Managerial Performance and the Cross-Sectional Pricing of Closed-End Funds

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Abstract

This paper finds that discounts and premiums of closed-end funds reflect the market's assessment of anticipated managerial performance. Using single and multiple benchmarks, we present evidence that there is a significant and positive relation between stock fund premiums and future net asset value performance over the following year. The relation is not caused by the anticipation of future expenses. The conclusions are the same if a measure of noise-trading (or the "investor sentiment index") is subtracted from a fund's discount/premium. We also find that bond closed-end funds show no such relation between premium and net asset value performance.

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1. Introduction

The evidence that past performance of open-end mutual funds is predictive of future performance is well documented in the finance literature (see, for example, Carhart, 1997, and the references therein). Although this literature provides insights about the existence of skilled or informed mutual fund portfolio managers, it does not tell us how the anticipated future performance is priced in the market. The latter question cannot be answered by examining share price data on open-end mutual funds since by law these funds sell at net asset value (NAV) and thus leave no room to observe how investors price the expected performance of fund managers.

The purpose of this paper is to investigate how expected future performance of fund managers is priced in the market by utilizing closed-end fund data. Like an open-end mutual fund, a closed-end fund is a professionally managed portfolio whose assets are publicly traded securities. While the price of an open-end fund is always equal to its NAV, the share price of a closed-end fund is determined in the stock market and it can differ from the fund's NAV per share. Empirical studies show that the average fund share price is less than the NAV per share, resulting in a 'discount' (or a 'negative premium').[1] This observed discrepancy between the price of a closed-end fund's shares and the value of its portfolio provides a unique opportunity to examine the extent to which the market anticipates and prices expected performance of fund managers.

Specifically, we test the hypothesis that the closed-end fund premium reflects the market's assessment of future expected performance of the fund managers (Boudreaux, 1973; Malkiel, 1977). Since closed-end funds are under active management that ostensibly provides investors with professional portfolio management services, we conjecture that investors will

[1] For an extensive review of the literature on closed-end fund discounts, see Kraakman (1988) or Rozeff (1991).

rationally evaluate future managerial performance at each point in time. The hypothesis implies that the cross-sectional variation in discount and premium reflects differential net management performance (after subtracting expenses from the gross performance) among funds in the future.

With some mixed evidence, the conclusion of early empirical research is that there is no significant relation between fund premiums and funds' managerial performance (Malkiel, 1977).[2] These studies used past or current performance as a proxy for the market's expectation about the future management performance. As pointed out by Lee, Shleifer and Thaler (1991), if rational expectations are assumed, an appropriate test of the management performance hypothesis is to examine the relation between discounts and future performance, not past or current performance. Using a comprehensive sample of stock and bond funds, we extend this literature by employing various risk-adjusted performance measures in a time-series of cross-sectional regressions that relates future NAV performance to current fund premium.

Based on monthly NAV return data for 94 closed-end stock funds for the period from 1966 to 1993, we find there is a significant and positive relation between a stock fund's current premium and its future NAV performance, especially in the following year. The relation becomes weaker for NAV performance further into the future and no significant relation is found for performance more than two years away. This suggests that the predictability is short term in nature, being concentrated mostly on NAV performance during the next year. We estimate that a 10% increase in premium, *ceteris paribus*, anticipates excess returns ranging from 1.8% to 2.4% per year. We also find that the ability of stock fund premiums to predict NAV performance is not caused by the anticipation of expenses. The results are not sensitive to the choice of benchmarks. Nor are they sensitive to an adjustment for a measure of 'noise trading'. The results are

[2] While Roenfeldt and Tuttle (1973) and Boudreaux (1973) find some weak evidence of positive relation between fund NAV performance and premiums, Malkiel (1977) does not find any significant relation. These studies are either sign tests [performance of discounted funds vs. premium funds (Roenfeldt and Tuttle, 1973)] or cross-sectional tests where year-end discounts (or time averaged discount based on annual observations) are regressed against various fund characteristics including past (or concurrent) managerial performance (Boudreaux, 1973; Malkiel, 1977).

consistent with the hypothesis that investors use the expected future performance of a stock fund in setting the discount or premium.

Our finding of a positive relation between premium and future NAV performance is at odds with the findings of recent studies by Lee et al. (1991) and Pontiff (1995) that document an insignificant or negative relation between premium and NAV return. We find that the main difference in results is attributable to the inclusion of bond funds in the analysis of premium-performance relation. By using a 22 closed-end bond fund sample for the period from 1974 to 1990, we find that there is no significant relation between current premiums of bond funds and future NAV performances. This finding is neither sensitive to benchmarks nor to the adjustments for investor sentiment and potential nonsynchronous trading of the fund's shares and its assets. Our results suggest that there exists a difference between stock funds and bond funds in the way the market assesses expected performance in determining a premium/discount.

The structure of this paper is as follows. Section 2 reviews the net managerial performance hypothesis and discusses implications of this hypothesis. Section 3 describes the data and presents summary statistics. Section 4 describes performance measures employed. Sections 5 and 6 provide evidence regarding the relation between fund premium and future managerial performance for stock funds and bond funds, respectively. Section 7 concludes the paper.

2. The managerial performance hypothesis

Under the managerial performance hypothesis, discounts are attributed to investors' rational expectation of the inferior investment skills of fund managers or to the agency costs resulting from managers' expropriation of fund assets (Boudreaux, 1973; Barclay, Holderness and Pontiff, 1993). This assumes that investors obtain sufficient information to form expectations regarding both the future investment decisions of the manager and the future expenses charged by management. We hypothesize that this information is used to set the discount or premium of a closed-end fund. Management fees in excess of the value of the services provided by the management will increase the discount, and inferior performance of the underlying portfolio also increases the discount. Conversely, superior performance will result in premiums.

It is worth noting that the expense ratio of a fund accounts for only part of the fee charged. Brokerage commissions are not included in the expense ratio and are added to the price of securities. Thus, higher commissions decrease the return of the securities. Commissions typically include "softdollars" that pay for much more than transactions services. According to Johnsen (1994), "In a typical softdollar arrangement the broker agrees to prepay the manager's research expenses in proportion to the future brokerage commissions the manager promises to pay the broker." Johnsen observes that fund beneficiaries (shareholders) face a collective action problem in monitoring their managers. Since the gains from monitoring are shared equally by all fund beneficiaries, no individual beneficiary has sufficient incentive to monitor the brokerage arrangements.[3]

Operationally, net managerial performance over a given period is defined as the gross abnormal performance resulting from the investment decisions of management minus all expenses incurred by management and other outflows not accruing to the shareholders of the fund. The gross abnormal performance of fund managers is defined as the total return on assets held by the fund in excess of the risk-adjusted market rate of return, before subtracting all outflows such as transaction costs, fees, and expenses. We define a "premium" as *ln(MV/NAV)* where MV is the market value of the fund's shares and NAV is the net asset value of the fund. A positive premium indicates that the market value of the fund's shares is higher than the net asset value of the fund. Therefore, a

[3] We take no position on Johnsen's theoretical argument that softdollars are a method of efficiently securing the property rights to research. We simply observe that the softdollar arrangement gives management a vehicle to charge fees that will not affect the expense ratio. Softdollar expenses can be quite large. For example, the CREF retirement fund's prospectus discloses that softdollar expenses *can* be as large as 90 basis points compared to the 34 basis point expense ratio of the equity fund.

discount is defined as a "negative premium." Given these definitions, the hypothesis tested in this paper is:

> *The market price of a closed-end fund's shares reflects investors' expectations of the fund's net managerial performance in the future as well as the current NAV of the fund. Thus there is a positive relation between the premium of a fund and its future NAV performance.*

Under this managerial performance hypothesis, managers of closed-end funds with discounts are expected to exhibit inferior gross performance in the future or to charge excessive expenses that are not justified by their gross performance. Similarly, the management of a fund with a premium is expected to accomplish superior net performance in the future.

