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CHAPTER 6

Tax-Exempt Interest as a Cost to Borrowing Governments and as a Yield to Investors

SUMMARY

The full story of postwar interest rate developments has yet to be written. This chapter cannot cover the entire subject; it can only concentrate on interest rate developments that were unique to the field of state and local government borrowing.

The most important fact to be considered is that yields on tax-exempt securities increased much more than almost any other comparable interest rate since World War II. During the almost unbroken boom of the postwar decade interest rates increased considerably. The largest relative increase for any major long-term yield, however, was that experienced in state and local government borrowing. The basic long-term yield on high-grade issues of this type increased from one per cent in the spring of 1946 to almost 3½ per cent in the late summer of 1957. Short-term tax-exempt yields went up relatively even more, as was true of all short-term interest rates. Because the underwriting margins also increased, the cost of borrowing by state and local governments increased even more than yields. Such an increase in interest costs meant that the total amortization cost of a 20-year serial debt with equal maturities increased by almost a fourth; for a 30-year debt the total amortization cost increased by more than a third.

One commonly offered explanation of the exceptionally large increase in tax-exempt yields is that restrictive monetary policies influenced them in an unusual degree. Monetary policy doubtless had a powerful and pervasive effect on interest rates generally. The case for a differential impact, however, is far less clear.

The narrowing differential between tax-exempt and fully taxable interest rates cannot be explained by tax expectations; quite the contrary, the expectations as to tax rate changes should have produced quite different differentials from the ones that, in fact, prevailed.

The most convincing explanation, and the one most in accord with both logic and fact, is that in order to market the increased

volume of state and local government securities, new investors had to be brought into the market and that these new investors had a lower marginal use for tax exemption. This point has already been developed in Chapter 3. In other words, to find markets for the considerably increased volume of offerings, the privilege of tax exemption had to be bargained away for less and less to investors for whom tax exemption had a relatively low marginal value.

Another significant observation with respect to tax-exempt interest yields during the postwar decade was that they fluctuated through a somewhat wider range than had been true of other long-term interest rates. One possible line of explanation explored in this chapter is the somewhat more volatile character of new issue yields compared with those which prevail in the secondary market. Since most of the customary measures of open-market interest rates depend on secondary market sources, there is a danger that these commonly cited figures conceal the true course of events. Though there is some merit in the point, our investigations suggested that new issue versus secondary market experience would not account for the wider fluctuations in state and local government yields except to a relatively small extent. The more convincing reason appears to be that commercial banks have been an extraordinarily important part of this market. For reasons of general banking policy, commercial banks have been quite volatile investors. Indirectly, of course, this may reflect the influence of monetary policy.

The third major characteristic of the postwar market for state and local government securities has been that the interest rate differential between lower credit quality and higher credit quality borrowers persisted more than the comparable differential in the corporate field. This is an extraordinarily puzzling fact. Various hypotheses that might explain it were tested, but none of them yielded satisfactory results; the question is worthy of further investigation. The principal significance of this finding, however, is that the financial problems of state and local government in the future may be even more acute than some forecasters have suggested since an increased volume of borrowing inevitably means some reduction in the quality of the securities issued. On this basis it may be expected that there will be increasing problems in financing state and local government capital improvements.

The fourth major characteristic of postwar state and local govern-

ment tax-exempt yields is that the yield curves or the relationship between yield and maturity for these securities were not parallel to those found in other sectors of the capital markets. The differences were sometimes so sharp that they cast doubt on the popular hypotheses that the maturity-yield relationship of interest rates reflects risk of loss on long-term obligations. Experience has shown that the serial offering scales of tax-exempt obligations often depart from the other yield curves appreciably. How much of this is due to the inflexible supply of unpopular maturities cannot be estimated. Experience with term bonds such as of toll roads is still too brief to forecast the pattern they will develop. It presumably will be similar to that of term corporate securities. The only hypothesis that seems to explain this interesting fact is that the market for state and local government securities is a highly segmented market. Demand in one segment of the market can vary considerably from the demand that prevails in other portions of the money markets or the capital markets.

The net effect of all four of these factors, but particularly of the first and third, has been to create a vast shift in the way in which the benefits of tax exemption are divided between borrowing governments and investors. The economic (if not the political) equivalent of tax exemption is that of a subsidy. Near the beginning of the postwar period it would appear that a very large part of the tax revenue foregone by the federal government was recaptured by state and local governments in lower borrowing costs. In fact the quantity of borrowing was small and so what in actuality took place was that investors in tax exempts from earlier periods were given the chance to realize capital gains. State and local governments did not get much advantage from this brief episode. But as the decade went along, this condition changed and investors were able to demand a larger and larger portion of the benefits of tax exemption and state and local governments were able to retain less of them. The subsidy lost much of its effectiveness. In the final part of this chapter, some admittedly rough estimates of the way in which this differential has been divided between borrowers and investors are presented.

RELATIVELY GREAT INCREASE IN TAX-EXEMPT YIELDS
DURING POSTWAR DECADE

The much greater increase in yields on tax-exempt state and local government securities is evident in any comparison of interest rate changes. In the spring of 1946, a top-rated state and local governmental unit could have sold its twenty-year obligations at an interest cost of less than 1 per cent. In the late summer of 1957 a similar borrower would have had to pay almost 3½ per cent for twenty-year money. The unusual degree of this increase in interest costs is disclosed by a comparison with other yield changes. During the same interval, the yield on fully taxable U.S. government twenty-year obligations went from about 2¼ per cent to almost 3¾ per cent, an increase of 1½ percentage points. The interest cost for newly marketed high-grade corporate bonds rose from about 2⅝ per cent to more than 4⅝ per cent, an increase of two percentage points. Increases in yields on high-grade corporate bonds in the secondary market were less, about the same as for U.S. Treasury long-term bonds. If yields on state and local government securities had increased only in the same proportion as those on U.S. Treasury or high-grade corporate bonds they would have risen only to about 2 per cent. In other words the major part of the tax-exempt yield increase must be explained by factors applying uniquely to that market.

The contrast between tax-exempt state and local government security yields and those on corporate bonds was (and is) greatest for the highest grade obligations. The differences were considerably less for intermediate-grade securities. This is shown in Chart 8. In this chart, the Aaa tax-exempt yield is shown as a ratio of the Aaa corporate yield; the Baa tax-exempt yield is also shown as a ratio of the Baa corporate yield. For comparative purposes, the corporate tax rate (for large corporations) is also shown. This chart demonstrates that the erosion of the borrowing advantage of tax exemption during the postwar decade has not been a steady matter; the differential has moved erratically.

Using 1946 as the starting point for our tax-exempt yield comparison undoubtedly results in some bias. The volume of new issues was very small and market supplies in the secondary markets were also limited. The 1946 yields were priced in a very thin market.

The extremely low yields on state and local government obligations in that year were partly due to a fear that there might be a shortage of tax-exempt investment outlets now that tax exemption was not available on newly offered federal obligations. In retrospect the fear seems odd, but editorial comment at that time confirms its

CHART 8

Municipal Bond Yields as a Percentage of Comparable Corporate Bond Yields
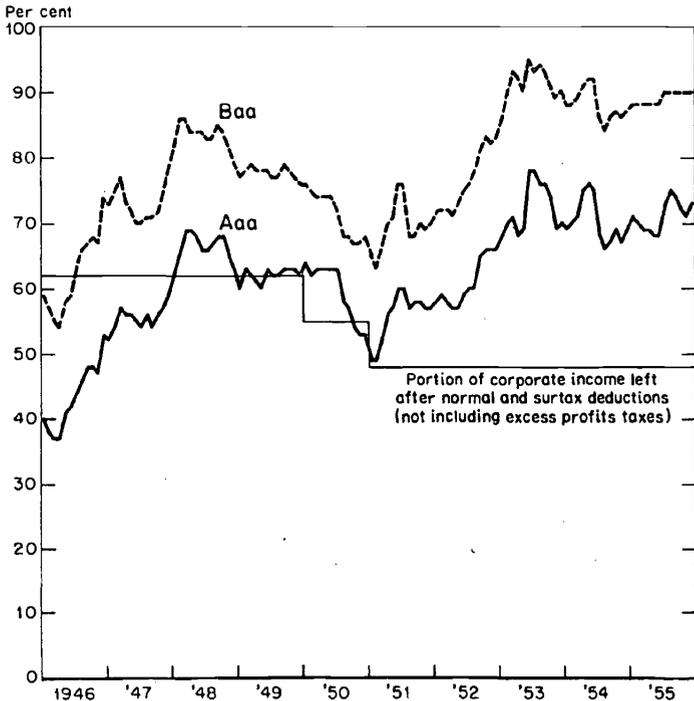
Source: Moody's Investors Service.

reality. With full allowance for the market effects of this fear, one cannot help wondering why tax exemption should have been given such a high value at that particular juncture. Applicable income tax rates had just been lowered and in that short idyllic interlude before the threat of war once more revived, the expectation must have been for even further tax reductions.

As other studies have shown, saving through financial interme-

diaries appears to have gained relative to direct individual invest-ment.[1] Many of the principal institutional investors are themselves either exempt from federal income taxation, pay only low marginal rates of taxes, or are unable to pass along the value of tax exemp-tion to their equity investors as was elaborated in Chapter 3. Life insurance companies are now subject to a $6\frac{1}{2}$ per cent gross invest-ment income tax rate. Public and private pension funds, both among the most rapidly growing investment institutions, can, and usually do, qualify for complete tax exemption. Mutual investment com-panies can qualify for tax exemption but cannot pass the benefits of tax exemption on their investments along to their stockholders. Among institutional investors, the only two important groups sub-ject to the full corporate tax rate are commercial banks; and fire, marine, and casualty insurance companies. Both of these types of institutions have frequently been important investors in tax-exempt securities; on some occasions they have put a large fraction of their accruing money in this market. But tax-exempt securities are hardly the most desirable form of investment for either type of institution. Customer loans continue to be the favorite outlet of commercial banks. With the special 85 per cent dividend credit on corporate equities, fire, marine, and casualty insurance companies pay taxes of only 7.8 per cent on dividend income (52 per cent times 15 per cent). This makes equity investment very attractive—except when equity prices get very high.

Individual investors with high incomes can choose tax-exempt obligations with considerable logic. But this is a defensive form of investment; it preserves only the dollar integrity of principal and shelters income from taxation. The widespread forecast of secular inflation has led many investment counselors to emphasize more the preservation of real value than of dollar amounts. Capital gains have been more emphasized as an investment objective; they have some tax and many strategic advantages. Other shelters from taxa-tion can be found in such investment media as oil royalties and rental real estate.

