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Market Knowledge in Managed Municipal Bond Portfolios

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In this paper, we analyze the investment performance of two types of open-end municipal bond mutual funds: first, mutual funds that have the objective of generating income free from federal income taxes; second, funds that have the objective of generating income free from not only federal but also a particular state's income taxes. Our results suggest the following: first, municipal bond fund monthly returns either mirror or lag the Lehman Brothers Municipal Bond Index returns on a risk-adjusted basis; second, when state taxes are significant, such as in California and New York, the investor benefits from investing in state-specific municipal bond funds.

I. INTRODUCTION

Because of the tax-free nature of their associated coupon payments, municipal bonds are particularly attractive investment vehicles for high-income individuals. In recent years, municipal bond mutual funds have become investment vehicles of choice for municipal bond investors for several reasons. First, due to information inefficiencies, limited trading, and high spreads in the municipal bond market, transferring the monitoring and trading decisions to a full time manager is appealing. Second, even for relatively small dollar investments, such mutual funds offer greater diversification than would be available through investment in individual bonds. And finally, the absence of indexed municipal bond funds points to the supposed superior portfolio management skills and consequent higher returns implicitly promised by the managers of these funds.

Considerable research has been directed towards the study of managed stock portfolios (see Shukla and Trzcinka (1992)). Despite the extensive investment in managed bond portfolios (estimated at $684 billion of the total $2.16 trillion invested in mutual funds as of the end of 1994), scant attention has been paid to the study of bond mutual funds. In this paper, we examine the performance of three categories of open-end municipal bond funds.

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We analyze the benefits of buying into a municipal bond mutual fund *vis-á-vis* a self-directed or unmanaged portfolio of municipal bonds or an index portfolio. Based on the results, we find, as with many equity fund studies, strong support in favor of indexing. As a group, all types of municipal bond mutual funds examined in this study are unable to outperform the index on a risk-adjusted basis.

Following this introduction, Section II provides a Review of the Literature. In Section III, the Data and Methodology of the study are discussed. In Section IV, the Empirical Results are provided. Finally, in Section V, a Summary and Implications of the findings are presented and concluding remarks are made.

II. REVIEW OF THE LITERATURE

Although most municipal bond coupon payments are free from federal income taxes, to be free from a particular state's income tax requires that such bonds meet pre-defined criteria. This requirement assumes special significance in states where such taxes are particularly punitive, such as New York, Oregon, and California. Over the past several years, a substantial market for bonds that are free from both federal and state income taxes has developed. In an effort to appeal to this segment of the market, investment companies sponsor funds whose objective is to generate income free from both federal and state taxes, for example, the California Municipal Bond Fund. The tremendous popularity of state municipal bond funds is evidenced by the fact that at the end of 1994 there were 703 such funds compared to only 258 at the end of 1989 (Mutual Fund Fact Book, 1995).

In a study of bond mutual funds, Gudikunst and McCarthy (1992) find that bond mutual fund performance closely mirrors that of stock mutual funds; i.e., after adjustment for fees and expenses, the performance of bond mutual funds closely matches that of the index on a risk-adjusted basis. They further observe that fund size, yield spreads, and asset growth of the funds affect excess returns. Blake, Elton, and Gruber (1993) find that bond funds under-perform relevant indexes. Fund expenses are also found to be inversely related to fund performance. After accounting for survivorship bias they find some evidence of persistence of performance.

One of the two popular approaches to active bond portfolio management involves the forecasting of interest rates. The second requires a manager to identify bonds that s/he considers mispriced and to build a portfolio of such bonds. Eventually managers with superior selectivity should be able to outperform, on a risk-adjusted basis, a passive index or a group of peers. This ability to identify mispriced bonds can have two possible sources: the superior analytical skills of the fund manager, and the acquisition of superior information regarding the issue/issuer.

