable to the preceding ones in the regression, and correlation coefficients.[40] The variable X_{10} stands for M_{10} in the case of the Moody regression, B_{10} in the Bankers Trust regression, K_{10} in the Kaplan regression, and H_{10} in the Homer regression. The same pattern follows for X_{30} through X_{41}. The subscript 1 denotes the

[39] The negative partial correlation of the level of yields and the yield spread in the regression with data uncorrected for coupon could be explained in part by the fact that the yield spread (due to any given difference in coupon rate) is lower when the level of yields is high. However, because of a high degree of multicollinearity between the difference in coupon rates and the level of interest rates, it seems probable that the correlation is essentially spurious. In any event, the regressions with data corrected for coupon are theoretically more satisfactory, and chief reliance is placed on them.

[40] An explanation of the statistical methodology used in this study is provided in any standard textbook of econometrics.

TABLE 5-4. Summary of Regressions for New-Seasoned Yield Spreads (X_1) Not Corrected for Coupon Differences (*by yield series*)

Independent Variable	Moody: M_1			Bankers Trust: B_1			Kaplan: K_1			Homer: H_1		
	b	*t*	*F*	*b*	*t*	*F*	*b*	*t*	*F*	*b*	*t*	*F*
X_{10} (coupon rate difference)	.284	11.34	243.38	.246	10.62	209.29	.287	15.17	232.94	.160	9.76	116.61
X_{30} (change in yields)	.492	8.94	45.95	.437	6.73	34.02	.384	4.35	24.59	.311	4.14	13.12
X_{31}	.265	4.62	8.79	.216	3.19	6.81	.084	0.91	1.44	.177	2.30	4.28
X_{32}	.167	2.93	3.02	.123	1.79	2.60	.055	0.60	0.95	.143	1.86	3.66
X_{33}	.147	2.61	2.32	.113	1.70	1.71	.121	1.38	1.89	.158	2.11	1.59
X_{34}	.145	2.69	2.99	.063	0.96	0.37	Not included			.084	1.13	0.65
X_{35}	.123	2.28	2.19	.072	1.02	0.35	"			.135	1.83	3.28
X_{36}	.127	2.36	2.77	.114	1.68	3.68	"			.157	2.14	4.93
X_{37}	.144	2.69	4.75	.151	2.27	4.48	"			.138	1.88	3.60
X_{38}	.107	1.98	2.02	.108	1.51	1.90	"			.105	1.41	1.56
X_{39}	.091	1.67	1.62	.114	1.72	3.03	"			.142	1.88	3.99
X_{40}	.093	1.74	2.34	.082	1.22	1.76	"			.112	1.48	4.04
X_{41}	.096	1.79	3.19	.080	1.22	1.48	"			.156	2.13	4.54
Constant	−.047			.017			−.060			.027		
Number of observations			121			127			144			144
Mean of yield spread			.175			.231			.129			.251
S.D. of yield spread			.235			.204			.175			.190
Simple correlation coefficient of yield spread and X_{10}			.820			.791			.788			.672
S.E. of estimate			.104			.104			.100			.124
Multiple correlation coefficient			.910			.876			.829			.784
F statistic of multiple correlation coefficient			39.40			28.74			60.65			15.94

new-seasoned spread without correction for coupon, the subscript 10 denotes the coupon difference variable, and subscripts 30 through 41 denote changes in new issue yields. A full explanation of the symbols is provided in the Appendix.

Coupon Difference. Because of its importance in explaining yield spreads, the difference in coupon rate must enter the regression equation when the series used to calculate those spreads do not have the same coupon rate at each observation. The variable used here is the difference between the average coupon on the bonds in the two series, new issue minus seasoned. The hypothesis concerning the effect of coupon rates discussed above suggests a positive correlation between yield spread and coupon difference.

The hypothesis is borne out by the four regressions shown in Table 5-4, all of which show a very high simple correlation coefficient (.67 to .82) and high *t*-values for the *b*-coefficient in the multiple regression. Part of the statistical influence of the coupon rate is no doubt due to its correlation with other variables not included in the regression equation. The regression coefficient of the coupon difference is large in absolute terms, ranging from .25 to .29 in the first three regressions. This implies that a 10 basis point difference in coupon produces a 2 to 3 basis point difference in spread. The coefficient is somewhat smaller in the Homer regression because the coupon rate was substantially lower for the seasoned Homer series than for the seasoned series used in the other regressions; and the influence of a given amount of coupon difference is relatively small at low coupon levels.[41]

For a number of reasons, use of a coupon difference variable in a linear regression equation is a very imperfect way of accounting for the effect of the coupon rate. The coupon rate and other variables we wished to include in the regression are intercorrelated. The influence of coupon differences on yield spread is not linear, and the effect apparently changed over the period studied.[42] Moreover, there may be a reverse influence of yield spread on coupon difference, stemming from the practice of setting the coupon rate on new issues so that the issues will sell close to par.[43]

To deal with these problems, series of seasoned bond yields were constructed for use with the Moody and Homer new issue series which

[41] Frankena study.

[42] Frankena found a marked downward trend in the size of yield spreads due to coupon differences during the period.

[43] Because of this practice, the new issue coupon rate is an endogenous variable, and it follows that the difference in coupon rates is an endogenous variable.

carried the same coupon rate as the new issues in each month. In this way, the influence of coupon differences is eliminated from the new-seasoned spread, making the data more satisfactory for testing other explanations of the spread.

The extent to which the spread between new and seasoned issues is reduced by eliminating the effect of coupon differences is striking. Charts 5-1 and 5-2 show graphically the effect of this correction for the Moody and Homer series. The average new-seasoned spread for the period from 1952 through 1963 was 16.7 basis points for the basic Moody Aa corporate series when no adjustment was made for coupon differences. When the spread was measured as the difference between the new issue yield and the yield on seasoned bonds with the same coupon rate as the new issues, it averaged only 9.2 basis points. Similarly, for the Homer series, the average spread was 25.1 basis points using uncorrected series, but only 9.0 basis points when measured from the yield on seasoned bonds with coupon rates equal to those on new issues. Thus, equalization of the coupon rate eliminates more than two-fifths of the spread in the Moody series and more than three-fifths of the spread in the Homer series. The larger correction in the case of the Homer series is due to the lower coupon rate in the Homer seasoned series.

Changes in the Level of Yields. Both the hypothesis concerning underwriters' pricing policies and that concerning market imperfections suggest a positive correlation between past changes in the level of yields and the size of the new-seasoned yield spread.[44] If underwriters expect yields to continue rising, or if the seasoned market lags behind the market for new issues, the spread will increase when new issue yields rise.

The change-in-yield variables [45] were tested in the four initial regres-

[44] In the case of the regressions for the yield spread measured without correction for differences in coupon rate, there is another reason for a correlation (negative) of the spread with the change-in-yield variables: A given coupon difference will have somewhat less influence on yield spreads when yields are rising. Frankena found that yield spreads between bonds with different coupon rates were smaller in periods of rising yields. It was hypothesized that this occurred because the greater call protection and capital gains potential of lower coupon bonds were given a lower market value when bond prices were falling.

[45] These are defined in the Appendix. Variables X_{30} through X_{41} used in Tables 5-4 and 5-5 are one-month changes in new issue yields with lags of from one to twelve months preceding the observation to be explained. It may be noted that if only the market imperfections were involved, the model employed in this paper would be less plausible than a distributed lag model which assumed that the level of yields on seasoned issues would adjust to its equilibrium level according to a distributed lag process. For

TABLE 5-5. Summary of Regressions for New-Seasoned Yield Spreads Corrected for Coupon Differences

Independent Variable (changes in yield)	Moody: M_2			Homer: H_2		
	b	*t*	*F*	*b*	*t*	*F*
X_{30}	.524	11.81	56.42	.244	8.81	51.72
X_{31}	.287	6.18	11.09	.143	5.04	20.84
X_{32}	.228	4.92	7.43	.093	3.27	10.60
X_{33}	.220	4.77	8.52	.094	3.39	6.03
X_{34}	.224	5.02	12.38	.060	2.20	3.31
X_{35}	.184	4.14	9.16	.071	2.61	8.21
X_{36}	.160	3.57	6.49	.110	4.03	16.58
X_{37}	.178	3.98	8.57	.072	2.65	6.94
X_{38}	.197	4.43	11.97	.043	1.56	2.94
X_{39}	.140	3.09	6.17	.064	2.30	6.41
X_{40}	.120	2.68	5.37	.034	1.21	2.33
X_{41}	.143	3.17	10.07	.032	1.17	1.36
Constant	.070			.081		
Number of observations		121			144	
Mean of yield spread		.097			.090	
S.D. of yield spread		.154			.069	
S.E. of estimate		.089			.046	
Multiple correlation coefficient		.838			.772	
F statistic of multiple correlation coefficient		18.25			16.14	

NOTE: See Appendix for definition of symbols.

sions run for spreads not corrected for coupon differences and in the two regressions covering bonds with the same coupon rate (Table 5-5). In each of the six regressions, all twelve change-in-yield variables covering the year preceding the month of observation have positive regression coefficients.[46] Not all of the regression coefficients were

example, the one-month change in seasoned yields might equal a certain fraction of the difference between the equilibrium level of seasoned yields at the end of the month and actual levels of seasoned yields at the beginning of the month. This model would have different implications for yield spreads than would the model tested here, particularly at turning points.

[46] Only four change-in-yield variables were used in the Kaplan series, but when the variables for the change in Moody new issue yields (M_{30}–M_{41}) were used as independent variables with the Kaplan spread, all twelve had positive regression coefficients.

statistically significant individually, but the uniformly positive signs make them collectively more significant than is indicated by their individual t-values and F statistics.[47] A weighted average of changes in yields over the past year therefore appears to be a very significant variable. The weights show a clear tendency to decline as the lag becomes longer, particularly in the case of the Moody series. This is to be expected whether the change-in-yields variables are important because of their influence on underwriters' expectations or because of a lag in the adjustment of seasoned rates.

The twelve change-in-yield variables explain 70 per cent and 60 per cent, respectively, of the total variance in the Moody and Homer regressions for spreads corrected for coupon differences. In the equations for spreads uncorrected for coupon difference the change-in-yield variables increase the explained variance by a smaller percentage but a statistically significant amount.

This finding, however, is consistent with either hypothesis, the one concerning underwriting risks or that concerning imperfections in the capital market, or with both. (We will return later to the problem of differentiating between these hypotheses.) Part of the correlation of the change-in-yield variables with yield spread, furthermore, may be spurious. The observation for the level of new issue yields can be viewed as a random variable, the mean of a sample drawn from a theoretical population of new issue yields. Any random influence on the sample mean for the new issue yields, causing it to deviate from the population value, will result in a corresponding change in the recorded new-seasoned spread.[48] This would cause an upward bias in the coefficient of the change-in-yield variable for the month immediately prior to the observation (i.e., X_{30}) and also in the correlation coefficient. It would bias the other regression coefficients only if there is positive autocorrelation of the error terms in the regression equation. Unfortunately, there seems to be autocorrelation in our equations;[49] hence the possibility of bias extends to the change-in-yield variables of earlier periods as well.[50]

[47] The probability of a t-value greater than 1.64 would be .10, greater than 1.96 would be .05, and greater than 2.58 would be .01 if there were in fact no relation between the independent and dependent variables.

[48] An error of measurement or factors omitted from the regression which influence the new issue but not the seasoned market would lead to the same problem.

[49] The problem of autocorrelation will be discussed below.