The timing of the shrinkage in yield differentials suggests that monetary policy is only a partial explanation at most. Much of the

[1] Raymond Goldsmith, *Financial Intermediaries in the American Economy* (Princeton University Press for National Bureau, 1958), Chapters vii and ix, particularly Table 91, p. 304.

shrinkage had occurred before 1951, when monetary policy was reactivated. Furthermore, it is hard to find any persuasive reason why monetary tension should have had an unusually severe effect on the tax-exempt market, except that commerical banks are unusually important investors in this market. Commercial banks are probably more directly affected by monetary policy than other financial institutions. It is true, of course, that state and local governments rely less on current surplus for capital expenditures and are less facile in the temporary use of short-term credits, both features of which help business corporations minimize the impact of monetary policy.

One would expect the differential between tax-exempt and fully taxable yields to respond not only to accomplished changes in tax rates but also to expectations as to future tax rates. This is particularly true of long-term tax-exempt obligations which discount tax rate expectations rather far into the future. Unfortunately the facts do not give much support to the hypothesis that this was a significant market factor. In the beginning of the postwar period, tax cut expectations were high but have since been dimmed by the course of international political developments. On the basis of these expectations the differential should have started narrow and become wider—the opposite of actual events.

Tax rate expectations clearly have been a market factor from time to time. In the fall of 1950 the prices of tax-exempt securities were bid up when other prices were going down. This was true likewise in earlier periods. After World War I the level of income tax rates was reduced sharply; the value of tax exemption was correspondingly discounted. During the New Deal period in the 1930's most investors, bitterly opposed as they were to the prevailing political temper of the times, found it hard to believe that steeply progressive rates of taxation were an enduring element in the political system. Much the same could have been said during the early phases of World War II. But the size of the federal debt and many other factors changed the views of many investors. By the time the postwar period was underway, most investors had come, no matter how reluctantly, to believe that relatively high tax rates were likely in the foreseeable future. When high-grade tax-exempt yields for twenty years dipped under one per cent in 1946, buyers of tax exempts were, in effect, discounting this privilege over the

next twenty years at a marginal rate in excess of 60 per cent. This is shown with Aaa and Baa municipal yields as a relative of similar corporate yields in Chart 8. Since this was considerably in excess of the 38 per cent rate on corporations at the time, the valuation of the market is hard to understand.[2] When Congress was considering a revision of tax rates in 1948, the prices of tax exempts were weak for a while but this was reversed in the mild recession of 1949.

The other side of the story is that the yield discount (price premium) of Aaa municipal bonds in 1953 came to be as low as 22 per cent. The value of tax exemption was only about two-fifths of the corporate tax rate and was equal to the marginal tax on income of individuals with only about $10,000 of income per annum. In neither case can it be said that expectations of tax rate changes justified such a change. In fact if a boom period reduces the expectation of tax reductions and enhances the prospects of individuals' advancing to higher tax brackets, as would seem reasonable, this factor should moderate the price reduction for tax-exempt securities. But, as shown above, the actual course of price developments has been quite the contrary.

Tax rates clearly have some relationship to yield differentials, as would be expected. One investment counsel service determines a "normal" relationship between Treasury yields and tax-exempt yields by a multiple regression using Treasury bond yields, existing tax rates for higher income individuals and for corporations as independent variables. Correlation coefficients of about .9 prevail between the presumptive normal yields and the actually observed yields.[3]

Even though this indicates a considerable relationship of yield differentials to tax rates, this analyst also observed that expectations appeared to lead actual tax rate changes by an appreciable margin. Time-lagged correlations were not computed, but this relationship seemed evident in the charts of this counseling service. This correlation was computed only for Aaa or Aa securities. These securities have preserved the greatest amount of differential, as indicated in

[2] Particularly so in light of the fact that individuals appear to have been selling tax exempts or at least failing to maintain their investment position in them while commercial banks were the only buyers during first half of 1946.

[3] J. Eugene Banks of Brown Brothers Harriman and Company, institutional investment counseling service.

another section of this chapter. Among securities of lower credit quality such high correlations might not be found.

Failure of the market for the privilege of tax exemption to expand probably explains most but not all of the differential yield movements. In the first place, the significance of the under-1-per cent yield on twenty-year state and local government obligations at the beginning of the decade may be questioned. The volume of new issues was negligible; almost the only bonds available were those in the secondary market. The *Blue List* of that period showed offerings only slightly in excess of 100 million. The proportion of issues of top quality was not unusually high. In other words, the yields quoted at that period must have been based on a relatively thin market.

Another factor that might account for a high-grade yield change would be a change in the proportion of state and local governmental units with high credit standing that are borrowing. At the beginning of the decade, the governmental units with high credit standing were borrowing very little; most of those coming to the market had an intermediate credit standing.[4] It could have been said that the supply of high-grade issues was short relative to the supply of issues of other qualities. But the widespread need for large state and local governmental capital expenditures brought more conservatively financed and richer communities into the market. Public Housing Authority issues, which are of the highest quality, became an increasingly important factor in the market. There was no shortage of high-grade issues at the end of 1956!

While the supply of high-grade issues increased relatively, this factor cannot explain the over-all yield increases. Yields of intermediate-grade state and local government securities increased by just about as much as those of high-grade issues. The general quality of state and local government credit probably has not changed materially. Large borrowing may have reduced it a bit but at most from something like a "superb" to a "very good" rating.

The large increase in state and local governmental yields compared with the relatively and absolutely much smaller one which has been shown by U.S. Treasury obligations must be considered against the background fact that the marketable debt of the federal government increased relatively little over the decade, while that

[4] See Table 7.

of state and local government had risen to more than three times its earlier level. The U.S. Treasury had to raise some new money, but its major problem was that of refunding the outstanding debt. While the total debt grew moderately in the postwar period, the marketable portion of the net debt changed very little.

But this relatively greater increase in debt is not the whole story. While the new money demands of state and local government were large, so were those of corporations. If the demand for new money explained the differential advance in state and local governmental yields, then the increase in corporate yields should have more nearly paralleled that of state and local governments than that of treasury obligations. This was not true: corporate yields, if measured by the cost of new money, went up only a bit more than yields on U.S. Treasury obligations: a matter of 3/8 of a percentage point at most. Corporate yield experience was much closer to that of Treasury financing than to that of state and local government borrowings. Tax exemption clearly isolated the market for state and local government securities from other capital markets.

WIDE PRICE FLUCTUATION OF STATE
AND LOCAL GOVERNMENT SECURITIES

The yields of long-term state and local government securities fluctuate through a wider range than any other important long-term interest rate. Any chart showing the history of bond yields demonstrates the fact adequately.[5] The large-scale buying of tax exempts in late 1950 produced a drastic price effect. The prices of tax exempts dropped more when the U.S. government security market was unpegged in early 1951 than did the prices of Treasury bonds themselves. The further drop in prices to mid-1953 was also greater for tax exempts than it was for taxable bonds. The recovery of prices after mid-1953 to mid-1954 was also greater for tax exempts than for taxable obligations. Again in late 1956, tax-exempt prices went down more than other bond prices.

The wider amplitude of price fluctuations is also shown in Chart 9. This chart is based on a series of prices derived from yields. To furnish comparability, the prices were derived for state and local government and corporate securities having a rating of Aa. Both

[5] As, for example, the bond yield chart in the *Federal Reserve Historical Chart Book*.

CHART 9

Relative Price Movement of Corporate and Municipal Bonds
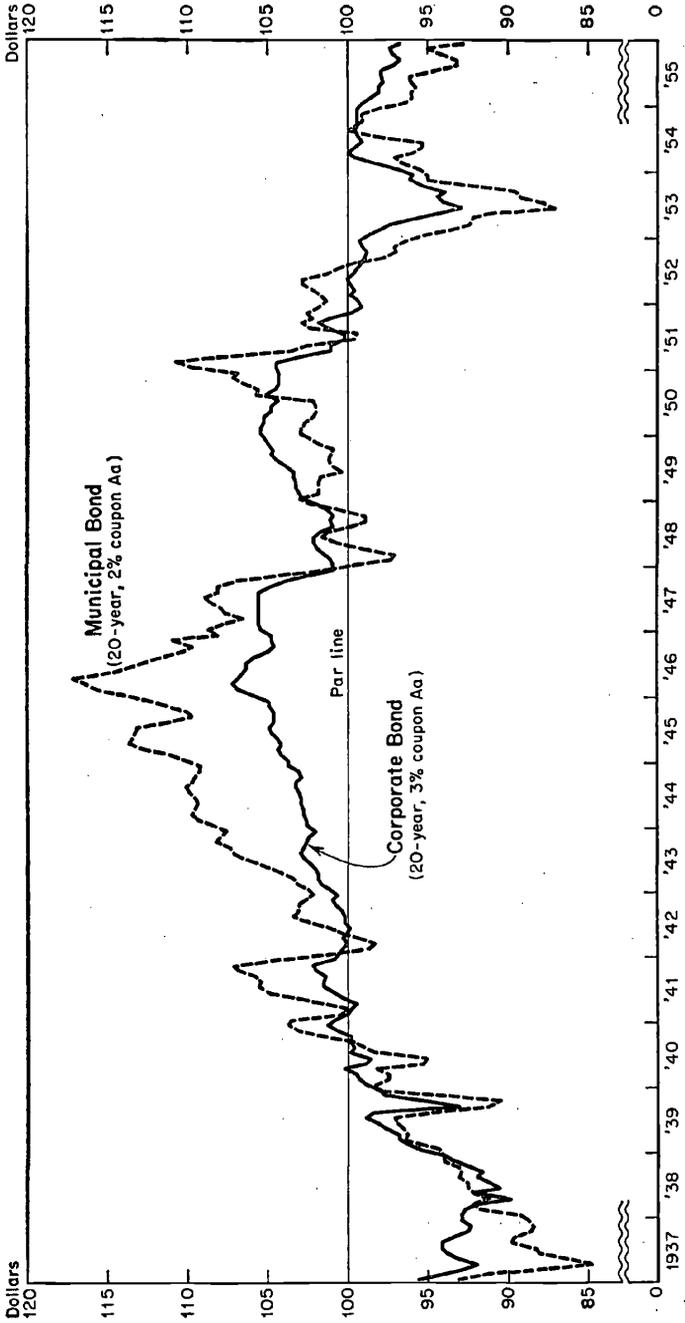
Price comparison based on prices derived from Moody's Aa municipal and corporate bond yields; a coupon of 2% being assumed for the municipal bond and a coupon of 3% being assumed for corporate bond; both bonds assumed to have 20-year maturity.

series were taken from Moody's Investors Service, as were the ratings. In both cases, the prices were those representing a constant twenty-year maturity bond. To facilitate comparison, the corporate bond was given a 3 per cent coupon which brought its average near par; a 2 per cent coupon for the municipal did likewise. In other words, the prices do not represent a single bond (which would shorten in maturity as time passed) but an assumed average of a portfolio with a constant maturity of twenty years. This was felt to approximate more closely the price experience of investors than any other form of representation. The much wider range of price fluctuation for state and local government securities is easily evident to the eye. The average variation of price for the municipal series was more than twice that of the corporate series for the entire 1937-1955 period. In the period since March 1951 (the Federal Reserve-Treasury "accord") both fluctuated a bit more than before and the difference in range is not quite as large, with the municipal average range a little less than twice that of corporate bonds.

