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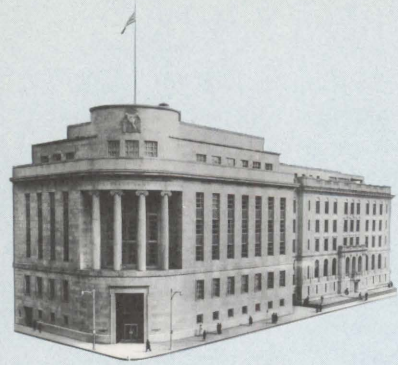
NEW ENGLAND ECONOMIC REVIEW

Tax Exemption of State and Local Interest Payments: an Economic Analysis of the Issues and an Alternative

Three major problems result from tax exemption: the volatility of tax-exempt yields, inefficiency of tax-exemption as a subsidy and the tax equity issue. This study suggests that giving state and local governments an option to issue directly subsidized taxable municipal bonds would overcome these problems if the Federal Government provides a sufficiently high subsidy rate.

Banks and Balance-Sheet Cosmetics: Tax Swapping Then and Now

Under the Tax Reform Act of 1969 banks are no longer under pressure to concentrate their gains and losses in separate years. However the banks' cosmetic interest in protecting the appearance of their accounting statements probably keeps them from realizing the full amount of their losses in any single year.

In recent years the Federal Reserve Bank of Boston has supported extensive research in public finance: specifically on the subjects of financing state-local expenditures and education, as well as welfare reform, and the structure of the municipal bond market. This support has taken the form of sponsoring or co-sponsoring conferences on municipal finance, financing doctoral dissertations, as well as conducting independent research at the Bank.

In addition, Frank E. Morris, President of the Federal Reserve Bank of Boston, has testified before the Senate Committee on Banking, Housing and Urban Affairs (May, 1972) and the House Ways and Means Committee (February, 1973) in favor of taxable municipal bonds, which is the subject of the first article in this issue of the *Review*.

This research has resulted in the following publications, which are available without charge from the Research Department of the Federal Reserve Bank of Boston.

Financing State and Local Governments in the Seventies. A compendium of papers presented at a conference sponsored by this Bank. Conference Series No. 3, June 1970.

Financing Public Schools. A compendium of papers presented at a New England School Development Council Conference held in cooperation with the Harvard Graduate School of Education and the Federal Reserve Bank of Boston. Conference Series No. 7, January 1972.

Taxable Alternatives to Municipal Bonds: An Analysis of the Issues, by Robert P. Heufner. Research Report No. 53. An extension of a doctoral dissertation at the Harvard Graduate School of Business Administration, 1972.

"The Need for Change in State Public School Finance," by Steven J. Weiss. **New England Economic Review,** January/February 1970.

"How to Pay for Higher Education," by J. Philip Hinson, **New England Economic Review,** March/April 1971.

"Income Supplements—How High Should They Be?," by Edward Moscovitch, **New England Economic Review,** January/February 1971.

"Income Supplements: Pros, Cons and Some Alternatives," by Paul S. Anderson, **New England Economic Review,** January/February 1971.

Tax-Exemption of State and Local Interest Payments: an Economic Analysis of the Issues and an Alternative

PETER FORTUNE*

THE purposes of this article are three-fold. The first is to document the operation of the market for tax-exempt state and local bonds in the postwar period in order to identify the key problems which have resulted from the use of tax-exemption to subsidize state-local debt. The second is to analyze the expected impact of the chief alternative to tax-exemption—taxable municipal bonds with a fixed fraction of state-local interest costs paid by the U.S. Treasury. Finally we present the results of a study made by this Bank of the impact of a taxable bond option.

The exemption of interest paid by state and local units from Federal taxation has long been under attack for several economic reasons. The use of tax-exemption has resulted in a greater volatility of tax-exempt interest rates than of interest rates on taxable securities of equivalent rating and maturity. This has increased the uncertainty faced by underwriters and has probably resulted in a higher net interest cost for state and local borrowers. In addition to this marketing problem (which arises because the market for tax-exempt se-

curities is dominated by commercial banks, which are especially sensitive to monetary policy) tax-exemption has been attacked because it provides an inefficient subsidy, with only part of the cost to the U.S. Treasury being gained by the state and local governments in the form of reduced interest costs. The remaining U.S. Treasury cost is lost tax revenues from high-tax rate investors who, as a result, receive a greater after-tax yield on tax-exempt securities than is necessary to induce them to enter the tax-exempt market. This windfall income has inspired the primary attack against tax-exemption—that it is inequitable in the sense of allowing some individuals to avoid being subject to the legislated income tax structure.

These three problems—the marketing problem, the efficiency problem and the equity problem—have led to a search for alternative means of subsidizing interest paid by state and local governments. While a number of pro-

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posals have been discussed[1] the alternative which has received the most attention, and which seems most likely to be adopted, is the *taxable bond option*. This would provide state and local governments with the option of issuing either tax-exempt securities (which would result in a variable amount of interest saving depending upon the tax rates of the investors in the tax-exempt market) or taxable municipal bonds (with a fixed proportion, called the subsidy rate, of the interest cost being paid directly by the U.S. Treasury rather than indirectly through "tax-expenditures").[2]

The principle of the taxable bond option has received wide political support: underwriters support it because it deals with the marketing problem of tax-exempt securities; state and local officials are giving it more support (after a period of resistance) because it provides an option which will reduce their interest costs while broadening the market for their debt; tax reformers support it because it can deal with the related problems of the inequity and inefficiency of tax-exemption. Recently the Nixon Administration has also endorsed the concept of a taxable municipal bond option.

However, while most participants in the municipal bond market support the general principle, there is disagreement over the subsidy rate which should be paid on taxable bond interest, as well as on other issues related to the operation of the taxable bond subsidy. Underwriters want a low subsidy rate which will deal with the short-term marketing problem of tax-exempts without reducing the volume in the long run, while state and local officials want a high subsidy rate (with assurance that it will not be reduced) and tax reformers want a high subsidy rate (since the effectiveness of the taxable bond option in the areas of equity and efficiency is greater the higher the subsidy rate). One of the peripheral

purposes of this article is to point out the reasons for these divergent opinions on the appropriate subsidy rate.[3]

This study concludes that the taxable bond option will reduce the volatility of interest rates on tax-exempt securities as well as the interest costs of state and local borrowers and the long-run level of tax-exempt yields. It will also improve both the efficiency and the equity of the overall subsidy of municipal debt interest costs and will involve some cost to the Federal taxpayer. Furthermore, the magnitude of each of these effects will be greater the higher is the subsidy rate chosen. Subsidy rates of 33 percent and 40 percent will provide only small benefits, while a subsidy rate of 50 percent would provide strong benefits in terms of equity and efficiency by eliminating the tax-exempt market. Thus, our evidence suggests that 40 percent would be a minimum subsidy rate to adopt if the goal is to use taxable municipal

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[1] For a discussion of some of these alternatives see Harvey Galper and John Petersen, "An Analysis of Subsidy Plans to Support State and Local Borrowing," *National Tax Journal* (June, 1971), 205-234. Also see *Financing State and Local Governments,* Federal Reserve Bank of Boston, 1970.

[2] Tax-expenditures are revenues lost to the Treasury because of preferential tax treatment of some sources of income. They are in effect expenditures made to individuals who receive the tax preference income.

[3] For the views of underwriters and municipal officials see *Federal Financing Authority,* Hearings before the Senate Committee on Banking, Housing and Urban Affairs, Ninety-Second Congress, Second Session, U.S. Government Printing Office, 1972. William Simon (now Deputy Secretary of the Treasury) represented the Securities Industry Association while Daniel B. Goldberg represented the Municipal Finance Officers Association. Simon endorsed a 33 percent subsidy rate, which is essentially the current position of the Treasury, while Goldberg endorsed a 50 percent subsidy.
The position of tax reformers is well represented by Stanley Surrey in "The Case for Broadening the Financial Options Open to State and Local Governments—Part I," *Financing State and Local Governments,* Federal Reserve Bank of Boston, 1970, 113-123.

bonds as a method of partially dealing with the problems posed by tax-exemption, while an effective solution might require a subsidy rate in the 45 percent-50 percent range. In addition to the contribution of a taxable bond option to the efficiency and equity of the municipal bond market, we estimate that it will provide a significant method of revenue sharing without much additional cost to the U.S. Treasury. A taxable bond option with a 50 percent subsidy will reduce the interest costs of state-local governments by about 70 percent compared to the interest costs which exist with tax-exemption alone, while the costs to the U.S. Treasury will increase by about 20 percent.

The structure of the article is as follows: In the first section the behavior of the market for municipal bonds in the postwar period is examined in order to establish the background for the development of an alternative to tax-exemption. The second section reports the empirical estimates of the impact of a taxable bond option at three subsidy rates (33 percent, 40 percent, and 50 percent). Finally the third section summarizes the main conclusions.

In an appendix a theoretical analysis of the tax-exempt bond market and of the impact of taxable municipal bonds is presented. The purpose of this appendix is to provide the reader with the framework for examining the operation of the municipal bond market which underlies the discussion in the text of the paper.

The Postwar Behavior of the Tax-Exempt Municipal Bond Market

The primary issues in tax-exemption are economic rather than legal. Tax-exemption of interest paid by state-local governments should be viewed as an economic and political question, capable of being analyzed with the tools developed by economists and political scientists. This section is devoted to an identification of the economic issues. It will become clear that the political positions of the various participants in the municipal bond market on the taxable bond option depend very strongly upon the economic interests involved.

The nature of the volatility of the interest rate on tax-exempt securities can best be seen by examining the cyclical and secular behavior of the ratio of tax-exempt to taxable bond interest rates. Because of tax-exemption, yields on tax-exempts will be below those on equivalent taxable securities, but the ratio will vary depending upon the relationship between the demand for and supply of tax-exempt securities. Although the ratio of tax-exempt to taxable yields will vary with the maturity of the bonds (see the appendix) we will concentrate upon the relationship at "long" maturities (10-20 years) since the average maturity of outstanding municipal bonds is in this range and it is in these maturities that the problems introduced by tax-exemption are most severe.[4]

The behavior of the *interest-rate ratio* (the ratio of tax-exempt to equivalent taxable bond yields) for long maturities (20 years) in the postwar period is documented in the upper panel of Chart I. After reaching a peak in 1953, tax-exempt yields fell relative to taxable yields until about 1962, while from 1962-71 the interest-rate ratio exhibited little trend but more volatility. In the years of general interest-rate stability from 1962-1965 the interest-rate ratio remained constant at about 0.70, while in the years of general interest-rate volatility

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[4] Commercial banks, with a 48 percent tax rate, are especially important in the demand for tax-exempt securities at shorter maturities while investors with lower tax rates tend to be relatively more important at longer maturities. Thus, the tax-exempt yield rises relative to the equivalent taxable bond yield as maturity lengthens.

from 1966-71 the interest-rate ratio fluctuated. The "easy money" years (1967-68, 1970-71) found the interest-rate ratio falling while the "tight money" years (1966 and especially 1969) found it rising.

The behavior of tax-exempt relative to taxable bond yields can be explained by the participation of commercial banks in the tax-exempt market. This is revealed in the lower panel of Chart I, which shows the proportion of total net issues of state and local debt acquired by households and by commercial banks —the two major purchasers of tax-exempt securities. In the period 1947-61 households generally bought more tax-exempt securities than commercial banks and the participation of each of the two sectors was volatile, but relatively stable when compared with the period 1962-71. In 1962 the commercial-bank share leaped to a very high level and for the entire period 1962-1971 commercial banks dominated households as purchasers of tax-exempt debt. This shift in the role of commercial banks was accompanied by increased instability of the commercial-bank share of net issues of state-local debt, due largely to the important role of commercial banks in the transmission of monetary policy.[5]

Both panels of Chart I show a very clear relationship between the participation of commercial banks in the tax-exempt market and the interest-rate ratio. When commercial banks increase (decrease) their share of tax-exempt securities, the tax-exempt yield falls (rises) relative to the taxable bond yield. This suggests that one method of stabilizing tax-exempt interest rates would be to broaden the market for tax-exempt securities by drawing investors with less volatile investable funds than banks into the market.

Of course, the interest-rate ratio is not affected by the demand for municipal securities

alone, especially in the short run. The amount of municipal bonds which state-local governments want to issue will affect the relationship between the tax-exempt yield and taxable security yields. The supply side can be viewed as the result of two decisions made by the state and local governments: (1) the amount of capital expenditures they want to make, and (2) the share of capital expenditures to be financed by debt issue. Most of the volatility of municipal bonds issued is due to the second decision since capital outlays of state-local governments are relatively stable.

This is shown in the two panels of Chart II. The upper panel shows the postwar behavior of the ratio of state-local gross capital outlays to total state-local government purchases of goods and services. This ratio exhibited a rising trend in the period 1947-55, was constant in 1956-59, and had a falling trend in 1960-71. Although the trends changed over the period 1947-71, there was little cyclical volatility in this ratio.

The stability of gross capital outlays is a strong contrast with the volatility of the ratio of gross state-local debt issues to gross capital outlays, shown in the bottom panel of Chart II. This ratio moves inversely with changes in interest rates—rising when interest rates fall, as in 1967 and 1970-71 but falling when interest rates rise, as in 1965-66 and 1969. The gross debt issue-to-gross capital outlay ratio has,

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[5] The major source of the increase in commercial-bank purchases of tax-exempt securities in 1962 was a shift from purchases of U.S. securities to purchases of less liquid securities such as municipal bonds and mortgages. Neither the proportion of new bank credit which went into security purchases, nor the proportion of non-U.S. securities which went into municipal bonds changed much in 1962. One reason for the shift from U.S. securities to less liquid securities was the development of the negotiable CD which gave banks more certainty about their deposits and reduced the need for highly liquid securities as a secondary reserve.