Many qualitative issues, especially those relating to the dissemination and analysis of financial information, are unique to the municipal bond market. For example, issues such as the timeliness with which information is reported by municipalities, factors that influence rating changes in the municipal bond market, and influences of geographic market segmentation on the cost of municipal borrowing have been the subject of previous research.

Dwyer and Wilson (1989) found that the timeliness of municipal reporting is influenced by incentives for management signaling and is related to the nature of the report

message; that is, good news or bad news. The assessment of the value of a municipal bond is further complicated by the role of the political underpinnings of the issuer and socio-economic influences. Ingram, Raman, and Wilson (1989) suggest that bond prices may not be free from the unobserved political and economic factors which influence the accounting numbers of municipal issuers. Such variables not only have to be assessed initially, but must also be continuously monitored by the manager, a task made difficult by the information issues previously discussed.

Benson, Marks, and Raman (1991) find differential levels of compliance with GAAP, and the degree of compliance, to have a significant impact on net interest cost, because municipal bond issuers are not subject to the Securities & Exchange Commission (SEC) requirement of compliance with generally accepted accounting principles (GAAP). The SEC, in an effort to improve the quality of information in the municipal bond market, adopted Rule 15c2-12 in June 1989. The rule requires greater and more accurate disclosure on the part of dealers and underwriters of new municipal bond issues. Through this rule, the SEC also imposed the responsibility of "reasonable basis of belief" upon dealers and underwriters in key representations made in the disclosure statements. Despite the rule, in a 1993 article in the Government Finance Review, Arthur Levitt, the Chairman of the SEC, expressed his concern over "abusive practices" in the municipal securities market. He remarked that more information regarding the issuers, transactions, and the market was essential to the reform of the municipal bond market.

Bond portfolio managers who attempt to identify undervalued bonds often focus their analyses on the default risk associated with a bond. The principal intent of such managers is to identify in advance bonds whose real default risk is lower than is widely agreed upon in the marketplace. Some indication regarding the default risk associated with a municipal bond issue can be inferred from its rating. The pricing of municipal bonds is further complicated by the impact of split ratings on yields and investor anticipation of rating changes, both of which have been the subject of much discussion. Moreover, many municipal bond issues are not rated at all. Reeve and Hartwell (1988), in a study of non-rated municipal bonds, find non-rated bonds do not necessarily indicate poor or high credit risk. Additional variables must be considered, such as the size of the municipality issuing these bonds, along with the decision of the municipality to rate or not to rate.

In a study of municipal bond rating changes, Lewis, Patton, and Green (1988) demonstrate uniformity in terms of statistical models and humans in their ability to predict bond rating changes. Marquette and Wilson (1992), in a study of rating decisions of seasoned municipal bond issues, show that rating decisions that can be predicted from publicly available information can be anticipated two years in advance. Interestingly, however, they find that changes that are not predictable from publicly available information cannot be anticipated by the market. Eshan and Wilson (1992) find a geographical (regional versus national) segmentation influence on the interest costs of primary issues of municipal bonds and financial disclosure by the municipalities.

In this paper, we examine the performance of the following three categories of managed municipal bond funds: (1) open-end mutual funds whose objective is to generate income free from federal income taxes, referred to as "National funds"; (2) similar funds whose objective is to generate income free from both federal and New York state income taxes, referred to as "New York funds"; and (3) similar funds whose objective is to generate income free from federal and California state income taxes, referred to as "California funds." We examine the benefits of buying into a municipal bond mutual fund *vis-á-vis* a

self-directed or an unmanaged portfolio of municipal bonds or an index portfolio. We also compare the performance of state-specific mutual funds to funds that are managed with the objective of generating income that is free from federal income taxes only.

