

New Financing Instruments for State and Local Capital Facilities

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Municipal bonds traditionally have been classified into two general types: term bonds, paid off in a lump sum at the end of the term of the loan, and serial bonds, retired in annual installments. Beginning in the late 1970s, however, a number of new fiscal instruments have been devised to meet the changing needs of the municipal bond market. While these new financing techniques are not a panacea, their careful application may uncover some real opportunities for meeting the needs of local government for expanded capital facilities.

The municipal bond market traditionally has been supported by large institutional investors, such as banks and fire and casualty insurance companies. In the late 1970s, many of these institutions, faced with reduced profit margins, curtailed their municipal bond buying, forcing tax-exempt bond yields to unprecedented highs. Interest costs increased significantly as bond issuers were forced to make yields more attractive to buyers. Investors were unwilling to lock into fixed returns, feeling uncertain about inflation, tax liabilities, and yield curves. Governments still needed to borrow, however, and investors still needed to earn returns. As a consequence, a number of new fiduciary and fiscal instruments have been devised to meet these respective needs.

TRADITIONAL TYPES OF BONDS

Municipal bonds traditionally have been classified into two general types according to the method of redemption. *Term bonds* become due in a lump sum at the end of the term of the loan. All of the bonds in the issue reach maturity and must be paid off at the same time. *Serial bonds* are retired in annual installments directly from tax rev-

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venues, or in the case of revenue bonds, from earned income. Serial bonds offer greater flexibility in marketing and in arranging the debt structure of the jurisdiction or public organization.

The lump-sum principal payment for term bonds is met by making annual payments to a *sinking fund*. When invested at compound interest, these annual payments should produce the amount of principal required at maturity. Frequent actuarial computations should be made to determine the adequacy of sinking funds to meet principal payments at maturity. Some states do not permit the issuance of bonds for which the principal is funded solely through a sinking fund. With proper investment safeguards, however, term bonds do offer some advantages. Term bonds may serve to finance public enterprises that do not have established earning records.

There are two types of serial bonds: annuity serials and straight serials. With *annuity serial bonds*, the debt service-payment is approximately the same each year (as with a home mortgage). The portion of the annual payment devoted to interest is higher in the early years of the issue, but declines as payments toward principal are made (as the outstanding principal is retired). *Straight serial bonds* require annual payments of principal of approximately equal amounts. Interest payments are large in the early years and decline gradually as the bonds approach maturity.

BOND OPTIONS FOR A PRENATAL HEALTH CARE CLINIC

To illustrate these traditional bond options, assume that the Jefferson County Council has authorized the construction of a new prenatal health care clinic as part of the overall services of the County Health Department. The cost for construction and acquisition of capital equipment is estimated to be \$2.5 million. The County Council has further authorized a 10-year bond issue to finance these costs.

The financial consultant hired by the County to assist in the placement of this bond has proposed three alternative bond strategies:

- (1) A 10-year term bond with a 5 percent interest rate and a sinking fund estimated to accrue 4.5 percent interest annually;
- (2) A 10-year annuity serial bond with a 5.25 percent interest rate; and
- (3) A 10-year straight serial bond with a 5.5 percent interest rate.

The annual interest payments on the 10-year term bond at 5 percent would be \$125,000. The amount that would have to be invested annually in the sinking fund to ensure an accrual of \$2.5 million at the end of 10 years can be determined by applying the following formula:

$$\text{Annual Sinking Fund Payment} = \text{Principal} \times (r) / [(1 + r)^n] - 1$$

$$\text{Annual Payment} = \$2,500,000 \times (.045) / [(1.045)^{10}] - 1$$

$$\text{Annual Payment} = \$2,500,000 \times 0.08137846$$

$$\text{Annual Sinking Fund Payment} = \$203,447$$

The annual interest and sinking fund payments total \$328,447 and, therefore, the total debt service over the 10-year period would be \$3,284,466, as shown in Table 1.

The annual debt service for the 10-year annuity serial bond can be determined by applying the following formula:

$$\text{Annual Debt Service} = \text{Principal} \times \frac{(r)(1+r)^n}{(1+r)^n - 1}$$

$$\text{Annual Debt Service} = \$2,500,000 \times \frac{(.0525)(1.0525)}{(1.0525)^{10} - 1}$$

$$\text{Annual Debt Service} = \$327,704$$

Therefore, the total debt service for the 10-year annuity serial bond would be \$3,277,040. The payment schedule, assuming semi-annual interest payments and annual payments of principal, is shown in Table 2.