[50] As a partial check on the severity of this problem, we tried a new specification, computing the change-in-yield variables from the yield on long-term governments rather than from the yield on corporate new issues. This reduces the spurious correlation between the yield spread and the change in yield in the preceding month. In applying this

Volume of New Issues. It was hypothesized above that the volume of new issues competing for investment funds might affect underwriting risk and, thereby, the size of the new-seasoned yield spread. This hypothesis received only moderate statistical support. Some measures of new issue volume were statistically significant when included in regressions along with the change-in-yield variables, but the levels of significance were not high enough, nor were the results consistent enough, to lend any certainty to the hypothesis.[51]

Among the different measures of volume tested in the study were (a) Aa corporate bonds, (b) Aaa through Baa corporate bonds, (c) all corporate bonds including both public offerings and private placements, (d) all corporate securities including both bonds and equities, (e) all corporate securities plus home mortgages, (f) all corporate plus two-thirds of state and local bonds,[52] (g) all corporates plus newly issued government bonds with maturities of fifteen years or more, and (h) all of these bonds. Simple and multiple regressions suggested that either all corporate bonds or all corporate securities including both bonds and equities were the best measures, although the results were not entirely consistent.[53]

In general, the best correlations were obtained using the volume for the month of the observation of yield spread plus the two months preceding. However, the best length of period varied from two to five months for different volume measures.

It seemed possible that the volume of new issues anticipated in the

procedure we employed a distributed lag technique developed by Shirley Almon after our other regressions were estimated (Shirley Almon, "The Distributed Lag Between Capital Appropriations and Expenditures," *Econometrica,* January 1965, pp. 178–181). This procedure generated a smoothly declining set of weights for the change-in-yield variables, and moderate reduction in the variance explained by these variables (from 70 and 60 per cent to 40 and 49 per cent in the Moody and Homer series, respectively). This change in procedure does not eliminate the possibility of bias, however, because changes in yields on governments in the month preceding the month of observation are correlated with changes in new issue yields, and may therefore be spuriously correlated with the yield spread.

[51] One problem caused by using new issue volume as an independent variable is that the volume is really endogenously determined. For this reason, the use of volume involves problems of simultaneous equations bias.

In his study of new-seasoned yield spreads for state and local government general obligation bonds, Richard West found that the regression coefficients for various measures of market volume (current or expected) and for dealer's inventories were not significantly different from zero.

[52] Two-thirds of the state and local issues were included on the basis that this might represent the long-term portion of the total.

[53] Deduction of new issues intended for refunding made no apparent improvement in the volume measures.

month following the observation for yield spread might also be relevant. Measures for the securities registered for issue in the succeeding month, for securities registered for issue in any future period including the next month, and for securities actually issued in the succeeding month, however, did not prove significant in any of the multiple regressions.

Tables 5-6 and 5-7 show the results of two regressions that generated relatively high *t*-values for volume as an independent variable.

TABLE 5-6. Summary of Regression for Moody New-Seasoned Yield Spreads Corrected for Coupon and Including Volume as an Independent Variable

Independent Variable	*b*	*t*	*F*
X_{30} (change in yield)	.515	12.08	56.88
X_{31}	.260	5.91	11.20
$X_{32} + X_{33}$	.222	6.69	16.66
$X_{34} + X_{35}$	.220	6.72	22.37
$X_{36} + X_{37}$	.163	5.05	16.05
$X_{38} + X_{39}$	.163	4.97	18.57
$X_{40} + X_{41}$	.134	4.25	16.09
V_{61} (volume)	.038	2.61	6.79
Constant	−.034		
Number of observations		122	
Mean of yield spread		.097	
S.D. of yield spread		.153	
S.E. of estimate		.085	
Multiple correlation coefficient		.845	
F statistic of multiple correlation coefficient		35.40	

NOTE: See Appendix for definition of symbols.

The equations used are for the Moody series with the same coupon rate for new and seasoned issues; change-in-yield variables are included in addition to volume.[54] The volume measure in Table 5-6 (V_{61}) covers new issues of corporate bonds and equities for the current and two preceding months, while volume in Table 5-7 (V_{62}) covers the same securities but includes three, rather than two, months

[54] In Table 5-6 the change-in-yield variables after the first one are each for two-month yield changes. This format was used at an earlier stage in the study, and does not significantly affect the regression.

TABLE 5-7. Summary of Regression for Moody New-Seasoned Yield Spread Corrected For Coupon and Including Level of Yields on Seasoned Bonds and Volume of New Issues as Independent Variables

Independent Variables	*b*	*t*
X_{30} (change in yield)	.518	11.77
X_{31}	.273	5.86
X_{32}	.223	4.86
X_{33}	.220	4.83
X_{34}	.231	5.22
X_{35}	.204	4.54
X_{36}	.169	3.81
X_{37}	.171	3.86
X_{38}	.193	4.39
X_{39}	.138	3.06
X_{40}	.115	2.60
X_{41}	.148	3.32
X_{21} (yield level)	−.015	−1.04
V_{62} (volume)	.028	2.10
Number of observations	121	
Mean of yield spread	.097	
S.D. of yield spread	.154	
S.E. of estimate	.088	
Multiple correlation coefficient	.846	
F statistic for over-all regression	19.01	

NOTE: See Appendix for definition of symbols.

prior to the current month. The *t*-value for volume is not quite as high when the level of yields is included in the regression, as in Table 5-7, but it is still significant at the .05 level. This overstates the true confidence level because a large number of volume measures were tried in order to find one with a *t*-value as high as this.[55]

In the Homer equation, the *t*-value for the best volume measure is 1.97 (Table 5-8).[56] However, addition of the level of seasoned yields

[55] This is true of all *t*-values for the volume variables.

[56] The volume measure in the Homer regressions, V_{52}, covers new corporate bonds only, for the three months preceding the observation of the yield spread. Since the Homer yield spreads apply to the first of the month while the Moody spreads are monthly averages, the time periods of the volume variables in the Moody and Homer regressions are approximately the same.

as an independent variable reduces it to .95, which is not statistically significant.[57]

Level of Yields. Charts 5-1 and 5-2 suggest that the yield spread is greatest when yields are high. For the most part, this is probably due to the correlation of yield levels with other factors affecting the spread, particularly with differences in coupon rates, which are larger when yield levels are higher.[58] Such an influence can be avoided by testing yield levels in the equations covering new and seasoned bonds with the same coupon rate.

The underwriting risk hypothesis indicates two reasons why the level of yields may be relevant. First, when yields are high the yield spread between long-term and short-term securities is small, or negative, making it more expensive to carry new issues (if holding periods yields are directly related to yields to maturity). Second, underwriters may fear that yields, which have climbed to high levels, may continue to rise.[59] Yet, the opposite reaction is often viewed as more plausible: When rates are high, dealers and investors may expect them to fall back toward "normal." The direction of influence is therefore not clear.

When the level of yields on seasoned bonds (unadjusted for coupon) is added to the Moody regression (adjusted for coupon) its coefficient is not significant (Table 5-7). In the Homer regression for spreads corrected for coupon, however, the level of yields on seasoned bonds with a coupon rate of $2\frac{3}{4}$ to $2\frac{7}{8}$ per cent is statistically significant at the .01 level in the multiple regression including the change-in-yield variables, whether or not volume is also included as an independent variable (Table 5-8). In the regression without a volume variable, the regression coefficient for the level of seasoned yields has a t-value of 3.57, and the F statistic for addition of the level of seasoned yields to the regression is 12.75. The addition of the level of yields increases the coefficient of multiple correlation from .772 to .795. The reason for the different results in the Moody and Homer regressions is not clear.

[57] The simple correlation coefficient of volume (V_{65}) and the level of yields (H_{21}) is .291.

[58] Partly offsetting this is the fact that the yield spread between bonds with the same coupon rates will be smaller the higher the general level of yields. The reason is that at a higher level of yields the risk of call and limited capital gains of the higher coupon bond appears smaller and hence the bond has a smaller risk premium. This relationship implies that the level of yields has a negative influence where coupon rates are held constant.

[59] William H. White study, p. 125.

TABLE 5-8. Summary of Regressions for Homer New-Seasoned Yield Spread Corrected for Coupon and Including Level of Yields on Seasoned Bonds With a Coupon Rate of $2\frac{3}{4}$–$2\frac{7}{8}$ Per Cent and Volume of New Issues as Independent Variables

Independent Variable	*b*	*t*	*b*	*t*	*b*	*t*
X_{30} (change in yields)	.243	9.12	.249	9.05	.246	9.17
X_{31}	.136	4.98	.140	4.98	.136	4.98
X_{32}	.087	3.21	.086	3.03	.086	3.16
X_{33}	.090	3.40	.093	3.38	.091	3.40
X_{34}	.053	2.01	.065	2.38	.053	2.02
X_{35}	.065	2.47	.080	2.92	.068	2.58
X_{36}	.105	4.04	.118	4.33	.111	4.15
X_{37}	.068	2.60	.078	2.89	.072	2.72
X_{38}	.040	1.53	.046	1.67	.043	1.63
X_{39}	.062	2.30	.064	2.33	.063	2.34
X_{40}	.034	1.26	.034	1.22	.034	1.28
X_{41}	.031	1.18	.034	1.27	.031	1.19
X_{21} (yield level)	.024	3.57			.021	2.97
V_{65} (volume)			.018	1.97	.0072	.95
Constant	−.007		.044		−.018	
Number of observations		144		144		144
Mean of yield spread		.090		.090		.090
S.D. of yield spread		.069		.069		.069
S.E. of estimates		.044		.046		.044
Multiple correlation coefficient		.795		.780		.797
F statistic of over-all regression		15.98		14.41		16.03

NOTE: See Appendix for definition of symbols.

Tightness in the Money Market. It was hypothesized that a tight money market could increase the cost and difficulty of underwriting new issues and, hence, contribute to a new-seasoned yield spread. To measure tightness in the money market, tests were performed using the level of free reserves, the yield spread between long-term and short-term issues, and the yield on newly issued three-month Treasury bills. On the basis of simple correlation coefficients, the bill rate was chosen as the best measure. However, in the multiple regressions covering the Moody and Homer series corrected for coupon differences, the regression coefficient for the bill rate was not significantly

different from zero at even the .10 per cent level in either series, although it was positive in both.[60]

Ratio of Slow-Selling to Total New Issues. It was hypothesized that when new issues had been selling slowly in the recent past, underwriters would bid low enough for new issues to permit their distribution at prices below those on comparable seasoned issues. This would suggest that the new-seasoned yield spread would be positively correlated with the proportion of new issues which had moved slowly in the recent past. A new issue was defined as slow-selling if it was still in syndicate on the Monday following the date of issue. The ratio of such issues to total new issues of A, Aa and Aaa public utilities was calculated for the month preceding the observation of yield spreads, and separately for the month before that one. However, using either the Moody or Homer series corrected for coupon, the coefficients for the ratio of slow-selling to total new issues in each of the two preceding months were not statistically significant, even at the .10 level, in multiple regressions including the volume of new issues during the previous three months, the level of yields, and four variables measuring the change of yields during the previous twelve months.

Summary of Findings from Full Period Regressions. On the basis of the regressions run for the full period from 1952 through 1963, we can draw the following conclusions concerning the three major hypotheses which were being tested:

(1) Coupon differences between the bonds in the new issue and seasoned series explain a large part of the average level and the variance of the new-seasoned yield spread as it is usually recorded. Differences between the average coupon rates on the bonds used in the new issue and seasoned issue series accounted for an average of 41 and 62 per cent of the spread and for 57 and 87 per cent of the variance of the spread for the Moody and Homer series, respectively.

(2) A weighted average of changes in new issue yields over the preceding year has been found to be very important as an explanatory

[60] In a previously published summary of this study, the bill rate was included in the regression covering the Homer series corrected for coupon because its regression coefficient had a *t*-value of 2.69. However, subsequent changes in the other variables in the regression and extension of the time period covered by the regression sharply reduced the coefficient.

Using regression equations which included four rather than twelve separate variables to measure the change in new yields over the preceding twelve months and which included the volume of new corporate securities including equities issued in the current month and in the preceding one, the regression coefficient of the bill rate had *t*-values of .43 and 1.31, respectively, in the Moody and Homer regressions.

variable in the regressions for yield spread—accounting for between 60 and 70 per cent of the variance of the spread remaining after correction for coupon. This was suggested by the consistently positive and generally significant regression coefficients of the twelve lagged change-in-yield variables used in the regressions, both with and without correction for coupon. The results give strong support to either or both of two hypotheses. In the first, new-seasoned spreads increase when new issue yields have been rising, because underwriters are led to believe that the yields will continue to rise in the near future. Consequently, underwriters reduce their bids and offering prices on new issues to assure rapid distribution, which further causes new issue yields to exceed the yields on comparable seasoned issues. The second hypothesis is that new-seasoned spreads increase following a rise in new issue yields because yields on seasoned issues lag behind those on new issues. Thus, when new issue yields rise, the spread widens.