The managerial performance hypothesis can explain occasional premiums observed for country funds if the net performance of the management is expected to be positive relative to a benchmark used by the uninformed domestic investor. The source of positive net performance may be the improved risk-return characteristics through extended diversification which the investor cannot obtain because of transactions costs or the potential reaping of abnormal returns by investing in undervalued securities traded in the informationally inefficient foreign markets.[4]

3. Data

Our sample consists of two different types of funds: stock and bond funds. To examine whether the results are sensitive to fund type, we perform our analyses separately for each type.

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[4] The managerial performance hypothesis does not explain why closed-end funds get started in the first place or why investors pay a premium for new closed-end funds when existing closed-end funds sell at a discount. If future performance of closed-end funds is rationally priced by the market, then the premium should reflect the market's expectations that the performance will be superior. But if the subsequent discount reflects an inferior future performance, the market seems to be making biased forecasts at the initial public offering. The investor sentiment hypothesis of the formation of closed-end funds (Lee et al., 1991) appears to be the only plausible explanation for the initial public offering.

3.1. Stock funds

A total of 94 closed-end stock funds are included in the sample based on the following criteria: (1) the fund's NAV should be reported in either the *Wall Street Journal* or *Barron's*[5]; (2) the fund should be listed either on the New York Stock Exchange (NYSE) or on the American Stock Exchange (AMEX); (3) the fund should not hold any restricted securities; and (4) the fund should have at least 36 monthly observations of net asset value during the sample period from July 1965 through December 1993. The sample of stock funds is listed in Appendix 1. For the period from 1965 to 1989, we collected the weekly NAV per share, stock price, and discount per share as reported by the *Wall Street Journal*. For the period from 1990 to 1993, we use NAV per share supplied by the *Investment Company Institute (ICI)*.[6] Friday closing prices, NAVs, and premiums are reported weekly, generally on Mondays, in the *Wall Street Journal*. The ICI data are also reported weekly. To convert the weekly data into a monthly series, we adopted the convention used by Lee et al. (1991) and selected the Friday closest to each month-end. Thus, each observation in a monthly data series is within three days of the last day of the month. In the case of missing observations, the next closest Friday's closing quotes were used to construct the monthly series.[7] Data on income dividends, capital gains distributions and stock splits were obtained from Moody's *Annual Dividend Record*, *Morningstar Closed-End Fund Reports* and the daily master tapes of the Center for Research of Security Prices (CRSP).

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[5] ASA Ltd., a fund that specializes in the stocks of gold mining companies in South Africa, is excluded from the sample because the NAVs reported by the Wall Street Journal were calculated based on the government controlled exchange rate of the South Africa rather than the actual exchange rate.

[6] We thank the ICI for making these data available. During this period the ICI supplied NAV data on equity funds to the financial press. Occasionally, a fund would misreport its NAV and then inform the ICI of the mistake subsequent to the publication of the incorrect NAV. The ICI revised its data every time a fund reported an error. We used this revised data since it is more accurate than the NAVs reported in the *Wall Street Journal*.

[7] Occasional inaccuracies in the Wall Street Journal figures were corrected through appeal to numbers reported in adjacent weeks and through the stock prices retrieved from the CRSP Daily Master tape. We spot checked the ICI data with data from *Bloomberg Financial Services*. For the 1965 to 1989 subset of our data, Richard Sias made available his data on equity funds (used in Sias, Starks and Tinic, 1995) and we compared the two data sets, correcting the few discrepancies using data from the *Wall Street Journal* and *Bloomberg Financial Services*. We thank Richard Sias for making his data available and A.G. Edwards for making a *Bloomberg* terminal available.

Descriptive statistics for the premiums are given in Table 1. The premium is computed as *ln(MV/NAV)*, where MV is the market value (share price) and NAV is the per share net asset value of the fund. A negative premium indicates a discount. Panel A of Table 1 shows that the stock funds on average are selling at discounts from their NAV with the cross-sectional average discount of 8.61% over the 29-year sample period. Table 1 also reveals considerable variation in the size of the mean premium across funds. Cross-sectional standard deviation of mean premium reaches 10.39%. An equally weighted portfolio of all the stock funds in the sample is constructed to examine the time series behavior of premium. This time-series spanned 343 months (June 1965 to December 1993). The actual number of funds included in computing premiums for the equally weighted portfolio varied from month to month. The equally weighted portfolio of all stock funds has monthly memberships ranging from 12 funds to 76 funds. The time-series average discount of the portfolio of all stock funds is 12.90% over the sample period. The standard deviation of time-series discounts of the equally weighted portfolio of all funds amounts to 8.73%, indicating a wide variation of discounts over time. When we weight each observation by total assets of the fund at the end of each month the average is 11.74% with a standard deviation of 9.30%. The picture that emerges from Panel A of Table 1 is that the stock funds on average are selling at a discount from NAV and that there exists considerable variation of discounts across funds and over time.

3.2. Bond funds

Our bond fund sample consists of 22 closed-end bond funds with monthly data from December 1973 to December 1990.[8] This is the sample of bond funds used by Sias, Starks, and Tinic (1995) except that we excluded convertible bond funds and the funds traded in the over-the-counter market. Convertible funds were eliminated because the convertible bonds in the funds'

[8] We thank Richard Sias for kindly providing us with the data.

portfolios are a combination of both equity and bond securities and, according to *Morningstar,* some of these convertible bonds are illiquid, privately placed securities.[9]

Panel B of Table 1 shows summary statistics on the bond funds' premiums. The mean of the cross-sectional averages of bond fund premiums is -4.18%, which is less than half the corresponding statistic of -8.61% for stock funds as reported in Panel A of Table 1. This is also true of the median premiums. The time-series average of premiums for an equally weighted portfolio of bond funds is -4.11%, which is less than one third the mean of -12.90% for stock funds. Again median premiums for the bond fund portfolio are about one-third those of the stock fund portfolio. The mean and median of the value-weighted portfolio of bond funds are about one-third those of the value-weighted portfolio of stock funds. Both cross-sectional and time-series standard deviations of bond fund premiums are substantially lower than those of stock funds. In summary, bond funds on average tend to sell at a narrower discount than stock funds, and the premiums on bond funds are much less volatile than those on stock funds.

4. Measures of NAV performance

We use three different expected return models that are commonly employed in the literature to estimate mutual fund performance: the unconditional CAPM (e.g., Jensen, 1968), the APT (e.g., Lehmann and Modest, 1987), and the conditional CAPM (e.g., Ferson and Schadt, 1996). We also report results using raw returns on the funds' NAVs as a performance measure without any risk-adjustment.