III. DATA AND METHODOLOGY

The total returns and traditional risk-adjusted returns generated by the previously mentioned groups of funds are analyzed. The monthly return on the Lehman Brothers Municipal Bond Index (LBMBI or "the Index") is used as a proxy for market return. Comparisons of performance are also conducted between National and New York funds and National and California funds. The total returns of the Index are used as a benchmark. Based on comparative performance, we attempt to identify the return premium, if any, to state municipal bond fund investors. An additional analysis based on excess return per unit of total risk is also utilized. This methodology is free from the bias in results that might be caused by the choice of an inappropriate benchmark.

A) Risk Adjustment

The proper measure of a bond portfolio's risk is a subject of debate. While a convincing argument can be made to regard a bond portfolio's duration as a measure of its risk, duration-based risk measurement methodologies are not without their shortcomings. Simple duration-based measures are computed on the assumption of parallel shifts in the yield curve and are a time-decaying measure of risk. Moreover, the utility of duration as a measure of risk is further compromised if the portfolio of bonds has a significant exposure to non-option-free bonds. Ilmanen (1992) shows that in the 1980s, duration explained 80 to 90 percent of the cross-sectional variation in government bond returns. However, for corporate bonds, Ilmanen, McGuire, and Warga (1994) find that duration is an incomplete measure of risk and its utility declines as the credit quality of the bond declines.

The other popular measure of the risk of a portfolio is derived from regression-based index models. Here, the risk of a portfolio is measured by beta. With regard to bond portfolio management, this methodology also has weaknesses. Aside from the traditional criticisms of estimation errors and appropriateness of benchmarks, any sampling of time series data assumes that the sample period is representative of the norm. Furthermore, index model-based performance evaluation measures assume stationary returns, stationary portfolio return variance, and stationary portfolio composition.

In this study, we opted for the use of the index model and the widely-used statistics of Sharpe's Measure, Treynor's Measure, and Jensen's Alpha for use as risk-adjusted performance measures for three primary reasons:

1. The performance of mutual funds, especially in the popular press, is almost always judged against an index (e.g. the EAFE or S&P 500).
2. Bonds often form only part of the total investment wealth of an individual. The performance of other asset classes, stocks for instance, is judged relative to a benchmark index and it would be confusing to the individual investor to use a duration-based measure which is unrelated to the measure of risk of other asset classes. Moreover, duration is a difficult concept for the individual investor to comprehend.

3. Many other papers on bond portfolio performance evaluation, Gudikunst and McCarthy (1992) and Blake, Elton, and Gruber (1993), for example, have used index based models in determining the risk of the portfolio. By using the index model we hope to add to this body of knowledge.

One of the criticisms advanced in the evaluation of risk-adjusted returns of a managed portfolio relative to an index is that the index is usually uninvestible and does not reflect passive management costs. To address this issue we reduced the monthly return on the unmanaged Index by 20 basis points per year (see Sharmin Mossavar-Rahmani (1987)) to reflect a uniform management fee for the Index. When comparing the performance of state-specific mutual funds to the LBMBI, the return on the Index was further reduced by the highest prevailing marginal income tax rate for the year in question in the state. The monthly return on the LBMBI was first reduced by 20 basis points when using it as a benchmark for National funds (LBMBI ADJ). It was then reduced by 20 basis points *plus* the highest marginal income tax rate for the state in that particular calendar year (LBMBI ADJ1 & LBMBI ADJ2). The income tax rate used for analyzing California funds was 11%; for New York funds, it ranged from a high of 8% for 1988 to a low of 7.5% for 1995.

In performance measurement studies, an inappropriate benchmark choice likely distorts results and conclusions (see Lehman and Modest [1987] and Grinblatt and Titman [1989, 1993]). To test the validity of our benchmark-based, risk-adjusted performance measures and results, we conducted non-parametric, benchmark-independent, tests of performance comparison. We used chi-square tests of independence to evaluate the number of funds having a Sharpe's Measure greater than the median of the mixed sample.