The wider range of yield fluctuation for state and local government obligations than for corporate or U.S. Treasury bond yields appears to be due to a combination of circumstances. In addition to the general economic influences that apply to all capital markets equally, the valuation of state and local government securities involves pricing the privilege of tax exemption. This makes it a narrower market.

A further circumstance influencing state and local government security yields is that this market is more subject to inventory adjustments. The supply of corporate obligations in the secondary market is seldom very large; the supply of new and unsold corporate issues is more often zero than any other amount. The supply of Treasury obligations in the market is concentrated in the shorter maturities; supplies of the longer maturities are seldom truly large. Sometimes one or two dealers will be holding a speculative position in long bonds, but inventory is more sporadic than regular. When market signs are adverse, these inventories are cleared out quickly.

But the market for state and local government securities apparently cannot operate satisfactorily without an inventory of significant size; sometimes it seems to need quite a large amount. Even though dealers may see the signs of marked adversity, they find it hard to reduce inventories quickly. Since many state and local

government finance authorities in offering their securities for com-
petitive bidding do not respond quickly to adverse market develop-
ments, inventory may pile up from new-issue marketing much more
than is true of the corporate field, where the units are larger,
financing plans can be changed more quickly, and the proportion
of negotiated deals is larger. The influence of unsold inventory
on this market is material. Several periods of this influence stand out
quite evidently. In the fall of 1947 when the Federal Reserve started
supporting Treasury bond prices, and on Christmas Eve when this
support was dropped to par, both the corporate and the tax-exempt
market responded by weakening. But whereas the initial response
of the corporate market accounted for most of its change, the tax-
exempt market continued to be weak well into 1948 until inventory
had been worked back to more normal proportions. Much the
same was true in 1951 when the Federal Reserve dropped par
support altogether. In the spring of 1953 when the entire capital
market was relatively tight, tax-exempt securities followed the
general pattern of weakness. Although the recovery of Treasury
and corporate bond prices started in early June after Federal Re-
serve easing was evident, it did not show up as promptly in the
tax-exempt market; some inventory had to be worked off before
the influence of credit ease was fully evident.

The unusual coupon practices that prevail in this field (see
Appendix B) and the wider range of outstanding coupons may
account for some, though probably only a small part, of the greater
price volatility of state and local government securities. When
Durand and Winn were studying bond yields in the early postwar
period, they encountered the fact that, other things being equal,
high-coupon tax-exempt obligations sold at a higher yield than
those with coupons near the levels of market yields.[6] Investors
apparently did not like to pay the large premiums involved in
high-coupon obligations; trust administrators had to amortize them
to preserve equity between life tenants and remaindermen but
amortization sometimes involves legal problems. In smaller port-
folios reinvestment of principal is awkward. Since the Durand-Winn
survey was made, yields have gone up a great deal. Some high-
coupon long-term bonds are still outstanding, but the effect of
coupon on yield is far less clear than it was earlier. Durand and

[6] Technical Paper 6 (National Bureau, 1947), pp. 31-40.

Winn solved the problem of quality uniformity by use of New York City bonds and corporate stock.[7] The subsequent retirement of a large number of the high-coupon issues meant that similar comparisons must be based on fewer observations. But a number of other coupon effects were noted and confirmed by traders. In periods of relatively easy money in 1949 and 1954, high-coupon short-term issues sold at lower yields than comparable maturities with lower coupons. Banks sometimes prefer high-coupon issues for reasons outlined in Chapter 3 and paid a slight premium for them. But in 1955, when bank credit was tight, high-coupon short-term issues sold at higher yields than comparable issues with lower coupons. High-coupon long-term issues generally sell at slightly higher yields if their coupon throws their price materially above par. This premium is large in a low-rate period such as when Durand and Winn were making their observations but it has been far smaller recently.

Another coupon-induced effect has emerged in recent periods: when yields have gone up so that low-coupon issues sell below par, their yield is also slightly above comparable high-coupon maturities of comparable quality. This effect is confined to municipals, rather the reverse being true of corporate obligations. The reason for this phenomenon seems to be as follows: if the low-coupon issue was originally sold at par, the holder can claim tax exemption only for the amount of the coupon; the approach of such an under-par security to par by the working of amortization mathematics is treated as a taxable capital gain. So the full yield of such a low coupon obligation is not tax exempt, only the coupon. For example, in January 1957, $1 million of 1¾ per cent general revenue bonds of the Triborough Bridge and Tunnel Authority maturing in 1960 were offered in the secondary market priced to yield 3.25 per cent. On the same day City of San Antonio Electric and Gas Systems Revenue Improvement bonds—an issue of comparable (or at least no higher) quality—were offered with the 1960 maturity (coupon 4 per cent) priced to yield 2.80 per cent. Seattle school district bonds, also of comparable but no higher quality, were offered on the same day priced to yield 2.80 per cent on the 1960 maturity (coupon 6 per cent).[8]

[7] They also paired bonds of one corporate issuer.
[8] *The New York Times*, January 21, 1957, financial advertisements.

Only the 1¾ per cent coupon on the Triborough bonds was tax exempt; the other 1½ per cent of the offered yield was subject to capital gains taxation. Allowing for taxation of this at the prevailing 25 per cent level for long-term capital gains, the net tax-exempt yield of the Triborough bonds was slightly more than 2.85 per cent, quite in line with the offering yields of comparable new issues.

When it was originally sold at a discount, the holder of a low coupon bond can claim the original yield as being tax exempt. Thus low-coupon[9] terminal maturities may offer full tax exemption. But even in these cases, low coupons are not popular in the market and require from 35 to 70 basis points higher yields.

From these observations, the following statement might be generalized: the effects of a high coupon on a short-maturity issue depend on the state of the money markets. Both a high coupon on a long-term issue and a low coupon on all issues (particularly if sold at a low yield by the issuer) tend to sell at higher yields than comparable maturities with coupons near to market yields. Investors, with the exceptions noted above, prefer municipal securities that sell near par.[10]

The hypothesis that is the most persuasive one in accounting for the considerable volatility of tax-exempt security prices is that commercial banks have been such important but unstable investors in them. As the evidence in Chapter 3 showed, commercial banks have absorbed as much as two-thirds of the new issues offered on the market in some semiannual periods; in others they absorbed none of the net increase. No other class of investors has alternately entered or retreated from the market with such great variability.

The reason commercial banks are such volatile investors in these securities is that they do not give them a top priority among the investment alternatives open to them. Commercial banks are dominantly customer-lending institutions. The next priority is for liquidity, and even short-term tax-exempt securities are not particularly liquid. The purchase of tax-exempt securities thus has a relatively low priority in the application of funds. For this reason

[9] See Chapter 3 and Appendix B for an account of why such coupons are offered.

[10] Investors buying callable corporate securities in the secondary market prefer low-coupon securities selling under par since these will not be "lost" to a call as readily. Thus, in a price decline, this factor sustains the prices of low-coupon corporate issues whereas low-coupon municipals sell off just that much more.

commercial banks may have been far less dependable buyers of tax exempts than the institutional investors that have accounted for the principal purchases of corporate bonds, such as life insurance companies and pension funds and other trust accounts. To the extent that this hypothesis is valid it raises an interesting question for the future: will the growth in money supply requirements, which guides the release of reserves by the central bank, be at such a pace as to expand or constrict the relative proportions of securities taken by commercial banks?

THE INFLUENCE OF CREDIT QUALITY ON YIELD

One of the most significant differentials among state and local government security yields is that induced by differences in the qualities of individual securities. The yield differentials between grades of corporate securities shrank considerably during the postwar decade. But the differentials between grades of state and local government securities continued to be large. These differentials are shown in Chart 10 in absolute amounts (of yield) and in relative amounts (yield differential as a ratio to highest grade yield) in Chart 11.

Neither basis of comparison is wholly satisfactory. An investor might consider the risk premium he would require to be a proportion of the basic high-grade yield available to him. For example, in a given circumstance an investor might assume a given risk gladly if he could improve his yield from 2 per cent to 3 per cent. He might, however, hesitate to assume the same risk in order to improve his yield from 5 per cent to 6 per cent. But if the differential is looked at as a fund that might be accumulated in reserve form, then an absolute amount is more nearly consistent with the actuarial nature of risk than a relative amount. The market does not seem to hold clearly to just one of these views; both are shown for reference purposes.

The measure of quality we used has been that of the ratings assigned by Moody's Investors Service. This source furnishes unusually comparable data because they not only prepare the ratings of individual securities but also compile yields by the same quality ratings. Such experience as has accumulated with rating systems suggests that they are reasonably accurate judges of quality. While

