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QUALITY AS INDICATED BY MARKET YIELD RELATIONSHIPS

The money and capital markets' evaluation of instrument and borrower characteristics and of the external environment is another method that can be used to measure the quality of state and local debt. Relationships between market yields on various debt instruments are used to assess the money and capital markets' evaluation. This method of measuring the quality of state and local debt is very difficult to interpret because of the large number of factors, in addition to credit quality, that affect market yield relationships.

In this chapter, the use of market yield relationships as a measure of credit quality is briefly examined. Two categories of yield relationships are analyzed: (1) the relationships between yield indexes of federal government debt and state and local debt and (2) the relationships among the yields on different rating classes and different other classifications of state and local debt.

The Use of Market Yield Relationships as a Measure of Credit Quality

There are numerous explanations of the determinants of relative prices and, therefore, relative market yields among debt instruments.[1] In order to avoid a lengthy discussion of these explanations, which seems inappropriate for this paper, the author has divided what he believes are the primary determinants of market yield relationships among debt instruments into three broad groupings: supply factors, institutional factors and factors affecting the preferences of investors and potential investors among debt instruments. Factors affecting

[1]Several National Bureau publications (such as *The Cyclical Behavior of the Term Structure of Interest Rates* by Reuben A. Kessel and *The Behavior of Interest Rates* by Joseph W. Conard) as well as numerous other books and journal articles are devoted to various explanations of the determinants of market yield relationships.

propensities to save and consume and the choice between debt and equity type instruments are not treated as direct determinants of market yield relationships among debt instruments in this study.

The supply factors include the supply outstanding, the supply recently issued and the expected future supply among various types of debt instruments. In the author's opinion, these supply factors, tend to affect market yields because the various types of debt instruments compete as imperfect substitutes for investible funds at any point of time.[2] Figures on the amounts of various debt instruments outstanding and newly issued and short period predictions for coming debt issues are generally available.

Institutional factors often limit the investors' choice among debt instruments. Institutional practices and regulatory constraints tend to influence particular markets and limit arbitrage among markets, therefore, the market for debt instruments has a degree of segmentation rather than perfect homogeneity. Particular attention should be paid to changes in institutional practices and regulatory constraints since they may have an appreciable effect on market yields.

The debt investment preferences of owners of investible dollars also affect the market yields of debt instruments. The principal factors that seem to affect the preferences of investors and potential investors among debt instruments (i.e., the price they are willing to pay) are: (1) special terms in the debt contract, such as callability or convertibility; (2) the taxability of the return of the debt instrument; (3) the time of repayment; (4) the marketability of the debt instrument; and (5) the quality of the debt instrument.

Most of the effects of special terms and taxability can be removed as factors affecting the market yield by observing groups of debt instruments that are fairly homogenous in those areas. Where comparisons are made between the market yields on federal government securities (whose interest is now fully subject to income taxes) and the market yields on state and local indebtedness (whose interest is exempt from both personal and corporate income taxes at the present time), the observations are generally for short periods of time and major changes in both the personal and corporate income tax rate structures are separately taken into account.

The third factor affecting investment preferences, the time of repayment, can be caused by differences in maturity dates or in the way repayment is distributed over time. Two market characteristics, the increased doubt about the quality of an issue as the maturity lengthens and the lower interest rate risk as the maturity becomes shorter, explain much of the disparity between market yields due to this factor. For short-term issues with quality character-

[2]Some economists reject the notion that relative supplies of debt instruments materially affect their prices. In previous work the author has found high simple correlation coefficients between the relative supplies of state and local debt and federal government debt and the market yield differentials between these two types of debt instruments.

istics similar to those on long-term contracts, the lender generally feels more assured about the repayment of his debt instrument and believes its price will be more stable. Lenders with liquidity requirements are willing to pay a premium for these advantages unless there are unusual interest rate expectations or an unusual supply-demand situation for liquidity. In this study, most of the variations among market yields due to maturity or repayment differences are removed by considering only securities within given maturity and repayment groupings.[3]

Differences in the degree of marketability also affect the yield differential between debt instruments. Marketability is defined as the ability to sell a debt instrument within a very short time without obliging either the seller or buyer to make an appreciable concession from the price at which the debt instrument was last sold. Some investors, realizing that they may want or may be forced to buy or sell their debt instruments quickly, prefer a highly marketable issue and are willing to pay more, i.e., accept a lower yield, for this characteristic. Because of this added demand, market yields on debt instruments tend to be lower with increasing degrees of marketability.

Accurate information on measures that might indicate marketability, as the number of issues traded in a given time period or the spread between bid and asked prices, is generally not available at the present time. The size of the issue may be another indicator of the marketability of state and local debt. However, two studies by the Investment Bankers Association indicated that within homogenous rating groups there was no tendency for larger municipal issues to have a net interest cost advantage over smaller municipal issues. These studies suggest that, where the quality of the state and local issue is similar, small units do not suffer any significant disadvantage by selling their bonds in competition with large units.[4] Therefore, while the effects of marketability have not been removed, these effects seem relatively minor with the possible exception of some very small issues.

Differences in the quality of debt instruments are reflected in the market yields of debt instruments because lenders are willing to pay a higher price for a debt contract of a high quality borrower than for a similar contract of a lower quality borrower. Two interrelated reasons explain this preference. First, a more trustworthy borrower gives more complete assurance that the promised principal and interest will be paid. As the credit trustworthiness of the borrower declines, the lender becomes less certain the promised sums will be paid. Second, the maximum amount all borrowers, regardless of credit

[3]There are several other theories explaining the term structure of interest rates. The important point is that, no matter which theory is correct, the effects of the time of repayment are removed by comparing securities within given maturity and repayment groupings.

[4]*I.B.A. Statistical Bulletins* Nos. 3 and 5, Investment Bankers Association, Washington, D. C.

rating, will pay is the promised principal and interest. Thus, the promised sums are the most the lender can expect; all the possible variations from the promised sums are negative ones. The second reason clearly indicates that the mean values of the probable outcomes for the borrower with weaker credit are less than those for the sound borrower. Combined, these two reasons may be expected to induce the lender to lend to the less sound borrower only if he is offered better terms. The premium the lender demands from the weaker borrower should be determined by the prospective risk of default so that the amounts finally realized from large groups of debt instruments at several levels of quality should be approximately the same.

After adjusting for the effects of the discussed factors other than quality, market yield relationships have still been an imprecise measure of quality. For example, Hickman's study on the quality of corporate bonds from 1900 to 1943 pointed out that, after all defaults and redemptions were considered, the group of bonds with the lowest promised yield to maturity had a realized yield of 5.1 per cent and the group of bonds with the highest promised yield to maturity had a realized yield of 8.6 per cent.[5] Assuming similar terms, and assuming that the maturity dates and repayment schedules are comparable, the results following the earlier explanation should have been similar realized yields, i.e., the different promised yields should have been about equalized by the incidence of defaults.

Such differences in the results probably are primarily caused by the effects of market imperfections and uncertainty on market yield relationships. The competition among investors for debt instruments is far from perfect. For example, investors are often limited by regulations and a lack of knowledge or resources. Such limitations may distort the demand for some types of quality levels of debt instruments. Furthermore, while uncertainty, which takes the character of subjective probability distributions, exists in all debt instruments having any degree of credit risk, such uncertainty is usually highest for bonds with the highest promised yields. This uncertainty is indicated by the greater dispersion of the probable outcomes for borrowers with weaker credit. The premium for accepting such uncertainty may well account for a substantial part of the differences between realized yields.

Despite market imperfections and uncertainty, market yield relationships on state and local debt still appear to be a measure of credit quality that should be examined. Market yield relationships have been useful indicators of the credit ranking of many debt instruments despite their admitted weaknesses in quantifying the exact credit differences. For example, in the Hickman study the default rate was 5.9 per cent for corporate bonds with the lowest promised yield and continued, in sequential order, up to a default rate

[5]W. Braddock Hickman, *Corporate Bonds: Quality and Investment Performance*, Occasional Paper 59, New York, NBER, 1957. Hickman's study is the only available study of the long-run realized yield in any sector of the capital market.

of 42.4 per cent for corporate bonds with the highest promised yield.[6] Market yield relationships have been more effective as a measure of credit quality within one type or sector of debt instruments than among types or sectors.

Yield differentials are used in this study as an estimate of the money and capital markets' evaluation of the quality of state and local debt. Changes in yield differentials are traced to quality changes only after the potential effects of other explanatory factors are examined. It should be noted that quality may play a role even when other factors dominate. Two categories of yield differentials are examined. First, the relationships between the yields on state and local debt and federal government debt with similar maturities are used to indicate the absolute quality of state and local debt. Changes in the differential between these yields should represent meaningful changes in the yields on state and local debt, rather than changes in the level of all market yields. The yields on federal securities are used as the market yardstick since they are as free from credit risk as possible. An appreciable change in the differential between the yields on state and local debt and the yields on federal government debt should, *ceteris paribus*, indicate a change in the quality of state and local debt.