However, the multiple regressions give no basis for deciding between these two hypotheses, and there remains the problem of spurious correlation. As has already been seen, both hypotheses are supported by institutional considerations. Additional tests will follow shortly which were made in an attempt to discover the importance of each hypothesis.

(3) Moderate statistical support was found for including a variable measuring the volume of new issues of corporate bonds or of corporate bonds and equities for the month of observation of the yield spread plus the two preceding it. The interpretation placed on this was that when the market becomes congested with new issues competing for investment funds, underwriters foresee greater difficulty in distributing them and, accordingly, reduce their bids and offering prices for new issues. Thus the yields on new issues are increased above those on comparable seasoned issues. However, the levels of the significance and consistency of the results were not great enough to lend any certainty to the hypothesis.

(4) The level of seasoned yields had no explanatory power in the Moody regression of spread corrected for coupon, but it was statistically significant with a positive regression coefficient in the coupon-corrected Homer regression.

(5) No statistical support was found for the hypothesis that underwriters' pricing policies might be affected by the speed of sale of recent issues, as measured by the ratio of slow-selling to total new issues in the recent past.

(6) No statistical support was found for the hypothesis that money

market conditions, as measured by the Treasury bill rate, affect the new-seasoned spread.

ANALYSIS OF SUBPERIODS. During the earlier stages of this study, regressions similar to those covering the full period, January 1952–December 1963, were run separately for periods of rising yields and periods of falling yields using the Moody data. Similarly, separate regressions were run for each of three complete specific cycles in interest rates.[61] These subperiod regressions are presented in Tables 5-9 and 5-10. The yield variables M_{30}, M_{56}, M_{57}, and M_{58} are somewhat different from those used before, but not importantly. Exact definitions are given in the Appendix. On the whole, the same variables that explain the variation in yield spreads in the full period seem to explain most of the variation in each of the subperiods as well. The following are the main points suggested by the subperiod regressions.

(1) The volume measure showed an inconsistent pattern in the subperiod runs, as it had in variously specified equations covering the whole period. In coupon-corrected equations that included the bill rate, volume was significant at the .01 level in the first two interest rate cycles, as it was during periods of rising yields, but it was not in the third interest rate cycle or in periods of falling yields. (In the regression uncorrected for coupon, volume was not significant in runs that included the bill rate in either subperiod or full-period regressions.)

(2) In regressions that do not include bill yields, the coefficients of the change-in-yield variables were of the same general order of magnitude during periods of rising yields and those of falling yields, and during the individual interest rate cycles, as they were during the entire period. In coupon-corrected regressions that included bill yields, however, the coefficients of the change-in-yield variables were considerably smaller for the separate interest rate cycles than for the period as a whole. This was most notably the case for the more remote change-in-yield variables.

(3) In each of the three interest rate cycles, but not in the regressions for periods of rising and falling yields, the Treasury bill rate

[61] The periods of rising rates were January 1952 through May 1953, April 1954 through October 1957, July 1958 through September 1959, and January through December 1963. The periods of falling rates were September 1953 through March 1954, November 1957 through June 1958, and October 1959 through January 1963. The first interest rate cycle was January 1952 through March 1954, the second was March 1954 through June 1958, and the third was June 1958 through January 1963.

proved to be statistically significant at the .05 level; and in the case of the second and third cycles it was statistically significant at the .01 level (Table 5-10). As noted above, when the bill rate was added to the regressions for the first and second cycles, though not the third one, it considerably reduced the significance of some of the change-in-yield variables, since the correlation of the bill rate and the change-in-yield variables is considerably higher in the individual interest rate cycles than in the whole period. Since very strong support has already been found for the change-in-yield variables, it might be that the bill rate is acting as a proxy for those variables and is statistically significant for that reason.

TABLE 5-9. Summary of Full Period and Subperiod Regressions for Moody New-Seasoned Spreads With and Without Corrections for Coupon Differences

	Full Period		Period of Rising Rates		Period of Falling Rates	
Equation	(1) M_1	(2) M_2	(3) M_1	(4) M_2	(5) M_1	(6) M_2
			Part A			
b_1 for M_{10} (coupon differences)	.279	–	.292	–	.378	–
b_2 for M_{30} (change in yields)	.485	.510	.474	.645	.328	.446
b_3 for M_{56}	.250	.239	.235	.313	.083	.145
b_4 for M_{57}	.136	.224	.136	.255	−.040	.250
b_5 for M_{58}	.157	.210	.096	.144	.131	.257
b_6 for V_{60} (volume)	−.016	.043	.004	.056	−.056	.049
Constant	−.010	−.005	−.003	−.037	−.067	−.020
t for b_1	11.934	–	9.696	–	9.034	–
t for b_2	9.428	12.257	6.501	11.950	4.346	6.497
t for b_3	5.035	5.892	3.463	5.991	1.056	1.963
t for b_4	3.113	6.343	2.132	5.497	−.553	3.830
t for b_5	4.362	7.542	2.527	4.590	2.321	5.082
t for b_6	−.707	2.238	.136	2.176	−1.664	1.536
Number of observations	128	128	77	77	57	57
Mean of yield spread	.172	.096	.222	.143	.114	.042
S.D. of yield spread	.230	.150	.238	.149	.229	.160
S.E. of estimate	.100	.085	.082	.075	.103	.103
Multiple correlation coefficient	.906	.831	.943	.874	.906	.787
F statistic of multiple correlation coefficient	92.02	54.25	94.08	45.81	37.96	16.57

(continued)

TABLE 5-9 (concluded)

Equation	Interest Rate Cycle #1 (1) M_1	(2) M_2	Interest Rate Cycle #2 (3) M_1	(4) M_2	Interest Rate Cycle #3 (5) M_1	(6) M_2
			Part B			
b_1 for M_{10} (coupon differences)	−.151	–	.314	–	.459	–
b_2 for M_{30} (change in yield)	.795	.357	.426	.464	.375	.639
b_3 for M_{56}	.555	.125	.163	.118	.178	.352
b_4 for M_{57}	.374	.186	.069	.164	.086	.329
b_5 for M_{58}	.327	.027	.102	.160	−.018	.191
b_6 for V_{60} (volume)	.001	.064	.023	.159	−.012	−.003
Constant	.175	−.021	−.020	−.182	−.247	.062
t for b_1	−1.094	–	17.065	–	15.287	–
t for b_2	6.048	6.948	12.456	7.948	6.948	9.997
t for b_3	4.909	2.163	5.376	2.205	3.493	5.601
t for b_4	4.677	3.493	2.376	3.376	1.925	5.762
t for b_5	3.427	.515	3.461	3.447	−.595	5.246
t for b_6	.043	2.302	.948	4.087	−.542	−.088
Number of observations	21	21	44	44	54	54
Mean of yield spread	.131	.070	.256	.148	.154	.069
S.D. of yield spread	.161	.096	.250	.159	.227	.164
S.E. of yield estimate	.034	.040	.043	.077	.060	.084
Multiple correlation coefficient	.985	.933	.987	.890	.968	.874
F statistic of multiple correlation coefficient	74.107	20.157	235.602	28.879	118.221	31.094

NOTE: See Appendix for definition of symbols.

AUTOCORRELATED ERRORS. A statistical problem encountered in the regressions used in the study is autocorrelation of the residual error terms. Although Durbin-Watson statistics were not computed for the residuals of the regressions run in the main part of this study, some checks showed that the Durbin-Watson statistics were typically between 1.2 and 1.6. This indicates a highly significant, positive first-order autocorrelation of the residuals.

Autocorrelation of errors does not introduce a bias into the least-squares estimates of the true parameters as long as the model is not autoregressive. However, even in the nonautoregressive case the statistical significance of the regression coefficients, as measured by their t-values, is overstated because of the underestimation of the standard errors of the regression coefficients computed by ordinary least-squares. Moreover, if the regression equation with autocorrelated

TABLE 5-10. Summary of Regressions by Interest Rate Cycle for Moody New-Seasoned Yield Spread Corrected for Coupon, Including Treasury Bill Rate as an Independent Variable

	Interest Rate Cycle			
	#1	#2	#3	Entire Period
b_1 for M_{30} (change in yields)	.259	.433	.628	.509
b_2 for M_{56}	.035	.066	.314	.235
b_3 for M_{57}	.078	.012	.269	.217
b_4 for M_{58}	−.014	.001	.073	.204
b_5 for V_{60} (volume)	.055	.103	.017	.0409
b_6 for T_{20} (bill yields)	.104	.095	.074	.0051
Constant	−.186	−.266	−.180	−.0134
t of b_1	3.975	8.786	10.415	12.13
t of b_2	.517	1.417	5.166	5.67
t of b_3	1.121	.221	4.635	5.50
t of b_4	−.285	.010	1.316	6.34
t of b_5	2.167	2.934	.592	2.07
t of b_6	2.113	4.175	2.694	.43
Number of observations	21	44	54	128
Mean of yield spread	.070	.148	.069	.096
S.D. of yield spread	.096	.159	.164	.150
S.E. of estimate	.004	.064	.079	.086
Multiple correlation coefficient	.950	.926	.892	.831
F statistic of multiple correlation coefficient	21.419	37.378	30.499	44.94

NOTE: See Appendix for definition of symbols.

errors is autoregressive, the least-squares estimates of the regression coefficients will be biased, even asymptotically.

Because of autocorrelation, the significance levels of the regression coefficients are lower than those indicated by the t-values listed. Second, the autocorrelation suggests that some errors may have been made in the specification of the relationship tested. That is, some significant variables may have been omitted or the form of the variables or the equation may be imperfect. Third, the coefficients of the change-in-yield variables may involve a bias, as already noted.

TIME REQUIRED FOR SEASONING. The above analysis of yield spreads is based on the assumption that there are no systematic differences be-

tween new and outstanding issues, other than coupon rate differences, that would account for any significant part of the spread. This implies that any spread which exists at the time of issue, after correction for coupon differences, should disappear after the new issue has been outstanding long enough for the market to equilibrate itself. Does the spread in fact vanish after the new bond has become seasoned? And, if so, how long does this take?

In order to make this part of the study meaningful, we had to select periods when new-seasoned spreads were reasonably high and remained high, so that the closing of the yield gap between individual recent issues and seasoned averages would not merely reflect the elimination of yield spreads between new and seasoned issues generally. The periods chosen were March through May 1953, May 1956 through March 1957, and June through September 1959.

The average yield spread on Aa utilities for all new issues during these periods was 9.0 basis points after correction for coupon. The average spread on these issues one month after the issue date was 3.8 basis points. After two months the spread was 3.1 basis points, after three months it was −1.0 basis points, and from then through the eighth month the average fluctuated within a narrow range above and below zero.

On the average, initial yield spreads on utilities thus appear to be eliminated within two to three months of the date of issue. White, using a somewhat different procedure, arrived at a similar conclusion.[62] Homer, in describing the recent issue market, wrote that "for a period up to, say, three months it [the volume of trading in a recent issue] will continue far larger than for seasoned bonds. At about that point trading activity will die out, and the issue will take its place as just one more seasoned utility." [63]

In addition, we carried out a brief study of the seasoning time required on federal obligations. The paucity and heterogeneity of new issues made it difficult to interpret the available data, but the indication seems to be that the new issue yield spread disappears somewhere between two and four months after issue. Our procedure was first to measure the monthend differences between the yields of bonds issued during the month and the corresponding point on the government yield curve. Omitting bills, certificates, and the 1½ per cent note series, there was a positive yield spread in thirty-eight cases and a negative yield

[62] White, p. 133.