CHART 10

Municipal Bond Yield Differentials by Quality of Issue, in Basis Points*
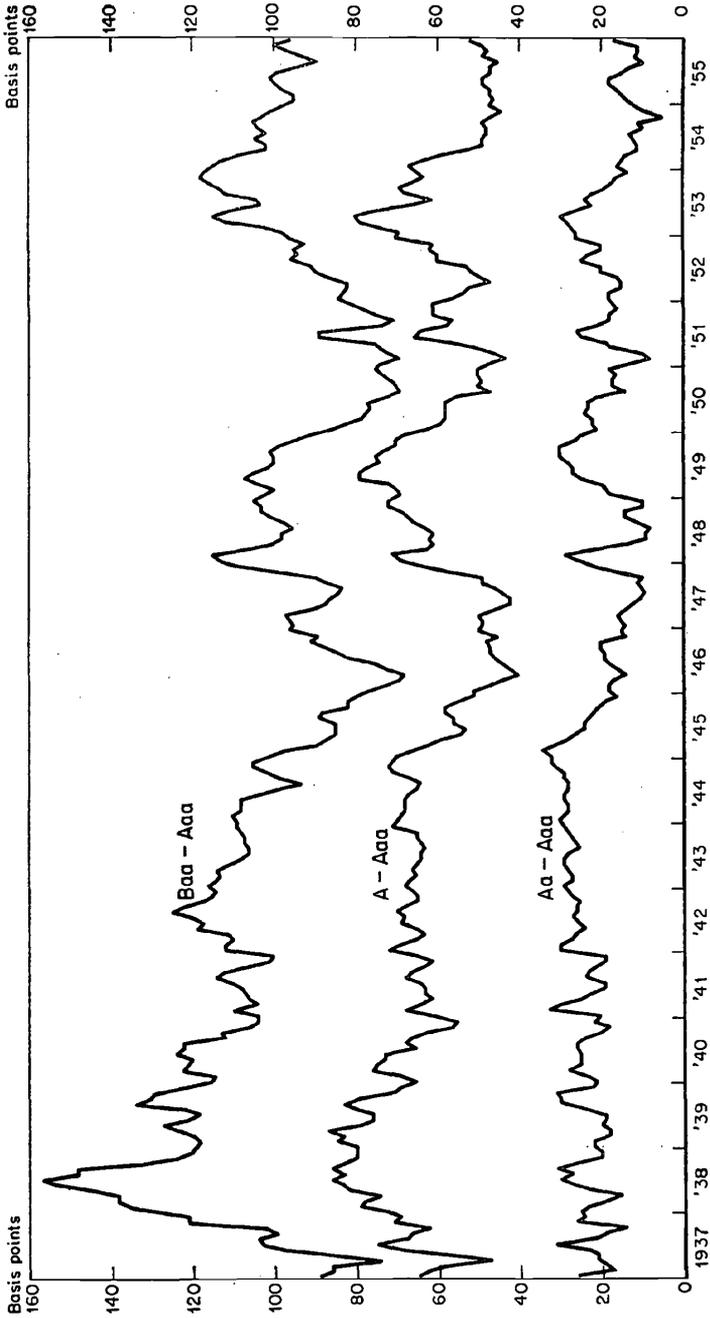
* A basis point is one-hundredth of one per cent of a yield quotation.
Source: Moody's municipal bond yields for Aaa, Aa, A, and Baa issues.

CHART 11

Municipal Bond Yield Differentials by Quality of Issue, in Relative Terms
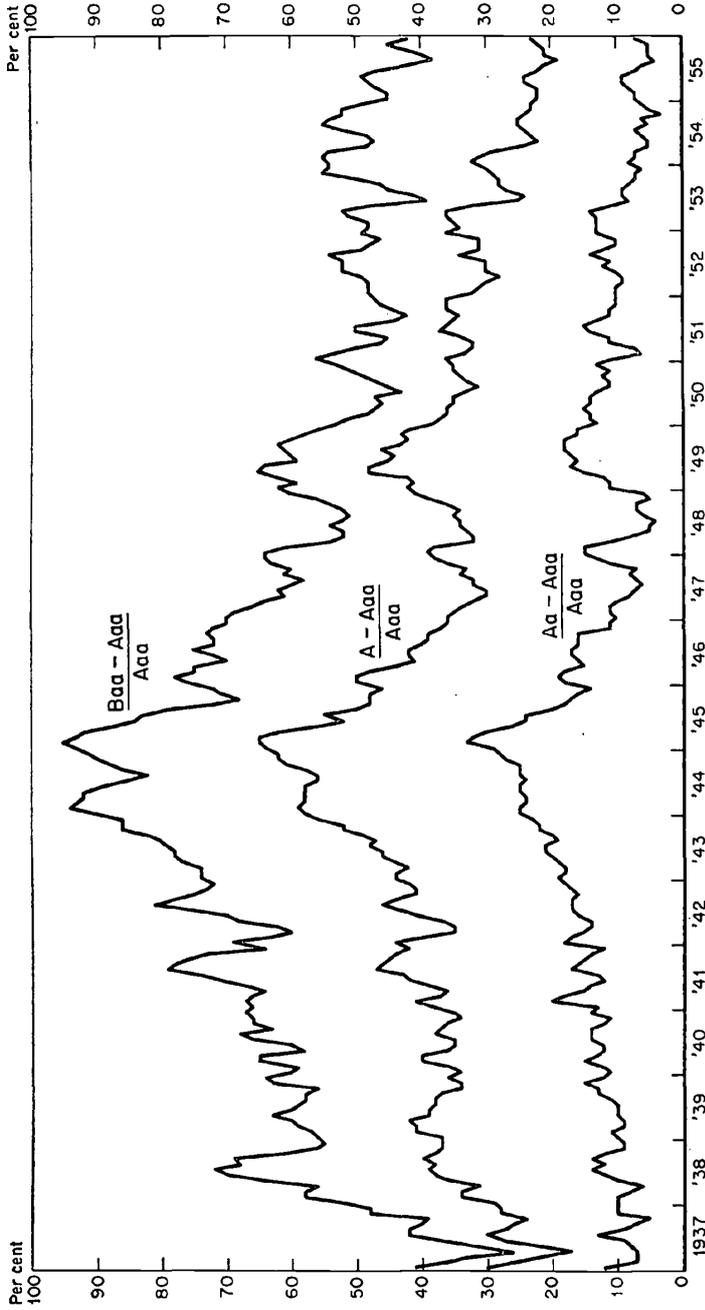
Source: Moody's municipal bond yields for four top rating groups.

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this record has been tested only for corporate bonds,[11] we have no reason for expecting the accuracy of municipal bond ratings to be less than that of corporates. The fundamental quality differences among the various rating groups probably are moderate. Practically all municipal credits that are rated fall within the top four rating groups. The rating agencies class securities in all four top groups as being of "investment quality." In other words, they judge state and local government credits to be generally good; some are better than others, but most of them are rated good. No rating agency gives even a Baa rating to a credit if it has dubious characteristics; rather, it is a good credit but with less margin of protection than the very top qualities. The Hickman survey of corporate bond quality cited above found that the differences in investment experience among quality ratings, while positively correlated, were smaller relatively than the yield differentials. In other words, the corporate bond market exacted a considerable surcharge for the risk element in corporate credit.

The quality yield differentials found in municipal bonds are so large as to raise questions as to the rationality of investment behavior. For example, the margin between the Aaa yields and Baa yields has averaged close to one percentage point during the post-war decade. Without some quantitative measure of risk this figure cannot mean much in itself. We can be confident, however, that the worst investment experience of a reasonably diversified portfolio of tax exempts in the Great Depression would have been far more than covered by a 1 per cent risk premium. The highest default estimate anyone made was 15 per cent (most were much smaller) and no one believes that ultimate losses to investors were more than 1 per cent of the debt outstanding. As shown below, a diversified portfolio of Baa state and local government securities should be able to accumulate a risk reserve that would allow for a Great Depression every few years and still show a handsome margin over the Aaa yields. Even the margin between the two highest grades

[11] W. Braddock Hickman, *Corporate Bond Quality and Investor Experience* (Princeton University Press for National Bureau, 1958), Chapter 3, particularly pp. 174-210. Hickman found the agency ratings were better for large than for small issues and these ratings did not anticipate the unfavorable experience of some industries such as railroads. But, with allowance for these qualifications, agency rating of corporate bonds was a fairly good forecaster of relative default experience.

has run from 10 to 20 basis points.[12] A margin of 10 basis points would accumulate an appreciable reserve over a long period of time.

The significance of yield differentials as risk premiums is probably best measured by calculating the reserve fund that could be accumulated with such differentials. As a starting point we might assume that periods of distress in municipal finance come rather rarely; they are considerably more than twenty years apart. Aside from such periods of widespread difficulty, the record of municipal credit has been remarkably good. Thus if a twenty-year period be used, and if the yields and yield differentials of the year 1955 be used, the following results are shown:

a. The Baa yield margin over the Aaa yield would accumulate a fund of about \$260 over a 20-year period per \$1,000 bond.

b. The A yield margin over the Aaa yield would accumulate a fund of about \$125 over a 20-year period per \$1,000 bond.

c. The Aa yield margin over the Aaa yield would accumulate a fund of about \$35 over a 20-year period per \$1,000 bond.

This overestimation of risk coverage is not as surprising as it first seems. The PHA obligations furnish an interesting example. The bonds of various local housing authorities covered by a contract with the Public Housing Administration guaranteeing service of these bonds amounts to a tax-exempt credit guaranteed by the federal government. But in the sales of these securities, differential yields are put on the securities of differing authorities but of the same maturity.[13] Some "names" sell better than others. The investment bankers making the offerings concede the irrationality of such differentials, but they know from experience that investors prefer the securities of some localities and they allow for these preferences in their bids. As many as three or four reoffering scales may be used indicating three or four types of judgment made by the market.

Every so often a small high-quality issue, sold virtually simultaneously with a batch of new PHA contract housing authority bonds, will fetch a better price (offer a lower yield) than is obtained from the housing bonds. Why will investors buy such issues with a

[12] A "basis point" is one-hundredth of one percentage point in the expression of yield; i.e., a change of yield from 3.16 to 3.12 is referred to as a drop of four basis points.

[13] See Chapter 4, note 11, for a possible rationality in these differences.

thinner return than that prevailing on a tax-exempt issue backed by the credit of the federal government? Sometimes local tax exemption accounts for such differentials but this advantage accrues only to local citizens and these bonds are being offered on the national market.[14]

While these differentials indicate something less than perfect rationality in the market, they are usually small differentials. In the end, the most important unanswered question is why the market demands such a substantial yield differential for intermediate-grade securities, a differential that exceeds any risk calculation that might be made. The reasons that seem to have the greatest cogency are institutional and traditional. The two principal institutional buyers are commercial banks, and fire and casualty insurance companies. Both of them prize liquidity and both should be considered conservative investors. The liquidity of a high-quality credit instrument is admittedly greater than that of one of intermediate quality. While we have no solid evidence to support the point, opinions of dealers seem to be that the marketing cost of selling a lower-grade security often is considerable. If an investor has to sell an intermediate-grade security before maturity, its higher income may fail to cover the added costs of liquidating the holding.

To the extent that institutional investors want to preserve liquidity for periods of economic adversity, the reasons for avoiding intermediate-grade securities are multiplied. As the two differential charts show (Charts 10 and 11), a recession of the 1937-1938 magnitude increases the yield differentials materially and doubtless would impair the liquidity of the intermediate grades.

Still another view of commercial banks as investors is that they are more anxious to maximize their loan income than their investment income. Loans not only bear a higher rate of return; they are important to customer relationships and are often determinate of a bank's ability to attract deposits—the life blood of the business. The returns from tax-exempt holdings are important, but they cannot claim top priority. And so banks do not attempt to maximize their returns from this segment of their assets; they rather lean

[14] As mentioned in Chapter 3, state and local government securities are only tax-exempt as respects federal income taxes and usually the income tax of the state of issue. States tax one another's issues freely.

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on its quality and liquidity. Banks also take a special interest in local government and the home state.

