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# FRBSF WEEKLY LETTER

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## Tax-Free Bonds

The bonds issued by state and local governments and their agencies are often referred to as municipal bonds or "munis." Typically, these bonds are exempt from federal income taxes and from the state and local income taxes of the locale in which they are issued. This "special" tax treatment affects the yields on these bonds compared to those on taxable bonds. Changes in tax rates and tax rules currently under consideration in Congress, therefore, may have important effects on the bond market in general. These potential effects are examined here.

### Types of bonds

Municipal bonds are categorized as either general obligation or revenue bonds. General obligation bonds are secured by the full faith, credit, and taxing power of the issuer. Revenue bonds are secured by the revenue (e.g., tolls, user charges, and rents) from the project financed by the bonds. In recent years, private-purpose revenue issues have been largely responsible for the dramatic growth in the stock of municipal bonds. The proceeds of private-purpose issues have been used to finance pollution control facilities, sports facilities and convention centers, airport facilities like hotels and stores, irrigation projects, and industrial parks. Such issues now account for more than half of all new municipal bond issues. Furthermore, about half of all private-purpose issues have been industrial development bonds in the last few years (Chart 1).

Although municipal bonds are issued by governments or related authorities, they differ from U.S. Treasury bonds in several ways. First, there are at least 50,000 different tax-exempt bond issuers and over a million different tax-exempt securities. These enormous numbers arise from the use of serial bond issues, the large number of relatively small issuing entities (often formed for a particular purpose or expenditure), and the large number of issues with small values. Consequently, many municipal issues are not traded in truly national markets. Rather, they tend to be thinly traded (if traded at all) in much smaller geographical markets.

Second, it is generally conceded that the probability of default on U.S. Treasury issues is lower.

Thus, municipal bonds are riskier investments. Third, some portion of municipal bonds is held for reasons other than the direct return they are expected to provide. In addition to deriving interest income from the bonds, commercial banks, for example, hold some "munis" to satisfy pledging requirements for their state and local government depositors and to facilitate their role as general obligation municipal bond underwriters and market makers.

### Tax status

The biggest difference between Treasury and municipal bonds, however, is associated with the latter's special tax status. Since investors look at the after-tax return in choosing investments, federal income tax exemption means that they would be willing to accept considerably lower before-tax interest rates on municipal bonds than on Treasury issues of similar maturity and default and call probability.

Since the attraction of municipals lies in the tax-exempt nature of their interest, changes in tax rates and tax rules may dramatically affect their market. Significant changes in the income tax code since 1980 include a reduction in personal income tax rates by about one-fourth. Congress is now deliberating further major changes, including substantial marginal personal and corporate income tax rate reductions. The current tax reform proposal, for example, would lower the maximum marginal personal rate from 50 to 38 percent and the maximum corporate rate from 46 to 36 percent. If enacted, these rate reductions would alter the spread between Treasury and municipal yields.

### Calculating the "implied" tax rate

A convenient way to examine the spread between taxable and tax-exempt yields is to calculate the marginal federal income tax rate that would make the *after-tax* yields on taxable and tax-exempt bonds the same. Chart 2 plots the "implied tax rate" based on a comparison of one-year tax-exempt and taxable yields. Also plotted are the maximum corporate tax rate and an index of marginal personal tax rates. The index is calculated as a weighted average of the marginal federal income tax rates that applied to interest income. The personal income tax sched-

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ule has marginal tax rates both substantially higher and substantially lower than this average of marginal personal tax rates. Nonetheless, the movements of the index through time reflect the changes in the effective personal tax rates that applied to interest income, whether due to bracket creep (movement to higher tax brackets caused by the effects of inflation on income), changes in the distribution of interest income, or tax schedule changes.

These personal and corporate tax rate series also reflect the major tax rate schedule changes over the last three decades: the 1964-65 tax cut, the 1968-70 temporary tax surcharge, the 1979 corporate income tax rate cut, and the multi-stage personal income tax rate reduction in the early 1980s. The personal tax series also reflects the steady rise in nominal income per household (leading to bracket creep) starting in the mid-1960s.