[63] Homer, July 20, 1965 Letter.

spread in ten cases between March 1951 and December 1960.[64] The total spread among the bonds showing a positive spread was 352 basis points; the total for those showing a negative spread was 28 basis points. During the second month after issue the spread declined on twenty-seven issues and increased on seven; the decline was 164 basis points and the increase was 27. By the end of the third month twenty-eight issues had shown a decline in spread from that at the end of the first month, and eight showed an increase. In basis points the decline from the end of the first month was now 244. During the fourth month there was no change in the number of recent issues for which the spread had changed since time of issue, but the total spread declined 12 more basis points net. In the fifth month after issue the spread declined on three more issues, and the net spread in basis points did not change. From that time on the behavior of spreads was random.

These tests confirm that yield spreads are not due to systematic differences in the characteristics of new and outstanding issues (other than coupon rate), and tend to support a hypothesis explaining spreads in terms of market imperfections. The fact that the spreads persist for a period of two to three months after issue suggests that market imperfections prevent more rapid arbitrage. The tests are not inconsistent, however, with the hypothesis which attributes yield spreads partly to underwriting risk. The regression results, moreover, are consistent with both hypotheses. We now turn to three additional tests designed to evaluate these two hypotheses, as well as throw light on the connection between the new issue, recent issue, and seasoned issue markets.[65]

UNDERWRITING RISKS VERSUS MARKET IMPERFECTIONS AS AN EXPLANATION OF YIELD SPREADS. The first two of the following three tests deal with the market imperfections hypothesis, and the third deals with the underwriting risk hypothesis.

(1) Suppose new issue yields turn downward from month t to month $t+1$, but that even in month $t+1$ these yields are above those on seasoned bonds in month t. If yields in the seasoned issue market lag behind those in the new issue market, seasoned yields would continue

[64] The yield curves used in this study were those prepared by the Morgan Guaranty Trust Company.

[65] William H. White states in his study that "even though the amplitude of variation of the yields on seasoned bonds is smaller than that on new issues, the yields on the two types of bonds are closely synchronized in regard to the timing of peaks, troughs, and major discontinuous changes." White, p. 136.

to rise when new issue yields are above them, attempting to close the spread, despite the falling rates on new issues. If, on the other hand, seasoned yields turn downward along with new issue yields even though the new issue yields in month $t + 1$ exceed the seasoned yields in month t, it can be inferred that seasoned yields are directly influenced by yield-determining conditions and are not simply following a distributed lag adjustment toward their equilibrium level.

Using the Moody corporate Aa series on seasoned issues and new issues with the same coupon rate as the bonds in the seasoned average,[66] the seasoned yields continued to rise in twenty-two of the thirty-one cases where the new issue yield turned downward while remaining above the level of seasoned yields; the reverse occurred in nine of the thirty-one cases. Nothing conclusive can be inferred from this test, but it suggests that the seasoned market lags the new issue market and, therefore, supports the market imperfections hypothesis.

(2) Is the correlation between changes in seasoned yields and changes in new issue yields the month before higher than the correlation between changes in new issue yields and changes in seasoned yields the month before? An affirmative answer would support the hypothesis that seasoned yields tend to lag.

In the Moody Aa corporate series for the period from 1952 through 1963 (with the new issue series corrected for coupon as described above), virtually no correlation was found between the first-differences (one-month changes) of new issue yields and those of seasoned yields for the preceding month, but there was a substantial correlation (.50) between the first-differences of seasoned yields and those of new issue yields for the preceding month. The correlation between first-differences of new and seasoned yields for the same month was only slightly higher (.55).[67] Thus, when the first-difference in seasoned yields is regressed on the change in new issue yields in the same month and the preceding one the coefficient of multiple correlation is very high (.83), and can be raised slightly (to .86) by the addition of the new issue rate change for the second month earlier.[68]

[66] This latter series was derived by adding to Moody's seasoned series the new-seasoned spread measured between Moody's new issue series and the series for the yield on seasoned bonds with the same coupon rate as the new issue. The adjustment affected the correlations very little.

[67] There was no correlation between the first differences of new issue yields and those of new issue yields for the previous month, indicating that in predicting changes in seasoned yields the change in new issue yields for the previous month is not simply a proxy variable for the simultaneous new issue yield change.

[68] It is possible that some of this correlation may be explained by the fact that the new issue yield change of the preceding month is a proxy for the change in seasoned yields of

The preceding two experiments support the conclusion that market forces operate more rapidly on new issue yields than on seasoned ones. Seasoned yield movements appear to follow new issue yield movements with a distributed lag. The tests thus support the hypothesis that frictions in the seasoned issue market are a cause of new-seasoned yield spreads. They do not, however, preclude a role for the underwriting risk hypothesis. The third test involves an examination of the behavior of yields on recently issued bonds after their prices are freed from syndicate price maintenance agreements.

(3) If new issue yields are higher than yields on outstandings because of underwriters' pricing policies, issues recently released from syndicate should decline relative to new issues. A direct comparison of yields on recently released issues with new issue yields is not possible because there are not enough new issues, in the weeks following termination of a syndicate, with which to compare the yield on the newly released issue. Instead, the test examines the behavior of yields on recent issues during periods of some length when new issue yields were predominantly rising and new-seasoned spreads were large. If the yields on issues recently released from syndicate fell during such periods, this would provide strong support for the underwriting risk hypothesis.

Using the yield data for A, Aa, and Aaa utilities in the weekly issues of *Moody's Bond Survey,* we found the percentage of bond issues whose yields fell in the first week following the end of syndicate price maintenance agreements, and the change from offering yield during the first week, first two weeks, and first three weeks after release from syndicate. Table 5-11 shows these data for each of six periods between 1956 and 1966. The bottom line shows the average three-week change in new issue yields during these periods and can be compared to the line above it showing three-week changes on recently released issues.

It is evident from the first line of Table 5-11 that the yields on a substantial number of bonds fell immediately after the termination of the syndicate despite the fact that new issue yields were predominantly rising. Because of the erraticism of new issue yields, some of the decline in yields on recent issues could be due to short periods of falling new issue yields during the longer periods of rising yields. However, in four of the six periods more than half of the recent issues fell—well above what one would expect from erratic movements in new issue yields. Furthermore, comparing the lower two lines in every one of the six periods, the average yield change on recently released issues in

the preceding month. There is more autocorrelation in seasoned than in new issue yields.

TABLE 5-11. Changes in Yields on Recent Issues After Termination of Syndicate Price Maintenance Agreements, Compared With Yield Changes on All New Issues (*yield changes in basis points*)

	Feb. 28, 1956–Jan. 30, 1957	Feb. 5, 1957–June 27, 1957	Aug. 27, 1957–Nov. 20, 1957	April 22, 1959–Aug. 26, 1959	Sept. 14, 1960–Dec. 9, 1960	July 14, 1965–June 30, 1966
(1) Per cent of bond issues whose yields fell in the first week after the end of price maintenance agreements	53	57	73	62	40	35
(2) Average change in yield from offering yield on issues recently released from syndicate:						
(a) during first week	0.0	0.3	−1.8	1.3	1.9	2.8
(b) during first two weeks	−0.2	0.7	−5.0	−0.2	4.1	2.6
(c) during first three weeks	−3.4	0.6	−1.5	1.5	3.0	3.1
(3) Average three-week change in new issue yields	7.2	10.7	0.5	6.7	8.5	6.4

the three weeks following syndicate termination was either negative or, if positive, far less than the average three-week change in new issue yields.

The test thus suggests that there is, indeed, some tendency for underwriters to underprice new issues. This test is limited, however, to periods of rising new issue yields. It should be remembered, moreover, that evidence also exists that some of the new-seasoned spread is caused by imperfections in the capital markets. Thus, both hypotheses, the one concerning the pricing policies of underwriters and that concerning market imperfections, appear to have some validity.

THE SPREAD UNDER STABLE MARKET CONDITIONS. What conditions would lead to the elimination of the yield spread? It is tempting to approach this question through the regression equations, but this would place on the equations a burden they clearly are not equipped to handle. The value of the constants, for example, varies considerably among the different equations.

Nevertheless, the evidence gathered here on the determinants of the spread suggests that it would be close to zero under stable market conditions. With one possible exception the three determinants of a positive spread discussed above presuppose rising market rates. Under stable markets, coupon rates on new issues would be similar to those on seasoned issues;[69] frictions in the market for seasoned bonds would have no importance; and underwriters would not have to incorporate a premium in their offering yields based on an extrapolation of past yield increases. Of course, the underwriters' aversion to risk might be such that they will always include some "sweetener" in their offering yield. However, if this differential consistently resulted in extra profits under stable market conditions, competition among underwriters would quickly erode it away.[70]

The time series on yield differences during a few periods of rate stability are consistent with these speculations. During the second half of 1954, yield levels were stable and the yield differential hovered around zero (see Charts 5-1 and 5-2). Again in the relatively stable period from June 1962 to June 1963, yield differentials were only slightly positive on balance in the Homer series and slightly negative on balance in the Moody's series. This implies that the positive yield

[69] Yields would have to be stable for a fairly long period, of course, for this to hold true.

[70] It could make a difference in this regard whether the market was stable, or unstable but without trend.

spreads during the period 1952–63 reflect largely, if not entirely, the tendency for yields to rise on balance over that period.

Our explanation of yield spreads suggests further that a prolonged period of falling yields would result in predominantly negative spreads. Coupon rates on new issues would be lower than those on outstandings, and thus would cause a negative spread. Past yield declines, furthermore, would tend to generate a negative spread if market frictions prevented the prompt adjustment of yields on outstandings. The pricing policy of underwriters could also contribute to a negative spread if they tended to extrapolate past rate declines and if competition between them was intense. Evidence from the 1930's appears to confirm this. Comparison of a series of Moody Aa seasoned utility yields with new issue yields on Aa utilities revealed that, on the average, spreads were negative in 1931 and from 1933 to 1937.[71]

Appendix

KEY TO SYMBOLS

TYPE OF SERIES

Note: All yield series are monthly unless designated with a subscript q for quarterly.

B Bankers Trust, series of yields on Grade 2 public utility bonds.

C_q Avery Cohan, series of yields on Aa public utility bonds. Quarterly.

F Federal Reserve, series of yields on long-term U.S. government bonds.

G Salomon Brothers and Hutzler, series of yields on long-term U.S. government bonds.

H Sidney Homer, series of yields on Aa public utility bonds.

K Mortimer Kaplan, series of yields on "recently issued" Aa corporate bonds.

M Moody, series of yields on Aa corporate bonds.

S Ratio of volume of slow selling to total newly issued Aaa, Aa and A public utilities.

T Treasury bills, ninety-day, series of yields.

V Volume of newly issued securities.

[71] Braddock Hickman offers an alternative explanation, namely, the inability of agency ratings to keep up with market views. Since new issues came chiefly from firms with better prospects than others with similar ratings, their lower yield could be attributed in part to differences in investment quality among equally rated bonds. Braddock Hickman, *Corporate Bond Quality and Investor Experience*, Princeton for NBER, 1958, p. 298. See also William H. White, p. 127.

X Symbol used in the tables summarizing the regression equations to stand for the letter corresponding to the series studied. For example, X_{10} stands for M_{10} when used in a table for Moody data.

SUBSCRIPTS FOR SERIES

1–4 New-seasoned yields spreads, new issue yield minus seasoned issue yield; or underwriting yield spread.

10 Coupon difference, average new minus average seasoned issue coupon.

20–22 Level of yields, current month.

30–58 Change in new issue yields over various periods.

60–65 Variables relating to volume of new issues.

q Quarterly series.