TABLE 1
Term Bond

Date	Outstanding Principal	Sinking Fund 4@4.5%	Rate	Interest	Period Total	Fiscal Total	Sinking Fund Accum.
6/1/98	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/98	\$2,500,000	\$203,447	5.00%	\$62,500	\$265,947	\$328,447	\$203,447
6/1/99	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/99	\$2,500,000	\$203,447	5.00%	\$62,500	\$265,947	\$328,447	\$416,049
6/1/00	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/00	\$2,500,000	\$203,447	5.00%	\$62,500	\$265,947	\$328,447	\$638,218
6/1/01	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/01	\$2,500,000	\$203,447	5.00%	\$62,500	\$265,947	\$328,447	\$870,385
6/1/02	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/02	\$2,500,000	\$203,447	5.00%	\$62,500	\$265,947	\$328,447	\$1,113,000
6/1/03	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/03	\$2,500,000	\$203,447	5.00%	\$62,500	\$265,947	\$328,447	\$1,366,532
6/1/04	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/04	\$2,500,000	\$203,447	5.00%	\$62,500	\$265,947	\$328,447	\$1,631,473
6/1/05	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/05	\$2,500,000	\$203,447	5.00%	\$62,500	\$265,947	\$328,447	\$1,908,336
6/1/06	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/06	\$2,500,000	\$203,447	5.00%	\$62,500	\$265,947	\$328,447	\$2,197,658
6/1/07	\$2,500,000		5.00%	\$62,500	\$62,500		
12/1/07	\$2,500,000	\$203,442	5.00%	\$62,500	\$265,942	\$328,442	\$2,500,000
Totals		\$2,034,466		\$1,250,000	\$3,284,466	\$3,284,466	\$2,500,000

TABLE 2
Annuity Serial Bond

Date	Outstanding Principal	Principal	Rate	Period Interest	Total	Fiscal Total
6/1/98		\$2,500,000	5.25%	\$65,625	\$65,625	
12/1/98	\$2,500,000	\$196,454	5.25%	\$65,625	\$262,079	\$327,704
6/1/99	\$2,303,546		5.25%	\$60,468	\$60,468	
12/1/99	\$2,303,546	\$206,768	5.25%	\$60,468	\$267,236	\$327,704
6/1/00	\$2,096,779		5.25%	\$55,040	\$55,040	
12/1/00	\$2,096,779	\$217,623	5.25%	\$55,040	\$272,663	\$327,704
6/1/01	\$1,879,156		5.25%	\$49,328	\$49,328	
12/1/01	\$1,879,156	\$229,048	5.25%	\$49,328	\$278,376	\$327,704
6/1/02	\$1,650,108		5.25%	\$43,315	\$43,315	
12/1/02	\$1,650,108	\$241,073	5.25%	\$43,315	\$284,388	\$327,704
6/1/03	\$1,409,034		5.25%	\$36,987	\$36,987	
12/1/03	\$1,409,034	\$253,729	5.25%	\$36,987	\$290,717	\$327,704
6/1/04	\$1,155,305		5.25%	\$30,327	\$30,327	
12/1/04	\$1,155,305	\$267,050	5.25%	\$30,327	\$297,377	\$327,704
6/1/05	\$888,255		5.25%	\$23,317	\$23,317	
12/1/05	\$888,255	\$281,070	5.25%	\$23,317	\$304,387	\$327,704
6/1/06	\$607,184		5.25%	\$15,939	\$15,939	
12/1/06	\$607,184	\$295,827	5.25%	\$15,939	\$311,765	\$327,704
6/1/07	\$311,358		5.25%	\$8,173	\$8,173	
12/1/07	\$311,358	\$311,358	5.25%	\$8,173	\$319,531	\$327,704
Totals	\$2,500,000			\$777,038	\$3,277,038	\$3,277,038

The total debt service for the 10-year straight serial bond can be determined by applying the following formula:

$$\begin{aligned} \text{Total Debt Service} &= \text{Principal} + [(N + 1)/2 \times r \times \text{Principal}] \\ \text{Total Debt Service} &= \$2,500,000 + [11/2 \times .055 \times \$2,500,000] \\ \text{Total Debt Service} &= \$3,256,250 \end{aligned}$$

The first-year debt service on the straight serial bond would be \$387,500, again assuming semi-annual interest payments and annual payments of principal. The annual payments would “step down” by \$13,750 each year, as shown in Table 3.

The question remains: which of these alternatives is the preferred bond strategy for Jefferson County? If the County can afford the initial annual payment of \$387,500, then the straight serial bond would be the preferred option since the total debt service is \$20,790 less than the annuity serial bond and \$28,216 less than the term bond. The term bond and the annuity serial bond have approximately the same annual costs. If the

TABLE 3
Straight Serial Bond

Date	Principal	Outstanding Principal	Rate	Interest	Period Total	Fiscal Total
6/1/98	\$2,500,000		5.50%	\$68,750	\$68,750	
12/1/98	\$2,500,000	\$250,000	5.50%	\$68,750	\$318,750	\$387,500
6/1/99	\$2,250,000		5.50%	\$61,875	\$61,875	
12/1/99	\$2,250,000	\$250,000	5.50%	\$61,875	\$311,875	\$373,750
6/1/00	\$2,000,000		5.50%	\$55,000	\$55,000	
12/1/00	\$2,000,000	\$250,000	5.50%	\$55,000	\$305,000	\$360,000
6/1/01	\$1,750,000		5.50%	\$48,125	\$48,125	
12/1/01	\$1,750,000	\$250,000	5.50%	\$48,125	\$298,125	\$346,250
6/1/02	\$1,500,000		5.50%	\$41,250	\$41,250	
12/1/02	\$1,500,000	\$250,000	5.50%	\$41,250	\$291,250	\$332,500
6/1/03	\$1,250,000		5.50%	\$34,375	\$34,375	
12/1/03	\$1,250,000	\$250,000	5.50%	\$34,375	\$284,375	\$318,750
6/1/04	\$1,000,000		5.50%	\$27,500	\$27,500	
12/1/04	\$1,000,000	\$250,000	5.50%	\$27,500	\$277,500	\$305,000
6/1/05	\$750,000		5.50%	\$20,625	\$20,625	
12/1/05	\$750,000	\$250,000	5.50%	\$20,625	\$270,625	\$291,250
6/1/06	\$500,000		5.50%	\$13,750	\$13,750	
12/1/06	\$500,000	\$250,000	5.50%	\$13,750	\$263,750	\$277,500
6/1/07	\$250,000		5.50%	\$6,875	\$6,875	
12/1/07	\$250,000	\$250,000	5.50%	\$6,875	\$256,875	\$263,750
Totals		\$2,500,000		\$756,250	\$3,256,250	\$3,256,250