The relationships among the yields on state and local debt both in different rating classes and in different classifications are also studied. The yield differentials should indicate the money and capital markets' evaluation of quality and changes in quality among the various rating categories and classifications of state and local debt. They should also help indicate sectors of classifications where quality is or may become a problem.

Quality as Measured by Yield Relationships with Federal Government Bonds

The comparison of the long-term yields on state and local issues and federal government bonds should, *ceteris paribus*, indicate the money and capital markets' evaluation of the quality of state and local debt.[7] Since other things are seldom equal, the effects of major exogenous factors must be included in the analysis. For example, pronounced shifts in the annual rate of change of marketable federal debt outstanding, or in the annual rate of change of marketable state and local debt outstanding, may cause deviations from the usual relationship between yields on the two types of bonds. Changes in tax rates and the level of taxable income may also distort direct comparisons between the yield differential at various points of time.

[6] *Ibid.*

[7] Long-term yield index relationships should be the most meaningful measure of yield in state and local debt because most state and local debt outstanding is long-term and because the relative term structure of state and local debt has remained fairly constant.

The average quarterly yields on Moody's index of long-term, partially taxable federal bonds[8] and on the *Bond Buyer's* index of twenty tax exempt long-term general obligation bonds from 1921 through 1943 are presented in Chart 21. The *Bond Buyer's* index is the only current yield index that was available in the 1920's and early 1930's. The yield differential is found by subtracting the yield on state and local bonds from that on federal bonds at the same point of time. This yield differential appears in the lower section of Chart 21. When the effects of factors affecting market yields other than quality are removed or isolated, movement toward a larger negative yield differential should indicate the money and capital markets believed the quality of state and local debt deteriorated, while movement toward a positive yield differential should indicate the money and capital markets believed the quality of state and local debt improved. To obtain a more meaningful analysis, the lengthy period covered in Chart 21 is broken into four subperiods of shorter duration.

The movement toward a larger negative yield differential between partially taxable federal bonds and tax exempt state and local bonds in the subperiod from 1921 through 1925 indicates that the money and capital markets would not pay as much, i.e., demanded a higher yield premium, for state and local bonds relative to federal bonds. The primary factor leading to this movement was probably the pronounced decline in personal income taxes – the maximum tax rate fell from 58 to 25 per cent in this subperiod. Supply factors, such as the decline in the amount of marketable federal debt outstanding, also probably contributed to the widening of the negative yield differential during this period. Changes in the money and capital markets' evaluation of the quality of state and local indebtedness seem difficult to meaningfully isolate because of these other factors which also lead to an increase in the negative yield differential.

The negative yield differential between state and local bonds and partially taxable federal bonds became slightly wider during most of the second subperiod, 1926-31. During these years, the supply of marketable federal debt decreased at approximately a 5 per cent compounded rate, while the supply of state and local debt increased at approximately a 6 per cent compounded rate. These changes tend to have a widening influence on the negative yield differential. Personal and corporate income tax rates were constant during most of this subperiod; however, the short-term narrowing in the negative yield differential in late 1931 appears to be due to a large increase in personal income tax rates at that time. The maximum personal income tax rate went from 25 per cent in 1931 to 63 per cent in 1932. Once again the market yields were not sufficiently free of the affects of other factors to isolate the

[8]All of the interest on these bonds was exempt from the normal income tax, but only the interest on the first $5,000 of principal was exempt from the surtax. Most of the federal government bonds issued prior to March 1, 1941, were taxed in this manner.

CHART 21

Yield Relationship between U.S. Government Bonds and State and Local Bonds, Quarterly Yields, 1921-43

Sources: *Moody's Municipal and Government Manual* and *The Weekly Bond Buyer.*

money and capital markets' evaluation of changes in the quality of state and local debt.

In the third subperiod, 1932-34, the negative yield differential between federal bonds and state and local bonds widened substantially. The primary cause for this increase in the differential was clearly that the money and capital markets believed the quality of state and local debt had deteriorated. This deterioration is substantiated by the very large relative increase in the negative yield differential, in spite of other factors such as higher personal income tax rates and an increase in the amount of marketable federal debt outstanding while state and local debt outstanding remained fairly constant, which should have had a narrowing influence. By early 1935 the yield differential had returned to the 1931 level.

From 1935 through 1943, the last subperiod covered in Chart 21, the negative yield differential gradually became smaller and was positive in 1943. The factors contributing to this gradual narrowing include: an appreciable increase in the amount of marketable federal debt outstanding, a constant amount of marketable state and local debt outstanding, a steady increase in corporate income tax rates (from 13.75 per cent maximum to 40 per cent maximum in this subperiod), and an increase in personal income tax rates. Because of the effects of these factors, it seems unreasonable to make a conclusion about the changes, if any, in the money and capital markets' evaluation of quality for this subperiod.

In summary, the yield differential between long-term yields on state and local indebtedness and on federal bonds indicated significant positive or negative shifts in the quality of state and local debt in only one of the four subperiods covered in Chart 21, 1932-34. Changes in the yield differential between state and local bonds and government bonds in the other years covered by Chart 21 were not sufficiently free of changes in supply factors or changes in income tax rates to allow a definitive conclusion about quality. It is noticeable that both the decline and subsequent improvement in the money and capital markets' evaluation of the quality of state and local debt lagged behind the increase and decrease in defaults in the early 1930's.

Chart 22 is a continuation of Chart 21 from 1942 through 1968 except for one major change. The quarterly average yield on Moody's index of long-term, *taxable* federal bonds is compared with the quarterly average yield on long-term state and local issues because the interest on all federal bonds issued after 1941 was fully taxable. Because of the different yield index used for the federal bonds, they typically sold at higher yields than the tax-exempt state and local bonds. This change means that, *ceteris paribus,* significant narrowing of the positive yield differential (movement toward a negative differential) should indicate a decline in the money and capital markets' evaluation of state and local debt, while significant movement toward a larger positive yield differential should indicate an improved market evaluation.

In the period from 1942 through 1945 both personal and corporate in-

CHART 22
Yield Relationship between U.S. Government Bonds and State and Local Bonds, Quarterly Yields, 1942-68

Sources: *Moody's Municipal and Government Manual* and *The Weekly Bond Buyer.*

come tax rates rose, the amount of marketable U. S. government debt outstanding increased approximately fourfold and the amount of marketable state and local debt outstanding declined at a rate of approximately 5 per cent a year. These exogenous factors probably explain most of the increase in the positive yield differential during this period. The exact opposite of these factors – a decline in personal income tax rates, a decline in the amount of marketable federal debt oustanding and large increases in the amount of marketable state and local debt outstanding – probably explain most of the decrease in the yield differential in the four years following World War II.

Because of the marked changes in the above factors, no definitive conclusions can be made from market yields about changes in the money and capital markets' evaluation of the quality of state and local debt during World War II and in the years immediately following it.

Analysis of the period from 1949 through 1960 is simplified because personal and corporate income tax rates were fairly stable (there were small adjustments in 1951 and 1954) and the supply of marketable outstanding state and local debt increased at a relatively constant rate each year. In this period the shifts in the yield differential were relatively small and followed a definite cyclical pattern. The yield differential tended to widen in periods of prosperity and narrow during recessionary periods. Part of the explanation for this cyclical pattern may be that the money and capital markets believed there was a slight deterioration in the quality of state and local debt during recessionary periods and a slight improvement in its quality during boom periods. Much of the shifts in the yield differential from 1949 to 1961, however, seems to be explained by changes in the supply of marketable federal debt.[9]

The wider positive yield differential between federal bonds and state and local bonds from 1961 through 1965 calls for special attention. During several earlier periods covered in Chart 22 this yield differential had widened as much or more than it did from 1961 through 1965. During these earlier periods one or more of the other factors affecting market yields appear to have explained much of the widening in the positive yield differential. From 1961 through 1965, the supply of outstanding marketable federal debt grew slowly and at a constant rate; the supply of outstanding marketable state and local debt grew rapidly at a rate similar to its growth throughout the 1950's; and corporate and personal income tax rates were reduced slightly. These factors should tend to exert a narrowing influence on the positive yield differential between the two types of bonds. However, this narrowing influence was moderated by a change in institutional conditions – commercial banks were allowed to pay higher rates to attract certificates of deposits – that exerted a widening influence on the positive yield differential between federal bonds and state and local bonds in the 1961-65 period. Examined in the light of these changes in other factors the market yields in Chart 22 seem to indicate that the money and capital markets believed the quality of state and local debt remained constant or improved slightly from 1961 through 1965.