4.1. The unconditional CAPM alpha

[9] In 1994 approximately 18% of the convertible funds' assets were in non-rated bonds. However, the results do not materially change with the inclusion of the convertible bond funds.

The alpha measure using the unconditional CAPM is the intercept from the regression of the fund's NAV return in excess of the risk-free return on the benchmark's return in excess of the risk-free return. The benchmark used to proxy for the market portfolio is the monthly rebalanced equally weighted portfolio of the CRSP New York Stock Exchange (NYSE) and American Stock Exchange (AMEX) stocks.[10] For bond funds, we also use the Lehman Brothers government/corporate bond index as a benchmark. This index is a market value-weighted index of government and investment-grade corporate issues that have more than one year remaining until maturity and is the one most often used as a basis of comparison for bond portfolios (Blake, Elton and Gruber, 1993). We use the return on the one-month Treasury bills from Ibbotson Associates (1994) as a proxy for the monthly risk-free rate of return.

4.2. The APT alpha

To construct a factor model we started with daily *CRSP* returns on individual stocks.[11] The primary advantage of daily data is the potential increase in precision of the estimated variances and covariances (the inputs to the factor-analysis model) that comes with sampling the data more often. We extracted returns for all industries that have at least 10 firms meeting the following criteria: (1) they existed throughout each of the four 7-year subperiods, and (2) their SIC code did not change during either subperiod.[12] The selection resulted in a maximum of 61 industries consisting of a maximum of 1143 securities.[13] Using daily returns (roughly about 1,500) on an equally weighted portfolio of each industry N, (N = *32, 44, 48, 61*), the sample covariance matrix of industry

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[10] We also used the value-weighted CRSP NYSE/AMEX index returns as the benchmark and found very similar results.

[11] See Lehman and Modest (1987), Roll and Ross (1980) and Brown and Weinstein (1983).

[12] Industries with SIC codes of 671 and 672 are excluded because these codes represent holding and investment companies, respectively.

[13] The exact distribution is:

July 1965 to December 1972: 48 SIC codes 876 securities
January 1973 to December 1979: 61 SIC codes 1143 securities
January 1980 to December 1986: 44 SIC codes 833 securities

portfolio returns was estimated for each of the four seven-year subperiods. These sample covariance matrices were factor analyzed using maximum likelihood factor analysis assuming five factors. The factor loadings ($N \times 5$) were assumed constant for each seven year period and a cross-sectional GLS regression was estimated in each month by regressing the return of each industry portfolio against the factor loadings. The covariance matrix of idiosyncratic risks was used as the variance-covariance matrix in the cross-sectional regression. This produced a time-series of returns on each factor loading. The time-series of each factor coefficient plus the intercept is used as a "basis portfolio" to control for normal returns.

The monthly time-series NAV returns of the closed-end funds in excess of one-month Treasury bill returns are regressed on the five basis portfolio returns in excess of one-month Treasury bill returns. The intercepts from these time-series regressions provide the estimated risk-adjusted performance. If the intercept is significantly positive, the portfolio is evaluated as a superior performer. This measure of risk-adjusted performance is analogous to the Jensen's alpha in the single index unconditional CAPM and measures performance in excess of the normal return, assuming that the parameters remain constant over the estimation period.

4.3. The conditional CAPM alpha

Recently, Ferson and Schadt (1996) show that controlling for variation in risk can be important in measuring mutual fund performance. The time-varying conditional performance evaluation method explicitly allows for variation in beta as a function of predetermined instruments for information variables (Pontiff, 1995; Ferson and Schadt, 1996).

Following Ferson and Schadt (1996), we estimate the following regression model:

$$r_{p,t+1} = \alpha_p + \delta_{1p}\, r_{m,t+1} + \delta'_{2p}\, (z_t\, r_{m,t+1}) + \varepsilon_{p,t+1}\,,$$

January 1987 to December 1993: 32 SIC codes 575 securities.

where $r_{p,t+1} = R_{p,t+1} - R_{f,t+1}$ is the return on the fund p's NAVs (i.e. $R_{p,t+1}$) in excess of the return of a one-month Treasury bill between times t and t+1; $z_t = Z_t - E(Z)$ is a vector of the deviation of the information variable Z_t available at time t from the unconditional means; and $r_{m,t+1}$ is the excess return on the market portfolio. For stock funds, we use the CRSP value-weighted NYSE and AMEX index as a proxy for the market portfolio. For bond funds, we use the Lehman Brothers government/corporate bond index as a market benchmark. The coefficient α_p is the conditional alpha which measures the average difference between the fund's excess NAV return and the excess return to the dynamic strategies which replicate its time-varying risk exposure.

We use five instruments for the information variables: (1) the lagged level of the one-month Treasury bill yield from the CRSP Riskfree files; (2) the lagged dividend yield of the CRSP value-weighted New York Stock Exchange (NYSE) and American Stock Exchange (AMEX) stock index, which is obtained by dividing the index by the previous 12 months of dividend payments for the index; (3) the lagged term spread which is a constant-maturity 10-year Treasury bond yield less the 3-month Treasury bill yield, which is taken from Citibase; (4) the lagged measure of the corporate bond default-related yield spread which is Moody's BAA-rated corporate bond yield less the AAA-rated corporate bond yield taken from Citibase; and (5) a dummy variable for the month of January.

5. Fund premium and managerial performance: Stock funds

Monthly returns on the NAVs of the 94 closed-end stock funds are used in estimating the managerial performance over the sample period from January 1966 to December 1993.[14]

[14] To guard against the possibility that our results are driven by international stock funds, we performed our analyses by excluding international funds. The results are qualitatively the same. For brevity, we only report the results from the full sample.

5.1. The basic result

This section documents the empirical relation between the current premium (denoting a discount as a negative premium) and future managerial performance for our sample of stock funds. Assuming rational expectations, the premiums of closed-end funds at each point in time will be systematically related to future managerial performance (measured as the abnormal returns on the NAV of the funds). If the managerial performance hypothesis is true, there should be a positive relation between current premium and future performance.

To examine how far into the future the current premium can anticipate fund performance, we estimate Jensen alphas for three distinct, non-overlapping one-year performance evaluation periods in the future after the month of the premium: the first year, the second year and the third year. We then regress the alpha on the premium computed prior to the beginning of the first evaluation year. The alpha measures the *ex post* realized managerial performance and is used as a proxy for the market's expectation of the future managerial performance of a fund. We always begin the performance evaluation period in January. As the measure for beginning-of-the-period premium or discount, we use the premiums or discounts observed at the end of the year immediately before the first evaluation year starts.

We estimate the coefficients for each year by cross-sectional regressions. We report the average of the estimated coefficients from the cross-sectional regressions. Following Fama and MacBeth (1973), a standard error is computed from the standard deviation of the coefficients from the cross-sectional regressions. The method is used since the cross-sectional correlation between funds' NAV alphas will not affect the standard errors.

Panel A of Table 2 presents the regression results regarding the relation between the current fund premium and the managerial performance over each of the three years in the future, using a sample starting in January 1966 and ending in December 1993. This table reports the averages of parameter estimates from the annual cross-sectional regressions. *T*-statistics are reported in parentheses.