County Council thought that in future years a better rate of return than 4.5 percent on the sinking fund could be obtained, then the term bond would be the preferred alternative between these two options.

Zero Coupon Bonds

Zero coupon bonds (also called “zeros”) were introduced into the tax-exempt bond market in the late 1970s and quickly became a “hot item” in public finance. As a form of original investment discount bonds, they are especially favored by individual bond buyers. Zero coupon bonds may be issued as either general obligation bonds or revenue bonds.

Brokerage firms have purchased traditional coupon-bearing, long-term issues and have stripped the coupons from the bonds. Each component is then sold separately. In effect, the bond becomes a zero coupon bond, with the guarantees of the issuing public agency. Without coupons, the value of what is called the *corpus* is much reduced.

Zero coupon bonds sell at substantial discounts from the customary par or face value of \$1,000 because they pay no interest. By paying face value upon maturity, however, they offer capital gains that may be as much as fifty times the original investment, depending on the length of the issue and the equivalent rate of return on the original investment. For example, the Virginia Housing Development Authority issued mortgage revenue bonds in 1982 with a 2014 maturity, priced at \$20, for an annualized yield of 12.586 percent. The Virginia issue also included bonds maturing in 2001, priced at \$100, for an annualized yield of 12.202 percent, as well as some maturing in 1994, priced at \$250 per \$1,000, for an annualized yield of 11.253 percent.

Federal tax laws entitle bondholders who forego tax-free interest over the life of their investment to receive tax-exempt capital gains upon maturity. The result is a form of tax-free income, accrued annually from the time the bonds are first issued. Held to maturity, for example, 15-year zero coupon bond purchased for \$315 will provide a tax-free capital gain of \$685; or, according to the IRS, \$45.67 in tax-exempt income each year (\$685 divided by 15). These earnings are the equivalent of an 8 percent compound interest on the original investment.

Zero coupon bonds may be attractive to investors who are interested in investing for a future need, such as retirement or college for their children. Since the interest on a zero coupon bond, in essence, is automatically reinvested in the bond, this type of bond may appeal to investors who expect future interest rates to decline or want the convenience of not having to deal with how to invest their returns.

From the municipality standpoint, issuing zero coupon bonds means that a much larger face value (value at maturity) must be issued. For example, if the objective were to finance the \$2.5 million prenatal health care clinic through a 10-year zero coupon bond that provides a 6 percent annual rate of return, the Jefferson County Council would have to issue bonds which would be worth over \$4.25 million at maturity (see Table 4).

Debt limits usually apply to the par value of bonds. Therefore, zero coupon bonds usually use the same level of debt capacity as a non-zero coupon bond for the same amount, yet result in less bond proceeds because they are sold at a discount. Since all interest is paid at maturity, the issuer must have substantial funds available for what is effectively a balloon payment.

Stepped Coupon Bonds

Stepped coupon bonds have also grown in popularity since their introduction in the early 1980s. Each maturity of a traditional serial bond has a single coupon rate payable over the life of the bond. Stepped coupon bonds, on the other hand, use a variable maturity schedule, with coupon rates that start at lower levels and progressively increase to higher levels, even though all the bonds in the issue are sold at par. Stepped coupon bonds are particularly applicable to the financing of projects requiring that interest payments be made from project revenue.

The increase in coupon payments each year is intended to provide investors with a

TABLE 4
Zero Coupon Bond Issue for \$2.5 Million

Year	Annual Rate of Increase @6%	Sinking Annual Payment	Fund @ 4.5% Accum. Value
1	\$591	\$345,998	\$345,998
2	\$627	\$345,998	\$707,566
3	\$665	\$345,998	\$1,085,404
4	\$704	\$345,998	\$1,480,246
5	\$747	\$345,998	\$1,892,855
6	\$792	\$345,998	\$2,324,031
7	\$839	\$345,998	\$2,774,610
8	\$889	\$345,998	\$3,245,466
9	\$943	\$345,998	\$3,737,510
10	\$1,000	\$346,002	\$4,251,700
Totals		\$3,459,984	

Note:	Discount Price of Bond =	$\$1000 / ((1.06)^{10} - 1) =$	\$558;
	Amount of Bonds Issued =	$\$2.5 \text{ Million} / 558 * 1000 =$	\$4,251,700;
	Sinking Fund Payment =	$P * (r) / ((1 + r)^n - 1) =$	\$345,998;

hedge against inflation and thus make the bonds more marketable. The assumption is that, as the purchasing power of paper money goes down each year, stepped coupons give bondholders more paper money to keep pace with inflation.