On top of this, some weight must be given to the incentives working on professional investment officers in commercial banks. An aggressive policy of investment involving some concession to usual quality standards might increase the rate of return on the portfolio. But if this policy should involve no more than one or two conspicuous defaults, the officer rightly fears that he might lose in salary, prestige, and possibly even in job more than he would gain from a better rate of earnings. Even if he could demonstrate to his board of directors that, as an actuarial calculation, the bank was ahead by virtue of a higher rate of return on portfolio, directors do not like losses. They would find it hard to support this philosophy before bank examiners. Bank examiners seem to take a dim view of what might be called the actuarial view of investment risk. They criticize calculated risk-taking even though earnings may suggest the advantage of such a policy. The customs of the financial community do not tolerate much risk assumption.

The investment policies of fire and casualty companies are quite similar. They also look to tax-exempt holdings for liquidity and for that reason prefer high-quality securities. Indeed, it is reported that the boards of directors of some companies have adopted policies of not buying less than Aa rated bonds.

The investment policies of individuals vary widely. Dealers report that some individuals shop for high returns and will assume risk. But individuals will not take risks for trivial yield differentials. They will buy a toll road bond with an income approaching 4 per cent rather than a high-grade 2½ per cent obligation, but probably not for a small differential. Individuals who buy tax exempts generally are not of a speculative temperament; in fact, it appears from the Harvard study interviews[15] that investors in tax-exempt securities tend to be those who would be classed as "conservative" or capital conserving investors. They are not calculating risk-takers; they are cautious.

To the extent that individual investment in state and local government securities is controlled by trust investment policies, one can be sure that caution and conservatism prevail, that calcu-

[15] J. Keith Butters, Lawrence E. Thompson, and Lynn L. Bollinger, *Investment for Individuals* (Harvard Business School, 1953).

lated risk-taking is rare. A trust department that aggressively im-
proved the returns for most beneficiaries would get few thanks for
the yield improvement; but if they have just one or two publicized
losses, the word might spread and they could lose trust business.
This is a high order of rationality on the part of trust investment
officers as a safeguard against the irrationality of trust beneficiaries.

In other words, the natural market for tax-exempt securities is
among investors who prize safety and who are not aggressive yield
improvers at the cost of some risk-taking. This comparison can be
made even more explicit: life insurance companies and some self-
administered pension funds have shown themselves yield-conscious;
they are not exactly risk-takers but they are not cautious to the
point of avoiding some balancing of risk with yield improvement.
But these institutions, though of growing importance in the capital
markets, are of moderate importance as buyers of rated tax-exempt
securities. The buyers of tax exempts thus tend to pay a higher
price (or accept a wider yield differential) for investment safety
than is true elsewhere. This fact in turn affects the market for
state and local government obligations in this way: as long as the
volume of offerings is moderate, investors will pay a good price
for tax protection. But when the volume of offerings increases, as
it has in the past few years, the inevitable averaging down of quality
and the need to broaden the groups of buyers tends to have a sharp
effect on yields. The greater fluctuation in yield and price of tax
exempts is not unreasonable in the light of such demand inelasticity.

TERM STRUCTURE OF YIELDS ON STATE
AND LOCAL GOVERNMENT OBLIGATIONS

Maturity-yield differentials and the patterns into which they fall
are a market factor of considerable importance and have become
one of the most frequently employed empirical foundations for
interest rate theorizing. When maturity is the sole difference be-
tween otherwise homogeneous securities, differences of yield for
various maturities seem to offer clues for answering basic questions
as to why interest is paid or for what service investors demand the
payment of interest. Heretofore analytical attention has been given
mostly to differentials in the high-grade fully taxable markets.
Maturity-yield differentials for tax-exempt obligations as repre-

sented by offering scales introduce a new factor: the discount of tax rate expectations.

Maturity-yield differentials appear to have been implicit in the market structures of interest rates for as long as we have reasonably dependable figures. But detailed measurement of the differentials and plotting of so-called yield curves did not come until the 1930's. In the middle of this decade Macaulay tested the hypothesis that the long-term short-term interest rate relationship was a kind of implied forecast: an upsweeping yield curve forecast rising interest rates and a downsweeping curve forecast falling interest rates.[16] Though he believed that such forecasting was implied, he found it to be unsuccessful. He found no evidence that the long-term interest rates of a period had been anticipated by the preceding long-term short-term interest rate relationship.

Another hypothesis advanced as an explanation of maturity-yield differentials was that of liquidity preference: investors, fearing the risks implicit in the price fluctuations of long-term bonds, would accept lower returns on shorter maturities as a form of loss prevention as well as liquidity assurance. This hypothesis implied that an upsweeping yield curve was the normal expectation; that any other form of curve was a temporary abnormality. But the historians of interest rates showed that downsweeping yield curves appear to have been just about as frequent as upsweeping ones.

A third hypothesis was simply imperfection in the market structure. The smoothness of the yield curves suggested that there was some arbitraging of nearby maturities but that the market was segmented to such a degree that remoter extremes of maturity for otherwise homogeneous obligations could sell at quite different yields.

Macaulay's pioneer work on the relationship of long-term and short-term interest rates was followed by the National Bureau's corporate bond survey. Because the subject of this inquiry was limited to corporate bonds, early work on the term structure of interest rates (done by Hickman[17] and Durand[18]) was similarly

[16] *Movements of Interest Rates, Bond Yields and Stock Prices in the United States since 1856* (National Bureau, 1938).

[17] W. Braddock Hickman, *The Term Structure of Interest Rates, an Exploratory Analysis* (National Bureau unpublished manuscript dated November 16, 1942).

[18] David Durand, *Basic Yields of Corporate Bonds, 1900-1942*, Technical Paper 3 (National Bureau 1942).

focused. A second study by Durand and Winn,[19] published in 1947, covered other kinds of bonds including some serial municipal issues. It is possible that even earlier work was done on this subject by the technical staff of the Treasury Department, but their work records unfortunately are cloaked in official secrecy.[20]

Very little work has been done on the empirical character of maturity-yield relationships for tax-exempt securities except for that of Durand and Winn cited above. The reason could hardly be lack of data since the yields assigned to various maturities of serial offerings by underwriters in the form of "offering scales" furnish a readily available source of data. But there are problems of comparability of these scales to those derived from analysis of other segments of the capital markets.

The securities of the U.S. Treasury and most corporate securities are offered on the market in single maturity or "term" form; measurement of the relationship between yield and the period to maturity is therefore based largely on secondary market observations. Serial corporate offerings are found only in the form of railroad equipment trust obligations. The measurement of the corporate yield-maturity relationship, the "term structure," is therefore more difficult than is true of state and local government securities. For this reason it was only feasible within the resources of this project to compute an annual term-maturity pattern for each of the postwar years. The computation was made for the first quarter of each year and the observations were limited to the month of February so far as possible. These are shown in Table 26. Term maturity structures derived in this way are reasonably comparable to the Durand-Winn corporate and municipal bond yields.[21] The sole difference is that new issue yields were used rather than those from the secondary market. This can be viewed as more of an advantage than a disadvantage: the quality of issues in the secondary market is diverse and scattered; in some periods it is almost impossible to get enough observations for the drawing of

[19] David Durand and Willis J. Winn, *Basic Yields of Bonds, 1926-1947: Their Measurement and Pattern,* Technical Paper 6 (National Bureau, 1947).

[20] The first yield curve published by the Treasury appeared in the *Treasury Bulletin* for February 1939, but this analytical device had been used internally for some time previous to this publication date.

[21] Cited above; the basic corporate yields have since been kept up to date in the National Industrial Conference Board Economic Almanac.

TABLE 26

Maturity-Yield Relationship for Aaa State and Local Government Obligations

(per cent)

Years to Maturity	1945a	1946a	1947a	1948a	1949	1950	1951	1952	1953	1954	1955	1956
1	.40	.25	.65	.80	.65	.70	.90	1.00	1.15	.80	.80	1.50
2	.45	.30	.70	.90	.80	.80	.95	1.05	1.25	.90	.95	1.60
3	.50	.35	.75	1.00	.90	.85	1.00	1.10	1.35	1.00	1.05	1.70
4	.55	.40	.80	1.10	1.00	.90	1.03	1.13	1.40	1.10	1.15	1.77
5	.58	.45	.85	1.20	1.10	.95	1.05	1.15	1.45	1.15	1.23	1.80
6	.62	.50	.90	1.27	1.18	1.00	1.07	1.18	1.50	1.20	1.30	1.85
7	.66	.53	.95	1.33	1.25	1.05	1.10	1.22	1.55	1.25	1.38	1.87
8	.70	.57	.98	1.38	1.30	1.10	1.13	1.26	1.60	1.30	1.45	1.90
9	.73	.60	1.02	1.42	1.35	1.15	1.15	1.30	1.65	1.35	1.50	1.92
10	.76	.63	1.05	1.47	1.40	1.20	1.18	1.35	1.70	1.40	1.55	1.95
12	.82	.68	1.12	1.55	1.50	1.30	1.20	1.43	1.77	1.50	1.65	2.00
15	.90	.80	1.20	1.70	1.65	1.45	1.28	1.50	1.95	1.65	1.80	2.05
20	.98	.90	1.30	1.80	1.85	1.55	1.35	1.55	2.20	1.90	2.00	2.15
25	1.05	.96	1.38	1.85	1.90	…	1.45a	1.75	2.40a	2.15a	2.20	2.25
30	…	1.00	1.40	1.90	…	…	1.55a	1.80	…	2.30a	2.35	2.30
35	…	…	…	…	…	…	1.60a	2.00	…	2.35a	2.40	2.40
40	…	…	…	…	…	…	1.60a	2.05	…	…	2.45	2.40

a Rough approximation.

Source: Yields based on observation of yield curves drawn from offering scales of Aaa obligations brought to the market in the month of February for each year. If no Aaa offerings came in that month, observations were based on offerings of the preceding or following month or on Aa offerings with slight adjustment.

yield curves. New issues were relatively infrequent when the Durand-Winn municipal yield curves were being derived and the secondary market was relatively active.[22] Their choice of data was appropriate to that period. But conditions have since changed and emphasis is currently on the new issues market. Three of the years in this series overlap the period computed by Durand-Winn. The results are so similar that the new-issues basis seems to be fully justified.

The municipal yield curves are generally not parallel to those for Treasury obligations and corporate bonds in the following cases: (a) the upward slope of yields within and after the intermediate maturities is greater for municipal obligations than for Treasury or corporate bonds; (b) the dip at the very short-term end of the scale for Treasury obligations is not found in either the corporate or the municipal yield curves in anything like the same degree.