Chart I

THE RATIO OF TAX-EXEMPT YIELDS TO EQUIVALENT QUALITY TAXABLE BOND YIELDS, AND THE COMMERCIAL BANK AND HOUSEHOLD SECTOR SHARES OF NET ISSUES OF STATE-LOCAL DEBT
1947-1971

RATIO OF TAX-EXEMPT TO TAXABLE YIELDS (R_{SL}/R_{Baa})

COMMERCIAL BANK AND HOUSEHOLD SECTOR
SHARES OF NET ISSUES OF STATE - LOCAL DEBT

HOUSEHOLDS

BANKS
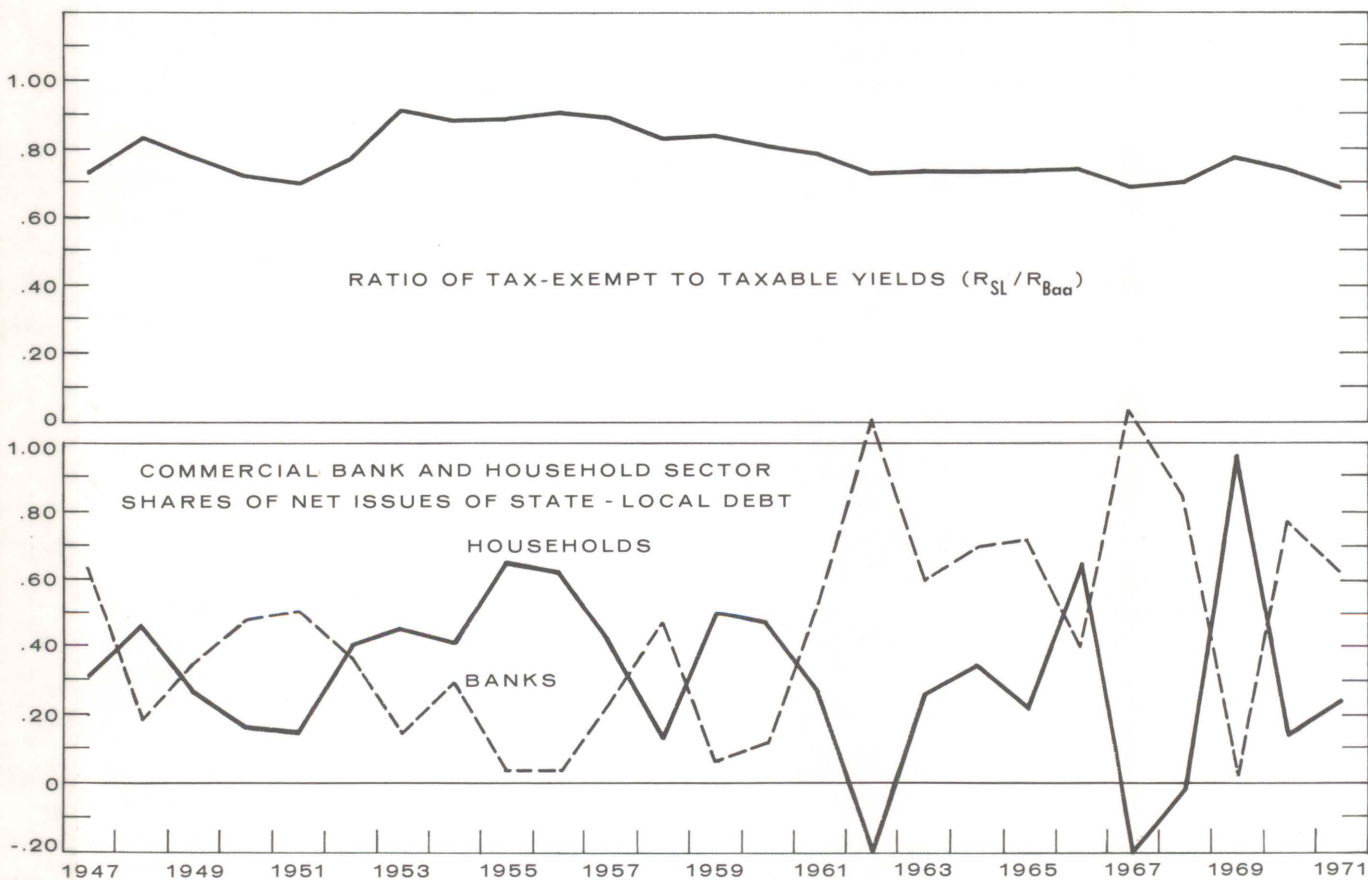
Sources: R_{SL}, R_{Baa} : Moody's Baa-Rated State-Local and Corporate Bond Market Yields.
Commercial Bank and Household Sector data from Federal Reserve System's Flow of Funds Accounts.

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Chart II

PURCHASES OF GOODS AND SERVICES, GROSS CAPITAL OUTLAYS AND
GROSS ISSUES OF DEBT, STATE AND LOCAL GOVERNMENTS
1947-1971

RATIO OF GROSS CAPITAL OUTLAYS TO STATE-LOCAL
GOVERNMENT PURCHASES OF GOODS AND SERVICES

RATIO OF GROSS ISSUES OF DEBT TO GROSS CAPITAL OUTLAYS
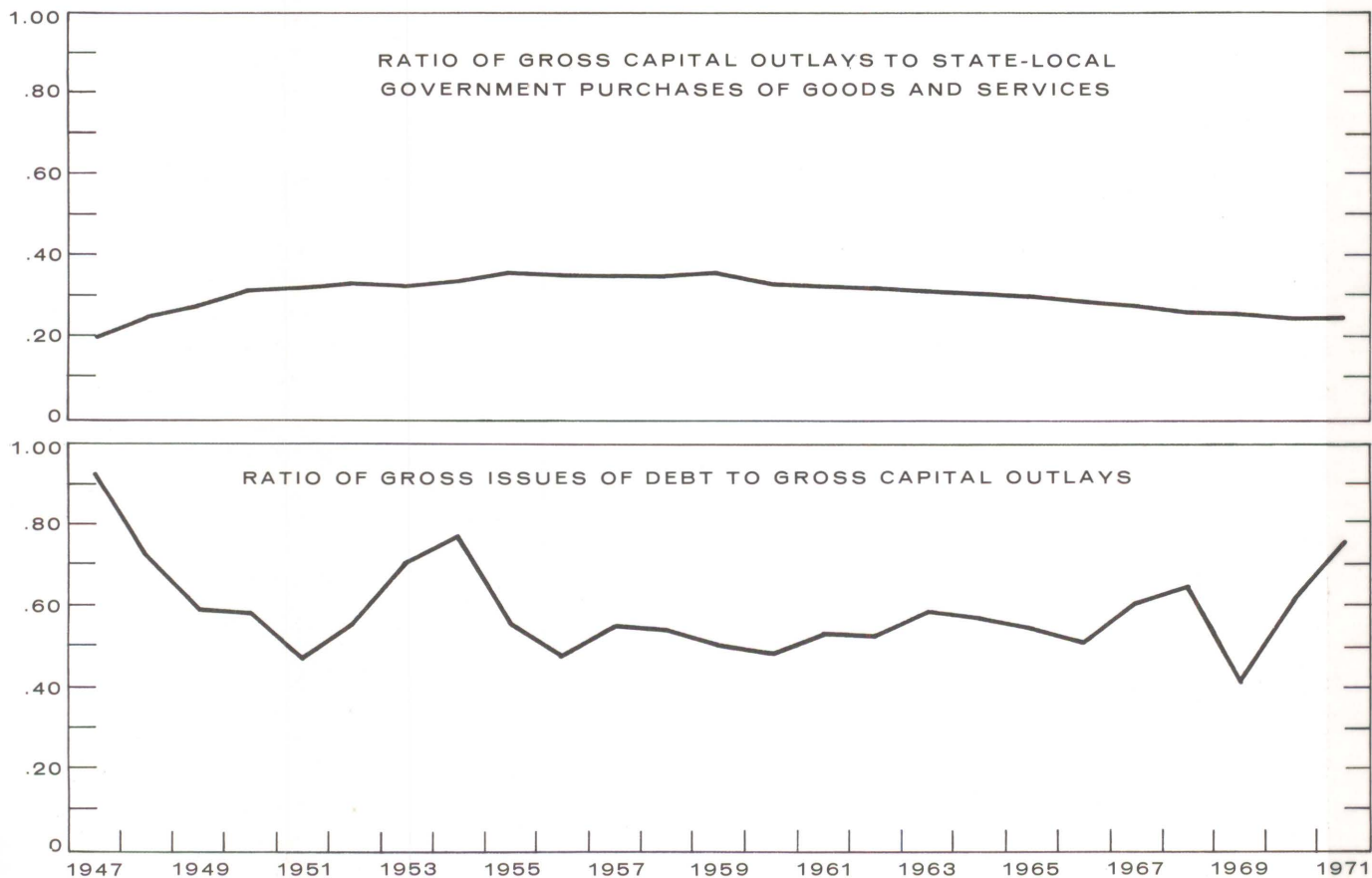
Source: Federal Reserve Bulletins.

however, been remarkably constant in the long-run over the period 1950-71, averaging roughly 0.50, in spite of the strong upward trend in interest rates. Thus, it appears that the timing of state-local debt issues is sensitive to interest rates but that, given gross capital outlays, the long-run level of municipal debt issues is not interest-sensitive.

The efficiency and equity aspects of tax-exemption are less well documented because data are not readily available on the tax rates of investors in tax-exempt securities. In a review of the literature up to 1958, a study undertaken by the Brookings Institution finds estimates of the proportion of cost to the U.S. Treasury which goes to state and local governments in the form of interest savings range from 23 percent to 65 percent, a wide range indeed.[6] The authors of that study do not directly estimate the efficiency but their data indicate that tax-exemption on gross issues *during 1960* was between 55 percent and 80 percent efficient.[7] This information is consistent with an estimate by the U.S. Treasury that during fiscal year 1968 the interest savings of state and local governments on the outstanding stock of tax-exempt securities was about 67 percent of the lost Treasury revenue.[8]

Thus, the subsidy through tax-exemption is inefficient, with recent estimates suggesting that roughly 70 percent of cost to the U.S. taxpayer is captured by state-local taxpayers in the form of reduced interest costs. The remaining 30 percent of Federal tax-expenditures is paid to high tax-investors who receive an after-tax yield in excess of the yield on alternative taxable securities. This windfall gain has been estimated by the Treasury at about $600 million during fiscal year 1968, the difference between the $1.8 billion in lost Federal revenues and the $1.2 billion in lower interest costs of state-local governments.[9]

Another issue is the future prospect for interest-rate volatility, the efficiency and the tax equity aspects of the current structure of the municipal bond market. Most forecasts of the future demand for tax-exempt securities suggest that commercial-bank participation in this market will be much less in the 1970s than in the 1960s, when banks acquired about 70 percent of the net issues of municipal debt. A rough estimate of the commercial bank demand for tax-exempts suggests that in the 1970s they might acquire only 40-45 percent of net issues of municipal debt.[10]

If this were the only change in the structure of the market for municipal bonds anticipated for the 1970s, we would expect the tax-exempt rate to rise relative to taxable bond interest rates, thereby exacerbating the efficiency and tax equity problems. However, changes in the

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[6] David J. Ott and Allan H. Meltzer, *Federal Tax Treatment of State and Local Securities,* The Brookings Institution, Washington, D.C., 1963, 15.

[7] *Ibid.,* 81.

[8] Joint Economic Committee of the U.S. Congress, *Hearings on the 1969 Economic Report of the President,* Ninety-first Congress, First Session, U.S. Government Printing Office (July, 1972), 30.

[9] More recent estimates suggest that over the lifetime of municipal debt issued in 1969 the Treasury will lose $2.6 billion in revenues while state-local governments will pay $1.9 billion less interest. The windfall income of high tax investors is about $0.7 billion. See David J. and Attiat F. Ott, "The Tax Subsidy Through Exemption of State and Local Bond Interest," *The Economics of Federal Subsidy Programs,* Part 3, Joint Economic Committee of Congress, U.S. Government Printing Office, Washington (July, 1972), 305.

[10] Robert P. Heufner, *Taxable Alternatives to Municipal Bonds: An Analysis of the Issues,* unpublished D.B.A. dissertation, Harvard Business School (1972), 68. Heufner provides a discussion of these estimates. The major reasons for this slowdown in bank demand for tax-exempts are the erosion of taxable income due to foreign tax credits and depreciation allowances on equipment leasing, and the inability of banks to continue to shift their security portfolios from U.S. securities to municipal bonds.

History of Tax Exemption of State and Local Bonds*

Origin

The rationale for tax exemption of interest on government bonds goes back to George Washington's administration and the concern then with the Federal debt. Because taxes were then specific levies against selected goods or income, it is easy to appreciate Treasury Secretary Alexander Hamilton's arguments that taxes levied against the Nation's own debt securities would destroy its foreign credit. For this and other reasons, Federal securities were exempted from Federal taxes throughout the 19th and early 20th centuries.

Tax exemption for the bonds of another unit of government grew from Chief Justice Marshall's concern about the abuse of tax power. In *McCulloch vs. Maryland* (1819) which is famous for establishing Federal supremacy, Justice Marshall protected that supremacy by declaring unconstitutional a state tax that was clearly intended to discriminate against the Bank of the United States. His court consistently struck down state and local taxes that discriminated against Federal operations.

In 1842, seven years after Marshall's death, the Court ruled that even a nondiscriminatory tax on the salary of a Federal officer was unconstitutional. Based on these decisions Federal bonds were granted exemption from state as well as Federal taxes.

Like the Federal government each state faced similar questions. In most cases the states have exempted their own bonds from state taxes but have not exempted bonds from other states. The question of whether the Federal Government would tax state and local bonds arose with the first Federal income tax, enacted to finance the Civil War. The tax covered state and local salaries and interest from municipal bonds. In 1871 however the Supreme Court (in *The Collector v. Day*) ruled that the application of the tax to the salary of a state judge was unconstitutional. This case established the doctrine of reciprocal immunity, thus protecting the Federal Government and the states from each other's tax powers. The immediate effect of this decision was limited because the income tax expired the next year.

When a new income tax was enacted in 1894, it recognized the Court's decision by exempting state and local salaries but taxed interest from municipal bonds. The next year the Court in *Pollock v. Farmers' Loan and Trust Company* unanimously ruled that Federal taxation of municipal bond interest was also unconstitutional, using the arguments that tax immunity is reciprocal and that a tax on income is a tax on its source. Later the income tax itself was found unconstitutional.

As the Government's needs increased, the

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* Most of this material is based on *Taxable Alternatives to Municipal Bonds: An Analysis of the Issues* by Robert P. Huefner, Research Report #53, Federal Reserve Bank of Boston, June 1973. The Report is available on request to the Research Department.

16th Amendment to the Constitution was ratified in 1913 allowing the Congress "to lay and collect taxes on income, from whatever source derived." The Congress then moved quickly to pass the new income tax but avoided the question of reciprocal immunity by exempting municipal bond interest and state and local government salaries.

The Changing Attitudes Toward the Exemption

By the end of World War I the municipal bond exemption was under attack as a result of the push for lower taxes and greater tax equity. In 1920 the U.S. Chamber of Commerce adopted by a vote of 1386 to 275 a resolution opposing the exemption. That same year also the National Tax Association unanimously resolved that they were ". . . unalterably opposed to the exemption of interest from income taxation." The next year the Association reaffirmed its resolution with but one lone dissenter who argued that someday the states would fight for the exemption.

Moreover, the governors in preparing for 1922 Congressional hearings wired their predominant opposition to the exemption: 16 opposed and 5 in favor. Private utilities objected to tax-exempt financing for their public competition. Investment bankers were also opposed because they thought it undermined the corporate debt market. Finally, economists opposed the exemption as causing a misallocation of resources.

Support for the exemption came primarily from local governments particularly in the South because of fear of higher borrowing costs. Although the exemption was threatened several times in the House of Representatives, the local governments found adequate support in the Senate to save it.