From the perspective of the issuing government, more bonds may be scheduled to mature in early years because of the lower coupon rates, thereby lowering the average interest rate for the issue. The repayment schedule for a \$2.5 million bond issue for the County prenatal health care clinic, shown in Table 5, provides for an initial principal payment of \$295,000, a second-year payment for \$285,000, and so forth. Using this approach to a stepped coupon bond, the Jefferson County Council could save \$138,020 in interest costs over the straight serial issue shown in Table 3.

Compound Interest Bonds

Compound interest bonds (also called capital appreciation bonds, accumulators, or municipal multiplier bonds) are sold at face value. The interest component is held by the issuer and compounded at a stated rate so that at the bonds' maturity, the investor receives a lump sum payment, consisting of both the principal and interest. An investor in compound interest bonds still pays much less for the bond than it would be worth at maturity. For example, a 10-year bond with a face value of \$1,000, earning at a compound interest rate of 6 percent, would be worth \$1,790.85 at maturity (see Table 6).

TABLE 5
Stepped Coupon Bond Issue

Date	Outstanding Principal	Principal	Rate	Interest	Period Total	Fiscal Total
6/1/98	\$2,500,000			\$53,548	\$53,548	
12/1/98	\$2,500,000	\$295,000	3.10%	\$53,548	\$348,548	\$402,095
6/1/99	\$2,205,000			\$48,975	\$48,975	
12/1/99	\$2,205,000	\$285,000	3.35%	\$48,975	\$333,975	\$382,950
6/1/00	\$1,920,000			\$44,201	\$44,201	
12/1/00	\$1,920,000	\$275,000	3.60%	\$44,201	\$319,201	\$363,403
6/1/01	\$1,645,000			\$39,251	\$39,251	
12/1/01	\$1,645,000	\$265,000	3.85%	\$39,251	\$304,251	\$343,503
6/1/02	\$1,380,000			\$34,150	\$34,150	
12/1/02	\$1,380,000	\$255,000	4.10%	\$34,150	\$289,150	\$323,300
6/1/03	\$1,125,000			\$28,923	\$28,923	
12/1/03	\$1,125,000	\$245,000	4.40%	\$28,923	\$273,923	\$302,845
6/1/04	\$880,000			\$23,533	\$23,533	
12/1/04	\$880,000	\$235,000	4.70%	\$23,533	\$258,533	\$282,065
6/1/05	\$645,000			\$18,010	\$18,010	
12/1/05	\$645,000	\$225,000	5.10%	\$18,010	\$243,010	\$261,020
6/1/06	\$420,000			\$12,273	\$12,273	
12/1/06	\$420,000	\$215,000	5.60%	\$12,273	\$227,273	\$239,545
6/1/07	\$205,000			\$6,253	\$6,253	
12/1/07	\$205,000	\$205,000	6.10%	\$6,253	\$211,253	\$217,505
Totals		\$2,500,000		\$618,230	\$3,118,230	\$3,118,230

Note: Average Coupon Rate

5 11%

The main advantage of these bonds over regular coupon bonds is that an investor knows exactly what the total return on his or her investment will be. With a traditional coupon bond, the bond holder must reinvest semi-annual interest earnings at the then prevailing rate, thus making the total return uncertain. Compound interest bonds guarantee the current rate of return for the duration of the issue—as much as fifteen to twenty years. This type of bond combines the investment multiplying power of compound interest with the income-sheltering feature of traditional tax-exempt bonds. If interest rates are expected to fall, investors will be attracted to zero coupon bonds and compound interest bonds. However, if interest rates are expected to increase, investors may be reluctant to invest in these types of bonds.

For an issuer, the main advantage to compound interest bonds relative to zero coupon bonds is a legal one. Since debt limits usually apply to the par value of bonds, compound interest bonds and zero coupon bonds with the same par value will utilize the same debt capacity. However, the compound interest bonds will result in more bond proceeds since zero coupon bonds are sold at a discount. Issuers approaching a

TABLE 6
Compound Interest Bond Issue for \$2.5 Million

Year	Annual Rate of Increase @6%	Compound Value of \$1,000 Bond	Sinking Fund @ 4.5% Annual Payment	Accum. Value
1	\$2,650,000	\$1,060.00	\$364,343	\$364,343
2	\$2,809,000	\$1,123.60	\$364,343	\$745,081
3	\$2,977,540	\$1,191.02	\$364,343	\$1,142,953
4	\$3,156,192	\$1,262.48	\$364,343	\$1,558,729
5	\$3,345,564	\$1,338.23	\$364,343	\$1,993,215
6	\$3,546,298	\$1,418.52	\$364,343	\$2,447,252
7	\$3,759,076	\$1,503.63	\$364,343	\$2,921,722
8	\$3,984,620	\$1,593.85	\$364,343	\$3,417,542
9	\$4,223,697	\$1,689.48	\$364,343	\$3,935,675
10	\$4,477,120	\$1,790.85	\$364,340	\$4,477,120
Totals			\$3,643,427	

debt limit may find compound interest bonds to be more desirable than zero coupon bonds.