As indicated by the numbers under the columns headed by "a_1", there is a significant and positive relation between funds' premiums and their future managerial performance, especially in the first year. The coefficient "a_1" is significant at the 1% level regardless of the choice of benchmark. The relation between the current premium and the NAV performance in the second year is positive but only marginally significant. No significant relation is found between the current premium and NAV performance in more than two years in the future. Again these results are not sensitive to the choice of benchmark.[15]

The results indicate that funds with larger premiums tend to have higher NAV performance in the subsequent year and funds with deeper discounts tend to have poorer future NAV performance. It can be inferred that the discounts on closed-end funds reflect in part compensation for inferior expected future performance.

What is the economic meaning of the premium-performance relation? Focusing on the relation between current premium and one-year-ahead performance, the first row of figures in Panel A of Table 2 shows that the slope coefficient "a_1" ranges from 0.015 to 0.020, depending on which benchmark is used. This implies that a 10% increase in fund premium predicts an increase in abnormal NAV return ranging from 0.15% to 0.20% per month, which is approximately between 1.8% and 2.4% per year.

For example, the slope coefficient obtained by using the CRSP equally weighted index as the benchmark is 0.016. Consider an investor who paid a 10% premium, anticipating 1.92% (=0.016*10%*12) of abnormal NAV performance per year. The relation is linear so that the sign of the premium predicts the sign of the abnormal NAV performance. Assuming that the market prices

15 We also examined the relation by estimating NAV performance in the fourth and the fifth years in the future and found no significant coefficients for premium.

a series of these annual alphas as an annuity, a 10% premium paid by the investor will be recovered in 6.7 years if the alphas are discounted by the riskfree rate of 7% per year. The implied holding period of 6.7 years may be considered too long and thus may suggest that investors overpay for the abnormal NAV performance. However, note that this calculation is rough and makes an extreme assumption that managerial performance is the only factor driving the premium. As documented in previous studies, there are other factors that determine the premium.[16] When these other factors are taken into account, the implied holding period will be substantially shortened and thus will make the market's pricing behavior look economically rational.

As shown in Table 2, the significance of the slope coefficient declines as the evaluation period moves further into the future. This finding implies that the market's ability to anticipate future NAV performance mainly stems from short-term rather than long-term forecasts. Probably, the market may use signals of managerial quality that are more accurate for short-run forecasts than for long-run forecasts. One reason is that the management of a fund may act strategically in response to changes in the discount. The clear implication of the positive relation of Table 2 is that discounts are either an agency cost controlled by management or the result of inferior selection of securities. In either case, the limitation on the discount is the arbitrage of taking over the fund and converting it to an open-end fund. Pontiff (1996) demonstrates that the costs of such arbitrage are substantial, but the discount can grow large enough that the arbitrage is worth the cost.[17] However, according to Pontiff (1996), arbitrage costs vary over funds and over time. A rent-seeking management will respond to changing arbitrage costs by altering rent-seeking, which in turn will change the discounts. This means that there is likely to be mean reversion in discounts. If they are too high, management will reduce rent-seeking to lower them. Sias et al. (1995) find there is a

16 These include tax liability due to unrealized capital gains, holding of illiquid securities, investor sentiment, private benefits to blockholders, and costs of arbitrage. See Malkiel (1977), Lee et al. (1991), Barclay et al. (1993) and Pontiff (1996).

17 Barclay et al. (1993) discusses the case of the Cypress Fund which was taken over by Robert Gordon after the discount reached about 22%, at a cost of about $1.6 million.

strong mean reversion in discounts from month to month or quarter to quarter. Sias et al.'s results and Table 2 suggest that the time-varying discounts are related to short-term rather than long-term performance.

5.2. Gross managerial performance

Perhaps the ability of premiums to predict managerial performance is attributable to the ability of premiums to predict expenses. To examine this possibility, we estimate gross managerial performance by adding the fund expenses back to the NAV returns. For earlier sample period, the expense ratios are collected from the Wiesenberger. For the period from 1990 to 1993, we used *Morningstar* database as the source for expense ratio data. We divided the reported annual expense ratios by 12 and added these monthly expense ratios to the monthly NAV returns to calculate the monthly series of gross NAV returns. The number of observations is reduced due to the unavailability of the expense ratio data for some of the smaller funds.

If the results obtained from using the net managerial performance are significantly different from those using the gross performance, then we can infer that the ability of current premiums to predict future net managerial performance is attributable to the ability of current premiums to predict future expenses. If the results are not materially different between the two cases, we can infer that the reported fund expenses do not play a significant role in the premium-performance relation.

Panel B of Table 2 reports the gross performance test with stock funds. Taken together, the results remain essentially the same when we replace the net NAV performance by the gross NAV performance. Adding the expense ratio does not make much of a difference in the "a_1" coefficient, suggesting that the current premiums seem to predict gross performance rather than the expenses as reported according to legal guidelines. We cannot determine from these tests whether the premiums are predicting softdollar use or security selection because the expense ratio does not include the commissions paid by the fund. Investment companies are not required to report softdollar use and do not report it voluntarily.

5.3. Nonsynchronous trading effect

If the securities in the fund's portfolio are not actively traded, while the fund's shares are actively traded, the observed NAVs will be 'stale.' True NAVs in this case would only be reflected in the fund's NAVs observed in the subsequent periods when the securities held in the portfolio are traded. NAVs in lead months such as January or February would then be close to the true NAVs of a fund if the staleness of its NAVs is severe. Alternatively if the current share price partially reflects the expected NAV, then current share price will be spuriously correlated with the NAV in subsequent months. A measure of premium not affected by this possibility would be a premium that is observed in lagged months such as November or October.

Table 3 reports the results for stock funds obtained by using the lead and then lagged premiums. Panels A and B use the lead premiums (i.e., February and January premiums, respectively) as predictors of the NAV alphas. Although the two-month-ahead (i.e., February) premiums produce somewhat weaker results than December-end premiums as shown in Table 2, the results obtained with January-end premium are very similar to those in Table 2. The significant and positive slope coefficients make it unlikely that our basic results are driven by nonsynchronous trading problems. As shown in Panels C and D in Table 3, the relation with lagged premiums (i.e., November and October premiums, respectively) is weaker than with lead premiums. The results for lagged premiums are also weaker than those obtained from the December-end premiums, suggesting that the results for stock funds might be partially affected by the nonsynchronous trading effect.[18] In light of the conservative allowance of one- or two-month interval for leads and lags to

[18]To examine this issue further we collected only the U.S. domestic funds and replicated the tests and found results (not reported) which are very similar to our basic results in Table 2, which suggests no significant influence of nonsynchronous

account for potential thin trading effect, we conclude that our basic results are not attributable to the staleness of the NAVs due to thin trading.

5.4. Investor sentiment

Lee et al. (1991) have argued that "investor sentiment" plays an important role in determining closed-end fund premiums. Our results could be due to a relation between sentiment and performance. We adjust the observed fund premiums by subtracting the portion of the premium affected by the index that Lee et al. (1991) use to represent investor sentiment. We first regress each fund's premium on the value-weighted index of all stock funds' premiums based on the following model:

$$PREM_{i,t-1} = \gamma_i + \delta_i \, VWPREM_{i,t-1} + \xi_{i,t-1},$$

where $VWPREM_{i,t-1}$ is the value-weighted index of all stock funds' premiums based on the total net asset value of each fund (i.e., net asset value per share times the number of shares outstanding) at the end of year *t-1*. This specification assumes that each fund has its own sensitivity to the investor sentiment index, i.e., δ_i. The adjusted premium, $ADJPREM_{i,t-1}$, then is estimated by adding the estimated intercept term to the residual for fund i at the end of year *t-1*:

$$ADJPREM_{i,t-1} = \hat{\gamma}_i + \hat{\xi}_{i,t-1}.$$

We then use the adjusted premium in place of our observed premium variable in our regression analyses of the relation between NAV performance and premium.

