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State of Connecticut Municipal Swap

In May 1990, Benson R. ("Bud") Cohn, Assistant Treasurer-Debt Management for the State of Connecticut, was considering how best to raise $325 million in tax-exempt, twenty-year fixed-rate debt. The funds were needed for the state's capital spending program. On his desk were competing proposals from Merrill Lynch Capital Markets and BT Securities (a wholly-owned subsidiary of Bankers Trust New York Corporation). The proposals each contained a "synthetic" alternative to straight fixed-rate debt which involved pairing a long-term variable-rate bond issue with an interest rate swap. Depending on the assumptions, it seemed the synthetic approach could save the state 50 basis points or more in financing costs. The market for municipal interest rate swaps was nascent, but growing. If executed, the proposed swap would be the first for the state and the largest to date in the municipal market. Before he could go this route, however, Bud Cohn wanted to satisfy himself not only that the cost savings were real, but also that the transaction was not unduly risky.

Financing the State of Connecticut

Connecticut was first settled in 1633 and was the fifth state to ratify the U.S. Constitution in 1788. In 1990, the State's population exceeded 3.2 million; three metropolitan areas, Hartford, Bridgeport and New Haven, accounted for 84% of the total. During the 1970s and 1980s, state population growth was slow. The economy was diversified between aerospace/defense (primarily aircraft engines, helicopters, and submarines), services (primarily insurance) and trade. Per-capita income, at $25,000, was 40% higher than for the nation as a whole. The 1990 state general funds budget totaled almost $6.4 billion and the capital budget came to almost $1.7 billion.

Connecticut first issued bonds in the eighteenth century. In recent years, it has ranked among the top twenty issuers of tax-exempt debt (in terms of dollar volume). From 1980 to mid-1990, the state sold $5.2 billion in fixed-rate, long-term bonds through 39 separate issues.

Interest paid to investors on municipal bonds like those issued by the state of Connecticut was exempt from federal taxation. For Connecticut residents, the interest was also exempt from state taxation. The tax exemption granted municipal issuers enabled them to raise financing at costs substantially below what a taxable entity of comparable credit would have to pay. **Exhibit 1** shows prevailing short-term and long-term municipal rates relative to taxable rates.

In the spring of 1990 the state of Connecticut had outstanding approximately $2.8 billion par amount of general obligation (GO) debt, for which the state pledged its "full faith and credit." The

Joel Barber and André F. Perold prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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standard GO pledge obligated a state or municipality to use its full statutory taxing authority to ensure payment of interest and principal. Because most cities and states held broad taxing powers, GO debt was among the most highly rated in the municipal market. In 1990, all U.S. states had investment grade ratings on their general obligation debts.[1] Connecticut's long-term debt was rated "Aa" by Moody's and "AA" by Standard & Poors.

In addition to GO debt, Connecticut had outstanding roughly $1.5 billion of "Transportation Infrastructure Purposes" bonds that were secured by a special tax obligation (STO). Certain transportation revenues including motor fuel taxes, motor vehicle receipts, and license, permit, and other fees were pledged to pay debt service on these bonds. Generally speaking, any (tax-exempt) bond that is not a direct general obligation of a state or municipality is referred to as a revenue bond. Connecticut STO bonds fell into this category.

The state also financed certain activities through various authorities. In 1990, two of the largest in terms of debt outstanding were the Connecticut Housing Finance Authority ($2.6 billion) and the Connecticut Resources Recovery Authority ($600 million).

Like most municipal issuers, Connecticut structured its long-term debt to even out repayments over time. Level payments were less disruptive to the municipal budgeting process. This was accomplished with a serial issue, a sequence of bonds with varying maturities.[2] Typical structures provided for either level principal payments (the first maturity coming perhaps one to two years after issuance) or level debt service (principal plus interest), as with home mortgages.[3] The long-term bonds in the series were usually callable at the option of the issuer, following a "call protection" period.

Commercial Paper and Variable-Rate Debt

For short-term funding the state of Connecticut relied on commercial paper (CP) programs. In April 1990, the state began a commercial paper program, rated P-1/A1+, with Goldman, Sachs as dealer. It was authorized up to $550 million and was backed by a five-year letter of credit (LOC) from Dai-Ichi Kangyo Bank covering both principal and interest. The LOC assured investors liquidity should the state experience difficulty in "rolling over" the CP when it matured. It cost the state seven basis points on the amount of CP outstanding and three basis points on the remainder (difference between CP outstanding and $550 million).[4] Connecticut used commercial paper to cover temporary funding shortfalls caused by timing differences between payments coming due and receipt of tax and other revenues. An earlier program started in the late 1970s was discontinued in 1982 during a period of state budget surpluses.