Most of the early efforts to eliminate the exemption were directed at passing a constitutional amendment. A resolution for an amendment passed the House in 1922 but died in a Senate committee. When the same resolution was reintroduced in the next Congress, it could not muster the necessary two-thirds vote in the House. At that time most conservatives were against tax exemption while liberals were in favor because they felt it served as a useful subsidy for state and local governments.

Presidents Coolidge, Harding, and Hoover and their cabinets continued to urge a constitutional amendment. In total, over 100 resolutions were introduced during these administrations making it the most frequently proposed constitutional amendment of the period. But the two houses of Congress never gave concurrent approval.

The municipal bond exemption was also at issue during the many hearings and battles between the two World Wars over the exemption for Federal securities. Both exemptions were attacked as undermining tax equity and the Treasury was reluctant to relinquish the exemption for its own securities if municipal bonds remained exempt and thereby enjoyed more favor in the market. Gradually, however, the scope of the exemption narrowed as the Court in a shift of emphasis upheld more taxes. In 1938 the Court upheld a Federal tax on a salary paid by an instrumentality of a state government, stating that:

The effect of the immunity if allowed would be to relieve respondents of their

duty of financial support to the national government, in order to secure the state a theoretical advantage so speculative in its character as to be unsubstantial.

In 1941 the exemption for Federal securities was finally eliminated even though Congressman Wright Patman opposed it because he believed it was a scheme to "get the camel's nose under the tent" to eventually tax municipal bonds.

These decisions upholding the government's right to tax seemed to open the way for direct Congressional repeal of the exemption. Moreover, the War gave the administration new reason to strengthen the income tax and in 1942 the Treasury requested taxation of new as well as outstanding municipal issues. The proposed legislation however was soundly defeated in the Congress, thus demonstrating the political

power of state and local governments and effectively discouraging further frontal attacks on the exemption.

With higher Federal income tax rates and broader coverage the rationale for tax exemption has shifted from constitutional considerations to economic and political ones. At the present time a consensus of opinion appears to be in favor of allowing state and local governments an option to offer taxable bonds with the U.S. Treasury paying an interest subsidy. Since January 3, 1973 several bills urging approval of the taxable option have been introduced into the House of Representatives. The proposed subsidies range from 30 to 50 percent of the interest rate. The Administration's tax package which was sent to Congress on May 1st includes a proposed subsidy of 30 percent. The accompanying article discusses the economic impact of the taxable bond option.

rate of growth of the supply of municipal debt may make such a conclusion premature. Unfortunately, available estimates of the rate of growth of supply are so divergent that we cannot draw any firm conclusions about the expected changes in the financing of tax-exempt bonds in the 1970s.

One of the more pessimistic projections is provided by the Urban Institute, which estimates that the rate of growth of gross municipal debt issues in the 1970-75 period may be roughly 8.0 percent per year, below the average rate of growth of 9.6 percent experienced in 1960-70 but still quite substantial.[11] Over the period 1970-72 the actual rate of growth of gross municipal debt issues has been about 14

percent per year, far higher than the Urban Institute projections for 1970-75. While a significant part of the surge in gross municipal debt issues in 1970-72 has been due to postponements during the previous period of monetary restraint, this suggests that the Urban Institute study might be even more optimistic than it appeared at the time.

The results of the Urban Institute study are

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[11] John Petersen and Harvey Galper, "Forecasting State and Local Government Capital Outlays," Urban Institute Paper 705-59 (February, 1970). The authors estimated gross outlays by state-local governments to be $34 billion in 1970 and about $50 billion in 1975, yielding an average annual growth rate of 8.0 percent. They then assume that the ratio of gross debt issues-to-gross outlays will remain constant, as Chart II indicates it has in the postwar period when short-run cyclical effects are eliminated. This yields an average annual rate of growth of gross municipal debt issues of 8.0 percent.

supported by a Bureau of Labor Statistics study which forecasts an average annual growth in total *real* purchases of goods and services by state-local governments of 4.7 percent over the period 1970-75, compared to the annual rate of growth of 5.5 percent experienced in the 1960-70 period. If these real growth rates are adjusted for inflation the projected growth rate over 1970-75 in purchases of goods and services measured in current dollars is 10.0 percent per year, compared with the 10.3 percent experienced in 1960-70.[12] Assuming a constant ratio of gross capital outlays-to-purchases of goods and services and a constant ratio of gross debt issues-to-gross capital outlays (both of which appear to be tenable first approximations) this study would indicate a rate of growth of gross debt issues in the 1970s roughly equal to that in the 1960s of 9.6 percent.

Both the Urban Institute and Bureau of Labor Statistics studies suggest that the financing terms of state-local debt will deteriorate over the 1970s, since the supply of municipal debt will grow at about the same rate as in the 1960s while the quantity of municipal debt demanded (at a "normal" interest-rate ratio) is likely to grow at a reduced rate as a result of the behavior of commercial banks.

This conclusion is contested in a study recently published by the American Enterprise Institute.[13] This study projects the expenditures and receipts of the state-local governments for the period 1975-80 and finds that unless there are major changes in the structure of state-local expenditure and receipt decisions, state and local governments will enjoy historically large budget surpluses of approximately \$20-\$25 billion per year. Over the entire postwar period the budget surplus of state-local governments has never exceeded \$2 billion. Thus, this study suggests that state-local governments might be able to reduce

taxes, reduce their dependence on Federal funding, increases their expenditures and/or reduce their issues of debt in the 1970s. In short, the study suggests the possibility of a major change in the historical relationships upon which the projections cited above are based.

In the face of the uncertainty about the future behavior of the market for tax-exempt securities it seems best to take a neutral stance and project the behavior of the tax-exempt market to be about the same in the 1970s as in the 1960s. Thus, little if any weight will be put upon a possible deterioration of the terms upon which municipalities issue debt as an argument for structural change in the municipal securities market.

The Impact of the Taxable Municipal Bond Option

The taxable bond option provides municipalities with the choice of issuing either tax-exempt bonds or taxable bonds with a fixed proportion—the subsidy rate—of the interest cost being reimbursed by the U.S. Treasury. If the first course is chosen, the municipality receives an interest subsidy which depends upon the tax rates of investors in the tax-exempt bonds. If the second course is chosen the interest subsidy depends upon the subsidy rate. In the appendix we use a simple the-

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[12] Thomas F. Fleming, Jr., "State and Local Government Spending in 1975," *Monthly Labor Review* (August, 1971), 19-28. The rate of inflation for the price deflator for state-local purchases of goods and services over 1970-75 is assumed to be equal to its rate of inflation over 1970-72 of 5.3 percent. Adding this to the projected 4.7 percent real growth per year in Fleming's study yields a nominal growth rate of 10 percent.

[13] David J. Ott, *et al., Nixon, McGovern and the Federal Budget,* American Enterprise Institute for Public Policy Research, Washington, D.C. (1972).

oretical framework to describe the impact of the taxable municipal bond. We show there that the taxable bond option has the potential for eliminating the marketing, equity, and efficiency problems which have arisen under the tax-exemption but that the effectiveness of the option depends upon the subsidy rate chosen. We also show that the level of the subsidy rate which is chosen has strong implications for the maturity structure of tax-exempt and taxable municipal bonds.[14]

The purpose of this section is to provide estimates of the impact of the taxable bond option at three subsidy rates: 33 percent, 40 percent, and 50 percent. These are the subsidy levels most often found in discussions of the taxable bond option. Our estimates are derived from two sources. First, we have used an econometric model of U.S. financial markets in order to derive judgments about the impact of the subsidy rate upon interest rates and the proportion of municipal debt issued in the taxable form.[15] Secondly, using some of the results obtained in our model, and the theoretical framework provided in the appendix, we have made long-range projections of the interest savings to municipalities and the costs to the U.S. Treasury of a taxable bond option with subsidy rates of 33 percent and 50 percent.

Our econometric model was used in the following manner: after estimating the model we used it to "predict" the values of interest rates, municipal debt issued, and the other variables relevant to our analysis over the period 1968-1970, when no taxable bond option existed. We then used the model to predict the same variables over the same period on the assumption that taxable municipal bonds did exist and that the Federal government pays 33 percent, 40 percent, and 50 percent of the interest cost of taxable municipal bonds. The difference between the value of a variable before and after

the taxable bond option is the effect of the option on that variable.

Since the short-run impact of introducing taxable municipal bonds is different from the long-run impact because of the dynamics of the model, we report only the impact of the taxable bond option in the third year of operation. This will give us a better idea of the effect of the option after the first year shocks have worn off. However, this is only an approximation to the long-run impact of the taxable bond option since it might take more than three years for the impact to work itself out fully.[16]

Table 1 reports our estimates of the market share of taxable bonds and the impact of the taxable bond option upon long-term interest rates. In order to minimize the impact of our choice of a simulation period upon judgments about the taxable bond option we report these results in a form which adjusts for growth. Thus, instead of reporting the absolute amounts of taxable bonds issued or the levels of interest, we report the market share of taxable bonds and the percentage changes in interest rates

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[14] In particular, "low" subsidy rates will induce municipalities to issue taxable bonds only at "long" maturities, while shorter maturities will remain in the tax-exempt form.

[15] The model consists of 45 equations, 10 of which represent the municipal bond market after a taxable bond option is introduced. The taxable bond option was simulated over the period 1968-70. Thus, the estimates obtained reflect the state of the economy in that period and may not be representative of the future state of the municipal bond market. For more detail on the model and the policy simulations see Peter Fortune, "The Impact of Taxable Municipal Bonds: Policy Simulations with a Large Econometric Model," *National Tax Journal* (March, 1973), 29-42.

[16] An analogy might be made with the simple yo-yo. When the yo-yo is first dropped, it rebounds sharply, but if no further pressure is put on it, the oscillations reduce until the yo-yo settles into a "long-run" equilibrium in which it sits motionless at the end of the string. We are trying to approximate the long-run equilibrium impact of the taxable bond option.

Table 1

IMPACT OF TAXABLE BOND OPTION ON MUNICIPAL BOND MARKET IN THE THIRD YEAR AFTER INTRODUCTION OF OPTION

	Subsidy Rate		
	33%	40%	50%
Market Share of Taxable Municipal Bonds[1]	1%	10%	93%
Percentage Change in Market Yield[2]			
a) Taxable Bonds	+0.2%	+0.7%	+1.3%
b) Tax-exempt Bonds	−3.7%	−12.9%	−22.4%

[1] Defined on a "net" basis as the ratio of net issues of taxable bonds to net issues of both forms of municipal debt (x 100).

[2] These are the percentage changes in the interest rate, not the percentage points by which the rate changes. For example, if the interest rate were 5% before the option and 4% afterward, the percentage change shown in the table would be −20%. The interest rate series used are Moody's Baa-rated corporate and state-local 20-year bond market yields, respectively.

which are due to the taxable bond option.

Table 1 indicates that 33 percent and 40 percent subsidy rates will have little impact on the form in which municipal debt is issued. Not until a 50 percent subsidy rate is simulated do we find the taxable bond option being heavily used. This means that in order to obtain significant improvements in the equity and efficiency characteristics of the method of subsidizing debt issues by state and local governments the subsidy rate should be set at some level above 40 percent and close to 50 percent. If this is not done, the taxable bond option will be effective in stabilizing the interest-rate ratio but it will have little long-run impact on the use of taxable bonds. In short, subsidy rates below (say) 40-45 percent will deal with the interest-rate volatility problem of tax-exemption but will have little effect on the equity and efficiency problems.

The taxable bond option will raise taxable bond yields and reduce tax-exempt yields, as is expected since the supply of taxable bonds of all issuers increases while the supply of tax-exempts is reduced. However, the upward pressure on taxable bond yields is small, with the taxable bond rate being raised by only 1.3 percent (about 13 basis points on a "pre-subsidy" base of 9.90 percent) at a 50 percent subsidy rate. Thus, even a high subsidy rate should have very little effect on the financing conditions for borrowers other than municipalities.

The impact of the option on tax-exempt rates is much more substantial. A 33 percent subsidy rate will reduce the tax-exempt rate by about 3.7 percent, but a 50 percent subsidy rate will reduce it by about 22 percent (or 150 basis points with a pre-subsidy tax-exempt rate of 6.75 percent).

These empirical results provide support for the analytical conclusions obtained in the appendix. An effective taxable bond option— one which induces use of taxable bonds by

setting a high enough subsidy rate—will require a subsidy rate above the 30-33 percent level which has been proposed by such students of the market as Senator Proxmire, the Securities Industry Association and, more recently, the Nixon Administration, and it will improve the equity and efficiency of the method of subsidizing municipal debt issues but at some additional cost to the U.S. taxpayer. If the subsidy rate chosen is at a low level (say 33 percent-40 percent) it will be effective in dealing with the problem of special volatility in the yield on long-term tax-exempts at a low cost to the U.S. Treasury, but it will provide little tax reform or improvement in the efficiency of the overall subsidy. To achieve a significant improvement in terms of tax reform and efficiency criteria, a higher subsidy rate, and therefore a greater cost to the Treasury, will be required.

What are the costs to the U.S. Treasury and the benefits to municipalities in the form of lower interest expenses? The estimates generated by our model are based on the conditions prevailing in the 1968-70 period and will not be representative of the future costs and benefits of a taxable bond option for several reasons. First, the volume of municipal debt issued will not remain at its 1968-70 levels, and the amounts of costs and benefits depend upon the amount of municipal debt issued. Secondly, the municipal bond market of the future is likely to exist in an environment different from that of 1968-70 in terms of the levels of interest rates (which had reached unprecedented highs in that period), and this will affect the estimates of interest saving and Treasury cost. Finally, a long-run estimate of benefits and costs should be based on the assumption that the existing stock of municipal bonds has been refinanced with the appropriate relationship between taxable and tax-exempt bonds. For these reasons we will not report the absolute amounts of interest savings for municipalities and costs to the Treasury which are predicted by our model.[17] Instead we will roughly estimate the percentage change in interest savings and Treasury costs which the taxable bond option is likely to induce at the 33 percent and 50 percent subsidy rates.

A 33 percent subsidy rate is not likely to induce any use of taxable municipal bonds in the long run. Thus, we would estimate that it will provide no additional interest savings and no additional Treasury costs.