Since all interest is paid at maturity, payments to a sinking fund must be structured to earn a sufficient sum to cover the "appreciated capital," that is, the accumulated interest and principal costs. At some point during the term of the bond, the issuing jurisdiction may begin to make interest payments to the bond holders. The total annual payments are much higher, however, because interest must now be paid on the interest that has accumulated as additional capital (principal).

The justification often stated for the use of compound interest bonds is that the cost impact of the improvement is deferred until more direct beneficiaries of the facility can participate in the payment of these costs (e.g., through increased tax revenues). The impact of the additional interest costs on the "appreciated capital" can be partially absorbed *if* the sinking fund investments are carefully managed. Misuse of these bonds, however, can create a floating debt of significant proportions.

Flexible Interest and Variable Rate Demand Bonds

The idea of issuing tax-exempt bonds with a floating interest rate was adapted in the 1980s from the Eurocurrency market. This approach provides stability for both the issuer and the bondholder throughout the life of the bonds, particularly during times of interest rate volatility. As the name implies, the interest paid (yield) on a flexible interest bond changes over the life of the bond, based on some interest index printed on the bond itself. This feature stands in contrast to the traditional fixed-rate bond, on

which the interest rate remains constant, but the market value may change when interest rates rise or fall.

Since flexible interest bonds have less risk of principal erosion, interest costs are lower than on long-term, conventional bonds. The savings in interest costs to the issuer can be very substantial; the difference between a traditional bond and a flexible interest bond is often as much as 3 to 3.5 percent.

The interest index most often used is the average weekly rate of Treasury bills or bonds issued during the preceding interest period. For example, the floating rate for a short-term bond might be pegged at 67 percent of the average weekly T-bill quote, while the rate for a longer-term issue might be set at 75 percent of the average weekly quote on thirty-year Treasury bonds (see Table 7).

An additional feature of flexible interest bonds is a swing limit—a pre-established range within which the interest (cost to the public agency) may vary. Bonds issued in the late 1980s, for example, had floating interest rate limits of 7 percent minimum to a maximum of 12.5 percent over the life of the bonds.

TABLE 7
Flexible Interest Bond Issue for \$2.5 Million

Date	Interest Index	Interest Rate @ 7.5%	Interest	Principal Payment	Annual Debt Service
12/1/98	8.25%	6.23%	\$77,875		
6/1/99	8.20%	6.15%	\$76,875	\$250,000	\$404,750
12/1/99	7.85%	5.89%	\$66,234		
6/1/00	7.75%	5.81%	\$65,391	\$250,000	\$381,625
12/1/00	8.00%	6.00%	\$60,000		
6/1/01	8.20%	6.15%	\$61,500	\$250,000	\$371,500
12/1/01	8.25%	6.19%	\$54,141		
6/1/02	8.20%	6.15%	\$53,813	\$250,000	\$357,953
12/1/02	8.15%	6.11%	\$45,844		
6/1/03	7.98%	5.99%	\$44,888	\$250,000	\$340,731
12/1/03	7.78%	5.84%	\$36,469		
6/1/04	7.90%	5.93%	\$37,031	\$250,000	\$323,500
12/1/04	8.10%	6.08%	\$30,375		
6/1/05	8.12%	6.09%	\$30,450	\$250,000	\$310,825
12/1/05	7.86%	5.90%	\$22,106		
6/1/06	7.76%	5.82%	\$21,825	\$250,000	\$293,931
12/1/06	7.65%	5.74%	\$14,344		
6/1/07	7.90%	5.93%	\$14,813	\$250,000	\$279,156
12/1/07	8.00%	6.00%	\$7,500		
6/1/08	8.10%	6.08%	\$7,594	\$250,000	\$265,094
Totals			\$829,066	\$2,500,000	\$3,329,066

Note: Average Interest Rate 6.00%.

As with other municipal bonds, the maturities of flexible interest bonds vary. Some recent flexible interest bonds have been structured so that they can be redeemed at the end of a given calendar quarter. Flexible rate certificates issued by the State of Washington, for example, pay interest each month, and bondholders may elect on the fifteenth day of each month in which the interest payments are due, either to accept a new interest payment date at the same rate as the previous month, or to redeem the bonds at par.

Flexible rate bonds with such short features are often called variable rate demand notes or *certificates of indebtedness*. The most common is the “lower floater,” in which the interest rate is adjusted weekly relative to a specified index that reflects the current market.¹ Holders of lower floater bonds can require redemption after seven days’ notice. A redemption option that can be exercised in fewer than thirty days, such as the lower floater, is called a “continuing put.”

The structure of long-term, variable rate demand debt involves a rather complicated credit system. The debt issuer usually enters into an agreement with a credit facility, typically a commercial bank. The bank provides the issuer with a letter of credit. Should bondholders redeem the bonds before maturity, the issuer enlists the services of a remarketing agent who resets the interest rate and then tries to remarket the bonds. If some bonds remain unsold, the issuer’s remaining cash needs are met by the agreement with the credit facility, which either purchases the unsold bonds or makes a loan to the issuer. The issuer must pay the fees associated with the remarketing agent and the credit agreement. If the credit facility has to provide cash, the issuer also will incur interest on the funds, which typically is tied to the bank prime rate or higher.²

Caps, Floors, and Collars

A system of caps, floors, and collars has been developed as derivative products to help mitigate the consequences of increasing interest rates. With these instruments, issuers can maintain their future interest rate payments within set boundaries.