The results are in Table 4. Our findings do not change. There is still a significant relation between current premium and one-year-ahead future alpha. A weak or non-existent relation is found for longer horizons.

trading. The result that only the full sample which includes international funds appears to be partially affected by the nonsynchronous trading effect is consistent with the observation that international funds are likely to have more thinly traded securities in their portfolios.

6. Fund premium and managerial performance: Bond funds

Our finding of the positive relation between current premium and future NAV performance is at odds with the findings of recent studies. Lee et al. (1991, p.78) find that there is, if anything, a negative correlation between premium and future NAV performance. Pontiff (1995, pp. 345-348) used the same sample as Lee et al. (1991), which covers 53 stock and bond funds from July 1965 to December 1985. Pontiff finds that current premiums are uncorrelated with future NAV returns leading up to the next six months period. The major difference between Lee et al.'s sample and our sample lies in the inclusion of bond funds in Lee et al.'s sample. We examine the premium-NAV performance relation with a sample of bond funds from 1974 to 1990 to see if the variation in premium-NAV return relation is attributable to bond funds.

6.1. Basic results

In Table 5 we replicate the tests of Table 2 to examine the premium-NAV performance relation for bond funds. Part A and Part B of Table 5, respectively, present results from using raw NAV returns as the measure of performance and the unconditional CAPM alphas with the CRSP equally weighted index returns as the benchmark. As demonstrated by the estimates for "a_1" coefficients, there is no significant relation between current premium and NAV performance during the first and the second year in the future. A negative relation is found between current premium and the NAV performance in the third year in the future. However, except for the case of CRSP equally weighted index, in general this relation is not significant. The basic results shown in Parts A and B of Table 5, compared to those in Table 2, indicate that the premium-performance relation is sensitive to fund type, i.e., whether the sample consists of stock funds or bond funds.

6.2. Results with bond benchmarks

The different results between stock and bond funds may be benchmark errors resulting from using the stock-based benchmarks for analyzing bond funds. We therefore replace the CRSP value-weighted stock market index by the Lehman Brothers (LB) government/corporate bond index in our unconditional and conditional performance evaluation based on the CAPM.

In addition, we also employ two term-structure related bond factors that Fama and French (1993) claim capture most of the variation in returns on government and corporate bond portfolios. Adding these two bond factors to the single index model, we estimate alphas for bond funds by regressing excess bond fund returns on the excess return of the CRSP value-weighted index, a term premium and a default premium.[19] The term premium is the difference between the monthly long-term government bond return from Ibbotson Associates and the one-month Treasury bill rate. The default premium is the difference between the return on a market portfolio of long-term corporate bonds (the composite portfolio on the corporate bond module of Ibbotson Associates) and the long-term government bond return. These factors can be thought of as an *ex post* version of the term-structure related instruments used in the conditional performance evaluation.

The results from using these bond-based benchmarks are reported in Parts C, D and E of Table 5. Again, as shown by "a_1" coefficients, no significant relation is found between current premium and the NAV alphas in the future.

6.3. The effect of thin trading in bond portfolios

The next question is whether the different results for bond funds are because bond portfolios are not as liquid as stock portfolios — the net asset values of bond funds tend to be more

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[19] In estimating the alphas for various bond portfolios Fama and French (1993) include two additional stock factors: the difference between the returns on small-stock portfolios and big-stock portfolios (SMB), and the difference between the returns on high book-to-market portfolios and low book-to-market portfolios (HML). However, Fama and French show that adding these two more factors does not make any difference in capturing the common variation in bond returns.

'stale' than those of stock funds and thus more inaccurate. We repeat the tests of Table 3 for bond funds by replacing current premium with the lagged and the lead premiums. For brevity the results are not reported, but they are essentially the same with all slope coefficients being insignificant. This finding implies that the basic results for bond funds are not driven by stale NAVs due to nonsynchronous trading.

6.4. Investor sentiment

In Table 6 we repeat the analyses after adjusting for fund-specific exposure to investor sentiment by using the NAV size-weighted index of bond fund premiums. The relation between premium and NAV performance remains insignificant.

6.5. Discussion

Why is premium not related to performance for bond funds? First, perhaps one or more of the technical factors, such as holdings of restricted or illiquid securities, that can potentially affect NAV returns is more important for bond funds than stock funds. Moreover, unlike the shares of open-end bond funds whose price should be the NAV calculated by the management, the management of a closed-end bond fund does not have as much incentive to accurately calculate the NAVs when illiquid portfolios need to be evaluated. Although this problem is partially dealt with by our thin trading tests and our screening of convertible bond funds, our results may not be completely free from the potential bias caused by incorrect NAVs.

Second, there is less room for managerial skills to affect bond funds than stock funds. The comparatively lower risk and return of bonds implies that bond fund managers can add less value to a portfolio. The lower risk of bonds implies that monitoring costs are lower for bond funds than stock funds. This implies that agency costs will be smaller for bond funds than stock funds. As a result, there will be a low variation in expected future alphas, which makes it difficult to estimate premium-performance relation. In unreported work, we find that the standard deviation of bond fund NAV alphas is less than stock fund and that the absolute value of bond fund alphas are lower than the absolute value of stock fund alphas.[20]

What is clear is that the inclusion of bond funds is the reason for the difference between our stock fund results and those of recent related studies. The bond fund premiums have no significant relation with future performance, but the stock fund premiums have a strong positive relation with future performance. Combining the two classes of funds makes it difficult to find any performance-premium relation. As reported in Table 7, we find no significant relation when we replicate our tests by using both the stock and bond funds combined for the same sample period examined by Lee et al. (1991) and Pontiff (1995).[21]

7. Summary and conclusions

This paper shows that managerial performance of closed-end stock funds is priced by investors who rationally forecast a fund's value-added in the future. Based on monthly NAV return data for closed-end stock funds, we find that there is a significant and positive relation between a fund's current premium and its future NAV performance in the following year. The results imply that the closed-end stock fund premium predicts a fund's short-run managerial performance in the future. We estimated that a 10% increase in premium anticipates excess returns ranging from 1.8% to 2.4% per year, depending on the choice of benchmark. The relation is linear so that the sign of the premium predicts the sign of the abnormal NAV performance. This predictability does not extend to performance more than two years in the future. This finding is

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20 The results are available on request.

21 Another difference between our study and these related studies lies in the method used for risk adjustment. While we try various risk measures, it appears that these other studies use only raw NAV returns and/or market-adjusted NAV returns. As suggested by the referee, Neal and Wheatly (1993) found an insignificant but negative relation between current premium and future NAV returns using only the stock funds for longer time periods. Their study is based on a value-weighted portfolio of stock funds and therefore is a time-series study rather than cross-sectional study. Also, their study does not examine the risk-adjusted NAV performance.

not caused by the market's anticipation of fund mangers' expenses. The results are not sensitive to the choice of benchmark nor to adjustment for possible "noise trading." The results imply that investors use the expected future performance of a fund in setting the discount or premium.