A 50 percent subsidy rate is an entirely different matter. We have estimated that it will lead to almost a complete displacement of tax-exempt by taxable municipal bonds. Let us assume that this displacement is complete. History suggests that tax-exemption results in an interest saving for municipalities equal to 30 percent of the taxable bond rate while other studies estimate the cost to the U.S. Treasury is about 42 percent of the taxable bond rate.[18] If only taxable bonds are issued, and a subsidy rate of 50 percent is paid, the interest saving per dollar of municipal debt will be 50 percent of the taxable bond rate while the cost per dollar of debt to the U.S. Treasury in lost tax revenues will still be about 42 percent (assuming that the owners of taxable securities will have about the same tax rates as the present owners of tax-exempt securities). These data suggest that a 50 percent subsidy rate will increase interest savings of municipalities by

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[17] The interested reader can find these results in Peter Fortune, *op. cit.,* Table I, rows 4 and 5d, p. 36.
[18] See the study by David J. Ott and Allan H. Meltzer, *op. cit.,* which estimates that the average marginal tax rate for investors who would shift from tax-exempt to taxable securities is about 42 percent. This study was completed in 1962 and thus might be obsolete. However, this estimate received the blessing of the U.S. Treasury in both 1966 and 1968 and we adopt it here.

about 67 percent and costs to the U.S. Treasury by about 20 percent,[19] although the Treasury costs are likely to be overstated.[20]

Thus, we estimate that with a 50 percent subsidy rate a taxable bond option will result in interest savings to municipalities and costs to the U.S. Treasury which are roughly 70 percent and 20 percent greater, respectively, than the interest savings and Treasury costs which will occur if the current program of subsidizing municipal interest payments through tax-exemption alone is continued.

We can generate crude estimates of the dollar values of interest savings and Treasury costs which provide a rough idea of the amounts involved. These estimates will clearly overstate the volume of interest savings and Treasury costs because they are based on the assumption that the percentage changes in interest savings and Treasury costs for the entire municipal bond market will be the same as those we have estimated for long-term maturities (e.g. 10-20 years). We have noted in the appendix that the efficiency of tax-exemption decreases with maturity so that estimates should be viewed as the *maximum* expected amounts.

In Table 2 we report these estimates for the year 1980. We assume that by 1980 the bulk of municipal debt will have been re-financed at either a taxable bond interest rate of 6.60 percent or a tax-exempt rate of 4.50 percent.[21] We also assume that the stock of outstanding municipal debt will grow at the 8.1 percent annual rate experienced in 1960-72, from the year-end 1972 value of $180 billion to a value in 1980 of $336 billion. The average marginal tax rate assumed is 42 percent both with and without a taxable bond option. Finally we assume that with a 50 percent subsidy rate only taxable municipal bonds will be issued. In order to provide a point of comparison

Table 2 reports the Treasury's estimates of interest savings and Treasury costs for fiscal year 1968.

Table 2 indicates that even if tax-exemption were maintained as the only method of subsidizing municipal interest costs a sharp rise in both interest savings and Treasury costs will take place by 1980. The reasons are: (1) a sharp rise in the tax-exempt interest rate assumed in the calculations due to the higher level of taxable bond interest rates (6.6 percent assumed for 1980, while taxable bond rates averaged about 4.8 percent in the 1960-

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[19] The percentage increase in interest savings is equal to 100 times the difference between the subsidy rate (S) and the marginal tax rate of the last investor if only tax-exempts are issued (t), divided by that tax rate, i.e., equal to 100x (S-t)/t. The 50 percent subsidy rate sets S = .50 while historically the break-even tax rate is t = .30. Thus, the percentage increase in interest saving is 67 percent.

The percentage increase in Treasury costs will be the difference between the subsidy rate and the *average* marginal tax rate of investors who shift from tax-exempts to taxable securities, i.e. equal to 100x (S-t̄)/t̄. Studies indicate that t̄ = .42, so that at a 50 percent subsidy rate the percentage increase in U.S. Treasury costs is 19 percent.

[20] It seems quite likely that the percentage increase in Treasury costs is overstated because the average marginal tax rate of investors (t̄) is understated. See David J. Ott and Attiat F. Ott, *op. cit.,* whose estimated average marginal tax rates suggest that the Treasury might almost break even with a 50 percent subsidy rate.

[21] For our calculations we chose the equivalent taxable bond rate to be the rate on new issues of 10-year Aa-rated railroad equipment trust certificates while the tax-exempt yield is the rate on new issues of 10-year Medium Grade Municipal bonds. The 10-year maturity is close to the average maturity of municipal bonds while the Aa-rating is close to the average rating of municipal bonds. The railroad equipment trust certificate yield was chosen because RETCs are issued in serial form, as is municipal debt.

The specific values of the taxable and tax-exempt rates of 6.6 percent and 4.5 percent which we use are the averages over 1965-1972 of the respective yields as presented in Salomon Brothers, *An Analytical Record of Yields and Yield Spreads.* Thus, we assume that the average yields on new issues between 1973 and 1980 are equal to the average yields over 1965-72.

Table 2

**INTEREST SAVINGS OF MUNICIPALITIES AND
COSTS TO U.S. TREASURY IN 1980
WITH AND WITHOUT TAXABLE MUNICIPAL BOND OPTION***

(billions of dollars)

	Actual Values in 1968[1]	No Taxable Bond Option	Taxable Bond Option with Subsidy Rate of 33%[2]	Taxable Bond Option with Subsidy Rate of 50%[3]
Interest Savings of Municipalities	1.20	7.10	7.10	11.10
Cost to U.S. Treasury	1.80	9.30	9.30	11.10
Windfall Income of High-Tax Investors	0.60	2.20	2.20	0

* Projections are based on the assumptions: (a) by 1980 all municipal bonds are refinanced in the appropriate taxable/tax-exempt ratios; (b) the taxable bond rate is 6.6 percent while the tax-exempt rate is 4.5 percent; (c) municipal debt outstanding grows at an 8.1 percent annual rate from $180 billion in 1972 to $336 billion in 1980; (d) the average marginal tax rate of investors in municipal bonds is 42 percent.

[1] U.S. Treasury estimate for fiscal year 1968.

[2] A 33 percent subsidy rate is assumed to have no impact, i.e. no taxable bonds issued.

[3] A 50 percent subsidy rate is assumed to completely eliminate tax-exempts.

68 period), and (2) a significant increase in the amount of municipal bonds outstanding, from $124 billion in 1968 to $336 billion assumed for 1980. Thus, unless municipal debt grows at a much slower rate (or the taxable bond rate is much lower) than we assume, a significant rise in Treasury costs will occur regardless of whether a 50 percent taxable bond option is adopted.

These rough estimates project interest savings to municipalities of about $7.0 billion and Treasury costs of about $9.3 billion in 1980 if tax-exemption is maintained (or if a 33 percent taxable bond option was instituted, in which case it would be used very little). If a taxable bond with a direct subsidy of 50 percent were introduced, we project interest savings and Treasury costs of about $11.1 billion. The windfall income of high-tax investors would be about $2.2 billion in 1980 under tax-exemption but it would be eliminated under a 50 percent taxable bond option.

To summarize our results, we find that a taxable bond option with a subsidy of 30-33 percent is likely to have no long-run impact on the structure of the municipal bond market except perhaps in reducing the volatility of tax-exempt bond yields. A 50 percent subsidy rate, on the other hand, has a high probability of providing an effective method of dealing with the tax-equity and efficiency problems associated with tax-exemption of state-local interest payments. The 50 percent subsidy rate should also provide a sharp increase in interest savings for municipalities, by about $4.0 billion in 1980, at the expense of an increase in

costs to the U.S. Treasury of about $1.8 billion in 1980. An additional cost to the Treasury of about $1.8 billion seems a small price to pay for the elimination of the problems associated with tax-exemption.

Summary and Conclusions

The purpose of this study has been to analyze the chief problems which exemption of state-local interest from Federal taxation has created and to examine within the same framework the impact of taxable municipal bonds with different subsidy rate levels. The study also points out the close correlation between the economic interests of interested parties in the debate over taxable municipal bonds and their positions on the appropriate subsidy rate.

The three chief problems posed by the tax-exemption of interest on state-local bonds are: the volatility of tax-exempt yields (the marketing problem), the excess of cost to the U.S. Treasury over the interest savings of state-local governments (the efficiency problem) and the impact on the distribution of after-tax income (the tax equity problem). The taxable municipal bond option will overcome these problems if the subsidy rate—the proportion of interest on taxable municipal bonds which is paid by the Federal Government—is sufficiently high.

A 33 percent subsidy rate will have no effect on the form of municipal debt in the long run but it will shelter the tax-exempt interest rate from the volatility imparted to it by monetary policy. Thus, this low subsidy rate will deal with the short-run marketing problem but it will have little, if any, effect on the long-run problems of efficiency and tax equity. Furthermore, since this low subsidy rate will induce little (if any) use of taxable bonds it will result in very little additional interest savings for municipalities or additional cost to the Trea-

sury. A 40 percent subsidy also promises little long-run impact on the efficiency and tax equity problems, although it is better in these respects than a 33 percent rate since it will induce some use of taxable bonds in the long run.

An effective taxable bond option—one which eliminates the problems cited above—is likely to require a subsidy rate in the range of 45-50 percent. Our estimates suggest that a 50 percent subsidy rate will almost eliminate issues of tax-exempts, thereby eliminating the marketing, efficiency, and tax-equity problems of tax-exemption. It will do this while raising the interest savings of municipalities by roughly 70 percent, and the costs to the U.S. Treasury by a *maximum* of 20 percent, compared to the interest savings and Treasury costs which will be experienced if only tax-exempt municipal bonds are issued.

When translated to dollar estimates, rough calculations suggest that if no taxable bonds are allowed (if an ineffective taxable bond option is introduced) the cost of tax-exemption to the U.S. Treasury could rise from the $1.8 billion experienced in fiscal year 1968 to about $9.3 billion in 1980, while interest savings of municipalities could rise from the 1968 value of $1.2 billion to $7.1 billion in 1980. Thus, even if we maintain tax-exempts as the only form of municipal debt issues, there are likely to be very substantial increases in costs to the U.S. Treasury as municipal debt grows and as debt is refinanced at the higher interest rates which are likely to prevail in the 1970s over those of the 1960s.

A taxable bond option with a subsidy rate of 50 percent is found to virtually eliminate tax-exempt bonds. Thus, the problems posed by tax-exemption would be eliminated. This would involve only a minor additional cost to the U.S. Treasury while providing a substantial increase in interest savings for municipalities.

Our study suggests that if a taxable municipal bond option with a 50 percent subsidy rate is adopted the costs to the U.S. Treasury in 1980 will be about $1.8 billion more than the $9.3 billion which tax-exemption alone would cost in that year. The benefits provided by incurring such costs are: (1) a substantial reduction in state-local interest costs (by about $4.0 billion in 1980); (2) a significant improvement in tax equity through the elimination of the $2.2 billion in windfall income which would accrue to high-tax rate investors in 1980 if only tax-exempts are issued; and (3) an elimination of the greater volatility of tax-exempt bond yields than of equivalent taxable bond yields which has been experienced in the 1960s.

TECHNICAL APPENDIX: THE THEORY OF TAXABLE MUNICIPAL BONDS

The purpose of this appendix is to describe the operation of the tax-exempt municipal bond market in the postwar period, and the anticipated operation of the municipal bond market with a taxable municipal bond at different subsidy rates. We use the techniques of microeconomic market analysis familiar to students in undergraduate economics courses. In doing so we abstract from some technical problems in order to reveal the essential characteristics of the municipal bond market.[1] Few of the techniques used in this appendix are innovations and much is owed to previous studies of the municipal bond market.[2]

An Analysis of the Market for Tax-Exempt Municipal Debt

In this section we describe a simple framework which can be used to analyze the problems posed by exemption from taxation of interest paid by state-local governments (henceforth called "municipalities"). Once this framework has been formed and used to shed light on the nature of the problems in the existing structure of the market for municipal bonds, the framework will be applied to an examination of the impacts of introducing taxable municipal bonds.

Suppose that municipal governments wish to issue a fixed amount of debt and that the only form of that debt is tax-exempt. In order to induce an investor to buy this debt the municipality must pay a tax-exempt rate which is at least equal to the after-tax yield of an equivalent taxable bond. The first bond sold will be bought by investors with the highest tax rates since they will accept the lowest tax-exempt yield. However, as more bonds are issued the tax-exempt rate must rise to induce individuals with lower tax rates to buy the bonds. Thus, as more bonds are issued the tax rate of the purchaser of the last bond falls, the tax-exempt yield rises and the intramarginal purchasers—those with higher tax rates than the last investor induced to enter the market—get a tax-exempt yield greater than that necessary to induce them to buy the bonds. Note that we are concentrating on the net issues of debt, not on the outstanding stock of municipal bonds.

This situation is shown in Figure 1, which describes the market for municipal bonds under these conditions. The vertical axis measures the ratio of the tax-exempt rate to the taxable bond rate (R^{TE}/R^T), which is called the "interest-rate ratio," while the horizontal axis measures the total quantity of municipal debt issued. The supply curve for municipal debt is SS', which is vertical because of the assumption that municipalities want to issue a fixed amount of debt which will not depend upon the interest rate. The demand curve (DD') is drawn with a positive slope to reflect the fact that the tax-exempt rate must rise relative to the taxable bond rate if more municipal debt is to be issued. Note that the taxable

bond rate referred to here is not that for taxable *municipal* bonds, since we have not yet considered them, but is for equivalent taxable bonds which already exist (e.g. railroad equipment trust certificates with the same credit rating as the municipality).

The ratio of the tax-exempt rate to the equivalent taxable bond rate varies along the demand curve because of the different tax rates of purchasers. For a purchaser with a tax rate of t, the ratio required to induce him to buy tax-exempts is (1-t).[3] In order to point out the relationship between tax rates and the demand for tax-exempt municipal debt we have shown the relationship in Figure 1 for purchasers with three different tax rates: 30 percent, 40 percent and 50 percent. Figure 1 shows that in order for municipalities to sell $1,000 of tax-exempt debt they must induce purchasers with a 50 percent tax rate to buy tax-exempts. This is done by offering a tax-exempt rate which is .50 (=1-.50) of the taxable rate. If municipalities wish to sell $1,500 of debt they must offer a tax-exempt rate which is .60 (=1-.40) of the taxable rate, thereby inducing purchasers with 40 percent tax rates to buy municipal bonds. In the final equilibrium shown in Figure 1, municipalities want to sell $2,000 of debt and must induce purchasers with 30 percent tax rates to enter the market by offering a tax-exempt rate equal to 70 percent of the taxable bond rate.

This simple diagram is extremely useful in pointing out the problems created for the municipal bond market by using tax-exemption to subsidize the interest cost of municipalities. As discussed above, the chief problems are: (1) the special sensitivity of tax-exempt interest rates to monetary policy; (2) the inefficiency of tax-exemption as a means of subsidizing municipal debt issues; and (3) the windfall income which accrues to individuals with higher tax rates than the tax rate of the last purchaser of municipal bonds.

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[1] These technical problems are avoided by assuming: (1) that the equivalent taxable bond rate is not affected by the operations of the municipal bond market; (2) that the tax-exempt bonds and equivalent taxable bonds are perfect substitutes; (3) that the supply of municipal bonds issued is independent of the net interest cost. These assumptions are made as a matter of convenience and are not likely to alter radically the conclusions obtained with more sophisticated analysis. Assumptions (1) and (3) are supported as long-run propositions by the econometric analysis described in the text, while assumption (2) is necessary since we have no reliable information on the degree of substitution between tax-exempts and taxable bonds.