Full Glossary

B BANKERS TRUST SERIES

B_1 Spread between yield on newly issued Bankers Trust Company Grade 2 public utilities and yield on seasoned Moody Aa public utilities. In percentage points. Both series are monthly averages of yields with issues weighted by volume in the case of the new issue average. (Sources: data obtained from Bankers Trust Company; *Moody's Bond Survey*)

B_{10} Average coupon difference between newly issued Bankers Trust Grade 2 utilities and seasoned Moody Aa utilities, 1957–63; average coupon difference on Moody Aa corporates, new versus seasoned issues, 1951–56. All in percentage points. (Sources: Bankers Trust Company; *Moody's Bond Survey*)

B_{20} Yield on newly issued Bankers Trust Company Grade 2 public utilities. In percentage points. (Source: Bankers Trust Company)

B_{30}–B_{41} B_{30} is the change in yield on new Bankers Trust Grade 2 utilities during the past month, measured as current yield minus yield of preceding month. B_{31} is the change for the month before the last, B_{32} is the change for the month before that, and so forth for B_{33} through B_{41}. In percentage points. (Source: Bankers Trust Company)

C_q COHAN SERIES (QUARTERLY)

C_{q20} Yield on newly issued Cohan Aa public utilities. The Cohan series consists of quarterly averages of yields on newly issued thirty-year Aa public utility mortgage bonds which were sold to underwriters at competitive bidding. In percentage points. (Source: Avery B. Cohan, "Yields on New Underwritten Corporate Bonds, 1935–1958," *The Journal of Finance*, December, 1962, and data supplied directly to us for 1959–60)

F FEDERAL RESERVE SERIES

F_{21} Yield on outstanding long-term U.S. government bonds, Federal Reserve series. Yields are monthly averages of daily quotations. (Source: *Federal Reserve Bulletin*)

F_{30}–F_{53} F_{30} is the change in yield on outstanding long-term government bonds, Federal Reserve series, current yield minus yield of preceding month. F_{31} is the change for the month before last, F_{32} is the change for the month before that, and so forth for F_{33} through F_{53}. (Source: *Federal Reserve Bulletin*)

G SALOMON BROTHERS AND HUTZLER

G_{21} Yield on outstanding long-term U.S. government bonds, Salomon Brothers and Hutzler series. Yields are for the first of the month. (Source: Salomon Brothers and Hutzler, "An Analytical Record of Yields and Yield Spreads")

G_{30-53} G_{30} is the change in yield on outstanding long-term government bonds, Salomon Brothers and Hutzler series, current yield minus yield of preceding month. G_{31} is the change for the month before last, G_{32} is the change for the month before that, and so forth for G_{33} through G_{53}. (Source: Salomon Brothers and Hutzler)

H HOMER SERIES

H_1 Spread between the yield on Homer's newly issued callable Aa public utilities and the yield on Homer's seasoned callable Aa public utility bonds with $2\frac{3}{4}$–$2\frac{7}{8}$ per cent coupon. In percentage points. Both the new issue and seasoned issue series are for yields as of the first of each month. (Source: Salomon Brothers and Hutzler; Mark W. Frankena)

H_2 Spread between the yield on new callable issues of Aa public utility bonds, Homer series, and the yield on seasoned callable Aa public utility bonds of current coupon. The yield on seasoned bonds of current coupon means the estimated yield on seasoned bonds with coupon rate equal to that on new issues for that date. This yield is calculated by interpolation and extrapolation of yields on seasoned bonds in various coupon groups. In percentage points. The series are for the first of the month. (Source: Salomon Brothers and Hutzler; Mark W. Frankena)

H_{10} Difference between average coupon on newly issued Homer Aa utilities and the $2\frac{3}{4}$–$2\frac{7}{8}$ per cent coupon rate. (Source: data obtained from Sidney Homer and Mark W. Frankena)

H_{20} Yield on new issues, callable Aa public utility bonds, Homer series. (Source: Salomon Brothers and Hutzler)

H_{21} Yield on seasoned issues with $2\frac{3}{4}$–$2\frac{7}{8}$ coupon, callable Aa public utility bonds, Homer series. (Source: Salomon Brothers and Hutzler; Mark W. Frankena)

H_{22} Yield on seasoned issues with coupon rate equal to that on new issues,

callable Aa public utility bonds, Homer series. (Source: Salomon Brothers and Hutzler; Mark W. Frankena)

H_{30}–H_{41} H_{30} is the change in yield on new Aa public utility bonds, Homer series, current yield minus yield of preceding month. H_{31} is the change for the month before last, H_{32} is the change for the month before that, and so forth for H_{33} through H_{41}. (Source: Salomon Brothers and Hutzler)

H_{56} Change in yield on newly issued Aa public utility bonds, Homer series, yield in preceding month minus average yield for two to three months preceding. In percentage points. (Source: Salomon Brothers and Hutzler)

H_{57} Change in yield on newly issued Aa public utility bonds, Homer series, average yield of two to three months preceding minus average yield for four to six months preceding. In percentage points. (Source: Salomon Brothers and Hutzler)

H_{58} Change in yield on newly issued Aa public utility bonds, Homer series, average yield for four to six months preceding minus average yield for seven to twelve months preceding. In percentage points. (Source: Salomon Brothers and Hutzler)

K KAPLAN SERIES

K_1 Spread between yield on Kaplan recently issued Aa corporate bonds and yield on Moody's seasoned Aa corporate bonds. In percentage points. The Kaplan series is for monthly averages of Friday yields for recently issued bonds and the Moody series is for monthly averages of yields. (Sources: *Moody's Bond Survey* and data from Mortimer Kaplan, Federal Housing Administration)

K_{10} Average coupon difference between Kaplan recently issued Aa corporates and Moody seasoned Aa corporates. (Sources: Moody's Investors' Service; Mortimer Kaplan)

K_{20} Yield on recently issued Aa corporates, Kaplan series. (Source: Mortimer Kaplan)

K_{30}–K_{33} K_{30} is the change in yield on recently issued Aa corporate bonds, Kaplan series, current yield minus yield of preceding month. K_{31} is the change for the month before last, K_{32} is the change for the month before that, and K_{33} is the change for the month before that. In percentage points. (Source: Mortimer Kaplan)

M MOODY SERIES

M_1 Spread between yield on newly issued Aa corporates and yield on seasoned Moody Aa corporates. Newly issued yields are Moody's specially computed averages of offering yields on new issues (other than convertibles, issues with warrants, and equipment trusts), weighted by amounts offered. Seasoned yields are Moody's monthly average (averages of daily figures) and includes yields on securities with various coupon rates. Figures are in percentage points. (Source: *Moody's Bond Survey*)

M_2 Spread between the yield on newly issued Aa corporates, Moody series, and the yield on seasoned Aa corporates with coupon rate equal to that on new issues. In percentage points. (Source: Moody's Investors' Service)

M_4 Moody new-seasoned yield spread as described under M_1 *plus* underwriter spread, which is the difference between the yield to maturity calculated from the offering price and the yield to maturity calculated from the price at which the issue was sold to the underwriter. Underwriter spread thus measures the difference between the investor's return to maturity and the actual interest cost to the borrower. The underwriter spread is an average for newly issued Aa corporates weighted by size of issue.

M_{10} Difference between average coupon on newly issued Moody Aa corporates and average coupon on seasoned Moody Aa corporates. (Source: *Moody's Bond Survey*)

M_{20} Yield on newly issued Aa corporates, Moody series. (Source: *Moody's Bond Survey*)

M_{21} Yield on seasoned Aa corporates, Moody series. (Source: *Moody's Bond Survey*)

M_{22} Yield on seasoned Aa corporates with coupon rate equal to that on new issues, Moody series. (Source: derived from data supplied by Moody's Investors Service)

M_{30}–M_{41} M_{30} is the change in yield on newly issued Aa corporates, Moody series, current yield minus yield of preceding month. M_{31} is the change for the month before last, M_{32} is the change for the month before that, and so forth for M_{33} through M_{41}. In percentage points. (Source: *Moody's Bond Survey*)

M_{56} Change in yield on newly issued Aa corporates, Moody series, yield in preceding month minus average yield for two to three months preceding. In percentage points. (Source: *Moody's Bond Survey*)

M_{57} Change in yield on newly issued Aa corporates, Moody series, average yield of two to three months preceding minus average yield for four to six months preceding. In percentage points. (Source: *Moody's Bond Survey*)

M_{58} Change in yield on newly issued Aa corporates, Moody series, average yield for four to six months preceding minus average yield for seven to twelve months preceding. In percentage points. (Source: *Moody's Bond Survey*)

S SLOW-SELLING ISSUES

S_{60} Ratio of volume of slow-selling to total new Aaa, Aa and A public utility issues. Ratio applies to month preceding the observation of yield spread being explained. (Source: data from Sidney Homer)

S_{61} Ratio of volume of slow-selling to total new Aaa, Aa and A public utility issues. Ratio applies to next to last month before the observation of yield spread being explained. (Source: Sidney Homer)

T TREASURY BILLS

T_{20} Monthly average of yields on newly issued three-month Treasury bills. In percentage points. (Source: *Federal Reserve Bulletin*)

T_{21} Yield on newly issued three-month Treasury bills on the Monday nearest the first of each month. In percentage points. (Source: *Federal Reserve Bulletin*)

V VOLUME OF NEW ISSUED SECURITIES

V_{60} Volume of newly issued corporate securities, including bonds and equities, issued in the current and preceding month. In billions of dollars. (Source: *Federal Reserve Bulletin*)

V_{61} Volume of newly issued corporate securities, including bonds and equities, issued in the current and the two preceding months. In billions of dollars. (Source: *Federal Reserve Bulletin*)

V_{62} Volume of newly issued corporate securities, including bonds and equities, issued in the current and three preceding months. In billions of dollars. (Source: *Federal Reserve Bulletin*)

V_{63} Volume of newly issued corporate securities, including bonds and equities, issued in the two preceding months. In billions of dollars. (Source: *Federal Reserve Bulletin*)

V_{64} Volume of newly issued corporate bonds, including public offerings and private placements, issued in the current and two preceding months. In billions of dollars. (Source: *Federal Reserve Bulletin*)

V_{65} Volume of newly issued corporate bonds, including public offerings and private placements, issued in the three preceding months. In billions of dollars. (Source: *Federal Reserve Bulletin*)

TABLE B_1. Spread Between Yield on Newly Issued Bankers Trust Company Grade 2 Public Utilities and Yield on Seasoned Moody Aa Public Utilities

	January	February	March	April	May	June	July	August	September	October	November	December
1952	.21	.27	.25	.15	.16	.19	.17	.19	.22	.18	.16	.13
1953	.12	.18	.20	.27	.33	.35	.27	.26	.28	.15	.10	.12
1954	.10	.02	.05	.06	.09	.04	.03	.07	.10	.05	.06	.08
1955	.12	.12	.16	.13	.17	.11	.17	.33	.11	.07	.11	.14
1956	.08	.07	.22	.30	.30	.21	.38	.65	.51	.47	.54	.51
1957	.64	.44	.51	.60	.80	1.02	.75	.66	.53	.60	.55	.38
1958	.02	.15	.41	.17	.28	.24	.24	.45	.51	.25	.25	.35
1959	.37	.21	.15	.27	.40	.29	.29	.35	.60	.42	.53	.58
1960	.23	.44	.31	.38	.39	.19	.15	.19	.23	.23	.37	.45
1961	.10	.04	.02	.28	.22	.30	.18	.18	−.02	−.14	.03	.08
1962	.03	−.04	−.10	−.14	−.17	−.10	−.07	−.06	−.16	−.11	−.10	−.12
1963	−.12	−.11	−.05	.03	.01	−.01	−02	−.02	.01	−.04	−.02	.04

TABLE B_{20}. Yield on Newly Issued Bankers Trust Company Grade 2 Public Utilities