The yield differential was subject to conflicting influences – rapid growth in outstanding marketable federal debt, a 10 per cent surcharge on corporate and personal income taxes in 1968, and an even higher maximum rate on

[9]The Investment Bankers Association concluded that the rate of change in outstanding marketable U. S. government debt accounted for about half of the deviation from the normal yield relationship from 1954 through 1960. (*I.B.A. Statistical Bulletin*, November 1960, pp. 1-3).

commercial bank certificates of deposits – again from 1966 through 1968. Yield differentials changed little from their 1965 levels throughout the 1966-68 period, which may indicate that the money and capital markets believed the quality of state and local debt remained relatively stable.

Conclusions based on the relationship between the yields on long-term federal bonds and those on the *Bond Buyer's* index of twenty long-term state and local bonds might overlook changes in the quality of state and local bonds not covered by this index. The *Bond Buyer's* index is based upon three Aaa general obligations, eight Aa general obligations, eight A general obligations and one Baa general obligation. Conclusions about changes in quality from Chart 22, therefore, are based primarily on the yield relationships between federal bonds and Aaa and A general obligations. Large changes in the quality of Aaa or Baa general obligations or other types of state and local debt might be indicated by the yield relationships between these rating classes or types of state and local debt, and federal bonds, and not be observable in Chart 22.

Chart 23 depicts the yield differentials between the quarterly yields on Moody's index of long-term, taxable federal bonds and Moody's quarterly average yields for long-term Aaa and Baa general obligation bonds from 1942 through 1968. Since the two state and local yield averages are subtracted from the yield on federal bonds at the same point of time a significant positive increase in either or both of these yield differentials should, *ceteris paribus,* indicate an improvement in the quality of that rating class of general obligations. Similarly, a significant decrease in the positive yield differential should, *ceteris paribus,* indicate that the money and capital markets believed there was a deterioration in the quality of that rating class.

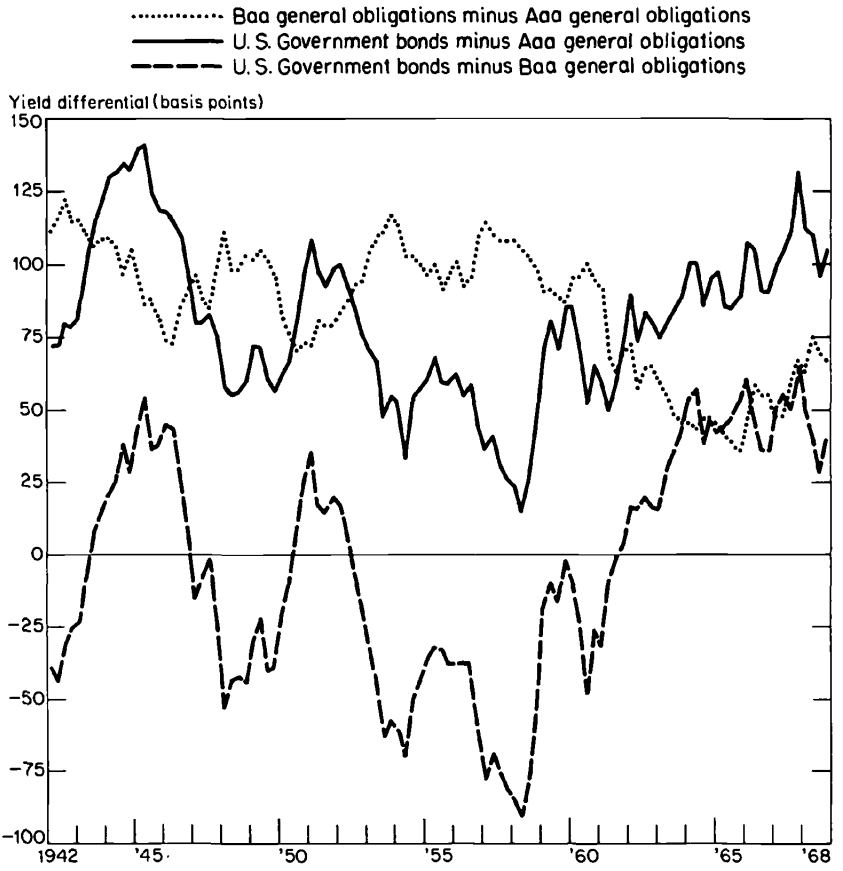
Analysis of Chart 23 indicates that both yield differentials had an upward trend from 1942 through 1945, a downward trend from 1945 through 1949, then followed a cyclical pattern from 1949 through 1960. The difference between the two yield differentials ranged from 70 to 120 basis points from 1942 through 1960. Thus, the yield differentials between federal bonds and both Aaa and Baa general obligations followed a pattern similar to the differential between the yields on federal bonds and those on the *Bond Buyer's* index of twenty state and local bonds from 1942 through 1960.

The 1960's are a different story. Yields on federal bonds exceeded yields on Baa general obligations in the early 1960's and exceeded these yields by roughly 50 basis points in the mid-1960's. During the same period yields on bonds did not rise over 100 basis points (as they did in the two earlier periods that federal yields exceeded Baa general obligation yields) above Aaa general obligations until the mid-1960's.

The money and capital markets appear to believe that the quality of Aaa general obligations remained fairly constant in the 1960's. This conclusion seems appropriate from 1961 through 1965 because the low rate of increase in the supply of outstanding federal debt and the small income tax reductions

CHART 23

Yield Differentials between U.S. Government Bonds and Aaa and Baa General Obligations, Quarterly Yields, 1942-68



Source: Moody's Municipal and Government Manual.

in 1963 and 1964 probably slowed the widening of the yield differential. The moderate increase in this yield differential in the 1966-68 period seems explained more by the switch to rapid growth in marketable federal debt outstanding than by a change in the money and capital markets' evaluation of quality.

In the case of Baa general obligations, however, the money and capital markets seem to believe that the quality of debt in this rating category improved slightly in the early 1960's. Some of the widening in the positive yield differential was probably because commercial banks reached for higher yields in order to be able to attract certificates of deposits. On the other hand, the low rate of increase in federal debt and the income tax reduction in

1963 and 1964 should have had a narrowing influence. By the mid-1960's the widening slowed and the quality of Baa general obligations as indicated by market yields appeared to be relatively constant.

Quality as Measured by Yield Relationships between Different Rating Categories and Different Types of State and Local Debt

Shifts in the relationship between the yields on federal bonds and the yields on an index of rated state and local general obligations with similar maturities provide only one way of measuring changes in the money and capital markets' evaluation of the quality of state and local debt. It seems equally important to study the level and any shifts in the relationships between the yields on state and local issues in different rating categories and between the yields on different types of state and local isssues. Such an analysis takes into account many issues not covered in the indexes of general obligations used so far and should indicate any appreciable changes in the money and capital markets' evaluation of the relative quality among various rating classes and types of such indebtedness. These yield comparisons should indicate the marginal classes of state and local debt, where the money and capital markets believe that the quality of the debt is materially different or has changed markedly from the quality indicated by the indexes used in the preceding section.[10] Since the analysis compares tax-exempt state and local yields, tax factors have little or no effect and changes in institutional conditions should have less of an impact.

Several types of yield relationships are examined. First, an analysis is made of the yield relationships among the various rating categories of general obligations. These relationships should help compare the evaluations of the money and capital markets as indicated by market yields with the evaluations of the rating agencies. The yields on unrated general obligations are then compared with the yields on rated general obligations. Since 49.5 per cent of the general obligations issued from 1957 through 1968 were not rated.[11] Some conception of the quality of unrated general obligations is necessary before reaching any over-all conclusions on the money and capital markets' evaluation of the quality of state and local debt.

[10]Some conclusions can still be made on the absolute quality of the different rating classes and types of state and local debt because the quality of Aaa general obligations was evaluated as being relatively constant in the postwar period and because the monthly yields on Aaa general obligations were highly correlated with the monthly yields on federal bonds for the mid-1956 through 1968 period.

[11]This proportion is based on the number of issues rated and unrated from the *I.B.A. Statistical Bulletins.* Figures from the same source show that these unrated bonds were 11.2 per cent of the total dollar amount of general obligations issued from 1957 through 1968.

The yields on rated and unrated state and local limited liability obligations are then compared with the yields on general obligations. This comparison should indicate areas where the money and capital markets feel the quality of limited liability obligations is substantially different, or has deteriorated or improved. In addition, the yield relationships between general obligations and rated limited liability obligations may give an impression of the comparability of the ratings given general obligations with the ratings assigned to limited liability obligations. Appendix Table 2 shows that limited liability obligations were nearly 40 per cent of the total amount of state and local debt outstanding in 1968, so a careful study of the money and capital markets' evaluation of the quality of limited liability obligations is very important to any over-all conclusions about the quality of such debt. Finally, the yields on special types of state and local debt, such as industrial aid bonds and toll road issues, are compared with the yields on rated obligations in order to isolate any special type or types of debt where the money and capital markets believe credit quality is materially different or has changed markedly.