In contrast, for our bond fund sample, we do not find any significant relation between premium and future NAV performance. This suggests that bond funds cannot be combined with stock funds in estimating a premium-performance relation. We show that the insignificant relation between premium and future NAV returns documented in recent papers is mainly driven by the inclusion of bond funds. More research is needed to understand why bond fund premiums behave differently from stock fund premiums.

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Appendix 1 List of closed-end stock funds

Fund Name	Sample period	Fund type*
1. Abacus und	10/65-5/69	US
2. Adams Express	7/65-12/93	US
3. Alliance Global Environment	6/90-12/93	INT
4. American Utility Shares	9/72-7/78	US
5. Asia Pacific Fund	5/87-12/93	INT
6. Austria Fund Inc.	11/89-12/93	INT
7. Baker Fentress & Co	1/75-12/93	US
8. Blue Chip Value Fund	5/87-12/93	US
9. Brazil Fund	4/88-12/93	INT
10. Carriers & General Corp.	7/65-4/78	US
11. Central Fund of Canada	5/86-12/93	INT
12. Central Securities Corp.	7/72-12/93	US
13. Chile Fund	11/89-12/93	INT
14. Clemente Global Growth Fund	7/87-12/93	INT
15. Cohen & Steers Total Return Rl Fund	10/88-12/93	US
16. Counsellors Tandem Securities Fund	2/87-12/93	US
17. Dominick Fund	7/65-9/74	US
18. Duff & Phelps Selected Utilities	1/87-12/93	US
19. Emerging Germany Fund	4/90-12/93	INT
20. Emerging Mexico Fund	11/90-12/93	INT
21. Energy & Utility Shares	11/72-10/81	US
22. Engex Inc.	11/79-12/93	US
23. Eurofund International	9/65-2/71	INT
24. Europe Fund	6/90-12/93	INT
25. European Warrant Fund	8/90-12/93	INT
26. First Australia Fund	10/86-12/93	INT
27. First Financial Fund	5/86-12/93	US
28. First Iberian Fund	4/88-12/93	INT
29. First Phillippine Fund	12/89-12/93	INT
30. France Fund	7/86-12/89	INT

Fund Name	Sample period	Fund type*
31. France Growth Fund	6/90-12/93	INT
32. Future Germany Fund	3/90-12/93	INT
33. G T Greater Europe Fund	3/90-12/93	INT
34. Gabelli Equity Trust	10/86-12/93	US
35. General American Investors	7/65-12/93	US
36. Germany Fund	8/86-12/93	INT
37. Growth Fund of Spain	4/90-12/93	INT
38. Growth Stock Outlook Trust	3/86-12/93	US
39. H & Q Healthcare Fund	5/87-12/93	US
40. India Growth Fund	9/88-12/93	INT
41. Indonesia Fund	3/90-12/93	INT
42. International Holdings Corp.	10/65-11/75	US
43. Irish Investment Fund	4/90-12/93	INT
44. Italy Fund	5/86-12/93	INT
45. Jakarta Growth Fund	4/90-12/93	INT
46. Japan Fund	7/65-7/87	INT
47. Japan OTC Equity Fund	3/90-12/93	INT
48. Korea Fund	11/84-12/93	INT
49. Latin America Investment Fund	8/90-12/93	INT
50. Liberty All Star Equity Fund	11/86-12/93	US
51. Madison Fund	7/65-7/83	US
52. Malaysia Fund	5/87-12/93	INT
53. Mexico Equity & Income	9/90-12/93	INT
54. Mexico Fund	10/81-12/93	INT
55. Morgan Grenfell Smallcap	5/87-12/93	US
56. National Aviation & Technology	1/75-4/79	US
57. New Germany Fund	3/90-12/93	INT
58. Niagara Share Corp.	7/65-7/92	US
59. Nicholas Applegate Growth Equity	5/87-5/91	US
60. Patriot Premium Dividend	12/88-12/93	US
61. Patriot Premium Dividend II	12/89-12/93	US

Fund Name	Sample period	Fund type*
62. Patriot Select Dividend Trust	8/90-12/93	US
63. Petroleum & Resources Corp.	7/65-12/93	US
64. Pilgrim Regional Bank Shares	1/86-12/93	US
65. Portugal Fund	12/89-12/93	INT
66. Preferred Income Fund	3/91-12/93	US
67. Putnam Dividend Income	11/89-12/93	US
68. Regional Financial Shares Investment	5/86-12/89	US
69. RET Income Fund	1/75-11/80	US
70. ROC Taiwan Fund	6/89-12/93	INT
71. Royce Value Trust	1/87-12/93	US
72. Salomon Brothers Fund	7/65-12/93	US
73. Schafer Value Trust	1/87-6/90	US
74. Scudder New Asia Fund	8/87-12/93	INT
75. Scudder New Europe Fund	3/90-12/93	INT
76. Singapore Fund	8/90-12/93	INT
77. Source Capital	1/75-12/93	US
78. Spain Fund	7/88-12/93	INT
79. Standard Shares Inc.	7/65-4/78	US
80. Surveyor Fund(General Public Service Corp.)	5/68-8/73	US
81. Swiss Helvetia Fund	8/87-12/93	INT
82. Taiwan Fund	2/87-12/93	INT
83. Templeton Emerging Markets	4/87-12/93	INT
84. Templeton Global Utilities Inc.	6/90-12/93	INT
85. Thai Capital Fund	6/90-12/93	INT
86. Thai Fund	2/88-12/93	INT
87. Tri-Continental Corp.	7/65-12/93	US
88. Turkish Investment Fund	12/89-12/93	INT
89. U.S & Foreign Securities	7/65-4/84	US
90. United Corp.	7/65-12/77	US
91. United Kingdom Fund	8/87-12/93	INT
92. Worldwide Value Fund	10/86-12/93	INT

Fund Name	Sample period	Fund type*
93. Zweig Fund	10/86-12/93	US
94. Zweig Total Return Fund	10/88-12/93	US

* US: domestic fund in the U.S.; INT: international fund.

Appendix 2 List of closed-end bond funds

Fund name	Sample period
1. 1838 Bond Debenture Trading	1/75-12/90
2. American Capital Bond Fund	12/73-12/90
3. AMEV Securities	12/73-12/90
4. Bunker Hill Inc.	1/75-12/90
5. CNA Income Shares	12/73-12/90
6. Current Income Shares	10/74-12/90
7. Excelsior Income Shares	12/73-12/90
8. Fort Dearborn Income Shares	12/73-12/90
9. Hatteras Income Securities	12/73-12/90
10. INA Investment Securities	12/73-12/90
11. Intercapital Income Securities	12/73-12/90
12. John Hancock Income Securities	12/73-12/90
13. John Hancock Investment	12/73-12/90
14. Lincoln National Income Fund	10/81-12/90
15. Massmutual Income Investors	12/73-7/87
16. Montgomery Street Income Securities	12/73-12/90
17. Mutual of Omaha Investment Shares	12/73-12/90
18. Pacific American Income Shares	12/73-12/90
19. State Mutual Securities Trust	12/74-12/90
20. Transamerica Income Shares	11/76-12/90
21. US Life Income Fund	12/73-12/90
22. Vestaur Securities	3/77-12/90

Table 1

Summary statistics on the premiums of closed-end funds, computed using monthly data.