	January	February	March	April	May	June	July	August	September	October	November	December
1951	2.75	2.81	2.96	3.16	3.21	3.45	3.35	3.12	3.10	3.21	3.27	3.28
1952	3.27	3.28	3.30	3.17	3.18	3.23	3.22	3.25	3.28	3.26	3.21	3.18
1953	3.23	3.36	3.42	3.62	3.83	3.92	3.68	3.64	3.70	3.42	3.30	3.33
1954	3.24	3.05	2.98	3.00	3.06	3.04	3.02	3.05	3.10	3.04	3.05	3.07
1955	3.13	3.18	3.25	3.21	3.28	3.23	3.30	3.50	3.32	3.25	3.28	3.37
1956	3.25	3.20	3.38	3.60	3.64	3.55	3.75	4.13	4.12	4.16	4.30	4.35
1957	4.51	4.25	4.31	4.40	4.65	4.96	4.85	4.91	4.84	4.92	4.85	4.43
1958	3.75	3.83	4.14	3.89	3.97	3.94	4.03	4.42	4.75	4.54	4.50	4.57
1959	4.64	4.52	4.45	4.67	4.96	4.96	4.93	4.95	5.32	5.22	5.21	5.28
1960	5.00	5.12	4.90	4.92	4.96	4.77	4.69	4.55	4.59	4.65	4.82	4.94
1961	4.58	4.44	4.36	4.65	4.63	4.75	4.71	4.75	4.57	4.42	4.57	4.64
1962	4.58	4.52	4.43	4.35	4.26	4.34	4.42	4.43	4.30	4.30	4.30	4.26
1963	4.25	4.25	4.29	4.38	4.37	4.35	4.37	4.38	4.42	4.39	4.42	4.50

TABLE C_{q20}. Yield on Newly Issued Cohan Aa Public Utilities, by Quarters

	First	Second	Third	Fourth		First	Second	Third	Fourth
1952	3.22	3.17	3.18	3.13	1957	4.37	4.58	4.79	4.72
1953	3.35	3.69	3.68	3.33	1958	3.96	3.87	4.18	4.47
1954	3.06	3.02	3.02	3.03	1959	4.49	4.85	4.86	5.15
1955	3.15	3.23	3.32	3.30	1960	4.90	4.85	4.60	4.80
1956	3.24	3.58	3.96	4.25					

TABLE H_1. Spread Between the Yield on Homer's Newly Issued Callable Aa Public Utilities and the Yield on Homer's Seasoned Callable Aa Public Utility Bonds With $2\frac{3}{4}$–$2\frac{7}{8}$ Per Cent Coupon

	January	February	March	April	May	June	July	August	September	October	November	December
1952	.14	.11	.08	.14	.08	.12	.13	.12	.14	.10	.08	.10
1953	.07	.06	.15	.17	.26	.26	.27	.25	.19	.22	.08	.08
1954	.13	.01	−.01	.03	.04	.09	.01	.03	.06	.06	.04	.06
1955	.04	.08	.08	.13	.10	.12	.06	.07	.17	.12	.08	.13
1956	.09	.08	.03	.23	.37	.28	.39	.47	.45	.37	.50	.47
1957	.62	.64	.53	.61	.57	.75	.73	.71	.49	.54	.76	.43
1958	.34	.15	.39	.34	.37	.29	.33	.43	.46	.40	.31	.46
1959	.42	.40	.20	.20	.13	.45	.37	.30	.41	.52	.56	.63
1960	.59	.32	.58	.44	.42	.38	.35	.39	.30	.40	.49	.63
1961	.29	.06	.20	.32	.42	.42	.43	.20	.26	.12	.15	.20
1962	.21	.13	.15	.09	.09	.06	.11	.10	.05	.11	.13	.15
1963	.13	.05	.13	.12	.14	.10	.07	.10	.10	.08	.10	.12
1964	.11	.09	.06	.09	.05	.07	.04	.04	.07	.07	.07	.09
1965	.06	.02	.09	.09	.08	.17	.13	.15	.18	.17	.11	.15
1966	.15	.21	.35	.14	.43	.62	.60	.57	.84	.54	.66	.85
1967	.62	.29	.61	.42	.67	.56						

TABLE H_2. Spread Between the Yield on New Callable Issues of Aa Public Utility Bonds, Homer Series, and the Yield on Seasoned Callable Aa Public Utility Bonds of Current Coupon

	January	February	March	April	May	June	July	August	September	October	November	December
1952	.14	.09	.08	.08	.02	.07	.09	.09	.09	.05	.06	.06
1953	.07	.08	.06	.10	.15	.18	.13	.10	.12	.05	.03	.06
1954	.05	−.06	−.06	−.02	−.02	.04	−.03	−.03	.03	.01	−.01	.01
1955	−.02	.05	.05	.09	.08	.10	.06	.06	.12	.09	.04	.11
1956	.06	.07	.02	.15	.21	.12	.15	.20	.17	.11	.20	.25
1957	.20	.17	.10	.14	.13	.19	.21	.30	.15	.08	.24	.05
1958	.11	.04	.11	.14	.11	.00	.10	.16	.28	.13	.12	.20
1959	.18	.17	.09	.07	.04	.25	.23	.13	.13	.21	.12	.13
1960	.22	.03	.15	.04	.01	.04	.07	.11	.03	.04	.11	.21
1961	−.01	−.05	.05	.11	.16	.12	.08	.00	.14	.06	.06	.13
1962	.14	.05	.10	.05	.04	.02	.08	.11	.05	.06	.02	.07
1963	.06	.03	.04	.03	.08	.07	.05	.04	.04	.05	.05	.06
1964	.04	.01	.04	.05	.03	.05	.00	−.01	.04	.03	.03	.05
1965	.02	−.01	.03	.03	.02	.07	.04	.05	.05	.07	.02	.04
1966	.05	.05										

TABLE H_{10}. Average Coupon Rate on Homer Newly Issued, Callable Aa Public Utilities [a]

	January	February	March	April	May	June	July	August	September	October	November	December
1952	$3\frac{3}{8}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$
1953	$3\frac{1}{4}$	$3\frac{3}{8}$	$3\frac{1}{2}$	$3\frac{5}{8}$	$3\frac{7}{8}$	$3\frac{7}{8}$	$3\frac{3}{4}$	$3\frac{3}{4}$	$3\frac{5}{8}$	$3\frac{5}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$
1954	$3\frac{3}{8}$	$3\frac{1}{8}$	3	3	$3\frac{1}{8}$	$3\frac{1}{4}$	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$
1955	$3\frac{1}{8}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{3}{8}$	$3\frac{1}{4}$	$3\frac{3}{8}$	$3\frac{1}{2}$	$3\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$
1956	$3\frac{3}{8}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{3}{4}$	$3\frac{5}{8}$	$3\frac{3}{4}$	4	$4\frac{1}{8}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$4\frac{3}{8}$
1957	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{5}{8}$	$4\frac{7}{8}$	5	$4\frac{7}{8}$	$4\frac{7}{8}$	5	$4\frac{1}{2}$
1958	$3\frac{7}{8}-4$	$3\frac{3}{4}$	$4\frac{1}{8}$	4	$3\frac{7}{8}$	4	4	$4\frac{3}{8}$	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{3}{8}$	$4\frac{5}{8}$
1959	$4\frac{5}{8}$	$4\frac{3}{4}$	$4\frac{3}{8}$	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{1}{8}$	5	5	5	$5\frac{1}{4}$	$5\frac{1}{4}$	$5\frac{1}{4}$
1960	$5\frac{1}{4}$	5	$5\frac{1}{8}$	$4\frac{7}{8}$	5	5	$4\frac{7}{8}$	$4\frac{5}{8}$	$4\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{3}{4}$	5
1961	$4\frac{5}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{5}{8}$	$4\frac{3}{4}$	$4\frac{3}{4}$	5	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{1}{2}-\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{5}{8}$
1962	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{1}{2}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{1}{2}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$
1963	$4\frac{3}{8}$	$4\frac{1}{4}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{1}{2}$	$4\frac{1}{2}$
1964	$4\frac{5}{8}$	$4\frac{1}{2}$	$4\frac{3}{8}$	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{5}{8}$
1965	$4\frac{5}{8}$	$4\frac{1}{2}$	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{5}{8}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{7}{8}$
1966	5	5										

[a] The difference between the average coupon rate on newly issued Homer Aa utilities and the $2\frac{3}{4}-\frac{7}{8}$ per cent coupon rate is derived by subtracting $2\frac{3}{4}$ per cent from the following coupon rates.

TABLE H_{20}. Yield on New Issues, Callable Aa Public Utility Bonds, Homer Series

	January	February	March	April	May	June	July	August	September	October	November	December
1951	2.80	2.80	2.90	3.05	3.10	3.20	3.35	3.20	3.01	3.14	3.23	3.30
1952	3.28	3.13	3.18	3.19	3.15	3.19	3.21	3.21	3.20	3.19	3.17	3.13
1953	3.19	3.26	3.40	3.45	3.75	3.78	3.73	3.60	3.65	3.50	3.22	3.30
1954	3.23	3.05	2.90	2.93	3.00	3.10	3.00	3.00	3.05	3.03	3.00	3.02
1955	3.00	3.14	3.20	3.20	3.20	3.25	3.20	3.25	3.40	3.30	3.22	3.32
1956	3.25	3.20	3.15	3.45	3.70	3.57	3.73	3.90	4.07	4.01	4.20	4.30
1957	4.50	4.40	4.22	4.29	4.35	4.62	4.85	5.00	4.81	4.78	4.97	4.47
1958	3.94	3.70	4.00	4.00	3.90	3.85	3.95	4.25	4.60	4.57	4.42	4.55
1959	4.60	4.65	4.37	4.47	4.59	5.05	4.95	4.85	5.00	5.25	5.15	5.15
1960	5.25	4.95	5.10	4.85	4.88	4.90	4.80	4.60	4.47	4.65	4.75	5.00
1961	4.60	4.32	4.32	4.52	4.75	4.75	4.85	4.65	4.75	4.55	4.52	4.60
1962	4.65	4.55	4.55	4.40	4.29	4.29	4.39	4.47	4.30	4.30	4.26	4.28
1963	4.28	4.19	4.27	4.27	4.39	4.35	4.32	4.35	4.35	4.38	4.40	4.43
1964	4.50	4.42	4.39	4.50	4.48	4.48	4.44	4.42	4.45	4.47	4.47	4.50
1965	4.45	4.39	4.47	4.48	4.48	4.59	4.56	4.60	4.67	4.70	4.66	4.80
1966	4.90	4.98	5.30	5.15	5.50	5.67	5.67	5.77	6.35	6.05	6.00	6.20
1967	5.85	5.20	5.70	5.55	5.80	5.95						

TABLE H_{21}. Yield on Seasoned Issues With $2\frac{3}{4}$–$2\frac{7}{8}$ Coupon, Callable Aa Public Utility Bonds, Homer Series

	January	February	March	April	May	June	July	August	September	October	November	December
1952	3.14	3.02	3.10	3.05	3.07	3.07	3.08	3.09	3.06	3.09	3.09	3.03
1953	3.12	3.20	3.25	3.28	3.49	3.52	3.46	3.35	3.46	3.28	3.14	3.22
1954	3.10	3.04	2.91	2.90	2.96	3.01	2.99	2.97	2.99	2.97	2.96	2.96
1955	2.96	3.06	3.12	3.07	3.10	3.13	3.14	3.18	3.23	3.18	3.14	3.19
1956	3.16	3.12	3.12	3.22	3.33	3.29	3.34	3.43	3.62	3.64	3.70	3.83
1957	3.88	3.76	3.69	3.68	3.78	3.87	4.12	4.29	4.32	4.24	4.21	4.04
1958	3.60	3.55	3.61	3.66	3.53	3.56	3.62	3.82	4.14	4.17	4.11	4.09
1959	4.18	4.25	4.17	4.27	4.46	4.60	4.58	4.55	4.59	4.73	4.59	4.52
1960	4.66	4.63	4.52	4.41	4.46	4.52	4.45	4.21	4.17	4.25	4.26	4.37
1961	4.31	4.26	4.12	4.20	4.33	4.33	4.42	4.45	4.49	4.43	4.37	4.40
1962	4.44	4.42	4.40	4.31	4.20	4.23	4.28	4.37	4.25	4.19	4.13	4.13
1963	4.15	4.14	4.14	4.15	4.25	4.25	4.25	4.25	4.25	4.30	4.30	4.31
1964	4.39	4.33	4.33	4.41	4.43	4.41	4.40	4.38	4.38	4.40	4.40	4.41
1965	4.39	4.37	4.38	4.39	4.40	4.42	4.43	4.45	4.49	4.53	4.55	4.65
1966	4.75	4.77	4.95	5.01	5.03	5.05	5.07	5.20	5.51	5.51	5.34	5.35
1967	5.23	4.91	5.09	5.07	5.13	5.39	5.66	5.68	5.75	5.75		