The Yield Relationship Among
General Obligation Rating Categories

The yield differential between the long-term yields on Moody's indexes of Aaa general obligations and Baa general obligations was included in Chart 23 (page 136). These two indexes were chosen because they represent, respectively, the best and worst quality of rated general obligations for which yield computations are available. Narrowing of this yield differential should indicate an improvement in the quality of Baa general obligations relative to the quality of Aaa general obligations. Widening of this yield differential should indicate the converse.

Chart 23 shows that from the early 1940's through 1960 the yield differential between Baa and Aaa general obligations fluctuated in a narrow range from 70 to 120 points. There was no marked trend in the fluctuations within this range; however, the yield differential tended to widen slightly during recessionary periods and to narrow somewhat during boom periods. In this decade and a half of relatively mild economic fluctuations, the yields on Baa general obligations did not follow the countercyclical interest rate policies as closely as the yields on Aaa general obligations. The assumption is that in recessionary periods, when interest rates tend to be relatively low, a slight deterioration in the quality of Baa general obligations kept the yields on these obligations from falling as much as the yields on Aaa general obligations whose quality remained about the same. The opposite effect occurred in prosperous periods when interest rates were high. These offsetting effects of the slight changes in bond quality and countercyclical interest rate policies mean that during periods of mild economic fluctuations the prices of the lower rated Baa general obligations tend to fluctuate less than the prices of

higher rated Aaa general obligations. Despite these small changes in the quality of Baa general obligations, the yield relationship between Baa and Aaa general obligations indicated the capital markets felt there was little in the way of substantial quality changes between these two rating categories from the early 1940's through 1960.

The only substantial postwar change in the money and capital markets' evaluation of the quality of Baa general obligations relative to Aaa general obligations, indicated by the market yields in Chart 23, began in 1961 when the yield differential broke through the postwar lower range limit of 70 basis points. From 1961 through 1965 the yield differential narrowed considerably indicating an improvement in the money and capital markets' evaluation of Baa relative to Aaa general obligations.[12] The narrowing trend in the yield differential appeared to end in 1966.

The improvement in the markets' evaluation of the quality of other rating categories of general obligations relative to Aaa general obligations is not limited to Baa general obligations. The yearly averages of the monthly differentials between the market yields of Aaa general obligations and those of Aa, A and Baa general obligations were:

	Aa minus Aaa	A minus Aaa	Baa minus Aaa
1957	22	65	105
1958	22	59	92
1959	14	50	81
1960	16	51	82
1961	14	34	61
1962	11	25	52
1963	8	20	43
1964	7	19	42
1965	7	19	40
1966	9	25	49
1967	10	26	55
1968	10	31	63[13]

Comparison of the decreases in these yield differentials shows that the yield differentials between Aaa general obligations and Aa and A general obligations have declined by at least as great a relative amount as the yield differential between Aaa and Baa general obligations. This decline in the yield differential seems to mean that the money and capital markets believed the

[12]As discussed earlier, the narrowing yield differential is also partly explained by commercial banks demanding more higher yielding state and local bonds to remain profitably competitive with higher maximum rates.

[13]Based on monthly new issue reoffering yields prepared by the Investment Bankers Association.

quality of both Aa and A general obligations also has improved slightly relative to the quality of Aaa general obligations from 1961 through 1965.[14]

Quality of Unrated Long-Term General Obligations

Up to this point the information on the quality of state and local debt as indicated by market yield differentials has only taken into account the quality of rated long-term general obligations. In attempting to evaluate the overall quality of state and local debt this is a limited and biased sample.

Only 31,917 of the 76,277 state and local bonds recorded as issued from 1957 through 1968 were rated general obligations. Thus, rated general obligations comprised only 41.8 per cent of all state and local bonds recorded as issued over this eleven year period. The dollar amount of long-term state and local debt recorded as issued from 1957 through 1968 was $119,638 million. Of this total, $70,066 million or 58.6 per cent was rated long-term general obligations.[15]

The market yields of rated general obligation bonds would be a valid sample for the population of all state and local debt if the market yields of these general obligations were representative of the market yields on all state and local debt. This supposition can be challenged even before observing the yield data. For example, bond analysts typically feel many state and local limited liability obligations should, *ceteris paribus*, command a higher yield than general obligations because of the limited resources backing them. Unrated general obligations should often have a higher yield than rated general obligations because of the limited marketability of most of these bonds and the fact that many poorer quality general obligations are not rated.

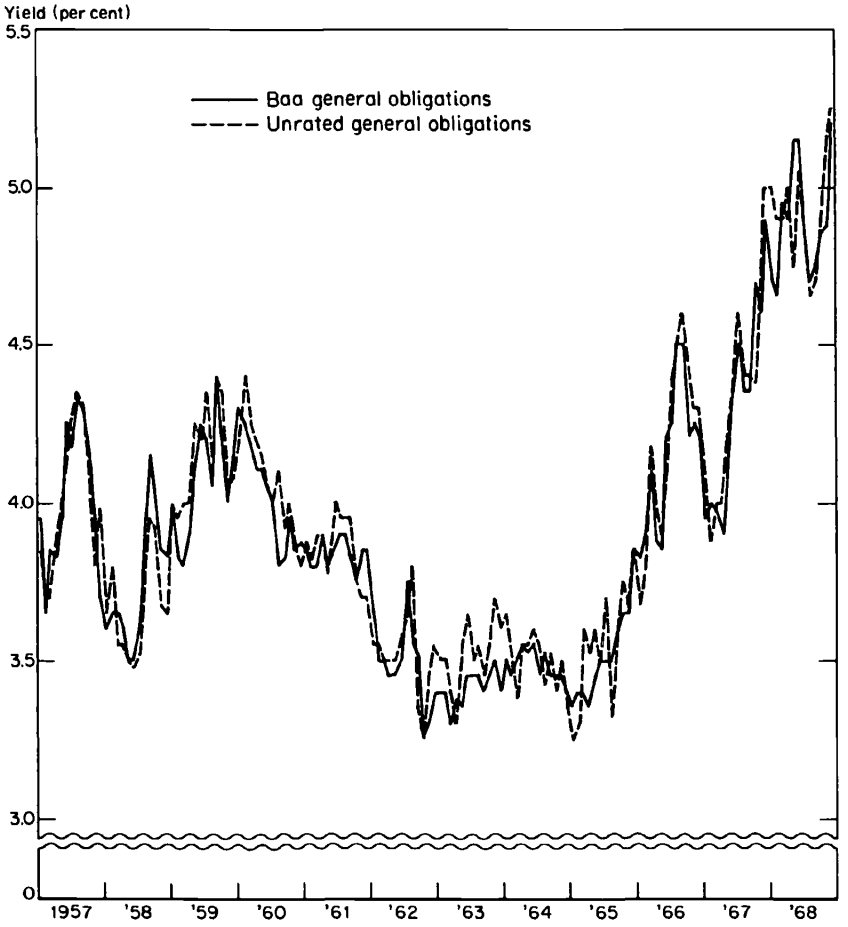
Rating agencies usually do not rate state and local issues (1) under a certain size, (2) as a matter of policy, or (3) where information was inadequate.[16] In addition, the major rating agencies do not rate some state and local issues that are in a weak credit position. There are some pressures for the rating services not to rate general obligations which they would rate below A. Some state and local units with weak credit positions appear to purposely fail to give the rating agencies information required for a rating. The issuing unit prefers no rating to a rating below A for fear of higher interest costs resulting from a rating below A. Some investment bankers also discourage ratings on issues they feel might receive a low rating. There is also a possibility that state and local units with only a small amount of debt

[14]The decline in these yield differentials is probably also partially explained by an increased demand for higher yielding state and local bonds by commercial banks under competitive pressures because of the higher maximum rate on certificates of deposits.

[15]Figures are based on data from the Investment Bankers Association.

[16]Both Moody's Investors Service (in *Moody's Manual*) and Standard and Poor's Corporation (in *Municipal Bond Selector*) give these reasons for not rating some state and local issues.

CHART 24
Monthly Median Yields on Unrated General Obligations and Baa General Obligations, 1957-68



Source: Unpublished data from the Investment Bankers Association.

outstanding may be biased toward weaker credit position since they may have inexperienced financial management and lack diversification with respect to the resources used to support their indebtedness.

Chart 24 compares the monthly, median new issue reoffering yields on unrated and Baa general obligations from 1957 through 1968. This chart demonstrates that the median yield on unrated general obligations was close to that on Baa general obligations in most of the 144 months covered. The median yield on unrated general obligations exceeded the median yield on

Baa general obligations in seventy-nine months, was less than the Baa median yield in forty-eight months and was the same as the Baa median yield in seventeen months. Examination of the reoffering yields on individual issues used to compute the median yields revealed the average range of unrated general obligations (approximately 110 basis points or 1.1 per cent) was considerably wider than the average range of Baa general obligations (approximately 60 basis points) from 1957 through 1968. The cause of this wider range was unrated issues which had yields substantially in excess of the median yields on Baa general obligations.[17]

Analysis of the new issue reoffering yield information on unrated general obligations provides two insights into the quality of unrated general obligations. First, if the new issue reoffering yields are indicative of the quality of state and local debt, the quality of rated long-term general obligations is not representative of the quality of all general obligations. Instead, the addition of unrated general obligations tends to lower the average quality of all general obligations. Median yield figures indicate that the average quality of unrated general obligations was approximately the same as the quality of Baa general obligations. Individual new issue reoffering yields also indicated that the quality of some unrated general obligations was considerably below the quality of Baa general obligations with the highest yields.