Both observations are consistent with recognized market characteristics. The two principal institutional buyers of municipal obligations—commercial banks and the fire and casualty insurance companies—both prefer the intermediate maturities. Indeed commercial banks prefer the quite short maturities but, as shown in Chapter 3, they are unable to meet their investment requirements within this range. The number of truly long-term investors is relatively less than in the corporate bond market. Life insurance companies and pension funds which dominate this latter market buy the longest maturities, but neither one is an important factor in the market for serial municipal obligations. Individuals buy long-term obligations but at a price. Thus the flatter slope to the intermediate range of the municipal yield curve squares with market logic. The very short-term end of the Treasury security market is the liquidity market—the one for bills, certificates, and the like. It is used for in-and-out investment. This special function of the Treasury security market often reduces short-term yields rather sharply. In this respect, short-term municipal obligations are rather more like corporate obligations than Treasury obligations.

Since railroad equipment obligations are issued in serial form it might be expected that the municipal and rail equipment offering scales would tend to be parallel. This is true only part of the time. Equipment trust offering scales parallel the Treasury yield curve

[22] See Chapter 5.

rather closely and usually show a little more bow in the intermediate range than is true of municipal bonds. In a period such as the fall of 1955, the parallel virtually disappeared. Equipment trust obligations then offered had little slope in their yield curve. In a number of cases, all the individual maturities were sold "flat," i.e., at the same yield. Commercial banks tapered off their buying, and equipment trust obligations had to be sold to pension funds. But pension funds require as high a yield for a short obligation as for a long-term one. During this same period, the slope to the offering scales for municipal obligations was usually fully as great or greater than that of Treasury obligations.

In 1956 further disparities in yield structures developed. When the money markets became tight, the yield-maturity pattern for U.S. Treasury obligations beyond the first few years became "hump-backed." Intermediate-term yields were above both short-term and long-term yields. But while the slope of the tax-exempt curve declined somewhat during this period, it never flattened out altogether. Explanation of this dissimilar experience appears to be the segmentation of the market. The tax-exempt market is dominated by a different group of buyers from the other capital markets. These buyers have different maturity preferences, hence variations in slopes of yield curves. Without buyers having adequate resources and sufficiently catholic tastes in maturities to arbitrage these markets, such differentials could persist indefinitely. Commercial banks are the only investors having these characteristics; when they are active, interest rate relationships show a more rational pattern. But when commercial banks withdraw from one of the capital markets, as they did in the latter part of 1955 and early 1956, yield arbitrage becomes more erratic.

As would be expected, the term structures of intermediate grades of securities do not parallel those of the top qualities. Generalized term structures for Baa bonds for a selected number of years were prepared for comparison with the Aaa term structures and are shown in Chart 12. As would be expected, the differentials for very short maturities are modest and tend to widen out for the longer maturities, with one exception. That exception is the year 1946 when the two term structures were virtually parallel from the one- to thirty-year maturity. The investment logic that accounted for this relationship is far from clear. The differential continues to widen up to about

the fifteen-year maturity in most cases and thereafter tends to be a constant. The year 1948 is an exception. In that year the differential continued to spread out to the longest measureable maturity. But 1948 appears to be the one year which conforms to investment logic. Risk presumably is partly a function of time; the more remote the

CHART 12

Basic Yield Curves for Aaa and Baa Municipal Bonds, Selected Years
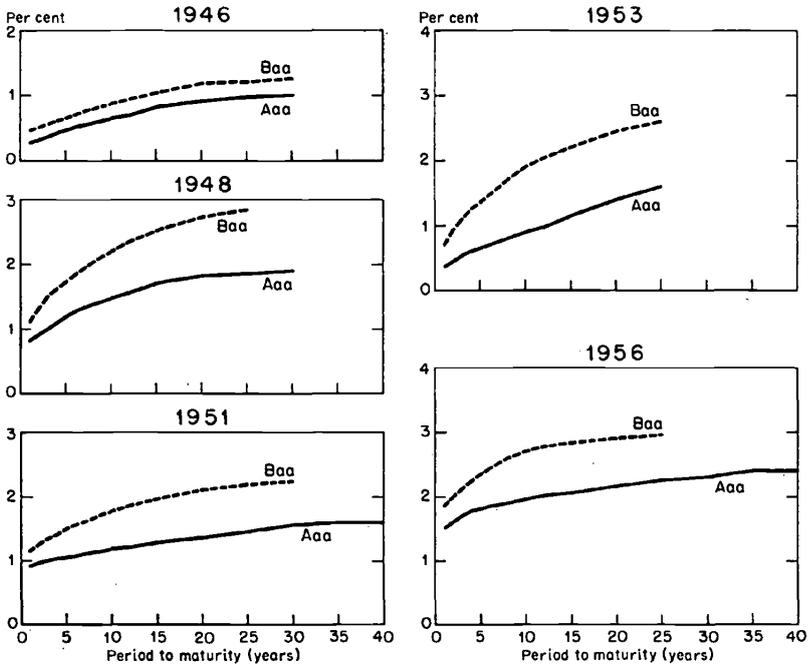
maturity, the greater the range of unforeseen contingencies. The logic of rating investment quality is largely that of margins of protection. No security is given one of the top four ratings unless it offers an "investment" quality likelihood of being paid according to contract. The margin of protection for the highest two grades is so large that it is hard to conceive of hazards that would upset the repayment probability. But this margin is not quite as generous in the intermediate grades. Time may erode this margin even further. And it would be logical that the more remote the time

interval, the greater the possibility, per unit of time, that such erosion could take place.

The humpbacked nature to the yield curve for Treasury obligations in 1956 was basically due to the fact that commercial banks dominate the intermediate-term market. In that year commercial banks were both net sellers of intermediate-term obligations and also active traders of such securities in tax swaps.[23] Furthermore, it can be deduced that the very long-term yields on U.S. Treasury obligations were below those prevailing on intermediate-term obligations because relatively few long-term securities were outstanding or were being traded in the market. The few which were offered could be absorbed by investors who preferred U.S. Treasury obligations for special legal reasons—small state and local government pension funds, for example.

The offering scale of state and local government obligations, however, continued to have quite a bit of slope, possibly because the marginal expectation of investors in tax-exempt obligations is for higher interest rates. The very longest term obligations can be sold only if they offer investors somewhat more than can be earned in the intermediate market. The long maturities have to be baited with more yield than the shorter maturities of the same issues with which they are compared by investors.

Still another fact adds further evidence in support of this hypothesis. The offering scales of intermediate-grade tax-exempt obligations have had even more slope than those of the highest grades. Investors apparently felt that credit risk was not a proportionate but an increasing function of time. In other words, the maturity-yield relationship in the market for state and local government securities

[23] The foundation of the process of tax switching lies in a provision of the Internal Revenue code permitting commercial banks to charge all capital losses in excess of capital gains against current income. If a security, which is quoted considerably below book value, is sold and replaced with a security of similar maturity and yield, the current tax rate applies only to the coupon of the replacement issue: the accrual of discount is treated as a capital gain. Thus the greater the loss now taken, and the greater the proportion of subsequent income that can be taken on a capital gains basis, the more tax liabilities are reduced. The principal operating requirement is that commercial banks time their capital gains and losses in such a way that each tends to be concentrated in separate tax years. This is necessary so that losses do not have to be offset against gains but can be charged against current income. The deep discounts and high yields which characterize the prevailing humpbacked yield curve reflect the fact that few investors other than commercial banks are active traders in this part of the market.

apparently did not parallel the relationship prevailing in the market for Treasury obligations because investors in tax-exempt obligations compounded the joint influence of two risk appraisals: the risk of further increases in yields (and in capital losses on outstanding bonds) and also of a more rational time-function credit risk for lower-grade tax-exempt obligations.

One negative conclusion can be drawn from the comparison of maturity-yield differentials in the tax-exempt market with those prevailing on fully taxable obligations: investors do not imply complex tax-rate forecasts in their differential yield appraisal. At almost every juncture, the observed differentials made no sense if tested by prevailing expectations as to tax rates. This is a most odd conclusion. Investors certainly do have tax-rate expectations. During most of the postwar decade they apparently were prepared to pay as much for tax exemption in a remote period as in a nearby one: a pessimistic forecast of future tax rates! The most probable explanation is that many investors prefer a defensive posture; they will forego some yield to provide against the unknown and probably hostile future.

DIVIDING THE TAX-EXEMPTION SUBSIDY

A rational investor presumably invests in tax-exempt securities only at yields which are at least equal to, or greater than, the after-tax yield on fully taxable securities of comparable quality. This means that the yield differential between tax-exempt and fully taxable securities should not be a greater fraction of comparable fully taxable yields than the tax rate applying to this investor's marginal income. In practice, prudent investors probably do not go this far. Tax rates are known only for the present and immediate future; an investor may also be rather uncertain about his income expectations. Thus a prudent investor presumably would buy tax-exempt securities only if they offered some comfortable margin of protection against unexpected changes in tax rates and in income.

To the extent that this describes investment behavior correctly, the revenue lost by the federal government as a result of state and local governmental units selling tax-exempt securities will be only partly reflected in lowered borrowing costs to these governmental units. The tax revenue lost by the federal government is, in effect,

split up between investors and state and local government bor-
rowers. Tax exemption can be viewed as a subsidy of somewhat less
than complete effectiveness; a direct subsidy from the federal to
state and local government presumably would not have to be shared
with investors.

The sharing of this revenue loss (or subsidy if one wishes to
stress the equity considerations) can be viewed as a test of the bal-
ance of market power. If state and local governmental borrowers
retain most of the revenue lost to the federal government in the
form of lower borrowing costs the market could be said to reflect
a strong demand or limited supplies of securities or both. If in-
vestors get most of the benefit, the market reflects a weaker demand,
an ample supply of tax-exempt securities, or both.

A comparison of the yields on tax-exempt and full taxable obliga-
tions such as shown in Chart 8 suggests that there was a consider-
able shift in this division of gain during the postwar decade.

Estimation of this margin is statistically difficult. The measure-
ment of revenue lost to the federal government as the result of tax
exemption presents many technical obstacles; the estimation of re-
duced borrowing costs is almost as difficult. The revenue lost by
the federal government depends on the marginal tax rates and alter-
native investment opportunities of those who buy and own tax-
exempt securities. Present owners have bought the securities they
now hold at varying times in the past: some acquired them directly
from the underwriters when they were first publicly offered; others
were bought in the secondary market. One of the functions of the
secondary market presumably is to transfer tax-exempt securities
from those who can make less complete use of the privilege of tax
exemption to those who can make maximum use of the privilege.
The chore of estimating the revenue losses for all outstanding securi-
ties thus presents a formidable problem. Estimation of the reduced
borrowing cost on all outstanding securities would involve going
far back into the history of such offerings, comparing market yields
for fully taxable and tax-exempt obligations. Even though relatively
simple in concept, the volume of historical research required to
complete such an estimate would be impossibly burdensome.