[2] In particular, the author has drawn heavily upon Robert P. Huefner, "Municipal Bonds: The Costs and Benefits of an Alternative," *National Tax Journal* (December, 1970), 407-416, and upon Susan Ackerman and David Ott, "An Analysis of the Revenue Effects of Proposed Substitutes for Tax Exemption of State and Local Bonds," *National Tax Journal* (December, 1970), 397-406.

[3] As described above, a purchaser with tax rate t will buy tax-exempt securities only if $R^{TE} \geqq (1-t) R^T$, or if $(R^{TE}/R^T) \geqq (1-t)$. It is convenient to use the interest rate ratio throughout our analysis.

FIGURE 1
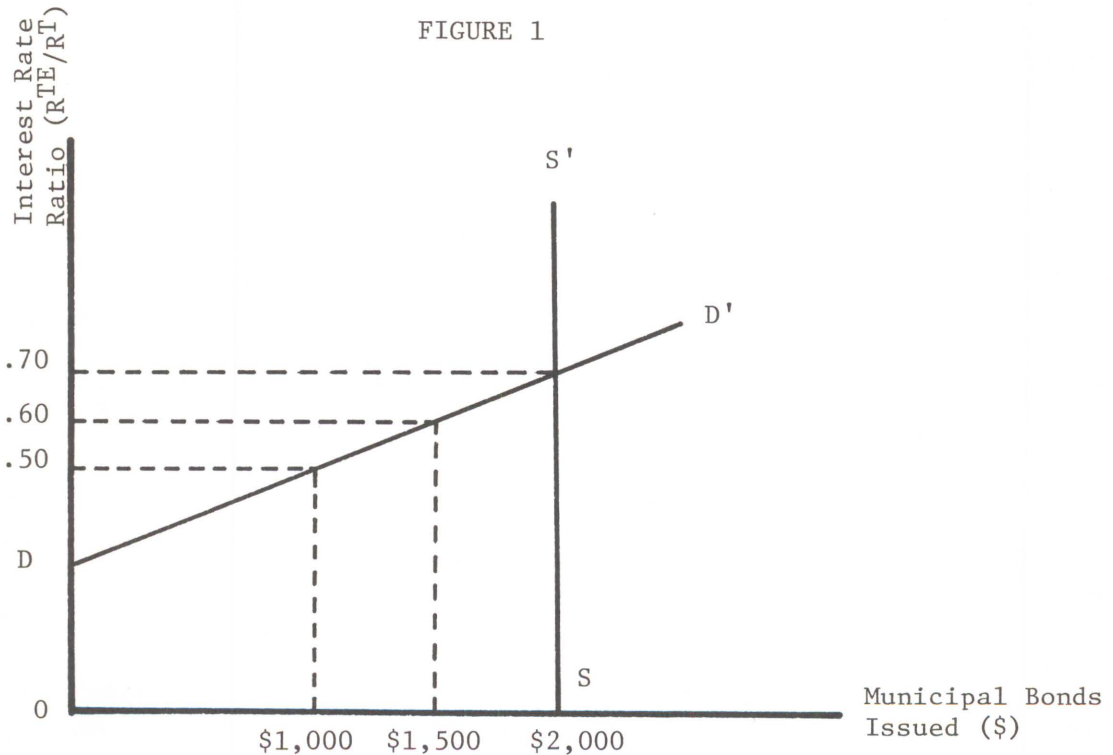
The first two problems arise largely because tax-exemption narrows the market for municipal debt to commercial banks, casualty insurance companies, and high-income individuals since thrift institutions, life insurance companies and pension funds have sufficiently low tax rates that tax-exempt securities give them no yield advantage. Monetary policy is known to have a major impact on bank credit and, therefore, to significantly affect the amount of tax-exempt securities which commercial banks wish to acquire at any given ratio of tax-exempt to taxable security yields. Since commercial banks are the major purchasers of tax-exempt securities—having acquired an average of 70 percent of net issues of tax-exempts during the 1960s—it is clear that monetary policy will have strong effects on the total demand for tax-exempt securities and that the interest rate on tax-exempt bonds will be more volatile than the interest rate on taxable securities.

The reasons for the special sensitivity of interest rates on tax-exempt bonds are shown graphically in Figure 2. Assume that initially the demand and supply curves for municipal debt are D_1D_1' and SS', respectively. For purposes of exposition this is assumed to yield a tax-exempt rate equal to 70 percent

of the taxable bond rate. If a restrictive monetary policy is introduced—say, through sales of securities by the Federal Reserve System which reduce commercial bank reserves and force a restriction in bank credit—the demand curve for tax-exempts will shift to the left and the new demand curve will be D_2D_2'. This means that purchasers of tax-exempts *other than* commercial banks must buy the bonds which banks would have bought in the absence of the restrictive monetary policy. As an inducement the interest-rate ratio must rise to provide incentive for new purchasers with tax rates lower than the 30 percent tax rate (which the last purchaser had before the restrictive monetary policy) to enter the market. We assume that the last purchaser with the demand curve D_2D_2' has a 20 percent tax rate, yielding an interest-rate ratio of .80. Thus, because of the important role of commercial banks in both the market for tax-exempt securities and the transmission of monetary policy, the tax-exempt interest rate will rise (or fall) more sharply than the equivalent taxable interest rate when monetary policy tightens (or eases).

The possibility of a long-run decay in the advantage of tax-exemption can be view through the same framework. As the economy grows we expect bank

FIGURE 2
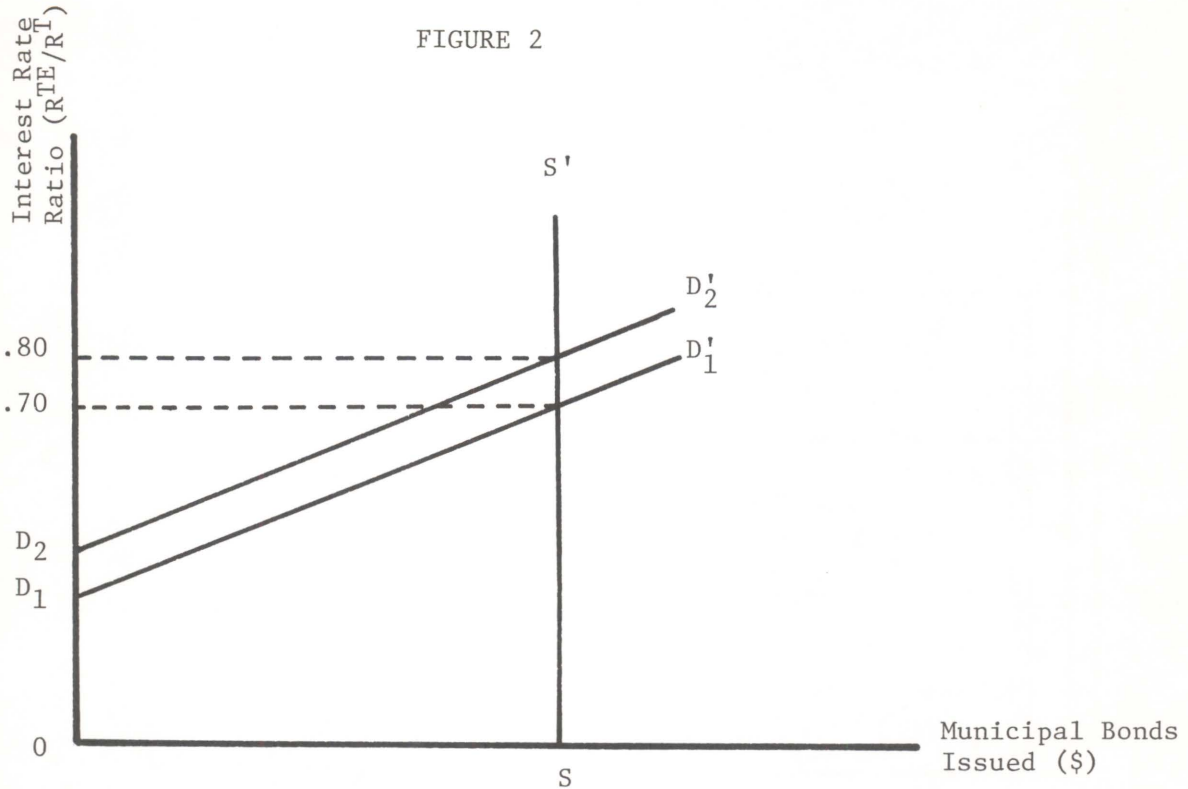
credit, the wealth of households, and the amount of debt issued by municipalities to grow. As bank credit and household wealth grow, the quantity of tax-exempt bonds demanded at each interest-rate ratio will increase. This can be viewed as a shift to the right in the demand curve. If the supply curve should shift to the right even faster, as municipalities finance additional capital projects, the interest-rate ratio will increase. This means, of course, that the advantage of tax-exemption to municipalities will decrease.

The issues of the efficiency and the equity of tax-exemption are inextricably related since the windfall income which accrues to high-income purchasers of tax-exempts is the result of the inefficiency of the tax-exemption as a subsidy device. If tax-exemption were 100 percent efficient, there would be no equity problem because all tax-expenditures by the U.S. Treasury would go to municipalities. Over the postwar period the interest-rate ratio has averaged about 0.70, indicating that tax-exemption reduces the interest rate paid by municipalities by roughly 30 percent because the last purchasers of tax-exempts have had about a

30 percent tax rate. Over the same period the bulk of tax-exempts have been bought by individuals or banks with tax rates above 30 percent. Thus, for every $1 of "tax-expenditures" (i.e., tax revenues lost) by the U.S. Treasury due to tax-exemption, less than $1 has actually gone to municipalities in the form of lower interest costs. According to U.S. Treasury estimates, during fiscal year 1968 the tax-exemption of interest paid by municipalities cost the U.S. Treasury about $1.8 billion in lost tax revenue but only 67 percent of this, or $1.2 billion, accrued to municipalities in the form of lower interest costs. The remaining 33 percent, or $0.6 billion, was enjoyed by individuals or banks with tax rates above the tax rate of the last purchaser. The tax-exemption is, by these estimates, 67 percent efficient and it provides windfall income to high tax-rate individuals of about $0.6 billion.

The aspects of efficiency and equity are examined in Figure 3, which is an extension of Figure 1. Since the highest tax rate under the current income tax structure is 70 percent, the first purchaser of tax-exempts will require an interest-rate ratio of 0.30

FIGURE 3
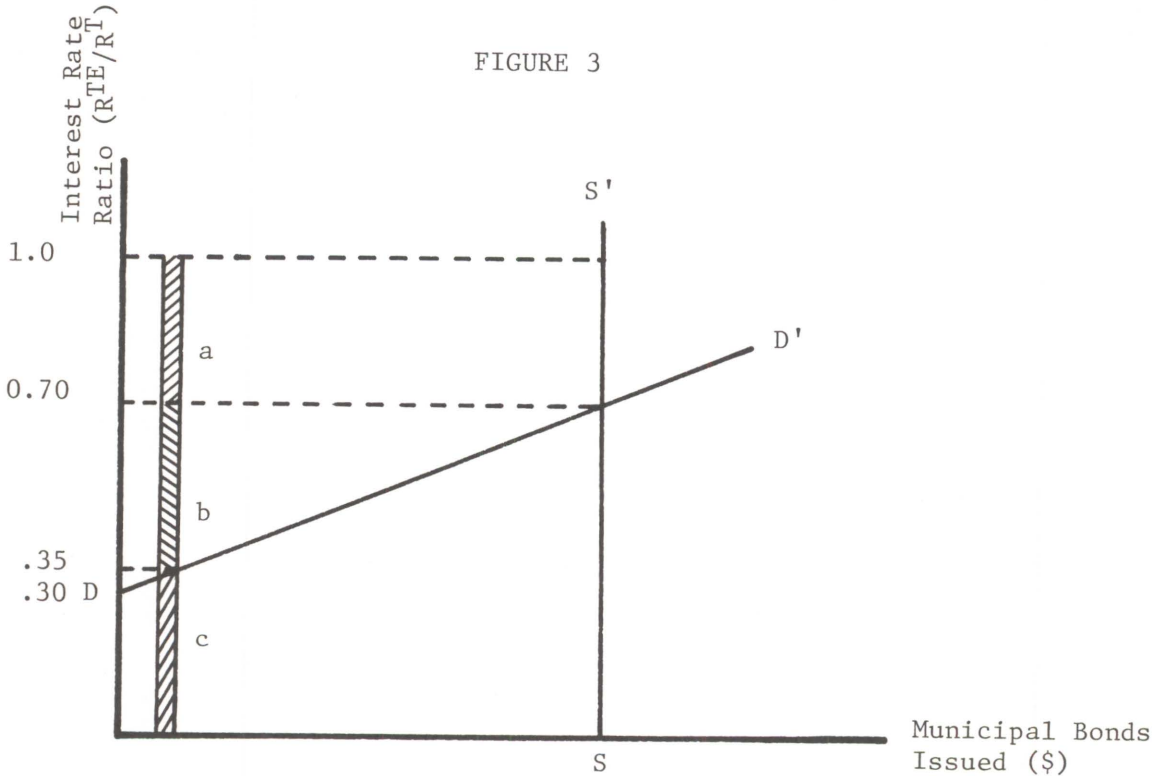
and, as we have seen, additional purchasers can be induced to enter the market only by receiving a higher interest-rate ratio. We assume that the equilibrium interest-rate ratio is 0.70. If tax-exemption were not allowed and all municipal debt had to be issued in a taxable form, the interest-rate ratio would be 1.0. We show this value in Figure 3 since it is needed to show the nature of the inefficiency and inequity of the tax-exemption.

Let us concentrate our attention on purchasers with tax rates of 65 percent. Our purpose is to separate out the interest expense incurred by municipal debt sold to these purchasers into the amount paid by the Treasury, the amount paid by municipal governments, and the amount of windfall income gained by purchasers with a 65 percent tax rate. In order to ease our task we have shaded the part of Figure 3 which represents interest associated with purchases of municipal debt by individuals with this tax rate.

The total interest associated with these purchasers is the sum of the three shaded areas marked "a", "b" and "c".[4] The area "a" represents payments by the

U.S. Treasury in the form of lost revenues which accrue to municipalities in the form of reduced interest costs. The area "b" represents U.S. Treasury tax-expenditures which accrue as windfall income to the purchasers with a 65 percent tax rate. The area "c" represents the interest required by these purchasers to induce them to buy tax-exempts. The area b + c represents interest paid by municipal governments to these purchasers. Note that the area "b" is paid twice—once as a direct interest payment to purchasers by the municipalities and once as an indirect "tax-expenditure" by the U.S. Treasury. This is the source of the inefficiency and inequity of tax-exemption: interest is paid by the municipality to high in-

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[4] Actually, the total interest is (a+b+c) *times* the taxable bond rate, since the vertical axis measures the interest-rate *ratio* rather than the tax-exempt interest rate. Since each area is multiplied by the same constant (R) to arrive at a measure of total interest, our failure to make the multiplication explicit does not affect our conclusions about the relationships between the areas.

come purchasers which would go to the U.S. Treasury if there were no tax-exemption but which instead stays in the hands of the purchasers. It is a windfall in the sense that the purchaser would be willing to buy the tax-exempt security even if he could not keep the amount represented by "b" since he only requires the amount represented by "c". In other words, the U.S. Treasury is paying the amount represented by "b" to induce a purchaser to do what he would do

anyhow. This is clearly inefficient and it is inequitable since it provides the individual with a way of avoiding the tax rates applicable to other forms of income.