During the 1980s, innovation in the municipal bond markets gave issuers additional short-term debt alternatives. Of particular significance was the development of variable-rate bonds sold

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1. The general obligation debt of Massachusetts was rated at the lowest investment grades: "Baa" by Moody's and "BBB" by Standard & Poors. All other states had higher ratings on their GO debts.

2. Often, municipal bond issues employed a combination serial *and* term structure. For example, assuming a typical 20-year maturity, years 3 through 15 might be serial maturities, with term bonds in years 18 and 20. Almost invariably, however, there were mandatory sinking fund payments that, in effect, "serialized" the term bonds. Sinking fund payments were used to immediately retire bonds selected at random within a given term maturity.

3. Principal on municipal bonds was paid annually, whereas interest was paid semi-annually. Level debt service, therefore, refers to level *annual* debt service.

4. Dai-Ichi Kangyo Bank was permitted to renegotiate the LOC in the event regulatory authorities substantially increased the bank's required capital ratios.

under names like "UPDATES" (Unit-Priced Demand-Adjustable Tax-Exempt Securities, a Merrill Lynch product) and, more generically, "VRDOs" or "VRDBs" (variable-rate demand obligations or bonds). By being both puttable by the investor and callable by the issuer, they had many of the features of short-term instruments, yet were nominally long-term securities, affording issuers added financial flexibility. For example, the call feature made refunding easier if conditions changed so that the state could issue debt with less burdensome covenants. It also gave flexibility to issuers who were not certain how long they would need funds, or if they would need funds at all.[5]

The put feature allowed investors to sell the bonds back to the issuer at a price of par; with most bonds, this could be done weekly.[6] In practice, investors never put their bonds to the issuer directly, but rather through the "remarketing agent," an investment bank retained by the issuer.[7] The remarketing agent would use its "best efforts" to remarket (i.e., sell) said bonds to new investors and, assuming a successful sale, would pay the proceeds over to the investor exercising the put.[8] (Another party, the "paying agent," often acted as intermediary between investors and the remarketing agent and handled all record-keeping and transfers of funds.)

By the terms of the indenture, the remarketing agent could resell the bonds only at par. To make this possible, the remarketing agent, at his or her sole discretion, could reset the coupon. Thus, each reset took into account changes in market conditions and issuer-specific factors. Once the coupon was reset, all the bonds would pay the new coupon. Rates paid on municipal put bonds were usually capped, a typical ceiling being in the range of 12% to 15% per annum.

Should the remarketing agent to fail for any reason to resell the bonds put to it, the issuer would be obligated to immediately provide the funds to pay existing bondholders. As it was, few municipal issuers would have the liquidity necessary to immediately redeem even a modest portion of their outstanding debt. Accordingly, they purchased liquidity from a third party, such as a commercial bank or insurance company, through a letter of credit.

LOC commitments were typically purchased for periods of five to ten years.[9] Draws against the LOC would usually transform automatically into term loans between the bank and the issuer. The decision to draw was left to an independent third party, such as the paying agent who was bound only by the terms of the bond indenture. This distinguished LOCs from lines of credit where the decision to draw was the direct option of the issuer.

Although the LOCs were noncancelable by either the issuer or the provider, the latter often had a limited number of "outs." So-called "liquidity-only" LOCs usually could be canceled by the provider if the issuer was in default on some or all of its debt. In addition, beginning in the late 1980s, LOC contracts increasingly contained language allowing them to be canceled if the regulatory authorities increased the provider's required capital ratios. "Liquidity-*and*-credit" LOCs typically did

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5. A municipality might be compelled to issue "in advance" of an anticipated requirement for funds if certain authorizations were soon to expire. In addition, municipalities were mindful that federal tax law could change at any time and give less favorable treatment to their debt issues, and there was always the possibility that local laws and procedures pertaining to governmental debt issuance could become more restrictive. However, since new laws were seldom made retroactive, issuers of and investors in any particular bond could be fairly certain that the legal environment at the time of initial issue would be preserved ("grandfathered") in the event of subsequent changes in the law.