B) Sample Selection

The Morningstar Mutual Funds OnDisc Database of July 1995 was the source for total monthly returns. We selected mutual funds which had the objective of investing in bonds whose coupon payments were free from federal income taxes and State of California and New York State income taxes, respectively, and that were in existence on January 1, 1988. This gave us a sample of 153 National, 36 New York, and 42 California funds. From the preceding sample, funds with available returns for all ninety months for the period from January, 1988 to June, 1995 were selected. This provided a sample of 152 National, 36 New York, and 42 California funds. Only one mutual fund (Mackenzie Limited Term Municipal A) was lost to attrition. The sample is, therefore, relatively free from survivorship bias for the period of the study.

Monthly returns on 90-day U.S. Treasury Bills were obtained from Ibbotson Associates, and monthly returns on the LBMBI were provided by the Lehman Brothers Fixed Income Research Department. The LBMBI consists of approximately 25,000 municipal bond issues with a market value totaling $400 billion. Inclusion in the Index requires an issue to have a credit rating of Baa3 or better, an outstanding par value of at least $3 million, and the issue must have been part of a deal of at least $50 million. The bonds must also have been issued within the past five years and must have at least one year remaining until maturity. The Index includes general obligation, revenue, insured, and pre-funded bonds; the Index excludes bonds subject to alternative minimum tax, taxable municipal bonds, and bonds with floating or zero coupons. Statistics on the Index are calculated at mid-month and at each month-end (A Guide to the Lehman Brothers Family of Fixed Income Indices,

1994). We know of no indexed municipal bond mutual fund currently available to individual investors. Cross-sectional data for the chi-square tests of independence were obtained from the Morningstar Mutual Funds OnDisc Database of July 1995.

IV. EMPIRICAL RESULTS

A) Descriptive Statistics and Total Returns

Demographic, total return information, and other descriptive statistics on the LBMBI and the three sets of mutual funds appear in Table 1. As the table shows, all groups of funds have mean monthly returns lower than that of the Index, while both New York and California funds have a higher total risk, as measured by the standard deviation of their monthly returns. A majority of funds in each group carried greater total risk than that of the Index, while only a small percentage provided a comparatively greater return as compensation.

B) Risk-Adjusted Performance

Using the 90 monthly returns for each fund and the monthly return on the 90-day U.S. Treasury Bill, three risk-adjusted measures of performance were calculated. The total monthly returns on the portfolio were used to calculate the standard deviation used in

TABLE 1
Fund Demographics amd Returns (Total and Risk Adjusted)
(All returns are based on monthly observations)

	LBMBI	*NATIONAL*	*NEW YORK*	*CALIFORNIA*
Number of Funds		152	36	42
Mean Fund Size ($ Millions)		756.08	507.39	723.20
Average Maturity (Years)		16.06	18.63	19.16
Mean Expense Ratio		0.84%	0.86%	0.82%
Average Manager Tenure (Years)		6.93	7.08	6.57
Mean Return	0.70%	0.64%*	0.66%*	0.66%*
Std. Deviation of Returns (Mean)	1.35%	1.34%	1.55%	1.59%
Funds with Average Return > Mean LBMBI Ret		33 (21.71%)	5 (13.89%)	6 (14.28%)
Funds with Std. Dev. > Std. Dev. of LBMBI		85 (55.92%)	31 (86.11%)	37 (88.09%)
Mean Sharpe's Ratio	0.18	0.13**	0.14**	0.13**
Std. Deviation of Sharpe's Ratio		0.06	0.03	0.02
Mean Treynor's Ratio	0.25%	0.19%	0.19%	0.19%
Std. Deviation of Treynor's Ratio		0.10	0.05	0.04
Funds with Sharpe's Ratio > LBMBI		20 (13.16%)	2 (5.55%)	2 (4.76%)
Funds with Treynor's Ratio > LBMBI		26 (17.10%)	3 (8.33%)	3 (7.14%)
Mean Alpha		–0.04%***	–0.06%***	–0.07%***
Std. Deviation of Alpha		0.05	0.05	0.05
Mean Beta		0.94	1.09	1.12
Std. Deviation of Beta		27%	13%	18%
Average R^2		89.46%	91.09%	91.38%