We now arrive at the final step of the examination of the efficiency and equity aspects of tax-exemption. If we apply the same analysis to all purchasers of tax-exempt securities, we arrive at Figure 4. The area designated as A represents the tax expenditures of the U.S. Treasury which accrue to municipal govern-
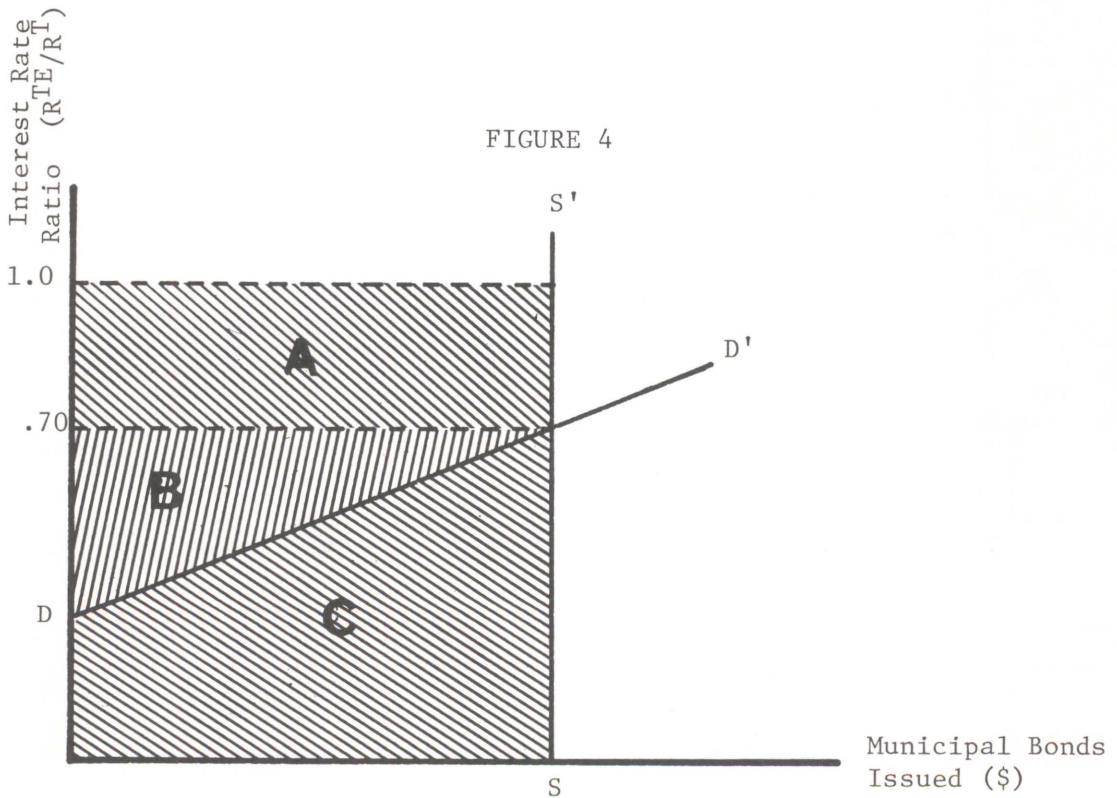
FIGURE 4

DECOMPOSITION OF AREAS IN FIGURE 4

Amount Paid by Federal Government: $(A + B) \times R^T$

Amount Paid by Municipal Government: $(B + C) \times R^T$

Amount Required by Purchasers: $C \times R^T$

Windfall Income of Purchasers: $B \times R^T$

Efficiency of Tax-Exemption: $(A/A + B)$

Interest Saving of Municipal Government: $A \times R^T$

ments; the area B represents tax expenditures to high income purchasers of tax-exempt securities; and the area C represents interest payments required by purchasers of tax-exempts to induce them to forego the acquisition of taxable debt. The ratio (A/A+B) provides a measure of the efficiency of tax-exemption, defined as interest saving of municipalities per dollar of cost to the U.S. Treasury.

The interest sensitivity of the demand for tax-exempt securities is an important characteristic of the market for municipal securities. The greater the interest sensitivity—that is, the flatter the demand curve —the greater is the efficiency of tax-exemption and the lower is the windfall income. Furthermore, the higher the interest sensitivity of the demand, the less sensitive is the interest-rate ratio to shifts in the demand for municipal debt in response to monetary policy. In short, the greater the interest sensitivity of the demand for tax-exempts, the less important are the problems of inefficiency, inequity and interest-rate volatility posed by the use of tax exemption to subsidize the interest costs of municipal governments.

The existence of the problems posed by tax exemption has led to the search for alternative means of subsidizing the interest costs of municipal debt while mitigating the problems discussed above. The chief alternative which has emerged is the introduction of a municipal government *option* to issue taxable bonds, with the Federal Government underwriting a proportion of the interest payments through a direct subsidy, as well as tax-exempt bonds for which the subsidy depends upon the tax rates of the purchasers of tax-exempts. This taxable bond option is the subject of the following section.

An Analysis of the Taxable Bond Option

The taxable bond option provides municipalities with the choice of issuing either tax-exempt bonds, and receiving an interest subsidy which depends upon the tax rate of the purchasers of tax-exempts, or a taxable municipal bond with a fixed fraction—the subsidy rate—of interest paid directly by the U.S. Treasury. Our purpose in this section is to use our

FIGURE 5
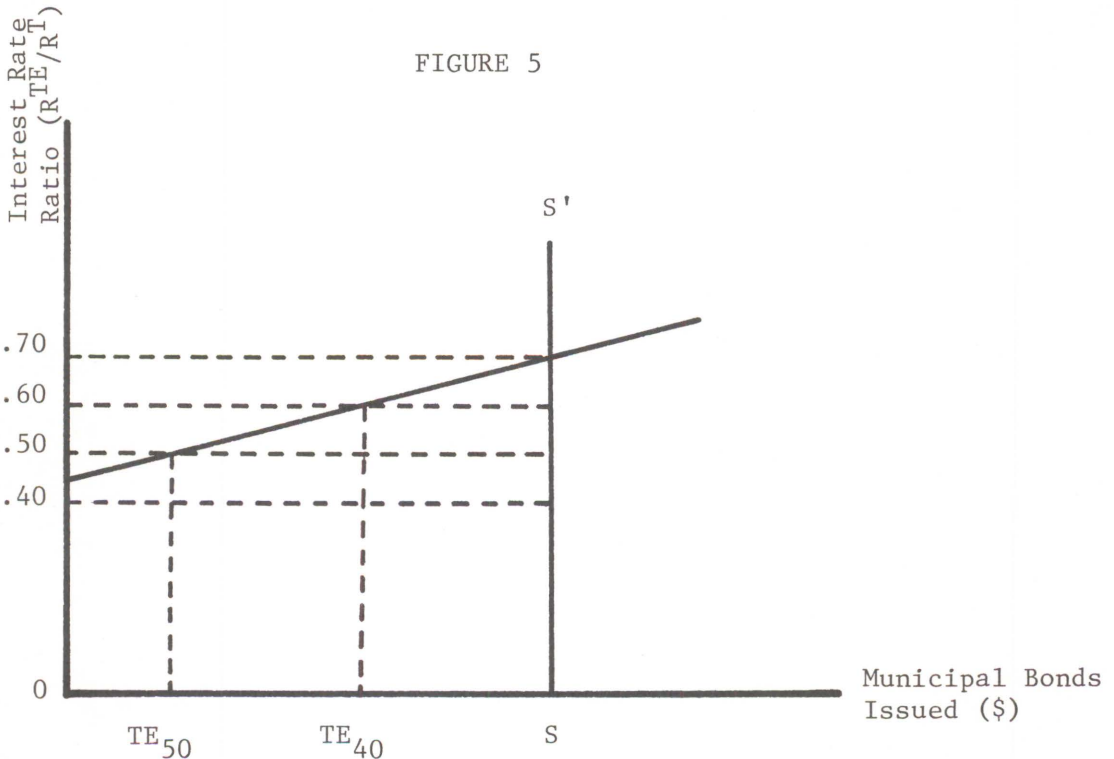
simple model to describe the operation of the taxable bond option, to indicate how it affects the interest-rate volatility, equity and efficiency aspects of the method of subsidizing municipal debt, and to show how these issues in turn are affected by the level of the subsidy rate.

Figure 5 presents the simple graph of the market for municipal debt which we first saw in Figure 1. However, now we consider two forms of debt—taxable and tax exempt. The supply curve (SS′) shows the supply of municipal debt of *both* forms which municipalities wish to issue, but the demand curve is the demand for tax-exempt bonds only. At any interest-rate ratio the quantity of taxable bonds sold is the difference between the total quantity of municipal debt which is sold by municipalities and the quantity of tax-exempts which wealth-owners want to buy.

Suppose the initial position, before introduction of taxable municipal bonds, is the same as that shown in Figure 1—all municipal debt is tax-exempt and the interest-rate ratio is 0.70. If a taxable bond option is introduced with, say, a 40 percent subsidy rate (40 percent of the interest cost of taxable municipal debt is paid by the U.S. Treasury) the interest-rate ratio will decline to 0.60. The reason can be seen by examining the response of municipalities, which will choose to issue the form of debt which costs less. Thus, at a 40 percent subsidy rate, tax-exempt debt will cost less if the interest-rate ratio is below 0.60 while taxable debt costs less if the interest-rate ratio exceeds 0.60. Both types of debt will be issued only if the interest-rate ratio equals one minus the subsidy rate, for in this case the cost of tax-exempt debt is equal to the after subsidy cost of taxable debt.[5]

If the subsidy rate is 40 percent, leading to an interest-rate ratio of .60. Figure 5 shows that the amount TE_{40} of municipal debt issued will be tax-exempt while the remainder (the amount $S\text{-}TE_{40}$) will be taxable. The reason is that at a 40 percent subsidy rate only purchasers with tax rates of 40 percent or above will buy tax-exempts, and the demand curve shows that they will buy the amount TE_{40}. Those purchasers who had bought tax-exempts before the taxable bond option but who had tax rates in the range 30 percent—40 percent now find that taxable bonds offer a higher yield *after tax* than tax exempts and they buy the remaining municipal debt issued in a taxable form.

As the subsidy rate increases, more municipal debt is shifted to the taxable form because the interest-rate ratio falls and the market for tax-exempts becomes concentrated in purchasers with higher tax rates. For example, Figure 5 shows that with a 50 percent subsidy rate, which results in an interest-rate ratio of 0.50, the amount of tax-exempts is TE_{50}, which is less than TE_{40}, while the amount of taxable bonds is $S\text{-}TE_{50}$. At a 60 percent subsidy rate our diagram shows that no tax-exempts will be issued. *Thus, the greater the subsidy rate on taxable municipal bonds, the greater will be the proportion of municipal debt issued in the taxable form and the lower will be the tax-exempt interest rate relative to the taxable bond interest rate.*[6] An implication of this is that higher

subsidy rates will reduce the amount of business done by underwriters who specialize in tax-exempt bonds (while increasing the business done by taxable municipal bond specialists), that it will result in lower yields to purchasers who still acquire tax-exempt securities and that it will result in greater capital gains on the outstanding stock of tax-exempt bonds. In short, existing underwriters and new purchasers of tax-exempts are likely to object to high subsidy rates. This might account for the strong preferences for low subsidy rates which are expressed by underwriters.

The taxable bond option will also result in much less sensitivity of the interest-rate ratio to shifts in the demand for tax-exempt bonds induced by monetary policy. Instead of such shifts being reflected in the interest-rate ratio we would expect them to be reflected in the proportion of municipal bonds issued in the tax-exempt form. In a period of restrictive monetary policy, when in the absence of taxable municipal bonds the tax-exempt rate would rise relative to the taxable bond rate, the interest-rate ratio would be unaffected and the entire adjustment to the reduced demand for tax-exempt debt would be through a substitution of taxable debt for tax-exempt debt. This is shown in Figure 6, which is drawn under the assumption of a 40 percent subsidy rate.

In Figure 6 the subsidy rate sets the interest-rate ratio at 0.60. Before the introduction of a restrictive monetary policy the demand curve is D_1D_1', the volume of tax-exempts is TE_1, while the volume of taxable municipals is $S\text{-}TE_1$. After the restrictive monetary policy the demand curve is D_2D_2', the interest-rate ratio is unchanged, and the volume of tax-exempts has decreased to TE_2. When this graph is compared with Figure 2, which describes the effect of restrictive monetary policy when only tax-exempt bonds can be issued, it is clear that the taxable bond option will make the tax-exempt interest rate much less volatile.

This is an important feature of the taxable bond option, for the experience of the 1960s shows clearly that periods of changes in monetary policy have significantly affected the terms upon which municipalities can borrow as well as the uncertainties faced by underwriters. This suggests that a taxable bond option would be advantageous to underwriters since it would ease their task of marketing tax-exempt securities, but that underwriters specializing in tax-exempts would prefer a low subsidy rate which would stabilize the tax-exempt rate in periods of changing monetary policy without leading to a long-run reduction in the volume of tax-exempts.

---

[5] Thus, if the subsidy rate is S, municipalities will issue tax-exempt debt if $R^{TE} < (1\text{-}S) R^T$, and they will issue taxable debt if $R^{TE} > (1\text{-}S) R^T$. They will issue both types of debt if $R^{TE} = (1\text{-}S) R^T$ since in this case each has an equal after subsidy interest rate.