Under an *interest rate cap* (also called a ceiling), in exchange for a one-time premium from the bond issuer, a third party agrees to pay the issuer if a specified interest rate index rises above a certain percentage rate, known as the cap or strike rate. The premium depends on the bond’s maturity date and usually is in the form of basis points on the notation principal—the size of the contract upon which interests amounts are determined. The more distant the maturity date, the larger the principal, and the lower the strike level, the larger the up-front fee. The bond issuer receives no payments if the floating interest rate remains below the strike rate for the duration of the contract. In effect, the bond issuer is buying an insurance policy to protect against high interest rate payments on its variable rate bonds.³

A *floor* is the mirror image of a cap or ceiling. With a floor contract, the bond issuer receives an up-front fee from a third party. If the interest rate index falls below the floor or strike level, the issuer makes payments to the third party. Similar to a cap

agreement, if the floating index does not fall below the strike level, the issuer pays nothing.

A *collar* is the simultaneous purchase of a cap and sale of a floor by the issuer. Under this contract, the government entity trades any benefits from a potential fall in the interest rate index for protection against excessive interest rates. Under a collar agreement, the issuer defines a specific range for its interest rate payments, eliminating some of the uncertainty associated with issuing variable rate debt. The closer the cap and floor strike rates are set, the more the bonds will resemble fixed rate obligations. The cap and floor levels of the collar agreement can even be determined so that they perfectly offset each other.

According to a 1994 survey by the Government Finance Officers Association, approximately 6 percent of the municipal issuers had used derivative products in connection with bond sales. More than a third of those issuers were from California and Florida. About 17 percent of these derivative users had entered into caps, floors, or collars, with the average term of contract of five-and-a-half years. Reasons for entering into derivative agreements cited by users include: lower borrowing costs, the need to lock in current interest rates, the decrease in interest rate risk, and the reduction of debt service uncertainty.⁴

Callable Bonds

Bonds may be issued with the provision that they can be paid off—"called in" for payment—prior to their maturity date. Virtually all bonds are now issued with a "date of first call" provision, after which the issuer can choose to retire the bonds before the stated maturity date. In general, the date of first call for municipal bonds is five to ten years after the date of issue. The call provision normally is exercised with appropriate notice only on interest payment dates.

Callable bonds can afford greater flexibility in a jurisdiction's debt structure. Bonds may be recalled and refunded at more favorable terms if (1) the market or the jurisdiction's credit rating improves, (2) the initial retirement schedule proves too rapid, or (3) a period of declining revenue is encountered. The callable feature can be used to avoid overly rigid fiscal responsibilities, while at the same time permitting more rapid retirement if the project's revenue capacity expands. Terms of the call will dictate whether the issuer must pay a premium to investors, which, in turn, may erode any resulting savings from refunding.

A variation on the callable bond has been used primarily in conjunction with mortgage revenue bonds used to finance low-income housing. A bond holder may purchase such bonds with the expectation of holding them for eight to ten years. However, as rental income from the housing units reaches pre-determined thresholds, the authority is required to call in some portion of the outstanding bonds for early payment at face value. The bonds are redeemed by lottery: the individual bondholder does not know when or if his/her bond will be called in for redemption.

Tender Option Bonds

A tender option bond, also known as a “put bond,” offers the investor the option of submitting the bond for redemption before maturity. Usually the investor may redeem or “put in” a bond five years after the date of issue or on any anniversary date thereafter. In return for this option, the investor accepts a lower yield. The issuer pays a lower rate of interest (usually about 1 percent less than for conventional bonds of the same maturity), and consequently, the jurisdiction’s cost is lower. However, the bond usually returns more to the investor (about 0.75 percent) than conventional bonds that mature on the first prescribed put date.

Tender option bonds may also be issued with a simultaneous “call” date, on which the issuer can call in and pay off the bonds. Thus, the issuer and the bondholder have equal rights to cash in the bonds when market conditions and interest rates are favorable. If interest rates go down, a put bond will probably be called in by the issuing government. Conversely, if interest rates go up, the bondholder can “tender his option” to be paid at face value by the issuer.

Detachable Warrant Bonds

A warrant gives the holder the right to purchase at some future date more of the same securities to which the warrant is attached, at the same price and rate of return as the original bond. In exchange for that right, the issuer pays a lower rate of interest (about 0.5 percent less) than offered on otherwise comparable securities. The marketability of such bonds depends on the opinion of prospective buyers as to anticipated fluctuations in interest rates. If interest rates rise, the savings to the issuer become real because of the initial lower interest cost. If the rates fall, the opposite is true.

The Municipal Assistance Corporation of the City of New York issued the first public tax-exempt detachable warrant bonds in 1982. These bonds gave the holders warrants that could be exercised for two years. The expectation was that, even if interest rates declined during the two-year period, the savings from the lower interest payments over the life of the bond issue would amount to about \$11 million. Since interest rates held relatively constant during this period, the long-term savings were even greater than anticipated.