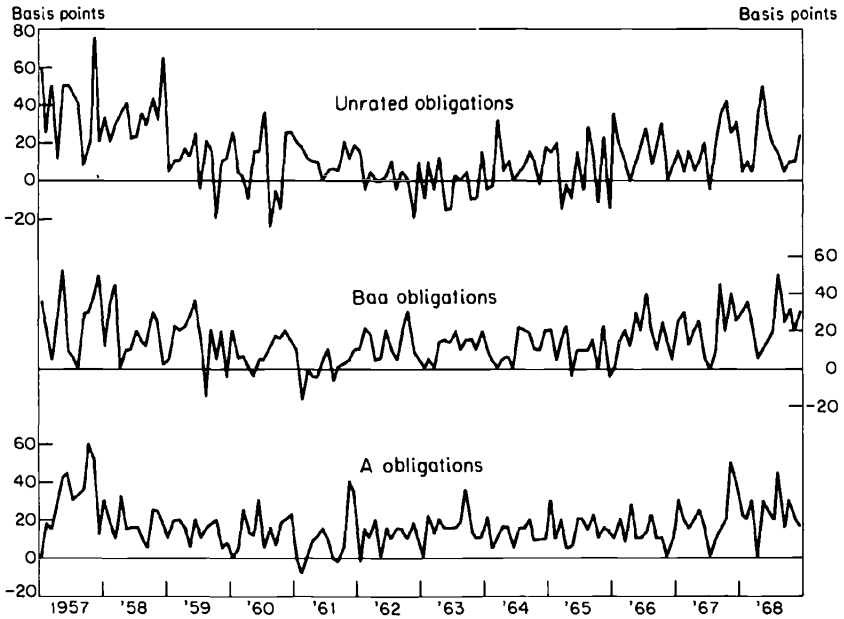
Second, the median yields on unrated general obligations have tended to exceed the median yields on Baa general obligations more often in the last few years than in the late 1950's. This observation indicates that the new issue reoffering yields on unrated general obligations have not followed the narrowing trend relative to the yields on Aaa general obligations as much as the yields on Baa and other rated general obligations. Thus, if new issue reoffering yields are indicative of quality, the average quality of unrated general obligations has remained more stable relative to the quality of Aaa general obligations than other rated general obligations over the twelve years covered in Chart 24.

Quality of Limited Liability Obligations

Chart 25 compares the yield differentials between A, Baa and unrated limited liability obligations and similar general obligations from 1957 through 1968. The median new issue reoffering yields on the limited liability obligations exceeded the yields on the similarly rated general obligations in a narrow range of from 5-30 basis points in over three-fourths of the comparisons. Over the twelve year period, the yields on A limited liability obligations exceeded the yields on A general obligations by an average of 17 basis points. The yields on Baa limited liability obligations exceeded the yields on Baa

[17]The medians and ranges of new issue reoffering yields were compiled by the NBER staff from three sources: the Investment Bankers Association, Rand and Company and *The Weekly Bond Buyer.*

CHART 25
Limited Liability Obligation Yields Minus General Obligation Yields, 1957-68



Source: Unpublished data from the Investment Bankers Association.

general obligations by an average of 14 basis points, and the yields on unrated limited liability obligations also exceeded the yields on unrated general obligations by an average of 14 basis points.[18]

The yield data in Chart 25 indicate that the money and capital markets have accepted fairly similar yields for limited liability obligations in similar rating categories. The monthly median yield in each rating category has averaged slightly higher for limited liability obligations than for general obligations. These yield relationships have remained remarkably stable over the twelve year period except in the case of unrated limited liability obligations. The median yield on unrated limited liability obligations exceeded the median yield on unrated general obligations by a monthly average of nearly 40 basis points in the late 1950's, but exceeded this general obligation median by an average of less than 5 basis points in the mid-1960's. There has been a trend, therefore, by the money and capital markets toward evaluating the

[18]There were not enough Aaa or Aa rated limited liability obligations to have meaningful monthly medians for the two categories. Individual Aaa or Aa limited liability issues generally had median reoffering yields which were slightly (0-20 basis points) above the similar Aaa or Aa general obligation median yields at the time of issue.

quality of unrated limited liability obligations as roughly equal to that of unrated general obligations. This observation seems particularly pertinent because between 40 and 50 per cent of the dollar amount and nearly three-fourths of the number of limited liability obligations issued from 1957 through 1968 were not rated.[19]

These yields relationships indicate that the money and capital markets evaluate the quality of limited liability obligations as being slightly below the over-all quality of general obligations. The quality of limited liability obligations in each rating category is slightly below the quality of general obligations in the same category. The quality of unrated limited liability obligations has improved to nearly equal to the quality of unrated general obligations.

Quality of Selected Special Classifications of State and Local Debt

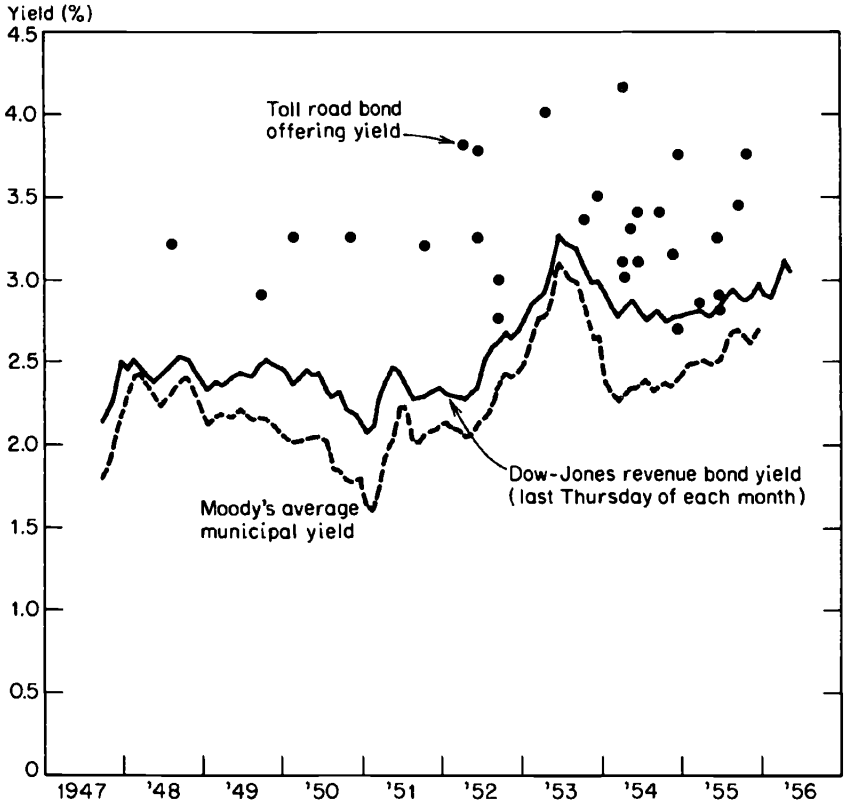
Market yields offer one way to evaluate the quality of special classes of state and local debt. For instance, the market yields of state and local debt issued for a specific purpose or by a particular type of governmental unit can be compared with a state and local yield average. This yield comparison should indicate how the markets' evaluate the quality of the selected special class of state and local debt relative to the quality of the state and local debt represented by the yield average.

There is very little information currently available on the market yields of most classifications of state and local debt. Actual market yields are only available for a limited number of actively traded "dollar" bonds, and new issue reoffering yields have generally not been segregated into any special class groupings. All of the available yield information on two special classes of state and local debt in which quality has been questioned – the toll road bonds and the industrial aid bonds – is examined in the following paragraphs. The methods used should give some ideas about the procedures which can be followed and the problems which may arise as more yield information for special classifications of state and local debt becomes available.

Because of their competitive nature and limited liability, the quality of toll road bonds has often been questioned. Chart 26 compares the offering yields on toll road bonds issued from 1947 through 1955 with two yield indexes for the same period. Toll road bond offering yields show no clear pattern of conformity to the general market for state and local bonds; however, individual issues do appear to be influenced by this market. The offering yields on many of the toll road issues were substantially above the two yield indexes, indicating that the money and capital markets evaluated the quality of many toll road issues as being substantially below the quality of the state and local bonds represented by these two yield indexes.

[19]Based on figures obtained from the Investment Bankers Association.