[6] There is a limit to the amount by which the tax-exempt rate will decline, since it will not go below the rate at which no tax-exempts are issued. At that rate the tax-exempt yield has no importance except for its impact on the value of the outstanding stock of tax-exempts.
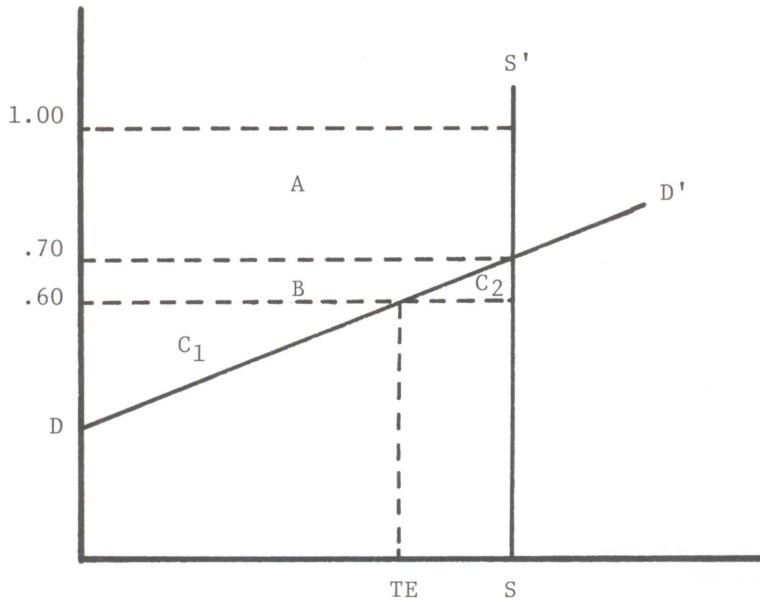
FIGURE 6
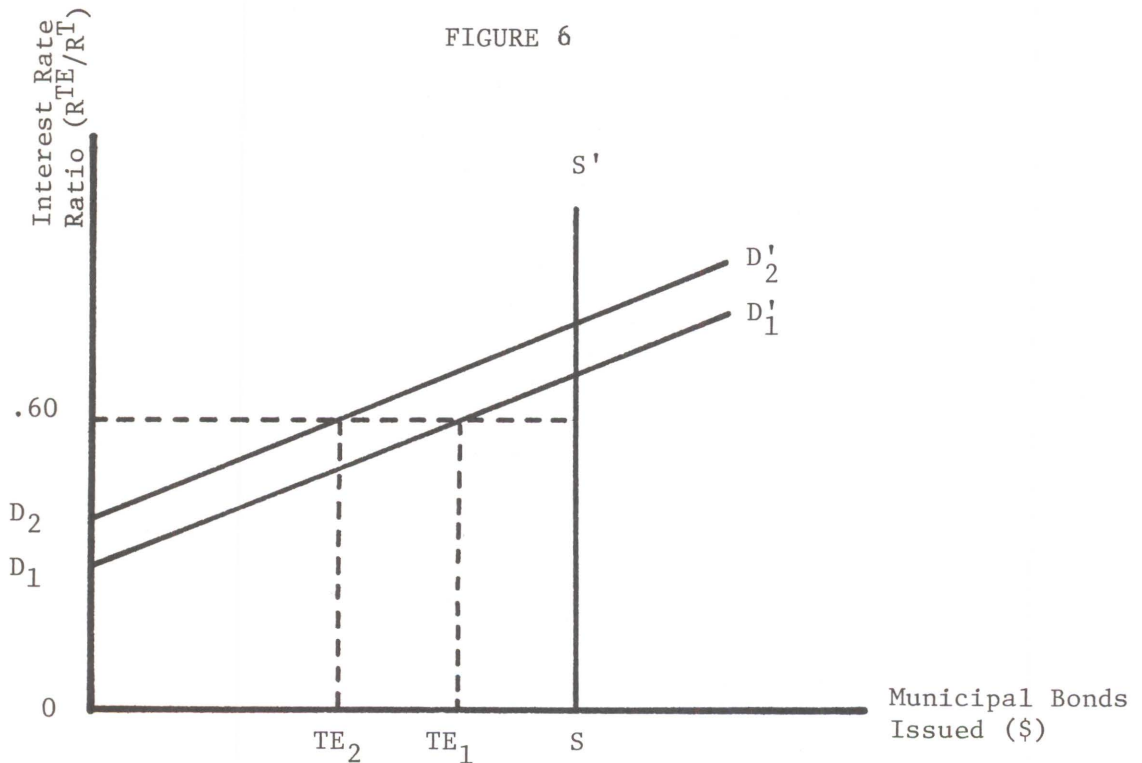
The impacts of the taxable bond option on the costs to the U.S. Treasury and the equity and efficiency of the subsidy to municipalities can also be examined with our simple model. In Figure 4 we examined these aspects for the case where only tax-exempt bonds can be issued. In Figure 7 we introduce the taxable bond option into our analysis. Before the taxable bond option the interest-rate ratio is 0.70 and U.S. Treasury costs are represented by the area $(A+B+C_1)$, of which A goes to municipalities in the form of lower interest costs while $(B+C_1)$ is windfall income of high-tax investors.

As a result of the taxable bond option with a 40 percent subsidy the interest-rate ratio drops to 0.60 and we see that U.S. Treasury costs will increase (measured by the area C_2) while interest savings of municipalities increase (measured by $B+C_2$) and windfall income is reduced (in the amount represented by B). Although the general taxpayer must bear an additional expense, the taxable bond option will provide a more equitable method of subsidizing municipal debt. Furthermore, it will be more efficient than the use of tax-exemption alone.

In order to examine the impact of the taxable bond upon the efficiency of the overall subsidy we have calculated the "incremental efficiency" of the taxable bond option. This measures the *additional* interest savings of municipalities per dollar of *additional* U.S. Treasury cost. The incremental efficiency is the ratio $(B+C_2)/C_2$ and will be greater than one since there were windfall gains. The incremental efficiency is clearly larger the greater are the windfall gains due to the use of tax exemption alone.

Since the incremental efficiency of the taxable bond option is greater than one, we know that the "average efficiency" of the total subsidy (through tax-exemption *and* the taxable bond subsidy) will be greater with taxable bonds than without. The average efficiency of the subsidy is defined as the ratio of *total* interest savings of municipalities to *total* U.S. Treasury costs, and it cannot exceed unity since windfall income cannot be driven below zero. The average efficiency of the subsidy paid on taxable bonds is 100 percent since each dollar of Treasury cost is paid directly to the municipalities, but the average efficiency of tax-exemption is, of course, less than 100 percent. Thus, the

FIGURE 7


DECOMPOSITION OF AREAS IN FIGURE 7

	Before Subsidy	After Subsidy	Change
Costs to U.S. Treasury	$A + B + C_1$	$A + B + C_1 + C_2$	C_2
Interest Saving of Municipalities	A	$A + B + C_2$	$B + C_2$
Windfall to High-Tax Investors	$B + C_1$	C_1	$-B$
Incremental Efficiency of the Taxable Bond Option	—	$(B + C_2)/C_2$	—

average efficiency of the total subsidy will increase the greater the use of taxable bonds and will reach a peak of 100 percent when all municipal bonds are issued in the taxable form.

How does the level of the subsidy rate affect the equity and efficiency aspects of the taxable bond option? An increase in the subsidy rate can be viewed in Figure 7 as a reduction in the interest-rate ratio.

This will result in an increase in the area represented by B with a corresponding decrease in the area C_1, and an increase in the area C_2. Thus, raising the subsidy rate will increase U.S. Treasury costs (represented by the increase in C_2), increase interest savings of municipalities (represented by the increase in $B + C_2$), reduce the windfalls to high-tax investors (represented by the reduction in C_1), and increase the aver-

FIGURE 8: THE INTEREST RATE
RATIO AND MATURITY
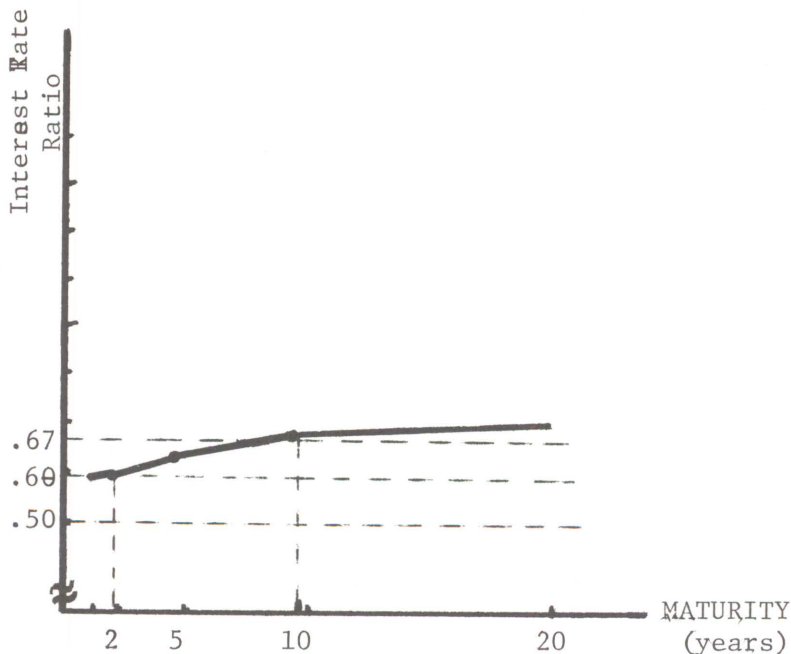
age efficiency of the overall subsidy paid to munici-palities. If the subsidy rate is set sufficiently high to eliminate the issue of tax-exempt securities, the taxable bond option will completely overcome the problems of efficiency and equity since it will eliminate the wind-falls to high-tax investors. Our analysis leads to the conclusions that a taxable bond option will reduce the volume of tax-exempt bonds being issued and reduce the tax-exempt interest rate. It will also reduce the sensitivity of the tax-exempt interest rate to changes in the demand for tax-exempt bonds such as those introduced by changes in monetary policy. Fur-thermore, it will reduce the problem of equity which has been central in the controversy about tax-exemp-tion by reducing the windfall income gains—after-tax interest received in excess of the amount required to induce investors to acquire tax-exempts—of high-tax investors, while at the same time increasing the effi-ciency of the subsidy to municipal governments. All of these benefits must, however, be gained at the ex-pense of some additional cost to the Federal taxpayer

(although part of this might be recaptured in lower taxes at the state and local level).

An aspect of the equity implications of the taxable bond option which has not been discussed is its effect upon the progressivity of the total (Federal and state-local) tax structure and upon the distribution of the benefits from public services. The taxable bond option will provide municipalities with more resources at a cost to the Federal taxpayer. If municipalities use part of these funds to keep property or sales taxes down the taxable bond option will distribute income toward lower income groups since the Federal tax structure is more progressive than the local tax struc-ture. If part of these additional funds are used to finance more capital expenditures by local units the result should also be to shift the distribution of bene-fits from public services toward lower income groups since such benefits tend to be distributed regressively. However, these sources of income redistribution are likely to be of minor importance since the additional costs to the U.S. taxpayer will probably be small.

The Subsidy Rate and the Maturity of Taxable Municipal Bonds

One aspect of the impact of the taxable bond option which has not yet been considered is the relationship between the subsidy rate and the maturity of municipal bonds which will be issued in a taxable form. If the interest-rate ratio (the ratio of tax-exempt yields to equivalent taxable bond yields) did not depend upon the maturity of the bond, the level of the subsidy rate will not affect the maturity of taxable municipal bonds. In this case, all municipal bonds would be issued in *either* the tax-exempt form *or* the taxable form. However, the interest-rate ratio rises as the maturity of the bond increases.

In Figure 8 the average maturity-interest-rate ratio relationship for the period 1965-72 is graphed.[7] This graph is presented to illustrate the behavior of the interest-rate ratio, but it should be noted that it is based upon some particular definitions and assumptions which can be questioned.[8]

In order to calculate roughly the relationship between the maturity of taxable municipal bonds and the subsidy rate we will assume that the interest-rate ratio curve shown in Figure 8 will be that observed in the future and that the curve is unaffected by the shift from tax-exempt to taxable bonds induced by the introduction of the taxable bond option.[9]

At a subsidy rate of S the municipality will issue taxable bonds if the interest-rate ratio exceeds (1-S). This is because at a higher ratio the net interest cost will be lower on taxable than tax-exempt debt. Conversely, at an interest-rate ratio less than (1-S) the net interest cost is lower on tax-exempts and only tax-exempt bonds will be issued. From this it is clear that the higher the subsidy rate the lower the interest-rate ratio at which it is cheaper to issue taxable bonds rather than tax-exempts. Since the interest-rate ratio curve is positively sloped, this means that as the subsidy rate rises the maturity at which it becomes cheaper to issue taxable bonds decreases, i.e. the average maturity of taxable bonds decreases.

In Figure 8 we show three horizontal lines, for subsidy rates of 33 percent, 40 percent, and 50 percent. Each horizontal line shows the interest-rate ratio *above* which it is cheaper to issue taxable bonds. Thus, at a subsidy rate of 33 percent Figure 8 shows that for maturities greater than approximately 10 years it is cheaper to issue taxable bonds. With a subsidy rate of 40 percent it is cheaper to issue taxable bonds at maturities greater than about 2 years. For a 50 percent subsidy rate it is *always* cheaper to issue taxable bonds so that no tax-exempts will be issued.

Because of the crude nature of our calculations, especially the assumption that the interest-rate ratio curve does not change as municipalities use the taxable bond option, the particular numbers used in Figure 8 should not be given any value. What is important in this exercise is the basic conclusion that

low levels of the subsidy rate will result in only "long-term" bonds being issued in the taxable form, and that the higher the subsidy rate the shorter will be the maturity of municipal bonds issued in a taxable rather than tax-exempt form. This aspect of the impact of a taxable bond option is important but we are only beginning our research into the determinants of the interest-rate ratio curve.

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[7] The positive relationship between the interest-rate ratio and maturity is due to several factors. First, investors with high-tax rates dominate the market at shorter maturities. For example, commercial banks with short maturity preferences have marginal tax rates of 48 percent while individuals with marginal tax rates of about 30 percent dominate the market for longer maturities. This causes the tax-exempt rate to rise relative to equivalent taxable bond yields as maturity increases.

A second factor contributing to the positive relationship is the uncertainty about tax rates, and about the continuation of tax exemption, in the future. An investor is less certain about the existence, and value, of tax-exemption in 20 years than he is about tax-exemption in one year. Thus, he will require a higher tax-exempt yield relative to equivalent taxable bond yields for a 20-year bond than for a one-year bond.

[8] The interest-rate ratio graphed in Figure 8 is the ratio of the yield on prime municipal bonds to the yield on U.S. agency issues. This assumes that U.S. agency issues are the taxable bonds which are equivalent to prime municipals at each maturity. The choice of U.S. agency issues rather than a corporate security (e.g. Aa railroad equipment trust certificates, which are issued in a serial form as are tax-exempts) as the taxable equivalent is dictated by problems of inadequate data on the yield curve of newly issued corporate bonds. For example, the data source used (Salomon Brothers, *An Analytical Record of Yields and Yield Spreads*) provides data on railroad equipment trust certificate yields only at 5, 10, and 15 year maturities while U.S. agency obligation yields are provided at the same maturities as the yields on prime municipal bonds (1, 2, 5, 10, and 20 years).

The interest-rate ratio at a maturity of 20 years is available only for 1971-1972. Thus, we are less certain about the interest-rate ratio at this maturity than we are at the other maturities shown in Figure 8 since there are eight observations (for the eight years 1965-1972) at the other maturities.