Private Activity Bonds

A private activity bond is a municipal bond, used either entirely or partially for private purposes. To qualify as a private activity, tax-exempt bond, the debt must fit into one of the following seven categories:

- *Exempt facility bonds* used to finance government-owned airports, docks and wharves; mass commuting facilities; facilities for the furnishing of water, sewage treatment, or solid waste disposal; qualified residential rental projects; facilities for local furnishing of electric energy

or gas; local district heating or cooling facilities; qualified hazardous waste facilities; and high-speed intercity rail facilities;

- *Qualified mortgage bonds* used to finance multi-family and single-family housing;
- *Qualified veterans mortgage bonds* used to assist veterans in financing housing;
- *Qualified small issue bonds*, also called Industrial Development Bonds, used for manufacturing facilities with capital less than \$10 million looking three years back or three years forward;
- *Qualified student loan bonds* used to finance student loan programs;
- *Qualified redevelopment bonds* issued for use in areas that the government designates as distressed areas or enterprise zones; and
- *Qualified 501(c)(3) bonds* issued to finance facilities for non-profit corporations.

Private activity bonds must also meet volume cap requirements and satisfy several other requirements outlined in section 147 of the federal statutes. Each state's volume cap is determined by a formula computed as the greater of either \$50 per capita or \$150 million. The purpose of these bonds must be defined specifically and must be used according to the limitations of the state and federal statutes. The strict limitations on private activity bonds make them inflexible—changes in their purpose may make them taxable.

Tax-exempt bonds offer private entities lower interest rates than they would otherwise be able to obtain. A government can use private activity bonds to support economic incentives to targeted activities or geographic areas. Some economists believe that these incentives create positive economic effects beyond the specific project or program that is being financed.

LEASE-PURCHASE FINANCING

The use of lease-purchase agreements grew significantly in the 1980s and has become a powerful and flexible financing tool for state and local governments as an alternative to long-term borrowing. In 1980, lease-secured debt of state and local governments totaled less than \$1 billion. By the end of the decade, however, that figure had grown to between \$7 and \$8 billion.⁵

In a lease-purchase agreement, a government unit acquires an asset by making a series of payments which are considered installments toward the purchase of the asset. The government may obtain title to the asset either at the beginning or at the end of the lease term. The most important benefit of lease purchases is the flexibility that they offer. Lease purchases can be entered into much more quickly than bonds. Expedited issuance can permit a government to save money by avoiding inflation in construction costs. Lease purchases enable a government both to avoid committing a large share of operating revenues to the cash purchase of an asset and to preserve its general obligation debt capacity. In addition, lease-purchase financing avoids some of the substantial referendum costs associated with general obligation bond financing. Finally, lease purchases permit the acquisition of equipment that costs too much to fund from one fiscal year's budget but has too short a useful life to finance with bonds or other long-term debt.⁶

Individual lease purchases can be consolidated into a master lease-purchase program in order to achieve lower interest rates, tighter controls, and lower administrative costs. Typically, a centralized governmental department issues tax-exempt debt to finance the purchase of vehicles, equipment, computers, or other capital assets on behalf of other governmental departments. The centralized department then enters into a standardized lease-purchase contract with each of the other departments. The lease-purchase payments received from these departments are used to repay the debt.

Master lease-purchase programs often are financed through the issuance of commercial paper that may be periodically rolled into a fixed-rate bond with a five- to seven-year maturity. The use of commercial paper allows the government to issue additional debt on an as-needed basis without incurring large incremental issuance costs.

A master lease-purchase program often can obtain significantly lower interest rates than would be available through vendor-financed lease purchases. The centralization and standardization of the lease-purchase contracts also can result in lower administrative costs and tighter controls over lease purchases. Centralizing financing procedures reduces the likelihood of vendor leases being entered into without the proper authorization. Some states and local governments, however, have encountered unwillingness by agencies to participate in a master lease-purchase program because of a perception that such programs reduce an agency's purchasing flexibility and autonomy.

The main players in a lease-purchase agreement are: (1) the lessee—a government unit; (2) the lessor—a private firm, vendor, or another governmental entity; and (3) investors. After arranging an agreement, the lessor often will assign the rights to the lease payments to a number of investors. Certificates of participation, commonly referred to as COPs, are a widely used mechanism to provide individual investors the opportunity to purchase fractional interests in a particular lease. Certificates are generally issued in \$5,000 denominations through a competitive or negotiated sale to underwriters and can receive investment ratings from a rating agency. COPs can be traded in the secondary market, making them more marketable. Therefore, issuers are able to obtain a lower interest rate on COPs than on other types of lease-purchase financing. The relatively small denominations of the COPs spread the risk associated with lease-purchase transactions and facilitates an active secondary market.⁷ The tax-exempt status passes through to owners of COPs who receive the distribution of the interest component.⁸

TAX-EXEMPT LEVERAGED LEASE FINANCING

Lease purchases have been used primarily to finance the acquisition of equipment, such as computers and motor vehicles. Increasingly, however, more costly, long-term projects, such as the acquisition of real property and the construction of new facilities, have also been financed using lease-purchase agreements.⁹

Tax-exempt leveraged lease (TELL) financing is one of the more creative approaches, which in today's investment market often is more versatile and cost-effective than

conventional borrowing. TELL financing can greatly reduce the cost of borrowing on capital projects of \$5 million or more. In TELL financing, municipalities generate capital funds by selling public facilities. The sale is financed through tax-exempt revenue bonds. Once the buildings have been sold, the private investment is “leveraged” by the municipality leasing back the facility at subsidized rates. The results are sharply reduced financing costs, a new pool of unrestricted funds for capital projects, and greater financial flexibility for borrowers.