TABLE H_{22}. Yield on Seasoned Issues of Current Coupon, Callable Aa Public Utility Bonds, Homer Series

	January	February	March	April	May	June	July	August	September	October	November	December
1952	3.14	3.04	3.10	3.11	3.13	3.12	3.12	3.12	3.11	3.14	3.11	3.07
1953	3.12	3.18	3.34	3.35	3.60	3.60	3.60	3.50	3.53	3.45	3.19	3.24
1954	3.18	3.11	2.96	2.95	3.02	3.06	3.03	3.03	3.02	3.02	3.01	3.01
1955	3.02	3.09	3.15	3.11	3.12	3.15	3.14	3.19	3.28	3.21	3.18	3.21
1956	3.19	3.13	3.13	3.30	3.49	3.45	3.58	3.70	3.90	3.90	4.00	4.05
1957	4.30	4.23	4.12	4.15	4.22	4.43	4.64	4.70	4.66	4.70	4.73	4.42
1958	3.83	3.66	3.89	3.86	3.79	3.85	3.85	4.09	4.32	4.44	4.30	4.35
1959	4.42	4.48	4.28	4.40	4.55	4.80	4.72	4.72	4.87	5.04	5.03	5.02
1960	5.03	4.92	4.95	4.81	4.87	4.86	4.73	4.49	4.44	4.61	4.64	4.79
1961	4.61	4.37	4.27	4.41	4.59	4.63	4.77	4.65	4.61	4.49	4.46	4.47
1962	4.51	4.50	4.45	4.35	4.25	4.27	4.31	4.36	4.25	4.24	4.24	4.21
1963	4.22	4.16	4.23	4.24	4.31	4.28	4.27	4.31	4.31	4.33	4.35	4.37
1964	4.46	4.41	4.35	4.45	4.45	4.43	4.44	4.43	4.41	4.44	4.44	4.45
1965	4.43	4.40	4.44	4.45	4.46	4.52	4.52	4.55	4.62	4.63	4.64	4.76
1966	4.85	4.93										

TABLE K_1. Spread Between Yield on Kaplan Recently Issued Aa Corporate Bonds and Yield on Moody Seasoned Aa Corporate Bonds

	January	February	March	April	May	June	July	August	September	October	November	December
1952	.13	.10	.13	.16	.17	.15	.16	.14	.11	.10	.06	.07
1953	.18	.18	.16	.16	.26	.34	.29	.27	.26	.15	.11	.02
1954	−.02	.01	−.04	.01	−.03	−.03	−.03	−.03	−.01	−.03	−.04	−.04
1955	−.01	.03	.03	.02	.03	.06	.07	.06	.07	.07	.02	.02
1956	.02	−.01	.04	.15	.16	.19	.22	.31	.25	.19	.15	.21
1957	.30	.45	.51	.52	.51	.66	.65	.54	.48	.51	.47	.32
1958	.47	.07	.23	.14	.10	.07	.11	.17	.22	.18	.10	.22
1959	.26	.24	.18	.16	.18	.21	.15	.18	.35	.31	.38	.42
1960	.32	.25	.31	.27	.29	.25	.17	.16	.20	.20	.20	.28
1961	.21	.10	.04	.13	.14	.22	.15	.10	.03	−.01	−.03	−.02
1962	−.06	−.08	−.10	−.15	−.16	−.18	−.15	−.16	−.15	−.14	−.13	−.11
1963	−.13	−.11	−.09	−.03	−.02	−.04	−.07	−.09	−.05	−.07	−.06	−.04

TABLE K_{10}. Average Coupon Rate on Kaplan Recently Issued Aa Corporates [a]

	January	February	March	April	May	June	July	August	September	October	November	December
1952	3.38	3.33	3.33	3.32	3.30	3.27	3.30	3.31	3.30	3.25	3.25	3.25
1953	3.25	3.31	3.40	3.41	3.64	3.86	3.89	3.88	3.82	3.71	3.63	3.43
1954	3.41	3.33	3.16	3.09	2.99	3.05	3.07	3.11	3.10	3.12	3.10	3.12
1955	3.13	3.13	3.17	3.18	3.20	3.27	3.30	3.31	3.38	3.38	3.29	3.31
1956	3.33	3.30	3.29	3.39	3.55	3.62	3.65	3.75	3.89	3.98	3.86	4.08
1957	4.33	4.52	4.44	4.36	4.40	4.69	4.86	4.87	4.92	4.97	4.93	4.82
1958	4.67	3.88	4.09	4.09	4.04	3.94	3.94	3.99	4.22	4.47	4.48	4.55
1959	4.59	4.68	4.56	4.52	4.58	4.82	4.89	4.88	5.01	5.22	5.34	5.33
1960	5.28	5.21	5.10	4.93	4.93	4.99	4.90	4.88	4.73	4.60	4.66	4.88
1961	4.94	4.76	4.58	4.50	4.62	4.65	4.74	4.78	4.80	4.75	4.68	4.58
1962	4.58	4.57	4.57	4.48	4.33	4.28	4.28	4.40	4.45	4.39	4.38	4.36
1963	4.36	4.33	4.29	4.31	4.41	4.43	4.38	4.34	4.34	4.36	4.37	4.43

[a] The difference between the average coupon rate on Kaplan recent issues and the average coupon rate on Moody seasoned Aa corporates, is derived by subtracting the average coupon rate on seasoned Moody Aa corporates from the following coupon rates.

TABLE K_{20}. Yield on Recently Issued Aa Corporates, Kaplan Series

	January	February	March	April	May	June	July	August	September	October	November	December
1951	2.70	2.73	2.91	3.01	2.99	3.07	3.09	3.01	2.99	2.97	3.19	3.23
1952	3.18	3.11	3.16	3.17	3.17	3.18	3.20	3.20	3.18	3.18	3.12	3.12
1953	3.27	3.32	3.34	3.45	3.67	3.84	3.71	3.66	3.69	3.48	3.38	3.30
1954	3.20	3.13	2.99	3.01	3.00	3.03	3.01	3.00	3.03	3.01	3.00	3.00
1955	3.05	3.13	3.16	3.15	3.18	3.20	3.21	3.26	3.29	3.26	3.20	3.24
1956	3.21	3.15	3.22	3.45	3.50	3.54	3.61	3.81	3.88	3.88	3.91	4.06
1957	4.19	4.28	4.31	4.31	4.34	4.64	4.75	4.75	4.74	4.79	4.76	4.40
1958	4.28	3.84	4.01	3.92	3.88	3.85	3.94	4.15	4.42	4.39	4.31	4.40
1959	4.48	4.48	4.41	4.48	4.64	4.77	4.73	4.76	5.04	5.07	5.08	5.16
1960	5.09	4.96	4.93	4.85	4.90	4.85	4.73	4.60	4.61	4.64	4.67	4.78
1961	4.69	4.50	4.38	4.50	4.55	4.67	4.68	4.67	4.62	4.55	4.51	4.54
1962	4.49	4.48	4.43	4.34	4.27	4.26	4.34	4.33	4.31	4.27	4.27	4.27
1963	4.24	4.25	4.25	4.32	4.34	4.32	4.32	4.31	4.36	4.36	4.38	4.42

TABLE M_1. Spread Between Yield on Newly Issued Moody Aa Corporates and Yield on Seasoned Moody Aa Corporates

	January	February	March	April	May	June	July	August	September	October	November	December
1952	.09	.04	.23	.13	.14	.19	.15	—	—	.09	.03	.09
1953	.15	.25	.22	.30	.47	—	.26	.23	.42	−.13	.01	.02
1954	−.03	−.09	−.12	−.01	.03	−.06	—	−.06	.07	−.06	.06	−.02
1955	.08	.04	.15	—	.09	.06	—	.30	.10	.06	.05	.10
1956	—	−.01	.09	.42	.28	.20	.29	.62	.35	.35	.54	.45
1957	.47	.43	.50	.50	.59	.90	.59	.68	.53	.63	.40	.35
1958	−.09	.15	.31	.07	.10	.03	.15	.54	.48	.31	.26	.32
1959	.37	.11	.17	.27	.42	.42	.35	.35	.79	.36	.51	.42
1960	.15	.33	.12	.36	.27	.16	.09	−.02	.21	.18	.27	.47
1961	.04	—	.03	.19	.15	.27	.12	.15	−.09	−.11	−.06	.00
1962	.00	−.05	−.13	−.14	−.15	−.18	−.07	−.10	−.19	−.15	−.16	−.06
1963	−.17	−.09	−.08	.02	−.02	−.05	−.04	−.07	−.06	−.04	−.03	.03
1964	−.04	−.08	.03	—	−.04	−.03	−.08	−.07	.02	—	—	.00
1965	—	−.03	.03	−.01	.02	.07	.03	.11	.08	−.01	.04	.12
1966	.07	.22	.30	.10	.15	.49	.52	.50	.32	.29	.32	.45
1967	.09	.08	.22	.17	.30	.26	.24	.42	.22	.39		

TABLE M_2. Spread Between the Yield on Newly Issued Aa Corporates, Moody Series, and the Estimated Yield on Seasoned Aa Corporates, Coupon Rate Equal to That on New Issues

	January	February	March	April	May	June	July	August	September	October	November	December
1952	.05	.00	.14	.11	.10	.12	.13	—	—	.03	−.03	.10
1953	.08	.20	.12	.18	.20	—	.06	.13	.09	−.16	.03	.05
1954	−.02	−.09	−.08	−.01	.01	−.02	—	−.06	.06	−.06	.05	−.02
1955	.06	.03	.15	—	.09	.06	—	.22	.06	.04	.05	.08
1956	—	.00	.06	.40	.19	.12	.21	.46	.12	.04	.38	.27
1957	.29	.28	.32	.29	.20	.58	.34	.35	.17	.44	.19	.15
1958	−.05	.10	.16	−.02	.00	.01	.05	.26	.30	.12	.10	.12
1959	.19	.03	.07	.15	.26	.30	.25	.25	.72	.22	.35	.28
1960	.06	.24	−.08	.12	.08	−.04	−.11	.00	−.01	−.18	−.08	.18
1961	−.175	—	−.07	.06	.06	.20	.02	.12	−.145	−.16	−.11	−.02
1962	.02	−.03	−.105	−.06	−.10	−.03	.025	.02	.00	−.02	−.03	.07
1963	−.09	.04	.01	.09	.05	.03	.05	.01	.015	.03	.035	.08

TABLE M_4. Moody New-Seasoned Yield Spread as Described Under M_1 Plus Underwriter Spread [a]

	January	February	March	April	May	June	July	August	September	October	November	December
1952	.080	.020	.040	.049	.043	.032	.070	—	—	.030	.037	.043
1953	.030	.048	.032	.059	.046	—	.040	.040	.009	.030	.030	.030
1954	.030	.029	.119	.015	.025	.052	.070	.030	.029	.034	.035	.020
1955	.032	.030	.030	—	.033	.026	—	.030	.030	.030	.024	.039
1956	—	.030	.027	.050	.045	.040	.033	.060	.053	.050	.042	.040
1957	.057	.048	.040	.050	.050	.073	.059	.050	.051	.040	.057	.057
1958	.050	.040	.047	.050	.050	.042	.050	.055	.058	.053	.050	.042
1959	.047	.040	.047	.063	.055	.042	.040	.044	.074	.070	.009	.051
1960	.050	.046	.042	.059	.050	.045	.050	.057	.052	.055	.051	.045
1961	.040	.050	.050	.059	.053	.053	.040	.050	.040	.040	.045	.056
1962	.040	.050	.048	.040	.050	.048	.045	.043	.040	.040	.040	.040
1963	.030	.040	.036	.038	.036	.046	.040	.046	.057	.040	.050	.033

[a] Underwriter spread is the difference between the yield to maturity calculated from the offering price and the yield to maturity calculated from the price at which the issue was sold to the underwriter.