CHART 26
Offering Yields on Toll Road Bonds Compared with Yields on Outstanding State and Local Bonds

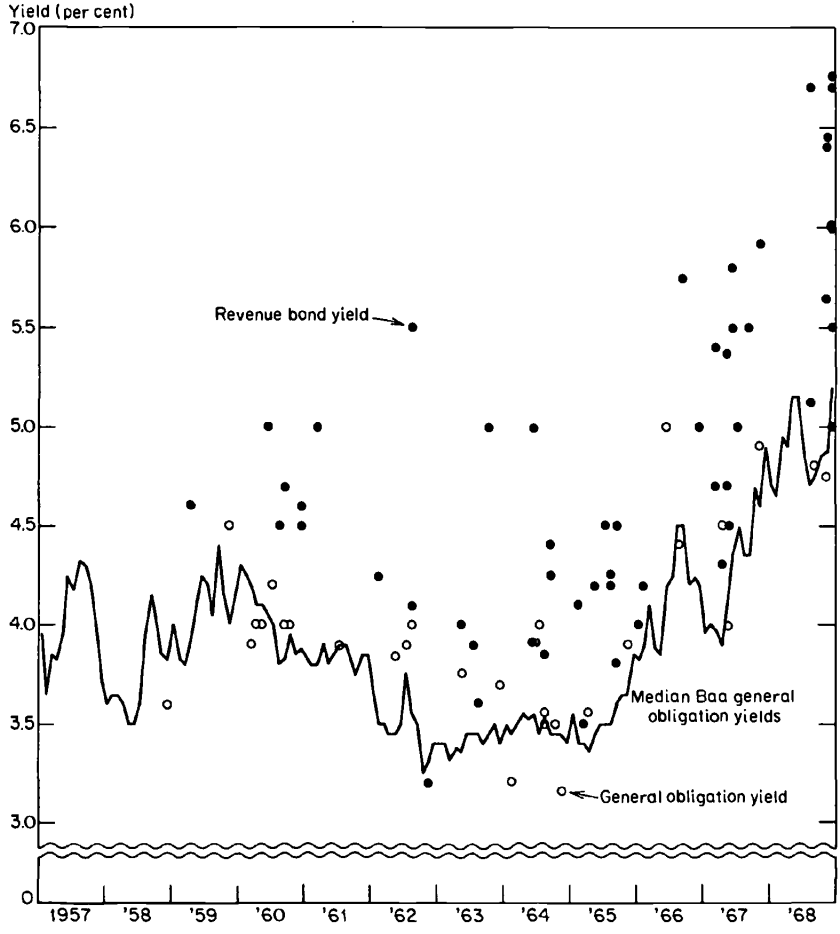


Source: Robinson, Roland I., *Postwar Market for State and Local Securities*, Princeton for NBER, 1960, p. 212.

The market yield information on the second selected special class of state and local debt, industrial aid bonds, is also limited. The twenty year new issue reoffering yields are available for only 85 of the 987 state and local industrial aid bonds reported to the Investment Bankers Association as issued between 1957 and 1968. The twenty year new issue reoffering yields on these industrial aid bonds are compared with the monthly median new issue reoffering yields on Baa general obligations from 1957 through 1968 in Chart 27. The yields on eleven of the eighty-five industrial aid bonds were below the monthly median yield on Baa general obligations. The reoffering yields on thirty-six of the eighty-five industrial aid bonds were from 0-50 basis points above the monthly median yield on Baa general obligations, while the yields on thirty-eight industrial aid bonds were over 50 basis points above the monthly

CHART 27

New Issue Reoffering Yields, 20 Year Maturity, for State and Local Bonds Issued for Industrial Aid, 1957-68



Source: Unpublished data from the Investment Bankers Association.

median yield on Baa general obligations. The yield information in Chart 27, therefore, indicates that the money and capital markets considered most industrial aid bonds to be of lower quality than the Baa general obligations. It also appears that the money and capital markets usually evaluated the quality of industrial aid revenue bonds as being weaker than the quality of general obligations issued for industrial aid.

Because of the limited size of this sample, all of the available net interest cost for industrial aid bonds issued from 1957 through 1968, with average

maturities of from ten to twenty years, are examined. The net interest cost available for industrial aid bonds issued in these twelve years are:

Net Interest Cost	Industrial Aid Bonds		
	General Obligations	Revenue Bonds	Total All Bonds[20]
3.01-3.50	57	3	60
3.51-4.00	117	41	158
4.01-4.50	40	58	98
4.51-5.00	18	50	68
5.01-5.50	5	50	55
5.51-6.00	7	60	67
6.01-6.50	2	13	15
Above 6.50	0	4	4
	246	279	525

Net interest costs are not directly comparable with yields. However, despite some individual differences, the average net interest cost of the 85 industrial aid bonds for which market yields are available was approximately equal to the average of the net interest costs for the 525 bonds in the above tabulation. The above net interest cost information would, then, seem to agree with the earlier conclusions based on the limited number of available market yields. The majority of industrial aid bonds issued from 1957 through 1968 appear to be of weaker quality than Baa general obligations, with the quality of industrial aid revenue bonds evaluated as being weaker than the quality of general obligations issued for industrial aid.

The money and capital markets' evaluation of the quality of the two special classes of state and local debt discussed above is far from complete. As more yield information for these and other special classifications of state and local debt becomes available, market yields should become an important method of evaluating the quality of selected special classes of state and local debt.

Summary

To the extent that other factors affecting market yields can be eliminated, market yield relationships indicate the money and capital markets' evaluation of the quality of state and local debt. In this study, equal marketability is assumed; comparisons are made between yields on bonds with similar maturity dates and special terms; and the direction of the effects of changes in

[20]Data obtained from the Investment Bankers Association.

income tax rates, relative supplies and major institutional conditions are considered. There is no attempt, however, to measure the effect of these three changes.

Subject to this limitation, the relationships between the yields on state and local general obligations and the yields on U.S. government bonds (which as a class are as free from credit risk as possible) indicated:

1. The only time since 1921 during which the quality of state and local debt clearly showed a substantial change was from 1931-34 when quality deteriorated markedly.

2. From 1945 through 1961, when inferences on quality changes can be drawn they are in the expected direction, i.e., premiums fall in business expansions and rise in contractions. These changes occurred rapidly and were short lived; therefore, they may have been caused by changes in factors other than quality.

3. The quality of state and local debt remained constant or improved slightly from 1961 through 1965. Any over-all improvement was a result of an improvement in the quality of medium-grade rather than high-grade general obligations. The degree of effect of the increased rates commercial banks could pay on certificates of deposits is particularly difficult to ascertain in this period. From 1966 through 1968 quality appears to have remained relatively stable.

The relationship between yields in different rating categories and on different types and different classes of state and local debt indicates the money and capital markets' evaluation of the quality of one rating category, type or class relative to another. The primary other factor affecting these yield relationships is changes in institutional conditions. Because of the high correlation between yields on Aaa general obligations and yields on federal bonds, a reasonably accurate estimation of the money and capital markets' evaluation of the absolute quality of a rating category, type or class of state and local debt can be obtained through comparisons with the yields on Aaa general obligations. [21] The relationship between the yields on different rating categories, different types, and different classes of state and local debt indicated:

1. The quality of rated general obligations was ranked in accordance with the rating order – the quality of Aaa general obligations was the highest, with bond quality becoming lower as the rating became lower.

2. The only sizeable potential change in the quality of Baa general obligations relative to Aaa general obligations during the postwar period occurred in the 1961-65 period when the quality of Baa general obligations may have improved slightly relative to the quality of Aaa general obligations. The degree of the effect of the changes in the maximum rate banks that could pay on certificates of deposits is difficult to determine.

[21] The relationship between yields on Aaa general obligations and federal bonds is discussed in "The Postwar Quality of Municipal Bonds" by George H. Hempel, pp. 266-269.

3. The quality of Aa and A general obligations also may have improved slightly relative to the quality of Aaa general obligations in the 1961-65 period. Once again, the degree of the effect of the change in the maximum rate that banks could pay on certificates of deposits is difficult to determine.

4. The average quality of unrated general obligations was lower than the average quality of rated general obligations. Furthermore, there were wide dispersions in the quality of unrated general obligations; some issues were high quality, while others were very low quality.

5. The average quality of unrated general obligations is close to that of Baa general obligations. The quality of unrated general obligations appears to have declined slightly relative to the quality of Baa general obligations from 1957 to 1968.

6. The over-all quality of limited liability obligations has been slightly below the over-all quality of general obligations from 1957 through 1968 because: (1) the quality of limited liability obligations in each rating category has been slightly below the quality of general obligations in the same rating category; (2) the sizeable proportion of unrated limited liability obligations with an average quality roughly equal to that of unrated general obligations in recent years.

7. The quality of many toll road revenue bonds and many industrial aid bonds is substantially below the quality of Baa general obligations. The quality of industrial aid revenue bonds is generally below the quality of general obligations issued for industrial aid.