Note: * Significantly different from mean LBMBI return ($\alpha = .05$, two tailed test). ** Significantly different from mean LBMBI Sharpe's Ratio ($\alpha = .05$, two tailed test). *** H_0: $\alpha \geq 0$ rejected at 5% level of significance, conclude $\alpha < 0$

deriving Sharpe's Measure. The ninety monthly excess returns of all mutual funds were then regressed individually against the monthly excess return on the Index. Summary statistics are presented in Table 1.

All groups of funds had a Sharpe's ratio significantly different from the mean Sharpe's Ratio of the LBMBI ($\alpha = .05$, two-tailed test). A majority of the funds had a return per unit of total risk lower than that of the Index. Using Treynor's Ratio as a measure of return per unit of systematic risk, it was again found that, as a group, the funds were unable to generate excess returns per unit of systematic risk superior to that of the Index. Based on the 90-month beta, alphas were calculated for each fund. For each set of funds the hypothesis that $\alpha \geq 0$ was tested. The evidence was overwhelmingly against managed portfolios. For all funds the preceding hypothesis was rejected at a 5% significance level, indicating negative alphas for all groups of funds. Stated alternatively, most funds had returns below the level that would be justified by the market risk of their portfolios.

C) Comparative Performance

In order to determine the total and risk-adjusted return benefits to state-specific mutual fund investors, a performance comparison between national and state-specific funds was then conducted. On a pre-tax basis, the total return and the related standard deviation of New York funds were significantly different from National funds. For California funds, the total return was not statistically different from National funds at a 5% level. Results of these tests appear in Table 2.

National funds had a systematic risk different from the New York funds. In relation to risk-adjusted performance measures at a 5% level, for the three risk-adjusted measures examined, the difference was not statistically significant. The difference in the systematic risk between the National and California funds, as measured by beta, was statistically significant. For risk-adjusted performance measures, the difference was statistically significant for Jensen's Alpha only.

TABLE 2
Comparative Statistics
(All returns are based on monthly observations)

	Total Return	*Standard Deviation*	*Sharpe's Ratio*	*Treynor's Ratio*	*Jensen's Alpha*	*Beta*
Mean (NATIONAL - NEW YORK)	–0.022%	–0.216%	–0.003	–0.005%	0.028%	–0.15
Standard Error (NATIONAL - NEW YORK)	0.011%	0.043%	0.007	0.011%	0.010%	0.03
t-statistic (NATIONAL - NEW YORK)	–2.00*	–4.99*	–0.46	–0.46	1.65	–4.94*
Mean (NATIONAL - CALIFORNIA)	–0.017%	–0.245%	0.003	0.003%	0.028%	–0.18
Standard Error (NATIONAL - CALIFORNIA)	0.010%	0.048%	0.006	0.017%	0.009%	0.035
t-statistic (NATIONAL - CALIFORNIA)	–1.74	–5.05*	0.41	0.19	3.21*	–5.126*

Note: * significant at the level of 0.05, two tailed test.

Although the systematic risk of the state-specific funds was higher than that of the National funds, the investors were compensated through higher returns. We found no difference between the funds in the risk-adjusted measures of Sharpe's Measure and Treynor's Measure, and we found the Jensen's Alpha of state-specific funds to be the same as, or higher than, that of National funds. It can therefore be concluded that if the holders of a National fund must pay a certain portion of their return in state taxes, thereby reducing the average return, it will be beneficial to invest in state-specific mutual funds rather than mutual funds subject to state income taxes. It is also be possible that state-specific funds may be subject to greater non-systematic risk such as budgetary problems of a particular state, but at this stage we do not find any statistical evidence to support this hypothesis. We would also like to point out that our sample of state-specific municipal bond mutual funds included funds relating to New York and California only. Although these funds comprise a major portion of the state-specific municipal bond fund market, the results should be interpreted with this fact in mind.