6. The bonds were also callable at par on the dates that they were puttable.

7. The remarketing agent and the original issue underwriter were, almost invariably, one and the same.

8. For an issue that was reset every seven days (i.e., was in a "seven-day mode"), investors were typically required to give the remarketing agent seven days notice of their intent to put.

9. The issuer was to secure a replacement LOC prior to the expiry of the original and, failing such, was to notify bondholders to allow for redemption prior to LOC expiration.

not carry the above-mentioned default and cross-default provisions and, accordingly, cost issuers more.[10] The majority of LOCs backing municipal put bonds were of the liquidity-only variety.

According to municipal traders, variable-rate debt carried interest rates similar to commercial paper, although it was difficult to draw exact comparisons given that few issuers had both variable-rate bonds and commercial paper outstanding simultaneously. The advent of variable-rate bonds also enabled the development of a municipal interest rate swap market by the mid-1980s. As already noted, long-term variable-rate bonds and an interest rate swap were the principal features of the synthetic fixed-rate financing proposed for the state of Connecticut. To date, the state had not yet issued variable-rate general obligation or revenue debt.

The variable-rate bond structure described above was also employed in the market for corporate preferred stock. Tax exemption was an important factor to both markets: for corporate investors, dividend income on preferred stock instruments was 70% (earlier 85%) tax-exempt. In both markets, "remarketing" was one of two principal reset mechanisms. The other mechanism—preceding remarketing and pioneered by Lehman Brothers—employed a Dutch auction in which investors would bid for the coupon at which they would be willing to buy the security at par.[11] In 1990, there was approximately $40 billion of such "auction-rate" or "money-market" preferred outstanding and $120 billion of municipal variable-rate bonds. Both markets were almost entirely institutional; the minimum denomination for a single bond was $100,000. Money-market funds and corporations represented approximately 70% and 20% of the market, respectively, for municipal variable-rate bonds, the remainder being held by bank trust departments and wealthy individuals.

Recent Credit Risk Concerns

Because the LOC was central to the credit structure of many municipal put bonds, the credit ratings of the LOC provider were an important determinant of bond credit-worthiness. In the spring of 1990 the credit strength of LOC banks was something of an issue for investors. One Japanese bank alone, Fuji Bank, backed over $8.5 billion in U.S. municipal bonds, most of them variable-rate. As a group, Japanese banks stood behind something over half of all variable-rate municipal bonds outstanding. At the time, many of these banks were beset with problems related to the crash earlier that year of the Tokyo equity market and the pressure it put on their capital ratios.[12] To such concerns were added their huge exposures to a softening Japanese real estate market. Already, Moody's was reviewing the ratings of two of the largest Japanese banks, Fuji and Dai-Ichi Kangyo, for possible downgrade. Analysts expected these banks would drop one "notch" (rating category) on their long-term debt ratings, but would maintain the highest short-term ratings.

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10. In May 1990 the state of Connecticut could have purchased a liquidity-only LOC for seven to ten basis points, whereas a liquidity-and-credit LOC would have cost perhaps twice as much.

11. These securities were not explicitly puttable. If the auction failed, i.e., if there were insufficient bids below the maximum coupon, holders would receive the maximum, but would be "stuck" with the security.

12. Japanese regulators allowed the nation's banks to count up to 45% of the unrealized gains on their (substantial) equity portfolios as core capital.

The Merrill Lynch Proposal

Merrill Lynch quoted the state an all-in cost of 7.060% on a straight 20-year fixed-rate issue.[13] This included an underwriters' spread of $9.25 per $1,000 par.[14] The issue would be comprised of twenty serial maturities all with the same principal. (**Exhibit 1**). The final ten maturities (from 2001 to 2010) would be callable at par after year 10.

To create a synthetic fixed-rate financing, Merrill Lynch proposed a 20-year variable-rate bond issue, with the same serial structure as above. To underwrite the bonds, Merrill Lynch quoted a spread of $4.25 per $1,000 par. It would also charge a remarketing fee of 0.125% per annum. Merrill Lynch estimated the state could obtain a liquidity-only LOC for 0.075% per annum.