Four main participants in TELL financing are a public jurisdiction, a limited partnership, a financing authority, and the bondholders. Any government unit or public agency authorized to issue special-purpose revenue bonds or industrial development bonds may take advantage of leveraged lease financing. The jurisdiction offers to sell a public facility to a private investor (using operating as a special-purpose limited partnership) who buys the facility by making a down payment and, over a five-year period, contributing equity equal to 25 to 30 percent of the sales price. The jurisdiction then leases back the building on a long-term basis for continued use. The infusion of equity by the investor reduces rents significantly during the first five years.

The balance of the sales price is financed by tax-exempt revenue bonds issued on behalf of the partnership and loaned by a qualified financing authority (such as an industrial development authority). Underwriters arrange the tax-exempt bond financing and structure the sale/leaseback transaction to meet the requirements of the bond market, the private investors, and the government. The lease serves as collateral for the loan which, in turn, secures the bond issue. The proceeds of the sale then finance the intended capital improvement.

In purchasing the facility, the private investors obtain the tax benefits associated with ownership. The subsidized base payments during the initial five years are a reflection of the value of these benefits. Lease payments represent the cost of financing to the governmental unit. In reducing the magnitude of the lease payments, TELL successfully reduces the effective borrowing cost below the issuer’s current tax-exempt rate.

Although investors own the building, the facility lease is carefully written to provide the government with maximum flexibility and control over the use and final disposition of the building. Typically, a jurisdiction leases back the building for a period of thirty years on a net-net basis; that is, the jurisdiction assumes the basic operating and maintenance costs. In so doing, the jurisdiction retains control over the day-to-day management and operations. In addition, the lease usually provides the government with several renewal options and with rights to repurchase the facility. As a further protection, the public agency often retains ownership of the land, leasing it to the investors for a period of sixty-five years. At the end of the land lease, the land and improvements automatically revert to the government.

Under TELL financing, the repurchase price cannot be negotiated in advance of the sale. However, lease provisions can shield the jurisdiction from inflated real estate values at the time of repurchase. These safeguards include the land lease, the renewal

options, and the method of appraisal that defines the repurchase price at the end of thirty years. The land lease, for example, serves to encumber the facility and to limit its future value in the open market.

Almost any capital project, from new construction to the refunding of outstanding debt, can be financed through leveraged leases. College dormitories, for example, have been successfully financed through TELL arrangements. In considering TELL financing, the managing underwriter should assist the government in developing a feasibility study, which should include an analysis of the impact of the project's proposed financing terms on the local budget, an estimated rental schedule, and an outline of legal and financial actions required of the government. Upon completion of this analysis, the managing underwriter, the bond counsel, and representatives of the equity partnership should draft necessary lease, purchase, and financing documents, followed by the submission of a firm purchase contract within sixty to ninety days.

A NOTE OF CAUTION

In the dynamic and uncertain period of the 1980s, state and local governments were forced to develop capital financing programs that were more responsive to their overall financial conditions and fiscal policies than traditional general obligation and revenue bonds.

The federal tax reform bill passed in August 1986 had a number of effects on the future supply of tax-exempt financing. The act eliminated significant tax breaks to banks, among the biggest bond buyers prior to the enactment of this act. As a consequence, the municipal bond market has continued to shift from institutional buyers to retail customers with smaller pocketbooks. Restrictions on the types of projects that can be financed by tax-exempt bonds, along with statewide caps on the volume of new issues, have resulted in further adjustments in municipal bond issues. A reduction in the supply of new issues has tended to increase the relative value of municipal bonds, particularly in states that have historically low municipal debt.

The second important effect of the tax bill is the lowering of the maximum federal tax bracket from 50 percent to 33 percent. Although the new, lower federal tax brackets have already been discounted, municipal bonds continue to be attractive relative to taxable alternatives for the vast majority of investors whose marginal tax rates are at the higher end of the federal tax schedule. At the same time, since federal tax brackets have been lowered, the state portion of an individual's total effective tax bracket becomes larger. As a consequence, the exemption from state taxes offered by municipal bonds to residents of the state of issue becomes more important.

New fiscal instruments and financing techniques are not a panacea for meeting the needs of local government for expanded capital facilities. More conventional approaches should not be abandoned unless officials are satisfied that sufficient benefits will accrue when compared to the risks. The emergence of more innovative approaches stems from the willingness and ability of state and local governments to accept and

deal with the uncertainty of future markets for financing capital facilities. Practical concerns are also part of the equation, including the political acceptability of such approaches, the ability of governments to structure and manage these creative financing mechanisms, and, of course, the laws that govern capital financing. Interest payments are still the cost that governments must pay for the use of other people's money. Careful application of new financing techniques, however, may uncover some real opportunities or provide capital resources that otherwise would be unavailable.

NOTES

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