APPENDIX TABLE 1

Dollar Amount of State and Local Debt Issued, 1904-68
(millions of dollars)

Year	Total Amount Issued	Short-Term Debt		Long-Term Debt			
		Public Housing Authority	Other	Total	Public Housing Authority	General Obligations[a]	Revenue Bonds
1968	25,033	2,062	6,597	16,374	528	9,084	6,763
1967	23,313	1,780	6,245	14,288	478	8,714	5,906
1966	17,612	1,740	4,784	11,089	440	6,573	4,076
1965	17,622	1,865	4,672	11,084	464	6,981	3,639
1964	15,967	1,892	3,531	10,544	636	6,250	3,658
1963	15,587	1,961	3,520	10,107	254	5,815	4,037
1962	13,322	1,727	3,036	8,558	382	5,510	2,666
1961	12,874	1,469	3,044	8,360	189	5,573	2,598
1960	11,236	1,283	2,723	7,230	383	4,652	2,195
1959	11,860	1,563	2,616	7,681	310	4,850	2,521
1958	11,359	1,675	2,235	7,449	182	5,543	1,724
1957	10,232	1,599	1,675	6,958	65	4,868	2,025
1956	8,153	1,222	1,484	5,446	199	3,577	1,670
1955	8,569	1,327	1,266	5,977	474	3,771	1,732
1954	10,319	1,897	1,453	6,969	374	3,381	3,214
1953	8,315	1,679	1,078	5,558	496	3,495	1,567
1952	6,450	955	1,094	4,401	304	2,634	1,463
1951	4,915	540	1,097	3,278	328	2,220	730
1950	5,305	544	1,067	3,694	59	3,035	600
1949	4,328	370	963	2,995	143	2,169	683
1948	3,994	307	698	2,990	66	2,374	550
1947	3,311	250	708	2,354	4	1,964	386
1946	1,944	252	489	1,204	19	980	205
1945	1,484	225	440	819	3	613	203
1944	1,281	252	317	712	13	457	242
1943	1,219	239	472	508	61	291	156
1942	1,689	425	688	576	89	390	97
1941	2,637	392	1,016	1,229	22	1,099	108
1940	3,124	495	1,131	1,498	22	1,288	188
1939	2,307	51	1,157	1,099	0	981	118
1938	2,397	0	1,168	1,229	0	1,078	151
1937	1,696	0	712	984	0	832	152
1936	1,889	0	733	1,156	0	1,039	117
1935	2,183	0	988	1,196	0	1,080	116
1934	2,108	0	933	1,175	0	1,159	16
1933	2,116	0	988	1,128	0	1,128	n
1932	2,029	0	1,092	937	0	937	n
1931	2,339	0	1,087	1,252	0	1,166	86
1930	2,335	0	952	1,383	0	1,369	14

(continued)

APPENDIX TABLE 1 concluded

Year	Total Amount Issued	Short-Term Debt		Long-Term Debt			
		Public Housing Authority	Other	Total	Public Housing Authority	General Obligations[a]	Revenue Bonds
1929	2,363	0	921	1,442	0	1,399	43
1928	2,107	0	717	1,390	0	1,370	20
1927	2,103	0	625	1,478	0	1,465	13
1926	2,023	0	661	1,362	0	1,317	45
1925	2,271	0	866	1,405	0	1,392	13
1924	2,426	0	979	1,447	0	1,440	7
1923	1,649	0	514	1,135	0	1,134	1
1922	1,675	0	396	1,280	0	1,277	3
1921	2,145	0	762	1,383	0	1,376	7
1920	1,438	0	664	774	0	773	1
1919	1,220	0	450	770	0	753	17
1918	736	0	473	263	0	263	n
1917	837	0	392	445	0	444	1
1916	790	0	292	497	0	495	2
1915	647	0	155	493	0	292	1
1914	732	0	286	446	0	446	n
1913	892	0	483	408	0	408	n
1912	591	0	192	399	0	399	n
1911	643	0	191	452	0	451	1
1910	522	0	197	324	0	324	n
1909	482	0	118	364	0	364	n
1908	530	0	175	355	0	355	n
1907	469	0	167	301	0	301	n
1906	426	0	125	301	0	301	n
1905	348	0	150	198	0	198	n
1904	417	0	131	287	0	287	n

Sources: Public housing debt figures obtained from the Public Housing Administration. Revenue bonds issued from 1904 through 1937 compiled by NBER staff from files at The Bond Buyer, Inc. and John F. Fowler, *Revenue Bonds*, New York, 1938. Other figures obtained from The Bond Buyer's *Municipal Finance Statistics*, Vol. IV, New York, 1969.

[a]General obligations in this appendix are total long-term debt less public housing bonds and revenue bond, and include nonguaranteed special assessment bonds, which are limited liability obligations.

n = Amount issued less than $500,000.

APPENDIX TABLE 2

Dollar Amount of State and Local Debt Outstanding, Selected Years from 1902 Through 1968
(millions of dollars)

Year[a]	Total Debt Outstanding	Short-Term Debt		Long-Term Debt			
		Public Housing Authority	Other	Total	Public Housing Authority	Other General Obligations[b]	Limited Liability Obligations[b]
1968[a]	121,158	1,117	7,310	112,731	5,297	59,781	47,653
1967[a]	114,614	976	6,017	107,621	4,845	57,917	44,859
1966[a]	107,051	979	5,072	101,000	4,537	55,263	41,200
1965[a]	99,512	911	4,398	94,204	4,224	52,194	37,786
1964[a]	92,222	1,001	3,694	87,527	3,804	49,462	34,261
1963	87,451	980	3,320	83,151	3,533	47,172	32,446
1962	81,278	977	2,758	77,543	3,270	45,051	29,222
1961	75,023	846	2,637	71,540	3,016	41,646	26,878
1960	69,955	731	2,423	66,801	2,872	38,778	25,151
1959	64,110	853	2,130	61,127	2,566	36,697	21,864
1958	58,187	816	1,635	55,737	2,383	33,461	19,893
1957	53,039	688	1,506	50,845	2,296	30,714	17,835
1956	48,868	720	1,373	46,775	2,181	29,634	14,960
1955	44,267	963	1,032	42,272	1,864	27,461	12,947
1954	38,931	1,203	830	36,898	1,407	25,586	9,905
1953	33,782	1,037	741	32,004	1,270	23,003	7,731
1952	30,100	849	531	28,720	857	21,579	6,284
1951	27,040	549	942	25,549	409	20,943	4,197
1950	24,115	239	821	23,056	414	19,378	3,264
1949	20,999	220	514	20,265	418	17,369	2,478
1948	18,656	223	360	18,073	414	15,739	1,920
1947	16,815	233	136	16,446	419	14,143	1,884
1946	15,917	232	23	15,662	423	13,241	1,998
1945	16,671	232	127	16,312	427	13,794	2,091
1944	17,479	244	381	16,854	434	14,238	2,182
1943	18,773	245	475	18,053	435	15,162	2,456
1942	19,337	299	632	18,406	338	15,482	2,586
1941	19,907	336	792	18,779	203	15,905	2,671
1940	20,283	287	948	19,048	33	16,347	2,668
1937	19,462	0	875	18,587	0	15,887	2,700
1932	19,205	0	1,331	17,874	0	15,869	2,005
1927	14,881	0	545	14,336	0	14,336[c]	
1922	10,109	0	654	9,455	0	8,661	794
1913	4,414	0	220	4,194	0	4,194[c]	
1902	2,107	0	100	2,007	0	2,007[c]	

Notes to Appendix Table 2

Note: Census data for *excluded* years prior to 1940 are not consistent with definition and data in this study.

Sources: Figures obtained from records of the Governments Division of U.S. Bureau of the Census and the Public Housing Administration.

[a]All data based on June 30 fiscal years starting in 1964. Prior to 1964 some local governments reported on different fiscal year bases. Total state and local debt outstanding was $85,056 in 1963 using the June 30 fiscal year basis for all local governments.

[b]Limited liability obligations were slightly understated and other general obligations overstated from 1948 to 1951 because some nonguaranteed special assessment bonds were (incorrectly) classified as general obligations. Prior to 1948 limited liability obligations were the total of revenue bonds and nonguaranteed special assessment bonds.

[c]Limited liability obligations were not separated from other long-term debt in 1927, 1913 and 1902.