In addition, the state would enter into a ten-year interest rate swap with Merrill Lynch & Company. Under the terms of the swap, Merrill Lynch would pay the state a floating rate equal to the J.J. Kenny Index of 30-day, AA-rated municipal put bonds (30-day JJK); in return, the state was to pay Merrill Lynch a fixed-rate of 6.905%.[15] Both fixed- and floating-rate payments, and the fees, would be based on the amount of principal then outstanding.[16]

Regardless of the financing method (or underwriter) selected, Bud Cohn estimated the state would incur $200,000 in out-of-pocket costs, primarily to pay securities lawyers and financial advisers, as well as printing costs for the prospectus.

Merrill Lynch, in its analysis of the proposal, estimated that, on average, the state's bonds would trade at 55 basis points below 30-day JJK:

> ...55 basis points below the J.J. Kenny Index is a reasonable and conservative expectation. This projection is based on an examination of the factors which most greatly influence these short-term interest rate levels including (1) the state's tax rate on interest income, and (2) the availability of purchasers of variable rate securities issued by Connecticut. Because there have been very few comparable Connecticut financings, it is not possible to look directly at the interest rate experience on past Connecticut issues; however, the interest rate history of financings in states with similar characteristics strongly supports our conclusions.
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> State tax rates on interest income have the most influence on short-term trading levels; the higher the state's income tax rate, the greater the expected spread vis-à-vis the Kenny Index and, at 14%, the state of Connecticut has the highest tax on interest income in the nation. At the short end of the yield curve, the state can anticipate realizing the full benefit of higher state tax levels, because investors are willing to purchase Connecticut securities at a yield which gives them the same yield on an

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13. The quotations provided by Merrill Lynch and BT Securities were as of May 24, 1990 and reflected market conditions on that day.

14. The gross spread included all fees and commissions for structuring, underwriting, and selling the issue.

15. Thirty-day JJK is computed and made available weekly by Kenny Information Systems, an affiliate of an independent municipal bond brokerage. In 1990 the municipal bond industry recognized the J.J. Kenny Index as "a standard," but not "*the* standard" floating rate benchmark for municipal swap transactions. Its use was pioneered by Merrill Lynch, an early proponent of municipal swaps. In December 1989, Merrill Lynch claimed it held over 90% of the municipal swap market (*The Bond Buyer*, December 11, 1989). Of the over $20 billion in municipal interest rate swaps outstanding in early 1990, the large majority were based on the 30-day Kenny Index.

16. Standard swap agreements called for payments to be made on a "net" basis; that is, amounts owed by each of the two parties were computed, and the difference between the two figures was paid by the party owing the greater amount to the party owing the lesser.

after-tax basis as an out-of-state security. For example, an investor would be willing to accept JJK minus 57 basis points for available rate debt issued by Connecticut if JJK were equal to 5.67% (the index's average level since inception). This 57 basis points is equal to 5.67% x (1 - federal tax rate) x state tax rate, or 5.67% x 72% x 14%.[17]

Our estimate of Connecticut's tax-related trading differential is strongly supported by the experience of issuers in other states with comparable tax characteristics. As the attached chart shows (see **Exhibit 2**), variable-rate debt issued by New York and California would have trading differentials of 48 and 38 basis points respectively, based on each state's income tax rates. However, representative issues from New York have shown trading differentials of 47 to 74 basis points. Similarly, a California issue has shown a trading differential of 55 basis points.

In-state demand for variable-rate securities - coming primarily from three sectors; tax-exempt money market funds, corporations and bank trust departments - also influences short-term rates. It is important to note that two of these sectors - bank trust departments and money market funds - are proxies for individual investors. It is therefore important to have higher income individuals within the state who are seeking tax-exempt income. As shown in the attached chart, Connecticut compares favorably with New York and California in these criteria. Connecticut money market fund assets per-capita are similar to both New York and California. Connecticut per-capita personal income is among the highest in the nation and is considerably higher than both New York and California. In addition, Connecticut is home to a large number of corporations who would also invest in these securities.