A rough approximation of this relationship was made by limiting
the comparison to new financing. One year's borrowing cost reduc-
tion for all securities issued during a year was compared with one

year's loss of revenue to the federal government based on the tax
rates applying to those who initially purchased these securities.
Even this simplified form of comparison involves some conceptual
and statistical difficulties. Changes in the holdings of tax-exempt
securities provided by the ownership estimates are net; they are the
result of gross purchases offset by sales or retirements by call or
maturity. No method could be found by which net changes in the
ownership estimates could be transmuted into a gross purchases
series.

To approximate the revenue foregone, the estimated average tax
rates for the two principal classes of buyers were applied to the
yields on comparable fully taxable securities. The selection of what
is "comparable" for various classes of investors is itself a matter of
judgment. Some alternative investment outlets were introduced into
these estimates: i.e., individuals might switch from tax-exempt securi-
ties to equities rather than to a fully taxable fixed-dollar form of
security.

Estimation of the reduction of borrowing costs follows a similar
pattern; the amount borrowed is multiplied by the differential in
yield between the obligations actually issued and yields on com-
parable fully taxable obligations assumed in this case to be corpo-
rate bonds. Because acquisitions were net, the estimated borrowing
cost reduction had to be adjusted by the ratio of net to gross ac-
quisitions to make them comparable with the reduction-of-revenue
estimates described above.

Such estimates for the years 1947-1955 are shown in Tables 27, 28,
and 29. Table 27 presents the estimate of revenue lost by the U.S.
Treasury. The owner-buyers of tax exempt obligations are divided
into two groups for purposes of this estimate: corporations and indi-
viduals. A single marginal tax rate is used for individuals; our
knowledge of holdings by income levels does not permit a more
refined division of this group. The assumed investment alternatives
were corporate bonds and stocks. In one estimate the investment
alternative was assumed to be one having the same yield as Moody's
corporate bond series. On the second estimate the investment alter-
native was assumed to be one having the same yield as Moody's
corporate stock series. A third estimate assumed the proportions to
be half of one and half of the other. Assumed differences as to in-

TABLE 27

Alternative Estimates[a] of Revenue Loss to Federal Government by Tax Exemption on State and Local Government Securities, 1947-1955

	Net Investment in Tax-Exempt Securities (millions of dollars)	Corporate Bond Yield[b]	Common Stock Yield[b]	Average Tax Rate	TAX LIABILITY	
			(p e r c e n t)		Bond Investment[c]	Equity Investment[d]
					(millions of dollars)	
Investment by Taxable Corporations[e]						
1947	959	2.86		38	10.7	
1948	614	3.08		38	7.2	
1949	1,171	2.96		38	13.2	
1950	1,886	2.86		45	24.3	
1951	1,384	3.08		52	22.2	
1952	1,414	3.19		52	23.5	
1953	1,380	3.43		52	24.6	
1954	2,548	3.16		52	41.9	
1955	905	3.25		52	15.3	
Investment by Individuals						
1947	498	2.86	5.13	60	8.5	15.3
1948	1,058	3.08	5.78	60	19.6	36.7
1949	650	2.96	6.63	60	11.5	25.9
1950	550	2.86	6.27	60	9.4	20.7
1951	430	3.08	6.12	60	7.9	15.8
1952	1,143	3.19	5.50	60	21.9	37.7
1953	1,814	3.43	5.49	60	37.3	59.8
1954	794	3.16	4.78	60	15.1	22.8
1955	1,748	3.25	4.06	60	34.1	42.6

Revenue Lost by Federal Government (millions of dollars)

	Bond Investment by Individuals Assumed[f]	Equity Investment by Individuals Assumed[g]	Half Bond/Half Equity Investments by Individuals Assumed[h]
1947	19.2	26.0	22.6
1948	26.8	43.9	35.3
1949	24.7	39.1	31.9
1950	33.7	45.0	39.3
1951	30.1	38.0	34.0
1952	45.4	61.2	53.3
1953	61.9	84.4	73.1
1954	57.0	64.7	60.8
1955	49.4	57.9	53.6

(notes on next page)

Notes to Table 27 (continued)

ᵃ Estimate for first-year revenue loss based on net purchases of principal investors.

ᵇ Assumed to be fully taxable investment.

ᶜ Net investment in tax-exempt securities times corporate bond yield times average tax rate.

ᵈ Net investment in tax-exempt securities times common stock yield times average tax rate.

ᵉ Consist of commercial bank and casualty insurance companies.

ᶠ Net investment in tax-exempt securities times corporate bond yield, times average tax rate for taxable corporations, plus comparable figure for individuals.

ᵍ Net investment in tax-exempt securities by individuals, times common stock yield, times average tax rate, plus comparable figure for taxable corporations based on corporate bond investment.

ʰ Mean of f and g.

Source: Net amount in tax-exempt securities: Table A-3. Corporate bond yield: Moody's corporate bond annual average yield series. Average tax rate for taxable corporations is from tax rate tables in *Statistics of Income*. Average tax rate for individuals is an estimate made by C. Harry Kahn of the National Bureau staff. Kahn computed an average of the marginal tax rates for the various income levels reporting corporate dividends and tax-exempt interest in 1940, weighted by the amount of income so reported. In that year both items were adequately reported and tabulated in the *Statistics of Income* (Part 1). He then computed a similar weighted average of marginal tax rates for corporate dividends in 1947, 1952, and 1954. Tax-exempt interest was not reported in those years. By adding the absolute rate differential that prevailed in 1940, an estimated average of weighted marginal rates for holders of tax-exempt securities was reached. The estimates for the three years were 58.7, 62.9, and 59.8 per cent, respectively. A flat 60 per cent rate was used since the estimates gave no indication of secular movement either up or down. All other columns are computed.

vestment alternatives affected the final results less than might have been expected.

The reduction in borrowing cost for state and local governments (Table 28) was assumed to be the differential between tax-exempt and corporate bond yields of a comparable quality. State and local government offerings were arrayed by quality of issue. The yield differentials for each quality of issue and between tax-exempt municipals and the comparable corporate bonds, based on Moody's annual average yield series, was assumed to measure the reduction of borrowing cost. Unrated tax-exempt issues were assigned values a bit below those applying to Baa issues, the lowest rating grade for which a borrowing cost differential was computed.

The reduction in borrowing cost is compared with the revenue loss in Table 29. In 1947 from three-fifths to three-fourths of the revenue lost by the federal government was recovered by state and local governments in reduced borrowing cost. Up until 1952 this proportion varied from levels down to as low as two-fifths. But in 1953 it fell to a level between 20 and 30 per cent. It rose slightly in 1954 and 1955.

Computation of the estimated division was not made either for 1956 or for 1957. It seemed reasonably evident, however, that investors reaped most of the benefits of tax exemption. The amount state and local governments saved on borrowing costs was only a fraction of the revenue lost by the federal government; investors retained the bulk of this margin. While the differential seems to be sensitive to money markets and business conditions, even in a period such as 1954 state and local government did not recapture a great deal of the advantage of tax exemption. In the second half of the postwar decade more of the advantage of tax exemption went to investors than was retained by state and local governments. No development now in sight threatens (or promises) to change this relationship.

The general methods of estimating both the revenue foregone and the increase in cost of borrowing have precedent in earlier estimates made by the Treasury Department.[24] In 1939 they estimated on essentially this same basis that the amount of revenue lost by virtue of tax exemption on states and local government obligations was about double the amount that borrowing costs would increase if tax exemption were removed.

Conditions were, of course, considerably different at that time. Exemption from income taxation could also be secured by investment in various federal government securities. Rates of corporate taxation were much lower and the income stage at which progression was steepest for individuals was considerably higher. After allowing for these differences, however, the results are fully consistent with the estimates shown in Table 29.

The estimates presented here may minimize the differential between yields in periods of tense money markets because they are based on secondary market quotations. The gap between new issue yields of tax exempts and of taxable obligations may have been more fully maintained than those which prevailed in the secondary markets. New issue yield series for corporate and state and local government obligations have not been projected over the entire postwar decade in a statistically satisfactory way.[25] It is probably

[24] Hearings before the Committee on Ways and Means, House of Representatives, of the Seventy-sixth Congress, first session: *Proposed Legislation Relating to Tax-Exempt Securities*, June 28 to July 11, 1939, Exhibits 12 and 13, pp. 34-47.

[25] In the appendix of this chapter an 18-month new issue yield series for state and local government securities prepared by the Investment Bankers Association is examined.

TABLE 28

Reduction of State and Local Government Borrowing Costs as a Result of Federal
Tax Exemption; Estimate for First-year Cost Reduction on Obligations Issued, 1947-1955

(dollar amounts in millions)

Class of Security	1947	1948	1949	1950	1951	1952	1953	1954	1955
Aaa									
1. Amount sold	262.1	642.8	200.7	322.1	630.9	631.5	926.3	798.0	831.1
Reduction in[a]									
2. Interest rate	1.16%	1.02%	1.01%	1.12%	1.25%	1.16%	.89%	.86%	.88%
3. Interest cost	3.0	6.6	2.0	3.6	7.9	7.3	8.2	6.9	7.3
Aa									
4. Amount sold	800.0	439.5	642.7	1,048.2	734.3	570.3	1,210.6	959.4	1,110.9
Reduction in[a]									
5. Interest rate	1.10%	.90%	.90%	.99%	1.13%	1.04%	.77%	.86%	.86%
6. Interest cost	8.8	4.0	5.8	10.4	8.3	5.9	9.3	8.3	9.6
A									
7. Amount sold	322.6	591.7	816.3	830.2	667.9	1,140.5	1,216.4	1,354.1	1,310.8
Reduction in[a]									
8. Interest rate	.87%	.62%	.65%	.79%	.96%	.83%	.46%	.58%	.59%
9. Interest cost	2.8	3.7	5.3	6.6	6.4	9.5	5.6	7.9	7.7

Baa

10. Amount sold Reduction in[a]	185.6	198.7	427.3	305.0	270.4	284.4	418.1	392.0	457.5
11. Interest rate	.74%	.52%	.72%	.94%	1.04%	.82%	.33%	.42%	.39%
12. Interest cost	1.4	1.0	3.1	2.9	2.8	2.3	1.4	1.6	1.8

Unrated issues[b]

13. Amount sold Reduction in[a]	783.5	1,117.0	908.5	1,188.1	974.7	1,774.7	1,786.5	3,465.1	2,266.1
14. Interest rate[c]	.60%	.40%	.60%	.75%	.90%	.70%	.25%	.30%	.30%
15. Interest cost	4.7	4.5	5.5	8.9	8.8	12.4	4.5	10.4	6.8

All issues

16. Total sold	2,354	2,990	2,995	3,694	3,278	4,401	5,558	6,969	5,977
17. Interest cost reduction	20.7	19.7	21.6	32.3	34.2	37.5	29.0	35.0	33.2
18. Net purchases by taxed investors	1,457	1,672	1,821	2,436	1,814	2,557	3,194	3,342	2,653
19. Per Cent of total[d]	61.9%	55.9%	60.8%	63.5%	55.3%	58.1%	57.5%	48.0%	44.3%
20. Interest cost reduction on such purchases	12.8	11.0	13.1	20.5	18.9	21.8	16.7	16.8	14.7

[a] Reduction due to tax exemption.
[b] Includes a small amount of issues rated but less than Baa.
[c] Rough estimate based on Line 11.
[d] Since the estimates in Table 27 are for revenue lost on *net* purchases of principal investors, the cost-of-borrowing estimate for all securities issued is reduced in this step to an amount equivalent to the net purchases of the principal investors.