A notable feature of the implied tax rate is its volatility compared with that of personal and corporate rates. While the implied tax rate drops during periods associated with the two personal tax cuts, many of its remaining movements cannot be explained by fluctuations in either marginal tax rate series. Other, non-tax factors apparently also affect the relative yields of taxable and tax-exempt bonds.

Explanations of the behavior of the implied tax rate through time fall into two categories: (1) those that suggest that the implied rate, apart from negligible deviations, will be the same as the corporate income tax rate, and (2) those that use an institutional approach.

The first begins with the observation that commercial banks can simultaneously acquire tax-exempt bonds and issue taxable, interest-deductible debt. If the implied tax rate falls below the corporate tax rate, commercial banks presumably can increase their after-tax profits by issuing taxable debt (or by selling taxable securities from their investment portfolio) and purchasing municipal bonds. The profit maximization motive then implies that this will continue until these flows raise the price and lower the yield on municipal bonds enough to push the implied tax rate up to the corporate tax rate. According to this view, neither changes in personal income tax rates nor changes in the supply of municipal

bonds will affect the implied tax rate. Changes in the supply of municipal bonds, in this framework, will be met with corresponding changes in commercial bank holdings of municipal bonds rather than fluctuations in the implied tax rate.

The institutional view offers not so much a prediction as a rationalization for observed municipal bond market behavior. This view suggests that the supply of and demand for municipal bonds are segmented by maturity. Market segmentation implies that there are distinct supplies and demands according to maturity that permit different implied tax rates at different maturities to coexist. This view is consistent with not only the movement of implied tax rates over time but also the systematic, negative relation between the level of implied tax rates and maturity.

Such differences in "break-even" tax rates across maturities can occur only if neither suppliers nor demanders consider municipal bonds of different maturities to be perfect substitutes. If either side of the market were indifferent to maturity, it could capitalize on the yield differences that arise from having different implied tax rates across maturities.

Why might suppliers and demanders not be indifferent to maturity? On the supply side, legal restrictions limit the ability of state and local governments to substitute between long-term and short-term issues. In addition, state and local governments often match bond and project maturities to avoid refinancing costs and the risk of having to roll over debt at higher interest rates. On the demand side, banks may not be able to exploit the differences fully because of regulatory constraints, while households may prefer holding short- rather than long-term issues.

## Who is the investor?

The magnitude of the effect of changes in tax rates and tax rules on the spread between taxable and tax-exempt interest rates depends on the marginal (or pivotal) investor in the market for municipals. To ascertain whether households (who are subject to the personal tax rate) or corporations (which are subject to the corporate rate) are the marginal investors, and therefore which tax rate determines the spread between these yields, we examine the historical record.

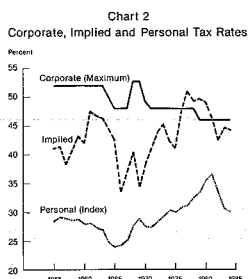
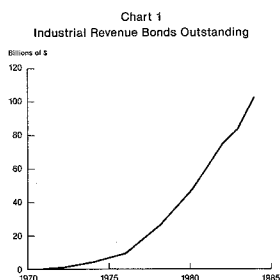


Chart 2 suggests that the implied tax rate has generally mimicked the index of personal tax rates. There is no obvious similar relation to the corporate income tax rate. Statistical analysis confirms these impressions. We find that, on average, the implied tax rate responds one-for-one to changes in personal tax rates. In contrast, the spread between taxable and tax-exempt yields exhibits no discernible reaction to changes in the corporate tax rate. These findings suggest that households comprise the group whose tax rate determines the spread between taxable and tax-exempt yields.

This evidence implies that, after a transition period, lower personal income tax rates would reduce implied tax rates nearly proportionately. Since the maximum marginal income tax rate places a ceiling on implied tax rates and since implied rates for short-term issues historically have been well above the maximum tax rates (38 and 36 percent) Congress is now considering, future implied rates are likely to be lower than their historical averages. Such a reduction in implied tax rates can occur through declines in taxable yields, increases in municipal yields, or a combination of the two.