D) Benchmark Independent Performance Comparison

The choice of an inappropriate benchmark might distort conclusions regarding risk-adjusted performance measures. To verify the results obtained in the earlier sections, the hypothesis of independence of Sharpe's Measure and fund type of the two samples was tested using the chi-square test of expected frequencies. This test is independent of benchmark influence.

In the case of New York and National funds, the hypothesis of independence of fund objectives and Sharpe's Measure could not be rejected. In the case of California and National funds, the hypothesis of independence of fund objectives and Sharpe's Measure was rejected at a 5% level of significance. The implication is that a fund's Sharpe's Measure is dependent upon fund type, i.e., National or California funds.

E) Performance Comparison (Adjusted LBMBI)

When analyzing performance of the state-specific mutual funds, the monthly returns of the Index were adjusted downward to reflect the cost of indexing and the effect of the highest tax rate on the returns. Total return and risk-adjusted performance measures after reducing the Index returns for management fees and income taxes appear in Table 3. The results reinforce the case for indexing. With the exception of California funds, other groups of funds were unable to generate statistically significant superior risk-adjusted returns. This is particularly compelling considering the reduction in Index returns to reflect the costs of indexing and state income taxes. When compared to a management-fee-adjusted index, National funds as a group were unable to generate superior post-fee, risk-adjusted returns. The National funds had a lower systematic risk but had a significantly lower Treynor's Measure than the Index and a mean Jensen's Alpha less than zero.

New York funds had a higher systematic risk but no risk-adjusted measure was statistically different from those of the Index. California funds as a group had a higher systematic risk than the Index, and the mean Treynor's Measure was higher than that of the Index. California funds as a group indicated a statistically significant non-negative alpha at a five percent significance level.

TABLE 3
Total and Risk-Adjusted Returns
(Benchmark Adjusted for Management Fee and State Taxes)
(All returns are based on monthly observations)

	NATIONAL (LBMBI ADJ)	*NEW YORK (LBMBI ADJ1)*	*CALIFORNIA (LBMBI ADJ2)*
Number of Funds	152	36	42
Mean Return	0.64%*	0.66%*	0.66%*
Std. Deviation of Returns (Mean)	0.0134	0.0155	0.0159
Funds with Average Return > Mean LBMBI Ret	57 (37.50%)	32 (88.89%)	37 (88.07%)
Funds with Std. Dev. > Std. Dev. of LBMBI	87 (57.24%)	35 (97.22%)	38 (90.47%)
Mean Sharpe's Ratio	0.13*	0.14	0.13
Std. Deviation of Sharpe's Ratio	0.06	0.03	0.02
Mean Treynor's Ratio	0.19%*	0.18%	0.17%*
Std. Deviation of Treynor's Ratio	0.097	0.045	0.038
Funds with Sharpe's Ratio > LBMBI	33 (21.71%)	17 (47.22%)	24 (57.14%)
Funds with Treynor's Ratio > LBMBI	48 (31.58%)	20 (55.55%)	31 (73.81%)
Mean Alpha	-0.02%**	0.0055%	0.016%***
Std. Deviation of Alpha	0.05	0.05	0.045
Funds with Alpha > 0	48 (31.58%)	20 (55.55%)	32 (71.11%)
Mean Beta	0.95	1.19	1.26
Std. Deviation of Beta	27%	14.5%	26%
Average R^2	89.45%	91.08%	91.28%

Note: * Significantly different from mean LBMBI measure ($\alpha = .05$, two tailed test). ** H_0: $\alpha \geq 0$ rejected at 5% level of significance, conclude $\alpha < 0$. *** Significantly equal to or greater than 0 ($\alpha = .05$)

F) Fund Variables and Performance

Previous studies of bond funds have shown that fund-specific factors, such as expense ratio and asset growth, influence fund performance. We tested the hypothesis of independence of fund's Sharpe Ratio and average maturity, fund size, expense ratio, manager tenure, and turnover rate, for all three set of funds. The results of the tests for National funds are presented in Table 4 below.