While we have only analyzed the trading differential as it relates to specific state tax and demand variables, it is important to note that we would expect Connecticut's securities to trade at yields lower than JJK, even without these factors, if these securities were structured as UPDATES. The J.J. Kenny Index is composed of securities (with a fixed thirty-day maturity). An UPDATES program, however, is structured like tax-exempt commercial paper (TECP). Historically, TECP and TECP-like variable rate securities have substantially outperformed [fixed-maturity] instruments.[18]

Three major factors underlie the superior performance of Merrill Lynch's UPDATES product. First, investors are able to use these securities for cash management since they can buy the securities out to the specific maturity (or put) date they request. This ability to fulfill cash management functions is especially important to corporate investors. These investors are willing to accept lower yields to have paper repriced on the dates they select, rather than be restricted to floaters with inflexible put dates. Second, these securities pay interest on the put date and are purchased at par (cash market investors are sensitive to paying accrued interest). Third, and most important, the remarketing agent can actively manage an UPDATES program to avoid the predictable technical spikes and lock in the interest rate troughs that occur regularly in the short-term tax-exempt market.

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17. State tax is tax-deductible at the federal level.

18. Casewriter's note: With commercial paper, the issuer can alter the maturity of the paper (when it rolls over). For example, the issuer can try to obtain lower rates by lengthening the paper in periods of inverted yield curves or shortening the paper in periods of upward-sloping yield curves. Under the terms of UPDATES, the issuer could achieve the same effect by lengthening or shortening the time between reset (put) dates (with appropriate advance notice).

Merrill Lynch's ability to manage a program to achieve low cost for issuers has been proven over time, and our experience indicates a trading differential for Connecticut of at least 20 basis points below JJK - even if there were no income tax rate-related trading impact. In fact, for the Port of Seattle in Washington, a state that does not tax interest income, UPDATES have produced average yields 27 basis points below the Kenny Index.

In May 1990, Merrill Lynch's long-term obligations were rated "A2" by Moody's and "A" by Standard & Poors.

The BT Securities Proposal

BT Securities quoted an all-in cost of 6.964% on a straight twenty-year fixed-rate issue. Included was a gross spread of $9.25 per $1,000 par. The issue consisted of fourteen serial maturities and two term bonds (in 2006 and 2010). With sinking funds on the two term bonds, principal payments would be equal over the twenty years. After ten years, remaining maturities would be callable.

The synthetic fixed-rate financing proposed by BT Securities was virtually identical in structure to that proposed by Merrill Lynch. BT Securities offered to underwrite the variable-rate issue for $3.25 per $1,000 par. Its remarketing fee was 0.100% and its estimate of the LOC fee (payable to the LOC provider, likely a Japanese bank) was 0.070%. On the swap, BT offered to pay the state a floating rate equal to the TENR index, the rate on the bank's own seven-day variable-rate program for municipal issuers. In return, the state was to pay BT a fixed-rate of 6.67%. The swap term would also be ten years.

BT Securities claimed that the state's bonds would trade, on average, at a level 25 basis points below TENR, and supported the contention with an analysis similar to that done by Merrill Lynch.

In May 1990, BT Securities' long-term obligations were rated "Aa" by Moody's and "AA" by Standard & Poors.

Relation to the LIBOR-Based Interest Rate Swap Market

J.J. Kenny- and TENR-based swaps were unique to the municipal market in that they were tied to short-term tax-exempt rates (see **Exhibit 3**). The swap payments were not tax-exempt, however. That is, for Merrill Lynch and BT Securities, inflows or outflows would be fully taxable or tax deductible as interest income or interest expense, respectively. The state itself was exempt from federal taxes.

The amount of these swaps outstanding, estimated around $20 billion in 1990, was small in comparison with the market for the corporate LIBOR-based fixed-to-floating swaps which exceeded $1 trillion. While twenty-year and even thirty-year swap quotes were obtainable, the market was most active and liquid for terms of ten years or less.[19] Activity at the longer terms was dominated by AAA-rated financial companies (see **Exhibit 4**).

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19. Demand for swaps was concentrated on terms of ten years or less because corporate debt seldom went beyond a ten-year maturity.

One such company was American International Group, Inc. (AIG), a property-casualty insurer focused on the commercial and industrial sectors. AIG was a large player in the long-term taxable swap markets, and had recently entered the municipal swap market. AIG was the primary provider of AAA-rated, long-term (up to 30-year) swaps to municipal issuers. Although AIG quoted both JJK- and LIBOR-based swaps, the firm was able to price more aggressively on the latter given the greater depth of, and facility to hedge in, the LIBOR-based market. In a LIBOR-based swap for municipal clients, AIG would typically "scale" all payments (fixed-rate and floating-rate) by a certain factor—around 70%—which reflected the long-term historic relationship between LIBOR and short-term municipal rates (see **Exhibit 5**).