TABLE M_{10}. Difference Between Average Coupon on Newly Issued Moody Aa Corporates and Average Coupon on Seasoned Moody Aa Corporates

	January	February	March	April	May	June	July	August	September	October	November	December
1952	.33	.25	.42	.31	.33	.26	.17	—	—	.35	.31	.24
1953	.43	.47	.46	.66	.92	—	.69	.52	.70	.14	.27	.27
1954	.22	−.05	−.14	−.04	.03	−.11	—	.02	.02	−.01	.08	.03
1955	.10	.14	.20	—	.20	.14	—	.50	.25	.23	.10	.29
1956	—	.10	.19	.60	.54	.48	.57	.92	.96	.96	1.21	1.21
1957	1.245	1.12	1.18	1.18	1.31	1.71	1.54	1.78	1.57	1.59	1.46	1.11
1958	.45	.67	.85	.57	.59	.57	.85	1.29	1.09	.995	1.045	.96
1959	1.14	.795	.89	.94	1.33	1.37	1.29	1.25	1.855	1.54	1.58	1.58
1960	1.265	1.30	1.09	1.255	1.255	1.13	.86	.61	.92	.84	.98	1.19
1961	.815	—	.69	.94	.865	1.065	.94	.975	.60	.64	.64	.85
1962	.725	.66	.56	.475	.40	.305	.475	.44	.35	.285	.285	.305
1963	.12	.305	.24	.35	.35	.28	.26	.215	.245	.325	.345	.455

TABLE M_{10a}. Average Coupon Rate on Newly Issued Moody Aa Corporates

	January	February	March	April	May	June	July	August	September	October	November	December
1952	3.2083	3.125	3.300	3.189	3.214	3.281	3.1875	–	–	3.250	3.208	3.1875
1953	3.375	3.416	3.458	3.656	3.916	–	3.750	3.625	3.8125	3.250	3.375	3.375
1954	3.333	3.062	2.968	3.083	3.145	3.000	–	3.125	3.125	3.100	3.1875	3.125
1955	3.2083	3.250	3.3125	–	3.312	3.250	–	3.625	3.375	3.375	3.250	3.4375
1956	–	3.250	3.343	3.750	3.687	3.625	3.718	4.083	4.125	4.125	4.375	4.375
1957	4.4375	4.312	4.375	4.375	4.500	4.906	4.729	4.968	4.900	4.916	4.791	4.437
1958	3.775	4.000	4.187	3.900	3.925	3.906	4.187	4.625	4.625	4.575	4.625	4.541
1959	4.718	4.375	4.531	4.587	5.000	5.041	5.000	4.958	5.562	5.250	5.291	5.3125
1960	5.000	5.041	4.833	5.000	5.000	4.875	4.625	4.375	4.687	4.6875	4.825	5.000
1961	4.625	–	4.500	4.750	4.675	4.875	4.750	4.875	4.500	4.5416	4.5416	4.750
1962	4.625	4.5625	4.4583	4.375	4.300	4.333	4.500	4.470	4.375	4.3125	4.3125	4.375
1963	4.1875	4.375	4.3125	4.4166	4.4166	4.350	4.375	4.333	4.3625	4.4375	4.4583	4.5833

TABLE M_{10b}. Average Coupon on Seasoned Moody Aa Corporates

	January	February	March	April	May	June	July	August	September	October	November	December
1952	2.88	2.88	2.88	2.88	2.88	3.02	3.02	3.02	3.02	2.90	2.90	2.95
1953	2.95	2.95	3.00	3.00	3.00	3.06	3.06	3.11	3.11	3.11	3.11	3.11
1954	3.11	3.11	3.11	3.12	3.12	3.11	3.11	3.11	3.11	3.11	3.11	3.10
1955	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.13	3.13	3.15	3.15	3.15
1956	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.16	3.16	3.16	3.16	3.16
1957	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.33	3.33	3.33	3.33
1958	3.34	3.34	3.33	3.33	3.33	3.33	3.33	3.33	3.53	3.58	3.58	3.58
1959	3.58	3.58	3.64	3.64	3.67	3.67	3.71	3.71	3.71	3.71	3.71	3.735
1960	3.735	3.745	3.745	3.745	3.745	3.745	3.77	3.77	3.77	3.84	3.84	3.81
1961	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.90	3.90	3.90	3.90	3.90
1962	3.90	3.90	3.90	3.90	3.90	4.025	4.025	4.025	4.025	4.025	4.025	4.07
1963	4.07	4.07	4.07	4.07	4.07	4.07	4.12	4.12	4.12	4.12	4.12	4.13

TABLE M_{20}. Yield on Newly Issued Aa Corporates, Moody Series

	January	February	March	April	May	June	July	August	September	October	November	December
1951	2.82	2.85	2.95	3.16	3.10	3.46	–	3.01	–	3.16	3.29	3.25
1952	3.14	3.05	3.26	3.14	3.14	3.22	3.19	–	–	3.17	3.09	3.14
1953	3.24	3.39	3.40	3.59	3.88	–	3.68	3.625	3.85	3.20	3.28	3.30
1954	3.19	3.03	2.91	2.99	3.06	3.00	–	2.97	3.11	2.98	3.10	3.02
1955	3.14	3.14	3.28	–	3.24	3.20	–	3.50	3.32	3.25	3.23	3.32
1956	–	3.15	3.27	3.72	3.62	3.55	3.68	4.12	3.98	4.04	4.30	4.30
1957	4.36	4.26	4.30	4.29	4.42	4.88	4.69	4.89	4.79	4.91	4.69	4.43
1958	3.72	3.92	4.09	3.85	3.88	3.81	3.98	4.52	4.68	4.52	4.47	4.50
1959	4.59	4.35	4.40	4.59	4.88	4.98	4.93	4.93	5.48	5.12	5.21	5.16
1960	4.92	5.04	4.74	4.94	4.88	4.76	4.65	4.42	4.62	4.62	4.74	4.97
1961	4.52	–	4.37	4.56	4.56	4.72	4.65	4.72	4.50	4.45	4.48	4.56
1962	4.55	4.51	4.40	4.35	4.28	4.26	4.42	4.39	4.27	4.26	4.24	4.32
1963	4.20	4.27	4.26	4.37	4.34	4.31	4.35	4.33	4.35	4.39	4.41	4.49
1964	4.45	4.38	4.50	–	4.46	4.48	4.42	4.42	4.50	–	–	4.50
1965	–	4.43	4.51	4.47	4.51	4.59	4.59	4.70	4.71	4.65	4.73	4.92
1966	4.90	5.12	5.35	5.20	5.25	5.65	5.77	5.88	5.90	5.84	5.78	5.93
1967	5.39	5.26	5.45	5.43	5.72	5.89	5.96	6.18	6.09	6.40		

TABLE M_{21}. Yield on Seasoned Aa Corporates, Moody Series

	January	February	March	April	May	June	July	August	September	October	November	December
1952	3.05	3.01	3.03	3.01	3.00	3.03	3.04	3.06	3.07	3.08	3.06	3.05
1953	3.09	3.14	3.18	3.29	3.41	3.50	3.42	3.39	3.43	3.33	3.27	3.28
1954	3.22	3.12	3.03	3.00	3.03	3.06	3.04	3.03	3.04	3.04	3.04	3.04
1955	3.06	3.10	3.13	3.13	3.15	3.14	3.14	3.20	3.22	3.19	3.18	3.22
1956	3.19	3.16	3.18	3.30	3.34	3.35	3.39	3.50	3.63	3.69	3.76	3.85
1957	3.89	3.83	3.80	3.79	3.83	3.98	4.10	4.21	4.26	4.28	4.29	4.08
1958	3.81	3.77	3.78	3.78	3.78	3.78	3.83	3.98	4.20	4.21	4.21	4.18
1959	4.22	4.24	4.23	4.32	4.46	4.56	4.58	4.58	4.69	4.76	4.70	4.74
1960	4.77	4.71	4.62	4.58	4.61	4.60	4.56	4.44	4.41	4.44	4.47	4.50
1961	4.48	4.40	4.34	4.37	4.41	4.45	4.53	4.57	4.59	4.56	4.54	4.56
1962	4.55	4.56	4.53	4.49	4.43	4.44	4.49	4.49	4.46	4.41	4.40	4.38
1963	4.37	4.36	4.34	4.35	4.36	4.36	4.39	4.40	4.41	4.43	4.44	4.46
1964	4.49	4.46	4.47	4.49	4.50	4.51	4.50	4.49	4.48	4.50	4.49	4.50
1965	4.48	4.46	4.48	4.48	4.49	4.52	4.56	4.59	4.63	4.66	4.69	4.80
1966	4.83	4.90	5.05	5.10	5.10	5.16	5.25	5.38	5.58	5.55	5.46	5.48
1967	5.30	5.18	5.23	5.26	5.42	5.63	5.72	5.76	5.87	6.01		

TABLE M_{22}. Yield on Seasoned Aa Corporates of Current Coupon, Coupon Rate Equal to That on New Issues, Moody Series

	January	February	March	April	May	June	July	August	September	October	November	December
1952	3.09	3.05	3.12	3.03	3.04	3.10	3.06	–	–	3.14	3.12	3.04
1953	3.16	3.19	3.28	3.41	3.68	–	3.62	3.49	3.76	3.36	3.25	3.25
1954	3.21	3.12	2.99	3.00	3.05	3.02	–	3.03	3.05	3.04	3.05	3.04
1955	3.08	3.11	3.13	–	3.15	3.14	–	3.28	3.26	3.21	3.18	3.24
1956	–	3.15	3.21	3.32	3.43	3.43	3.47	3.66	3.86	4.00	3.92	4.03
1957	4.07	3.98	3.98	4.00	4.22	4.30	4.35	4.54	4.62	4.47	4.50	4.28
1958	3.77	3.82	3.93	3.87	3.88	3.80	3.93	4.26	4.38	4.40	4.37	4.38
1959	4.40	4.32	4.33	4.44	4.62	4.68	4.68	4.68	4.76	4.90	4.86	4.88
1960	4.86	4.80	4.82	4.82	4.80	4.80	4.76	4.42	4.63	4.80	4.82	4.79
1961	4.70	–	4.44	4.50	4.50	4.52	4.63	4.60	4.65	4.61	4.59	4.58
1962	4.53	4.54	4.51	4.41	4.38	4.29	4.40	4.37	4.27	4.28	4.27	4.25
1963	4.29	4.23	4.25	4.28	4.29	4.28	4.30	4.32	4.34	4.36	4.38	4.41

TABLE S_{60}. Ratio of Volume of Slow-Selling to Total New Aaa, Aa and A Public Utility Issues [a]

	January	February	March	April	May	June	July	August	September	October	November	December
1952	1.000	.000	1.000	.757	.809	.481	.524	1.000	1.000	.629	.298	1.000
1953	.429	.647	.519	.743	.772	.515	.482	.615	.717	.739	.909	.846
1954	.588	.395	.868	.868	.591	.859	.917	.954	.949	.169	1.000	.194
1955	.969	.828	.862	1.000	.933	1.000	.766	1.000	.082	1.000	.372	1.000
1956	.560	.000	.787	.793	.709	.931	.901	.275	.078	.571	.671	.833
1957	.467	.216	.764	.102	.737	.601	.279	.440	.288	.848	.962	.113
1958	.000	.772	.802	.794	.958	1.000	.941	.292	.677	.000	.685	.636
1959	1.000	.547	1.000	1.000	1.000	.386	.190	1.000	1.000	.000	.483	.110
1960	.746	.500	1.000	.791	.812	1.000	.813	1.000	1.000	.947	.950	.684
1961	.595	.655	.830	.769	.818	.598	.828	.411	1.000	.000	.799	.772
1962	.000	.778	.951	.731	1.000	.776	.758	.476	.586	1.000	.295	1.000
1963	.568	1.000	.477	.747	.781	.985	1.000	1.000	1.000	1.000	1.000	.636

[a] Ratio applies to month preceding the observation of yield spread being explained.