For National funds we were unable to reject the hypothesis of independence of fund performance, as measured by Sharpe's Ratio, and the fund-specific variables of expense ratio, manager tenure and portfolio turnover. In other words, the hypothesis that the Sharpe's Measure was independent of these fund variables could not be rejected at a 5% level of significance. However, for National funds, the hypothesis of independence of the Sharpe's Measure and average maturity and fund's asset size was rejected at a 5% level. In other words, the number of funds in the top 50% of average maturity was disproportionately greater than expected, with the inference that funds with greater average maturity tended to have higher than the median Sharpe Ratio. Similar results were indicated for asset size. Larger funds that invested in municipal bonds nationally tended to have a Sharpe's Ratio higher than the median.

Identical tests were conducted with the same fund-specific variables for New York and California funds. For all the fund-specific variables, namely average maturity, asset size, expense ratio, manager tenure, and turnover, the hypothesis of the independence of those variables and Sharpe's Measure could not be rejected for all the fund specific variables at

TABLE 4
Contingency Table for National Funds
(Independence of Fund Variables and Performance)

	Funds with Sharpe's Measure		
	> = Median	*< = Median*	*Total*
Average Maturity			
Top 50%	45	31	76
Bottom 50%	31	45	76
TOTAL	76	76	152
Chi Square = 5.51789*			
Asset Size			
Top 50%	48	28	76
Bottom 50%	28	48	76
TOTAL	76	76	152
Chi Square = 10.5263*			
Expense Ratio			
Top 50%	35	41	76
Bottom 50%	41	35	76
TOTAL	76	76	152
Chi Square = 0.9473			
Manager Tenure			
Top 50%	42	34	76
Bottom 50%	34	42	76
TOTAL	76	76	152
Chi Square = 1.6842			
Turn Over			
Top 50%	44	32	76
Bottom 50%	32	44	76
TOTAL	76	76	152
Chi Square = 3.7895			

Note: (Critical Value at $\alpha = .05$ and 1 degree of freedom is 3.841).

a five percent significance. That is, the Sharpe's Measure was independent of these specific fund variables for both groups of funds.

V. SUMMARY AND CONCLUSIONS

As concluded in earlier studies (Gudikunst and McCarthy [1992]; and Blake, Elton and Gruber [1993]) of other types of bond funds, municipal bond fund returns either mirror or lag municipal bond index returns on a risk-adjusted basis. This study provides further support in favor of indexing. Mutual fund companies may find the idea of offering indexed municipal bond funds worth pursuing. From an individual investor's point of view, performance across actively managed municipal bond funds is similar. For an investor with no forecasting capabilities, if an opportunity to invest in an indexed municipal bond fund becomes available, such a fund should be the investor's first choice. S/he can expect performance that will match or surpass the returns of actively managed municipal bond portfolios on a risk-adjusted basis.

When state income taxes are considered significant, for example, in states like New York and California, it is beneficial for the individual investor to buy into state-specific municipal bond funds. We find that the total risk of state specific mutual funds for New York and California is consistently higher than that of the National funds. The owners of state specific municipal bond funds are subject to higher systematic (market) risk, though it is accompanied by a higher excess return. We further find that National funds are unable to overcome the return disadvantage created by the imposition of state income taxes. Thus, when the choice for the investor is to invest in one of the two sets of funds, it is beneficial, on a risk-adjusted basis, for the investor to allocate his or her investments to funds that are free from both federal and the investor's state income tax. The preceding assertion can only be made, however, for residents of California and New York, since our sample of state-specific bond funds includes mutual funds pertaining to these states only.

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