Bud Cohn's Initial Reactions

Bud Cohn found the swap proposals intriguing: interest cost savings of 50 basis points, if achievable, would be worth about $10 million. However, he had concerns:

First was "basis risk," the risk that the differentials between the J.J. Kenny or TENR indices and the rates paid on the state's variable-rate bonds could be narrower than the 55 and 25 basis points estimated by Merrill Lynch and BT Securities (see **Exhibit 6**). The estimated savings depended critically on these assumptions.

Second was term mismatch. The variable-rate bonds would be outstanding for twenty years, while Merrill Lynch and BT Securities were not willing to enter interest swap contracts for longer than ten years. He was not sure how to evaluate this risk. Issuing ten-year debt was not an option since it would require doubling the principal repaid each year; this was impractical given the myriad other financial commitments of the state.

His third concern was the risk of default on the swap agreement. The state budget, set once a year, might not be able to absorb the unanticipated costs that could arise in a default. This could compel the (publicly elected) treasurer to go back to the legislature and request additional funds. Besides the risk of real economic loss, the political embarrassment from such financial misfortunes would almost certainly be substantial.

Both mismatch and default concerns could be allayed by securing a twenty-year, AAA-rated swap; however, a LIBOR-based swap could increase basis risk. Moreover, Mr. Cohn did not have quotes from AIG for the financing at hand as he had only recently become aware of the firm's municipal swap capabilities. Given the advanced stage of the financing, a proposal from a firm the state had not dealt with previously would have to wait until the next time the state ventured into the capital markets.

Finally, the credit-rating agencies had concerns about municipal issuers taking on too much variable-rate debt, including short-term debt. It was possible they would view synthetic fixed-rate debt as being variable-rate. This could impair the State's ability to issue variable-rate debt in the future. Mr. Cohn felt capacity to issue variable-rate debt would be essential in the event long-term rates rose to unattractive or even prohibitive levels.

All told, Cohn wondered whether the risks of the synthetic financing were "reasonable" in relation to the potential benefits. He did not want the Office of the Treasurer to be seen as speculating with public funds. Reflecting on everything, Mr. Cohn noted matter-of-factly:

> If we (The Office of the Treasurer) did something innovative and saved the state millions of dollars, no one would pay any attention because that's what we're "supposed" to do—but should something go amiss despite our best efforts and

intentions, it'd be all over the newspapers. That's the "fishbowl" we work in everyday.

Exhibit 1 Interest Rates on May 24, 1990

Mat.	Treas.[1]	LIBOR[2]	Swap[3]	Muni[4]	ML[5]	BT[5]
1 mo	7.19	8.25				
3 mo	7.93	8.37				
6 mo	8.11	8.50				
1 yr	8.16			6.05	6.00	5.85
2 yr	8.50		43	6.20	6.20	6.00
3 yr	8.54		51	6.30	6.30	6.15
4 yr	8.59		58	6.40	6.40	6.25
5 yr	8.56		63	6.50	6.50	6.35
6 yr				6.60	6.60	6.45
7 yr	8.66		66	6.65	6.70	6.55
8 yr				6.70	6.70	6.65
9 yr				6.75	6.75	6.70
10 yr	8.64		76	6.80	6.80	6.75
11 yr				6.85	6.85	6.80
12 yr				6.90	6.90	6.85
13 yr				6.95	6.95	6.90
14 yr				7.00	7.00	6.95
15 yr				7.00	7.05	
16 yr				7.05	7.10	7.00
17 yr				7.05	7.40	
18 yr				7.10	7.65	
19 yr				7.10	7.75	
20 yr	8.74		81	7.10	7.875	7.05
30 yr	8.61		86	7.25		

(1) Bond-equivalent yields on U.S. Government securities.
(2) London Inter-Bank Offer Rate.
(3) Swap rates for 1- or 3-month LIBOR expressed as a basis point spread (middle of bid-offer) over U.S. Treasury.
(4) Delphis-Hanover estimates for a AA-rated municipal issuer. On 5/24/90, 30-d JJK was 6.28%; 7-d TENR was 6.10%.
(5) Coupons on individual bonds in the series (paid s.a.). BT Securities priced all maturities at par. Merrill Lynch priced the first sixteen maturities at par and the last four at premiums: 102.437, 105.018, 105.646, and 107.096, respectively. In both the ML and BT structures, bonds maturing in years 11 through 20 were callable at par after year 10.