Currently, state and local government are under pressure from the public to limit taxes, from reductions in federal grants, and from the need to repair and replace aging infrastructures. This makes the manner by which implied tax rates are reduced particularly important. Since, histor-

ically, cuts in the income tax rate seem to have led to lower taxable yields rather than higher tax-exempt yields, state and local government financing costs may be little affected by proposed income tax rate reductions.

While changes in the corporate tax rate do not appear to have significantly affected the implied tax rate, changes in corporate tax *rules* may. Reductions in the investment tax credit and depreciation allowances, for example, may lower commercial banks' return on alternative activities such as leasing. To the extent that new tax rules raise the commercial bank demand for municipal bonds, the spread between tax-exempt and taxable yields may widen. Proposed limits on the supply of tax-exempt private-purpose bonds could also widen the yield spread. With fewer such bonds on the market, fewer will need to be sold. Thus, the bonds need appeal to a smaller population of investors — those in higher tax brackets who demand a greater tax exemption.

In contrast, commercial banks could also reduce their demand for municipal bonds if the proposed tax deductibility of interest expense incurred in carrying municipal bonds is enacted. A reduction in alternative tax shelter opportunities, in real estate for example, might stimulate household demand for tax-exempt issues, and partially offset, or even reverse, the narrowing of the yield spread between taxable and tax-exempt issues caused by a decline in net commercial bank demand.

### Summary

Last year was the busiest year ever in the municipal bond market. Approximately \$200 billion of new issues were sold — more than double the volume of only two years earlier. The flood of new issues of municipal bonds in late 1985 has been followed by a drought in early 1986. The prospect of changes in the tax treatment of munis spurred the 1985 flow; uncertainty about how issues launched in 1986 will be treated is largely responsible for the ensuing drought. Once that uncertainty is resolved (and more normal tax-exempt flows resume), the influences discussed above will dominate the relationship between yields on municipal bonds and Treasury securities.

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**BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT**  
(Dollar amounts in millions)

<b>Selected Assets and Liabilities Large Commercial Banks</b>	Amount Outstanding 2/19/86	Change from 2/12/86	Change from 2/20/85 Dollar	Percent <sup>7</sup>
Loans, Leases and Investments <sup>1 2</sup>	200,863	617	12,378	6.5
Loans and Leases <sup>1 6</sup>	181,788	874	11,326	6.6
Commercial and Industrial	52,065	— 84	— 474	— 0.9
Real estate	66,296	104	3,916	6.2
Loans to Individuals	38,524	— 49	5,929	18.1
Leases	5,664	— 18	394	7.4
U.S. Treasury and Agency Securities	10,810	— 210	— 243	— 2.1
Other Securities <sup>2</sup>	8,264	— 48	1,293	18.5
Total Deposits	201,493	2,678	6,645	3.4
Demand Deposits	49,007	2,900	2,980	6.4
Demand Deposits Adjusted <sup>3</sup>	31,234	— 824	4,028	14.8
Other Transaction Balances <sup>4</sup>	14,987	57	2,046	15.8
Total Non-Transaction Balances <sup>6</sup>	137,499	— 279	1,620	1.1
Money Market Deposit Accounts—Total	45,807	124	2,093	4.7
Time Deposits in Amounts of \$100,000 or more	37,979	— 416	— 990	— 2.5
Other Liabilities for Borrowed Money <sup>5</sup>	24,740	674	5,585	29.1
<b>Two Week Averages of Daily Figures</b>	Period ended 2/10/86	Period ended 1/27/86		
<b>Reserve Position, All Reporting Banks</b>				
Excess Reserves (+)/Deficiency (—)	81	15		
Borrowings	10	64		
Net free reserves (+)/Net borrowed(—)	71	— 48		

<sup>1</sup> Includes loss reserves, unearned income, excludes interbank loans

<sup>2</sup> Excludes trading account securities

<sup>3</sup> Excludes U.S. government and depository institution deposits and cash items

<sup>4</sup> ATS, NOW, Super NOW and savings accounts with telephone transfers

<sup>5</sup> Includes borrowing via FRB, TT&L notes, Fed Funds, RPs and other sources

<sup>6</sup> Includes items not shown separately

<sup>7</sup> Annualized percent change