Source: Lines 1, 4, 7, 10, from percentages in Table 7 source times line 16. Line 18 from Table 27. Lines 2, 5, 8, and 11 are the differences between Moody's corporate bond annual average yields and Moody's series of annual average yields on state and local government general obligations for securities of same rating group. All other lines computed or derived as indicated.

TABLE 29

Percentage of Federal Tax Loss Retained by State and Local Governments as Reduced Borrowing Cost

Year	INVESTMENT ASSUMPTIONS		
	Corporations: Corporate Bonds Individuals: Corporate Bonds (1)	Corporations: Corporate Bonds Individuals: Equities (2)	Corporations: Corporate Bonds Individuals: Half Corporate Bonds and Half Equities (3)
1947	67	49	58
1948	41	25	32
1949	53	34	43
1950	61	46	53
1951	63	50	56
1952	48	36	42
1953	27	20	23
1954	29	26	28
1955	30	25	27
Simple average	47	34	40
Weighted average	42	32	36

Source: Col. 1: Line 20, Table 28 ÷ Line 11, Table 27. Col. 2: Line 20, Table 28 ÷ Line 12, Table 27. Col. 3: Line 20, Table 28 ÷ Line 13, Table 27.

true that if such new issue yields were available the tax-exempt corporate differential probably would be larger in periods of tense money markets. Nevertheless, since the only clear differences between new issue yields and those in the secondary markets have come in periods of tight money markets, it is only in those periods that the criticism is relevant. For example, in 1954 it was quite clear that new issue yields were not greatly different from secondary market yields. In other words, the cyclical variability of the division is less than indicated by our estimates. Nevertheless, with full allowance for this factor, it seems clear that in the period since 1950 investors captured much more of the benefit of tax exemption than was retained by state and local governments.

Two other facts also seem indisputable. The savings in borrowing cost were least for the lower-grade securities and it was for these that the revenue lost by the federal government was the greatest. In other words, those units of state and local government that would seem to have been most deserving of aid in reducing borrowing cost or subsidy received the least benefit. The second fact is that this differential became greater in years of heavy borrowing. If allowance could be made for the fact that securities are probably shifted in the secondary market from those who make lesser use of tax exemption to those who maximize its use, the disparity between revenue lost to the federal government and reduction of borrowing cost would probably be even more striking than suggested by these estimates.

Appendix Note to Chapter 6

Measurement of Yields in State and Local Government Market

Measurement of yield in the market for state and local government securities presents an unusual number of technical problems. In the first place, the market is composed of thousands of individual issues, each of which has special characteristics. Secondly, we have too few prices of verified transactions. The offering scales on new issues are published but these prices represent actual prices only for successful offerings. On others concessions are common. We have no record of prices in the secondary market for serial issues except the asking prices of the *Blue List*.

These problems are encountered in other bond markets and

would not be particularly difficult except for still another problem, that of discontinuity. The continuity needed for index number construction is hard to manage. Two solutions are possible and both are employed: a time series can be built up on the basis of hypothetical quotations supplied by experienced traders, or the new issue yields of successful offerings can be used as a measure of the market. Three of the trade yield series—Standard Statistics, Dow-Jones,[26] and the Bond Buyer two series—solve the problem in the first way. In each case a basic list of bonds is prepared. Each week dealers are called and asked to supply quotations for each of these bonds. In some cases several quotations are received; in others one quotation for each bond is secured. In two of the three series, the dealers are asked to supply a quotation for a twenty-year bond of the given city or issuing body. No such bond need exist; it can be purely hypothetical. One of the series tries to use actual bonds that average near twenty years in maturity and makes substitutions from time to time.

Thus these series have some elements of unreality. It is known, for example, that in some periods actual transactions are shaded more from *Blue List* offering prices than is true in other periods. This may easily be true of these series; they are subject to the uncertainties of the market. In quoting to a statistical service, dealers are under no compulsion to "shade" price as if they were trying to make a deal. One other feature of some significance is the fact that two of the three series use relatively high coupon bonds. It is not clear that in their hypothetical bids the dealers make allowance for this factor.

The second alternative is followed by Moody's Investors' Advisory Service. Using their own rating grades, they array the offering scales by grade. Using the scales of offerings that are successful (or of revised offering scales when such are available) the yield value for the twenty-year maturity of each quality rating is determined. The yields of the four top grades are then averaged to produce the combined index.

The week-to-week and month-to-month variations in the several indexes move with considerable similarity. But more surprising, they seem to retain about the same relationship over long periods

[26] Dow-Jones formerly computed a revenue bond index but discontinued publication in February 1957.

of time. The one limit—and this is something that seems to apply to all of them—is that they lag a bit behind events. This reflects some lag in the informational process: the levels at which transactions take place take the form of revisions and price shading, but dealers, although fully conscious of the process, hesitate to reflect the change in quotations that are to be used for index computation until the change is widely known. This lag probably applied more on the down side of the market than on the up side.

None of the yield series now compiled generalize the maturity-yield relationship. Although provision of new primary material on interest rates was not a part of our project, we attempted to fill two gaps: to provide a quarterly series of yields, by quality, for several maturities: 1-year, 5-year, 10-year, 15-year, and 20-year. The latter was included primarily so as to provide a connecting link with the existing yield series. The second contribution, mentioned in the body of Chapter 6, was to determine generalized maturity-yield relationships for high-grade obligations annually. This was timed for February of each year and thus was aimed at extending the Durand-Winn basic yield series.[27] Maturity-yields were also generalized for Baa offerings in selected years to test the effect of quality on this relationship.

The testing of the various yield series led to one somewhat unexpected conclusion: general obligation state and local government securities in ordinary serial form apparently do not have the yield improvement or "seasoning" gain which is usually characteristic of corporate obligations. Revenue bonds in term form do pass through such a stage but a general obligation may never sell on a better basis relatively than when it is first issued. Thus the difference between new issue yields and yields in the secondary market, which plagues the measurement of corporate bond yields, has no evident counterpart in this market.

This does not mean that no such differences exist. It only means that from such evidence as exists, mainly from a short time series prepared by the Investment Bankers Association of America, the differences do not have a clear pattern; so far they seem to have a somewhat random quality.

A comparison of the new issue reoffering yields estimated by the Investment Bankers Association statistical service with yields

[27] Cited fully in the opening to Chapter 6.

in the secondary market such as shown by Moody's statistical service offers some interesting comparisons. In the first place, the new issue yields for a given quality of security are almost always materially lower than yields for the same grade in the secondary market. It is not clear that strict quality comparability prevails. From the side of cyclical analysis, an even more interesting point is that new issue yields are clearly more volatile than secondary market yields. New issue yields rise more quickly and by a greater amount in tight money periods and fall rather more quickly and by greater amounts when monetary ease returns. These differences are reflected in Table 30. As this table shows, the prompter and more considerable response is evident in all grades of securities. It is quite clear, however, that the most volatile response is found in the highest-grade obligations. This might be interpreted to mean that yields on lower-grade obligations are less influenced by monetary factors and are more influenced by quality of security.

The relationship of new issue yields to those prevailing in the secondary market apparently are not the same for tax-exempt securities as they are for long-term corporate bonds which are fully taxable. Since time series for tax-exempt new issue yields cover such a short period of time and since corporate series are not much longer the point cannot be affirmed with complete confidence. It appears, however, that on a new issue yield basis there would be less of a differential between corporate securities and tax-exempt securities than indicated by Chart 8. Even with allowance for this point, tax-exempt yields appear to fluctuate more than corporate bond yields even when measured on a new issue basis.

New issue yields for securities of varying quality do not always move in the same direction, as is evident in Table 30. Indeed, the variations by quality of security are so considerable as to suggest that some of the fluctuations in the market for tax-exempt securities might be due to fluctuations in the relative proportions of securities of various quality offered on the market. If the quality mix of this market is relatively volatile it may mean that new issue yields for given qualities of securities have a somewhat random character.

TABLE 30

New Issue Reoffering Yields, 1957 to June 1958

(median yields on 20-year maturities of general obligation bonds)

Month	Aaa		Aa		A		Baa	
	IBA New Issue	Secondary Market	IBA New Issue	Secondary Market	IBA New Issue	Secondary Market	IBA New Issue	Secondary Market
January	2.73	2.99	2.83	3.24	3.40	3.64	3.95	4.16
February	2.60	2.79	2.85	3.05	3.30	3.37	3.65	3.96
March	2.80	2.88	3.00	3.15	3.40	3.42	3.85	3.97
April	2.80	2.88	3.00	3.15	3.40	3.43	3.83	3.95
May	3.05	3.00	3.20	3.26	3.60	3.54	3.95	4.10
June	3.15	3.19	3.55	3.41	3.85	3.69	4.25	4.32
July	3.15	3.17	3.30	3.41	3.80	3.73	4.18	4.29
August	3.30	3.37	3.60	3.64	4.03	3.90	4.33	4.43
September	3.15	3.43	3.50	3.68	3.95	3.96	4.30	4.49
October	3.10	3.31	3.30	3.50	3.70	3.78	4.20	4.38
November	3.00	3.24	3.23	3.42	3.60	3.68	3.95	4.35
December	2.70	2.92	2.78	3.05	3.25	3.33	3.70	4.00
Monthly av.	2.96	3.10	3.18	3.33	3.61	3.62	4.01	4.20
				1958				
January	2.45	2.75	2.70	2.94	3.10	3.18	3.60	3.81
February	2.63	2.72	2.88	2.96	3.25	3.13	3.65	3.79
March	2.70	2.79	2.90	3.04	3.40	3.22	3.65	3.88
April	2.70	2.70	2.75	3.00	3.18	3.17	3.60	3.78
May	2.65	2.69	2.80	2.95	3.10	3.12	3.50	3.71
June	2.73	2.74	2.90	3.01	3.25	3.20	3.45	3.78

Source: *IBA Bulletin*, No. 6, Jan. 1958, p. 3.