Exhibit 2 Merrill Lynch's Trading Differential Comparison

	New York	California	Connecticut
State Interest Income Rate	11.875%[1]	9.3%	14%
Expected Tax Rate Trading Differential (basis points)[2]	48	38	57
Money Market Assets Per Capita	$309	$337	$289
Net Tax-Supported Debt Per Capita[3]	$873	$184	$1,258
Personal Income Per Capita[3]	$19,305	$16,904	$23,059

(1) Of this, 3.4% is New York City tax
(2) Based on an average 5.67% J.J. Kenny index
(3) Source: Moody's Municipal Credit Report

Exhibit 3 SHORT-TERM TAXABLE vs. TAX-EXEMPT INTEREST RATES

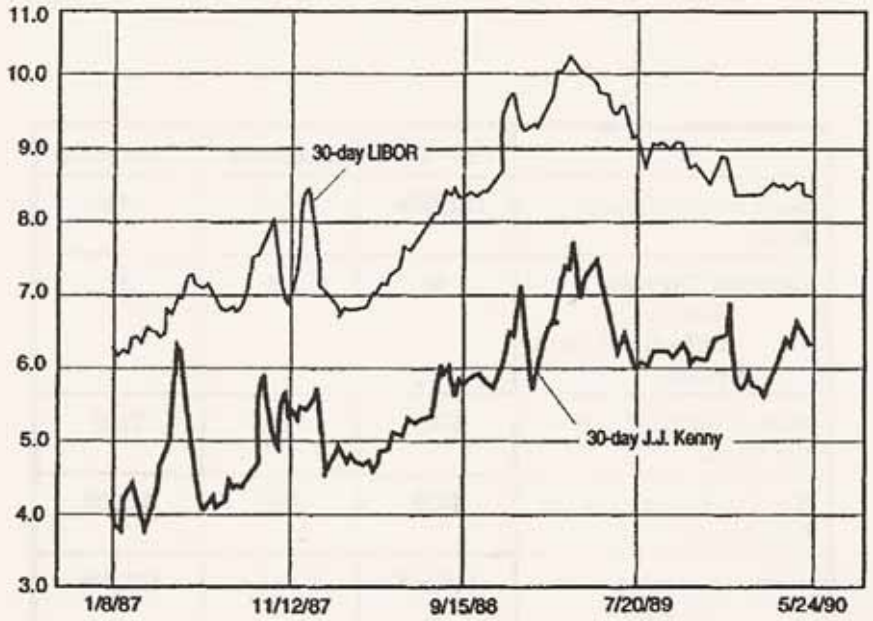

Exhibit 4 LONG-TERM TAXABLE vs. TAX-EXEMPT INTEREST RATES

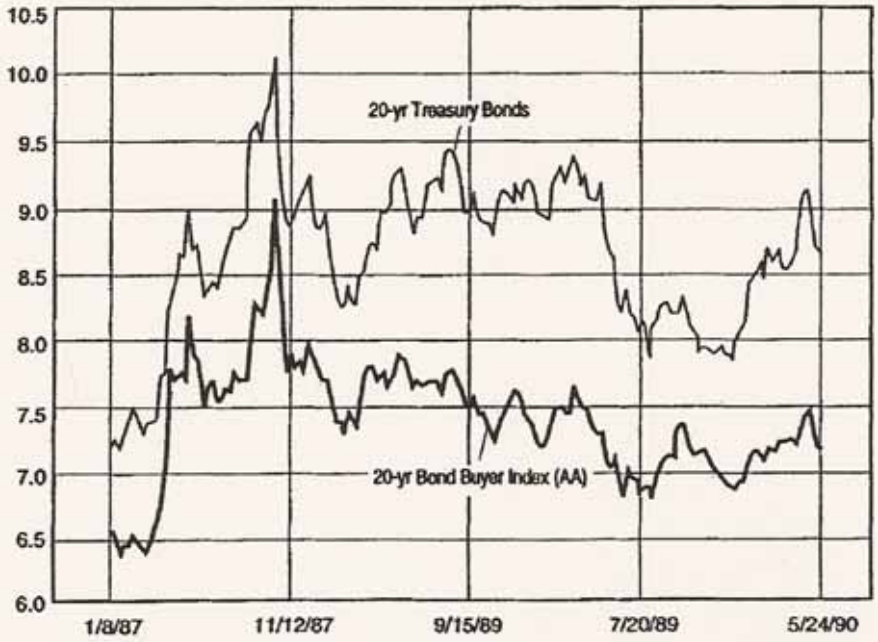

Exhibit 5 RATIO OF TAX-EXEMPT TO TAXABLE INTEREST RATES

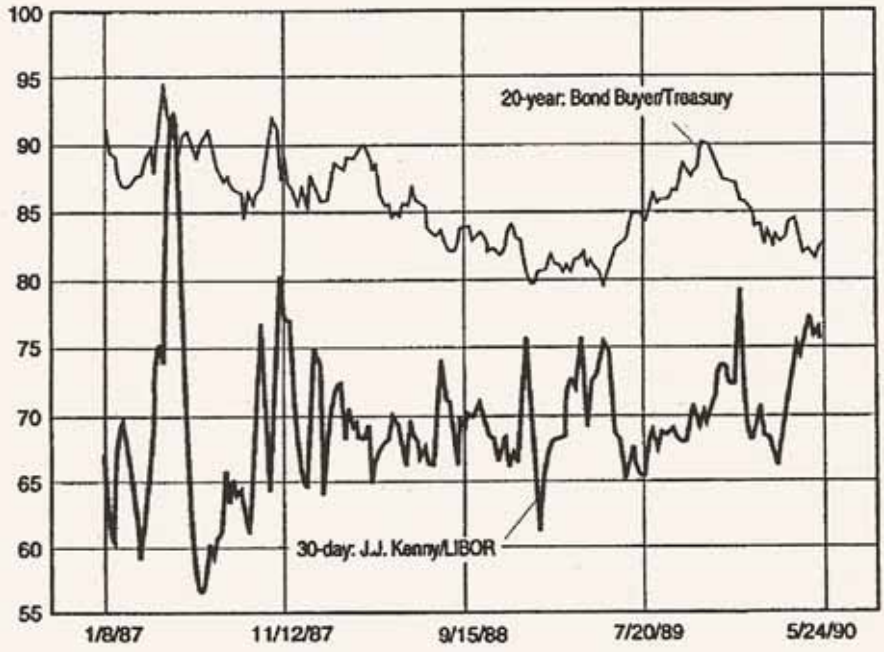
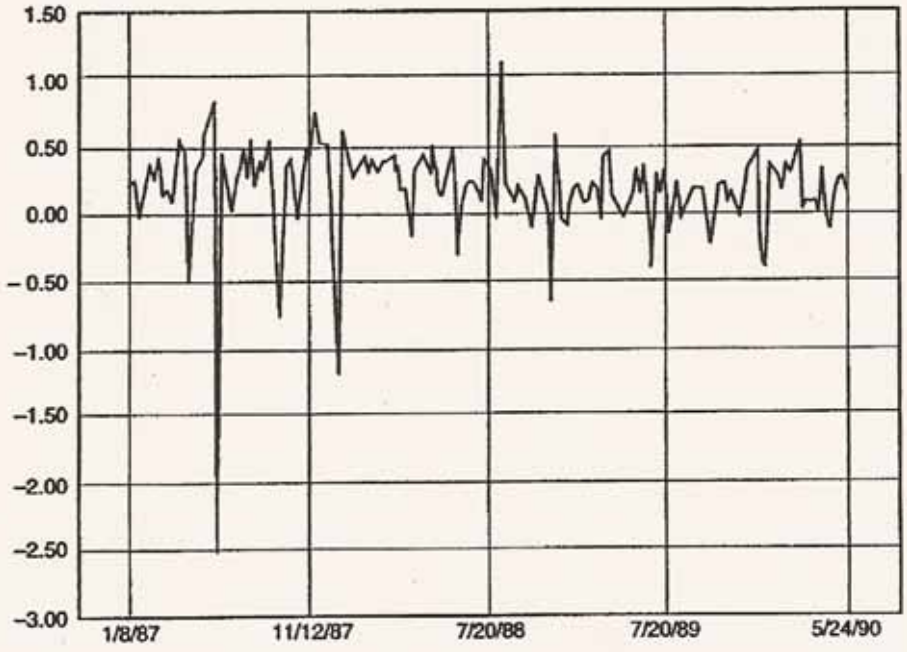
Exhibit 6 SPREAD OF J. J. KENNY (30 DAY) OVER TENR (7 DAY)