APPENDIX TABLE 3

Dollar Amount of Long-Term State and Local Debt Outstanding, by Type of Governmental Unit in Selected Years from 1902 Through 1968
(millions of dollars)

Year[a]	States	All Local	Counties	Incorporated Municipalities	Unincorporated Municipalities	School Districts	Special Districts[b]
1968[a]	33,622	79,109	8,462	33,942	1,973	18,016	16,716
1967[a]	31,185	76,436	7,685	32,186	1,950	18,006	16,611
1966[a]	28,504	72,497	6,841	30,892	1,723	17,368	15,664
1965[a]	26,235	67,969	6,367	29,280	1,707	16,290	14,325
1964[a]	24,401	63,126	5,818	27,773	1,651	15,257	12,627
1963	22,751	60,399	5,623	26,913	1,556	14,363	11,945
1962	21,561	55,982	5,247	24,866	1,315	13,767	10,787
1961	19,530	52,012	4,791	23,566	1,080	12,696	9,878
1960	18,128	48,673	4,900	21,900	1,035	11,800	9,000
1959	16,421	44,706	4,600	20,900	949	11,300	7,000
1958	15,065	40,672	4,100	19,400	1,000	10,000	6,200
1957	13,522	37,013	3,502	17,941	1,059	8,995	5,517
1956	12,643	34,424	3,343	16,140	956	8,394	5,593
1955	10,951	31,322	2,960	15,302	833	7,098	5,128
1954	9,317	27,581	2,624	13,893	782	5,827	4,454
1953	7,505	24,499	2,370	12,912	647	4,551	4,018
1952	6,640	22,081	1,937	12,113	604	3,715	3,710
1951	6,101	19,447	1,795	11,285	368	3,130	2,870
1950	5,254	17,887	1,629	10,577	308	2,590	2,784
1949	4,014	16,126	1,535	9,223	268	2,044	3,055
1948	3,716	14,357	1,370	8,641	247	1,477	2,621
1947	2,894	13,552	1,442	7,914	166	1,294	2,736
1946	2,333	13,334	1,381	7,981	155	1,220	2,597
1945	2,422	13,890	1,410	8,270	170	1,273	2,667
1944	2,760	14,086	1,659	8,407	191	1,380	2,449
1943	2,856	14,916	1,580	9,067	254	1,495	2,520
1942	3,067	15,657	1,776	9,485	250	1,626	2,520
1941	3,171	15,841	1,943	9,555	260	1,669	2,414
1940	3,280	16,057	2,036	9,511	280	1,699	2,531
1937	3,073	15,393	2,238	9,175	310	1,724	1,946
1932	2,502	15,317	2,548	9,157	343	1,987	1,282
1922	1,106	8,474	1,282	5,477	101	985	627
1913	423	4,075	393	3,447	80	119	36
1902	270	1,924	205	1,612	56	46	5

Note: Census data for *excluded* years prior to 1940 are not consistent with definition and data in this study.

Source: Figures obtained from records of the Governments Division of U.S. Bureau of the Census.

[a]All data based on June 30 fiscal years starting in 1964. Prior to 1964 some local governments reported on different fiscal year bases.

[b]The classification special districts (other than school districts) includes some local statutory authorities. State statutory authorities and the remaining local statutory authorities are included as nonguaranteed debt of the issuing governmental unit. A further breakdown of these figures is not available at the present time.

APPENDIX TABLE 4

Net Debt Figures and Measures of Economic Activity in the United States, 1916-68
(billion of dollars)

Year	Net Total Public and Private Debt[a]	Net Public Debt[a]	Net State and Local Debt[a]	Net Stock of Total Wealth[b]	Net State and Local Wealth[b]	Gross National Product	National Income[c]	Disposable Personal Income
1968	1,568.5	441.9	128.6			860.6	712.8	589.0
1967	1,419.1	410.7	113.4			789.7	652.9	546.3
1966	1,331.7	388.6	102.7			747.6	620.8	511.6
1965	1,240.2	373.7	96.4			684.9	564.3	473.2
1964	1,151.8	363.3	89.3			632.4	518.1	438.1
1963	1,068.9	348.2	82.0			590.5	481.9	404.6
1962	995.6	336.1	75.7			560.3	457.7	385.3
1961	947.7	318.1	67.0			520.1	427.3	364.4
1960	890.2	304.0	61.0			503.7	414.5	350.0
1959	846.2	299.8	55.6			483.7	400.0	337.3
1958	782.6	283.6	50.9	1,702.8	190.6	447.3	367.8	318.8
1957	738.9	271.1	46.7	1,629.8	180.3	441.1	366.1	308.5
1956	707.5	268.1	42.7	1,518.1	167.7	419.2	350.8	293.2
1955	672.3	269.8	38.4	1,401.9	152.1	398.0	331.1	275.3
1954	612.0	263.6	33.4	1,306.3	138.8	364.8	303.1	257.4
1953	586.4	256.7	28.6	1,259.3	129.6	364.6	304.7	252.6
1952	555.2	248.7	25.8	1,214.1	123.3	345.5	291.4	238.3
1951	524.0	241.8	23.3	1,164.6	115.3	328.4	278.0	226.6
1950	490.3	239.4	20.7	1,067.1	106.2	284.8	241.1	206.9
1949	448.4	236.7	18.1	932.0	94.2	256.5	217.5	188.6
1948	433.6	232.7	16.2	928.4	95.9	257.6	224.2	189.1
1947	417.4	237.7	14.4	843.5	90.1	231.3	199.0	169.8
1946	397.4	243.3	13.6	700.9	76.4	208.5	181.9	160.0

APPENDIX TABLE 4 continued

Year	Net Total Public and Private Debt[a]	Net Public Debt[a]	Net State and Local Debt[a]	Net Stock of Total Wealth[b]	Net State and Local Wealth[b]	Gross National Product	National Income[c]	Disposable Personal Income
1945	406.3	266.4	13.7	576.2	61.7	212.0	181.5	150.2
1944	370.8	226.0	14.1	538.2	58.1	210.1	182.6	146.3
1943	313.6	169.3	14.9	522.9	57.0	191.6	170.3	133.5
1942	259.0	117.5	15.8	505.2	56.1	167.9	137.1	116.9
1941	211.6	72.6	16.3	473.1	53.9	124.5	104.2	92.7
1940	189.9	61.3	16.5	424.2	49.6	99.7	81.1	75.7
1939	183.2	58.9	16.3	395.6	47.5	90.5	72.6	70.3
1938	179.6	56.5	16.0	384.4	46.5	84.7	67.4	65.5
1937	182.0	55.3	16.1	383.4	46.8	90.4	73.6	71.2
1936	180.3	53.9	16.2	366.6	44.7	82.5	65.0	66.3
1935	174.7	50.5	16.0	344.9	42.4	72.2	57.2	58.5
1934	171.4	46.3	15.9	341.8	42.4	65.1	49.5	52.4
1933	168.5	41.0	16.7	330.2	40.8	55.6	40.3	45.5
1932	174.6	37.9	16.6	323.1	36.8	58.0	42.8	48.7
1931	181.9	34.0	15.5	360.1	37.7	75.8	59.7	64.0
1930	191.0	30.6	14.1	410.1	38.5	90.4	75.4	74.5
1929	190.9	29.7	13.2	439.1	38.1	103.1	86.8	83.3
1928	185.9	29.8	12.3	430.6	36.6	95.6	78.7	
1927	177.3	29.7	11.5	413.9	34.6	93.5	75.9	
1926	168.8	29.9	10.7	398.9	32.7	95.3	76.6	
1925	162.6	30.3	10.0	384.2	31.1	90.0	73.7	
1924	153.0	30.0	9.0	367.6	29.4	83.4	69.1	

APPENDIX TABLE 4 concluded

Year	Net Total Public and Private Debt[a]	Net Public Debt[a]	Net State and Local Debt[a]	Net Stock of Total Wealth[b]	Net State and Local Wealth[b]	Gross National Product	National Income[c]	Disposable Personal Income
1923	146.3	30.0	8.2	357.1	28.2	84.3	69.5	
1922	140.0	30.5	7.7	334.2	26.1	72.5	59.5	
1921	135.8	29.6	6.5	328.6	25.8	70.3	51.7	
1920	135.4	29.6	5.9	374.4	29.2	86.2	69.5	
1919	128.0	30.8	5.2	373.0	29.1	77.1	68.2	
1918	117.4	25.9	5.0	314.4	24.6	65.5	58.3	
1917	94.4	12.0	4.7	274.4	21.7	59.5	53.7	
1916	82.1	5.6	4.4	226.8	18.1	47.8	44.8	

[a]U.S. Department of Commerce, *Survey of Current Business,* May 1969, May 1966, May 1965 and July 1960 issues.

[b]1945-58 data from R. W. Goldsmith, *The National Wealth of the United States in the Postwar Period,* Princeton for NBER, 1962, p. 112, 1916-44 data from R. W. Goldsmith, U.S. Brady, and H. Mendershausen, *A Study of Savings in the United States,* Princeton, N.J., 1956, p. 14. While similar definitions and measurement techniques were used in both studies, these two series are not directly connectable.

[c]1929-65 data from U.S. Department of Commerce, *Survey of Current Business* May 1969, May 1966 and August 1965 issues. 1916-28 figures from estimates of Office of Business Economics, U.S. Department of Commerce (1916-58 figures are not directly comparable with figures after 1928).