[9] The second assumption is particularly suspect. At any given subsidy rate we expect municipalities to issue "long" bonds in a taxable form and "short" bonds in a tax-exempt form. This alone will tend to lower the interest-rate ratio at "long" maturities as tax-exempt yields fall and taxable bond yields rise. In addition, since the net interest cost of "long" debt falls, municipalities will lengthen the maturity of their debt issues so that fewer tax-exempts are issued in the "short" range while even more taxables are issued in the long range. This will put more downward pressure on the interest-rate ratio at long maturities as well as place downward pressure at short maturities. Thus, we would expect the taxable bond option to result in a lower level of the interest-rate ratio at all maturities, with more of a reduction at the long end.

Final conclusions about the maturity of taxable municipal bonds can not be drawn without further research into the aspects of behavior of both municipalities and investors which determine the interest-rate ratio curve. We can only note at this point that our assumption that the interest-rate ratio curve remains unchanged will lead to an understatement of the maturity at which municipalities will issue taxable bonds rather than tax-exempts.

However, it should be noted that this analysis becomes irrelevant when subsidy rates of 33 percent or 50 percent are examined since in this case the results discussed in the text suggest that either tax-exempts or taxable bonds will be issued. The maturity question becomes important only at subsidy rates between 33 percent and 50 percent.

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Banks and Balance-Sheet Cosmetics: Tax Swapping Then and Now*

Edward J. Kane

SINCE the mythical first goldsmith engaged in the first act of credit creation, commercial bankers have devoted considerable energy to projecting a favorable image of their operations both to their depositors and to the public at large. In modern times, this concern expresses itself in terms of learning and practicing the art of financial-statement "cosmetics" and this art is employed to enhance a bank's allure in the eyes of current and prospective stockholders as well.

Perhaps the foremost items in any accountant's make-up kit are devices for masking year-to-year and quarter-to-quarter variation in the growth rate of his employer's earnings. Stabilizing reported growth in net income has a pleasant and well-established effect on the behavior of a firm's stock price. Additionally for banks, stability in income growth tends to reassure self-insuring large depositors holding $20,000 or more in single account.

Banks' hypothesized willingness to trade hard profits for the mere appearance of stability is known in the literature on securities trading as the predilected lock-in effect and has long formed a major part of the availability theory of credit control. This hypothesis claims that bank managers are extremely reluctant to sell securities at prices below book value even when doing so would allow them to reinvest the proceeds at an obviously higher profit. This reluctance is said to originate in bankers' distaste for recording capital losses *per se,* for fear that such losses would be construed as evidence of poor management by depositors, stockholders, government regulators, and their colleagues in the financial community.

In 1968, a cross-section study published in this *Review* confirmed the basic elements of this hypothesis.[1] That article presented an explanation or "model" of the individual-bank tax-year decision (whether to develop net gains or losses on securities sales during the current tax year) and listed variables that constrained the amount of net gains taken across a sample of 47 extremely large banks in 1966. These constraining variables included: (1) net operating income and various balance-sheet components (notably net worth) and (2) individual-bank bond-price forecasts.

[1] "Commercial Bank Tax Swaps," *New England Business Review,* March 1968, pp. 2-6.

By dropping these bond-price forecasts (which came from a private survey of approximately 50 large banks), it was possible to increase both the size of the sample (to about 800 banks) and the range of deposit sizes ($10 million to $15 billion). Analysis of this expanded sample suggests a new and richer picture of the forces conditioning bank realizations of securities losses. Net worth emerges as an important constraint only at the Nation's very largest banks, while net operating income plays an important role at any sample bank whose gross trading losses are large relative to trading gains. The evidence also indicates that banks try to avoid taking more than two consecutive loss years.

Although these findings relate to 1966 and 1967 (years when positive net profits on securities sales were taxed preferentially at the low capital-gains rate), they have important implications for the present and future. First, ignoring transactions costs, it is generally profitable even under the current tax law for banks to take losses more or less as they accrue. By realizing a book loss, a bank is able to offset this loss against other sources of taxable income. In this way, a bank cancels taxes that would otherwise be assessed against an equal amount of current income. Unlike ordinary taxpayers, banks and other financial institutions are allowed to write off such losses without limit on the quite-reasonable grounds that securities are their stock-in-trade. However, the results reported in this study tell us that banks' cosmetic interest in protecting the appearance of their accounting statements will keep them from realizing the full amount of losses available to them. Moreover, the fraction of losses realized should depend on much the same variables in 1973 as it did in 1966 and 1967. Second, taxing positive and negative securities profits symmetrically releases

banks from pressure to compartmentalize securities gains and losses in separate years. Unlike the 1960s individual banks should feel free now to realize gains or losses as necessary to control effectively the quarter-to-quarter variation in the growth rate of their reported net incomes. In particular, banks may be expected in the 1970s to trade actively for gains and accrued discounts in quarters of weak loan demand (as, e.g., in the first quarter of 1972). Such smoothing may improve the price-earnings ratio of bank stocks.

I. The High Costs of Tax Planning Under the Old Law

Prior to the Tax Reform Act of 1969, the Federal tax code gave commercial banks and certain other financial institutions an advantageous option as to how to declare their net gains or losses on securities trades made during each year. Then as now, in years when these net gains proved negative, the securities could be treated as stock-in-trade, and the loss charged without limit against ordinary income taxable at ordinary corporate tax rates. However, when net realized gains proved positive, banks could (if they had held the securities six months or longer prior to sale and if their reinvestment of the proceeds did not run afoul of liberally interpreted IRS restrictions against "wash" sales) declare these profits as capital gains, taxable at low capital-gains rates.

During the 1960s most large banks established an explicit tax-planning policy aimed at concentrating securities trades that would generate gains into so-called "gain years" and those that would generate losses into so-called "loss years." Since the option applied to *net* gains, potential tax benefits were wasted by any losses realized in a gain year and also by any gains taken in a loss year. However, segregating gains

and losses into separate years was complicated by factors that made effective tax planning a costly matter.

First, planners often faced technical difficulties in arranging and executing suitable trades. Such difficulties are said to have inhibited tax trading in municipal and corporate securities. In this connection, securities purchased at a premium over par and maturing securities each raised particular problems. For tax purposes, purchase premiums must be specifically amortized over the term to maturity of the securities involved. Losses and gains on maturing securities are largely unavoidable, since their price inexorably approaches par as they near their maturity date. This study verifies that during 1966 and 1967 unavoidable gains on low-coupon securities bought at deep discounts seriously constrained tax planners at a number of banks. However, with securities prices seldom at a premium, the incidence of unavoidable losses was negligible.

Second, to make an intelligent sequence of tax-year decisions, tax planners had to forecast interest-rate movements not only for the current year but for several years ahead. It was important for these forecasts to be accurate, since unexpected movements in interest rates could greatly inhibit a bank's ability to carry out its original plans. Years when interest rates rise steadily (that is, when bond prices fall) are "natural" loss years, while years when interest rates fall are natural gain years. In years such as 1967 that exhibit an intrayear break in the basic trend of interest rates, movements over the early part of the year tend to dominate the tax-year decision. To realize net gains in a natural loss year (or net losses in a natural gain year) is difficult and very much limits the options by which a bank can raise funds by security sales.

Third, tax planners needed to stay abreast of Internal Revenue Service rulings on precisely what differences in security attributes (e.g., in coupon, maturity, or issuer) were regarded as "substantial" enough to exempt a trade from the wash-sale restriction.

Fourth, tax planners were restricted by limits imposed by cosmetic-minded higher management both on the maximum amount of losses that could be taken in any year and on how frequently loss years could be taken back-to-back. According to the lock-in hypothesis, a bank's board of directors introduces such restraints to conserve the bank's reported capital position and thereby to bolster the apparent soundness of the bank. The goal is to assure stockholders and business depositors with balances in excess of the FDIC-insured maximum that the bank is safe and its affairs well-managed.

Limits on the maximum loss taken in any one year give rise to the concept of a bank's carrying over its "excess" securities losses unrealized into the following year and with them a predisposition to a loss year. On the other hand, because unrealized gains are not reflected in the bank's reported capital position, a succession of loss years leaves the bank's capital position understated. To keep this understatement from becoming cumulative, portfolio managers are expected to achieve a gain year at least every three or four years.

II. Forces Affecting Results of Tax Planning in 1966 and 1967

Movements in bond prices made 1966 a natural loss year and 1967 a natural gain year. The bulk of sample banks should therefore have been developing net losses in 1966 and net gains in 1967. Table 1, which divides sample banks into four categories of tax-year status, shows this to have been the case. In 1966, 418 banks

managed their securities sales carefully enough to avoid developing gains in excess of 10 percent of the magnitude of their gross losses.

Table 1

TAX-YEAR STATUS OF SAMPLE BANKS IN 1966 AND 1967

Number of Banks Whose Securities Sales Established Them as:

Year	Pure-Loss Banks[1]	Pure-Gains Banks[2]	Mixed-Loss Banks[3]	Mixed-Gains Banks[4]
1966	418	170	134	60
1967	163	457	105	118

Note: The total number of banks in the sample is greater in 1966 than 1967.

[1] Defined as banks that avoided developing gains in excess of 10 percent of their losses.

[2] Defined as banks that avoided losses as great as 10 percent of their gains.

[3] Defined as banks where losses exceeded gains but where gains amounted to more than 10 percent of losses.

[4] Defined as banks where gains exceeded losses but where losses amounted to more than 10 percent of gains.

These are categorized as "pure-loss" banks in the table. On the other hand, 457 banks managed in 1967 to avoid losses as great in magnitude as 10 percent of their gross gains and these are classified as "pure-gains" banks.

Our statistical analysis focuses on individual banks' tax-year decisions and, more specifically, on the dollar amount of the net gains they realize in any year on securities sales. Our tests are aimed at measuring the influence of eight variables on the amount of net gains or losses taken by individual banks. These explanatory variables can be divided into two groups of four: 1) "portfolio" variables that measure the bank's exposure to capital gains or losses

during the year; and 2) "constraining" variables that might lead a bank to choose against minimizing its income-tax bill. "The "portfolio" measures include bank holdings of tax-exempts and of long-term U.S. government securities, asset size, and unavoidable gains on maturing governments. The constraining variables include a measure of the pressure of loan demand and three cosmetic constraints: net operating income, net worth, and the amount of net gains realized in the previous year.

Statistical tests employing the aggregate sample confirm that some constraining variables play an important role in banks' realization of securities gains and losses. However, there is reason to suppose that certain explanatory variables would have different effects depending on a bank's tax-year history and on whether the current year had been designated a gain year or a loss year. To measure the extent of these differences, we conducted a series of statistical tests. These tests emphasize differences between pure-loss banks and the rest of the sample. Even in the 1968 study, pure-loss banks as compared with other banks, evidenced intriguing differences in taking losses.

III. Statistical Tests of Cosmetic Constraints

The Importance of Operating Income as a Constraint

The first hypothesis tested was that the level of net operating income wielded a constraining influence only at pure-loss banks and that other banks were not affected by this constraint. Our test indicates that pure-loss banks would have taken even larger losses than they did except for the fact that realizing larger losses would have pulled reported net profit down to an unacceptably low figure. This statistical test strongly supports our hypothesis about differ-

ences in motivation exhibited by pure-loss and other sample banks. Net operating earnings exert a statistically significant constraining influence at pure-loss banks, but not at other banks.

Other Influences on Pure-Loss Banks

To investigate whether the estimated effects of other explanatory variables also differ from pure-loss banks, we restructured the model to allow a separate estimate of the effects of *every* explanatory variable for pure-loss and other sample banks. In the natural loss year of 1966, except for the differential operation of the income constraint established in the previous section, pure-loss banks behaved in much the same manner as other sample banks. However, in the natural gain year of 1967, pure-loss banks show significant differences in the effects of six of the eight variables included in the model. These differences testify to the reasons for, and difficulties of, taking a loss year in a rising bond market. In particular, it was found that banks in the pure-loss category in 1967 had generally also incurred large losses in 1966. This result is consistent with the notion that the "unnatural" 1967 tax-year decision made by pure-loss banks grew out of their having carried over losses they had been unwilling for cosmetic reasons to realize in 1966.

Losses for More than Two Consecutive Years

To investigate directly whether pressure exists against running three or more consecutive loss years, we focused on the behavior of the 265 banks that had run loss years in both 1965 and 1966. The cosmetic or predilected lock-in hypothesis predicts that the condition of having run back-to-back loss years would dispose a bank, *ceteris paribus,* to make 1967 a gain year. However, to the extent that such

banks carried over unrealized "excess" losses from 1966, this tendency would be mitigated. To sort out these counterinfluences, we expanded our model to include two additional terms. We found that banks coming off consecutive loss years had a distinct tendency to realize gains, but that in many cases this tendency was counterbalanced by a large amount of "excess" unrealized losses carried over from 1966.

In 1967, 98 of the 457 pure-gains banks had run losses in 1965 and 1966 and 57 of them had in fact been pure-loss banks in both these years. Moreover, another 39 consecutive-loss-year banks fell in the mixed-gains category. However, it appears that approximately 300 of the banks that fell in the pure-loss category in 1966 carried a sufficiently large amount of unrealized losses into 1967 to preclude making it a gains year.

IV. Summary and Implications for Securities Trading Today

Except for the absence of expectational variables, the picture of net-gains behavior developed here is much richer than that featured in the earlier study that serves as this paper's point of departure. Moreover, the sample of banks used here is so large as almost to encompass the universe of large banks whose behavior is ultimately at issue, being limited primarily by the completeness and accounting of Call Reports and Income and Dividend Reports filed by individual banks whose holdings of U.S. government securities met a specific size criterion.

Statistical analysis of the expanded sample reaffirms the hypotheses of (1) an early tax-year decision explainable largely in terms of a bank's beginning-of-the-year portfolio structure and (presumably anticipated) interest-

rate movements, but modified by the existence of (2) a predilected or cosmetic lock-in effect. However, we uncover a very different picture of the detailed structure of the bank net-gains decisions. Except at the very largest banks, bank net worth—the central variable in our earlier study—is relegated to a minor role, with the predilected lock-in effect operating mainly through an operating-income constraint felt by pure-loss banks and more generally through tax-planning pressures emanating from unavoidable gains on maturing securities, previously locked-in losses carried over from the preceding year, and a desire to avoid running loss years for more than two years in a row.

Our re-affirmation of the predilected lock-in effect has interesting implications for securities trading now that the Tax Reform Act of 1969 has removed the need for banks to make a tax-year decision. Banks are no longer under pressure to concentrate gains and losses in separate years. Although it remains generally advantageous to delay realizing securities gains as long as possible (thereby deferring the tax liability they generate), in times of slack loan demand cosmetics may turn the lock-in into a "lock-out." That is, when profits are low during years of slack demand, the data examined here suggest that many banks would sell securities in order to realize capital gains for the purpose of enhancing the level of reported profits even though such action results in tax payment at an earlier date than is absolutely necessary. Assuming the predilected lock-in hypothesis operates symmetrically, trading for gains to improve accounting statements should become a very common phenomen and bank stocks may begin to show somewhat higher price-earnings multiples.