Premiums are in percentage and computed as *ln(MV/NAV)*, where *MV* is the market value (price) per share and *NAV* is the net asset value per share of the fund. A negative premium indicates a discount. For cross-sectional averages, the descriptive statistics are calculated for each fund using all the available monthly observations of premiums for the fund and then averaged across funds. Standard deviations of the statistics are in brackets. Statistics on the time series premiums are based on the monthly observations of premiums of the equally weighted portfolio of funds in each category.

	No. of Obs.	Mean	Median	Std. Dev.	Min.	Max.
Panel A: Stock funds (June 1965 - December 1993)						
Cross-sectional averages [standard deviations]:						
Stock funds	94	-8.61	-9.36	10.86	-31.58	18.76
		[10.39]	[10.32]	[5.39]	[15.15]	[21.94]
Time-series averages from equally weighted portfolios of funds:						
Stock funds	343	-12.90	-13.23	8.73	-32.10	5.68
Time-series behavior of value weighted average premium as the investor sentiment index:						
Stock funds	343	-11.74	-10.96	9.30	-30.89	8.93
Panel B: Bond funds (December 1973 - December 1990)						
Cross-sectional averages [standard deviations]:						
Bond funds	22	-4.18	-4.29	6.29	-19.26	11.47
		[3.32]	[3.29]	[1.67]	[3.91]	[6.61]
Time-series averages from equally weighted portfolios of funds:						
Bond funds	205	-4.11	-4.21	4.72	-15.98	9.15
Time-series behavior of value weighted average premium as the investor sentiment index:						
Bond funds	205	-3.30	-3.58	4.68	-15.22	9.69

Table 2
Premium and NAV performance relation: Stock funds

Fund premium as a predictor of future managerial performance (January 1966 - December 1993):

$$PERF_{it} = a_0 + a_1\, PREM_{i,\ t-1} + \varepsilon_{it}\,.$$

$PERF_{it}$ is the annual managerial performance for fund i during the subsequent three non-overlapping one-year periods starting in January of the year *t*. $PREM_{i,\ t-1}$ is the premium of fund *i* at the end of year *t-1*. In Part A there is no risk adjustment. *PERF* is the continuously compounded return for the horizon. In Part B, *PERF* is computed using the CRSP equal-weighted market index. In Part C, *PERF* is computed using a five-factor basis portfolio benchmark based on the generalized least square estimation method. In Part D, *PERF* is estimated by the conditional CAPM with the CRSP value-weighted index (Ferson and Schadt, 1996). For each year from 1966 through 1993, cross-sectional regressions are estimated and the averages of the parameter estimates are reported. *T*-statistics are in parentheses.

	Part A: No risk adjustment		*Part B:* CRSP equal-weighted index		*Part C:* Five factors APT index		*Part D:* Conditional CAPM with CRSP VW	
	$a_0\times100$	a_1	$a_0\times100$	a_1	$a_0\times100$	a_1	$a_0\times100$	a_1
Panel A: Net performance								
1 year	0.985	0.015	0.202	0.016	-0.115	0.020	0.549	0.020
ahead	(3.82)[a]	(3.01)[a]	(1.15)	(3.18)[a]	(-0.51)	(3.02)[a]	(3.78)[a]	(3.05)[a]
2 years	1.026	0.010	0.210	0.010	-0.204	0.016	0.455	0.008
ahead	(4.00)[a]	(1.89)	(1.27)	(1.95)	(-0.97)	(1.87)	(3.39)[a]	(1.37)
3 years	0.791	0.004	0.037	0.004	-0.287	0.017	0.222	-0.002
ahead	(3.05)[a]	(0.45)	(0.20)	(0.51)	(-1.32)	(1.66)	(1.65)	(-0.29)
Panel B: Gross performance with the expense added back								
1 year	1.089	0.016	0.299	0.016	-0.130	0.022	0.646	0.020
ahead	(4.23)[a]	(3.41)[a]	(1.72)[a]	(3.44)[a]	(-0.56)	(3.42)[a]	(4.52)[a]	(3.28)[a]
2 years	1.107	0.009	0.288	0.009	-0.246	0.017	0.541	0.007
ahead	(4.33)[a]	(1.78)	(1.73)	(1.77)	(-1.14)	(2.01)	(4.14)[a]	(1.34)
3 years	0.802	-0.002	0.106	0.003	-0.339	0.019	0.287	-0.004
ahead	(3.60)[a]	(-0.26)	(0.62)	(0.39)	(-1.47)	(1.72)	(2.18)[b]	(-0.51)

[a]Significant at the 1% level.
[b]Significant at the 5% level.

Table 3
Tests of the effects of nonsynchronous trading: Stock funds

Fund premium as a predictor of future managerial performance (January 1966 - December 1993):

$$PERF_{it} = a_0 + a_1 PREM_{i,\ t-1} + \varepsilon_{it}.$$

$PERF_{it}$ is the annual managerial performance for fund i during the subsequent three non-overlapping one-year periods starting in January of the year *t*. $PREM_{i,\ t-1}$ is the premium of fund *i* at the end of year *t-1*. In Part A there is no risk adjustment. *PERF* is the continuously compounded return for the horizon. In Part B, *PERF* is computed using the CRSP equal-weighted market index. In Part C, *PERF* is computed using a five-factor basis portfolio benchmark based on the generalized least square estimation method. In Part D, *PERF* is estimated by the conditional CAPM with the CRSP value-weighted index (Ferson and Schadt, 1996). For each year from 1966 through 1993, cross-sectional regressions are estimated and the averages of the parameter estimates are reported. *T*-statistics are in parentheses.

	Part A: No risk adjustment		*Part B:* CRSP equal-weighted index		*Part C:* Five factors APT index		*Part D:* Conditional CAPM with CRSP VW	
	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1
Panel A: Two-month-ahead premium as a predictor (February premium)								
1 year	0.842	0.008	0.102	0.013	-0.244	0.016	0.515	0.026
ahead	(3.30)[a]	(1.39)	(0.52)	(2.10)[b]	(-1.03)	(1.69)	(3.11)[a]	(3.13)[a]
2 years	1.037	0.011	0.251	0.014	-0.276	0.015	0.503	0.014
ahead	(4.08)[a]	(2.12)[b]	(1.58)	(2.52)[b]	(-1.20)	(1.70)	(3.46)[a]	(2.15)[b]
3 years	0.826	0.007	0.071	0.007	-0.203	0.023	0.227	-0.0006
ahead	(3.15)[a]	(0.81)	(0.38)	(0.85)	(-0.77)	(2.05)	(2.12)[b]	(-0.09)
Panel B: One-month-ahead premium as a predictor (January premium)								
1 year	0.878	0.014	0.164	0.019	-0.190	0.025	0.490	0.028
ahead	(3.60)[a]	(2.32)[b]	(1.02)	(3.17)[a]	(-0.83)	(2.66)[b]	(3.29)[a]	(3.79)[a]
2 years	0.982	0.008	0.172	0.009	-0.306	0.015	0.431	0.010
ahead	(3.97)[a]	(1.73)	(1.13)	(1.84)	(-1.55)	(1.52)	(3.32)[a]	(1.56)
3 years	0.804	0.005	0.045	0.004	-0.242	0.020	0.285	-0.0004
ahead	(3.01)[a]	(0.57)	(0.26)	(0.58)	(-0.87)	(1.74)	(2.33)[b]	(-0.06)
Panel C: One-month-old premium as a predictor (November premium)								
1 year	0.892	0.010	0.164	0.012	-0.280	0.009	0.439	0.012
ahead	(3.52)[a]	(1.60)	(0.90)	(2.15)[b]	(-1.14)	(1.25)	(2.68)[b]	(1.68)
2 years	1.001	0.010	0.190	0.010	-0.244	0.016	0.416	0.008
ahead	(3.97)[a]	(1.70)	(1.14)	(2.00)	(-1.09)	(1.91)	(2.88)[a]	(1.29)
3 years	0.814	0.005	0.064	0.005	-0.315	0.014	0.286	0.0001

	Part A: No risk adjustment		*Part B:* CRSP equal-weighted index		*Part C:* Five factors APT index		*Part D:* Conditional CAPM with CRSP VW	
	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1
ahead	(3.05)[a]	(0.71)	(0.38)	(0.75)	(-1.40)	(1.40)	(2.08)	(0.01)
Panel D: Two-month-old premium as a predictor (October premium)								
1 year	0.900	0.011	0.153	0.014	-0.266	0.013	0.464	0.013
ahead	(3.38)[a]	(1.71)	(0.77)	(2.19)[b]	(-1.11)	(1.40)	(2.95)[a]	(2.03)[b]
2 years	0.987	0.008	0.220	0.011	-0.085	0.023	0.512	0.011
ahead	(3.91)[a]	(1.19)	(1.30)	(1.68)	(-0.41)	(2.80)	(3.79)[a]	(1.62)
3 years	0.883	0.009	0.119	0.008	-0.214	0.018	0.377	0.004
ahead	(3.05)[a]	(1.05)	(0.62)	(1.12)	(-0.87)	(1.76)	(2.35)[b]	(0.47)

[a]Significant at the 1% level.
[b]Significant at the 5% level.

Table 4
Premium adjusted for investor sentiment: Stock funds

Adjusted fund premium as a predictor of future managerial performance (January 1966 - December 1993) after purging the effect of investor sentiment.

$$PERF_{it} = a_0 + a_1\, ADJPREM_{i,\, t-1} + \varepsilon_{it}\,.$$

$PERF_{it}$ is the annual managerial performance for fund i during the subsequent three non-overlapping one-year periods starting in January of the year *t*. $ADJPREM_{i,\, t-1}$ is the adjusted premium of fund *i* at the end of year *t-1* after purging the effect of investor sentiment. $ADJPREM_{i,\, t-1}$ is estimated by first regressing each fund's premium on the value-weighted index of all stock funds' premiums:

$$PREM_{i,t-1} = \gamma_i + \delta_i\, VWPREM_{i,t-1} + \xi_{i,\, t-1}\,,$$

where $PREM_{i,\, t-1}$ is the premium of fund *i* at the end of year *t-1* and $VWPREM_{i,\, t-1}$ is the value-weighted index of all stock funds' premiums based on the total assets of each fund at the end of year *t-1*. This specification assumes that each fund has its own sensitivity to the investor sentiment index, i.e., δ_i. The adjusted premium, $ADJPREM_{i,\, t-1}$, then is estimated by adding the estimated intercept term to the residual for fund i at the end of year *t-1*:

$$ADJPREM_{i,t-1} = \hat{\gamma}_i + \hat{\xi}_{i,t-1}\,.$$

In Part A there is no risk adjustment. *PERF* is the continuously compounded return for the horizon. In Part B, *PERF* is computed using the CRSP equal-weighted market index. In Part C, *PERF* is computed using a five-factor basis portfolio benchmark based on the generalized least square estimation method. In Part D, *PERF* is estimated by the conditional CAPM with the CRSP value-weighted index (Ferson and Schadt, 1996). For each year from 1966 through 1993, cross-sectional regressions are estimated and the averages of the parameter estimates are reported. *T*-statistics are in parentheses.

	Part A: No risk adjustment		*Part B:* CRSP equal-weighted index		*Part C:* Five factors APT index		*Part D:* Conditional CAPM with CRSP VW	
	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1
1 year	0.871	0.014	0.089	0.014	-0.257	0.021	0.360	0.014
ahead	(3.60)[a]	(2.85)[a]	(0.64)	(2.60)[b]	(-1.35)	(3.15)[a]	(3.00)[a]	(2.09)[b]
2 years	0.962	0.012	0.146	0.012	-0.271	0.016	0.336	0.005
ahead	(4.02)[a]	(2.20)[b]	(1.05)	(2.20)[b]	(-1.48)	(1.77)	(3.43)[a]	(0.71)
3 years	0.874	0.010	0.108	0.011	-0.364	0.019	0.251	0.002
ahead	(3.63)[a]	(1.68)	(0.78)	(1.98)	(-2.01)	(2.06)	(2.80)[b]	(0.32)

[a]Significant at the 1% level.
[b]Significant at the 5% level.

Table 5
Premium and NAV performance relation: Bond funds

Fund premium as a predictor of future managerial performance (January 1974 - December 1990):

$$PERF_{it} = a_0 + a_1 \, PREM_{i,\,t-1} + \varepsilon_{it} .$$

PREM is at the end of December of each year starting in December 1973. $PERF_{it}$ is the annual managerial performance for fund i during the subsequent three non-overlapping one-year periods starting in January of the year *t*. $PREM_{i,\,t-1}$ is the premium of fund *i* at the end of year *t-1*. In Part A there is no risk adjustment. *PERF* is the continuously compounded return for the horizon. In Part B, *PERF* is computed using the CRSP equal-weighted market index. In Part C, *PERF* is computed using the Lehman Brothers government/corporate bond index. In Part D, *PERF* is computed using the conditional performance evaluation technique due to Ferson and Schadt (1996) with the Lehman Brothers government/corporate bond index as the benchmark. In Part E, *PERF* is computed using the CRSP value-weighted index return together with Fama and French (1993) bond factors: ex post values of term premium and default premium. For each year from 1974 through 1990, cross-sectional regressions are estimated and the averages of the parameter estimates are reported. *T*-statistics are in parentheses.

	Part A: No risk adjustment		*Part B:* CRSP equal-weighted index		*Part C:* Lehman Brothers bond index		*Part D:* Conditional CAPM with Lehman Brothers bond index		*Part E:* Fama-French bond factors with CRSP value-weighted index	
	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_0	$a_0 \times 100$	a_1	$a_0 \times 100$	a_0
1 year	0.782 (3.84)[a]	0.004 (0.99)	0.023 (0.12)	0.005 (1.25)	0.032 (0.43)	0.005 (1.31)	-0.058 (-0.53)	0.001 (0.23)	0.050 (0.53)	0.004 (1.14)
2 years ahead	0.811 (4.34)[a]	-0.366 (-1.42)	0.042 (0.21)	-0.001 (-0.41)	0.011 (0.16)	-0.004 (-1.29)	0.013 (0.13)	0.001 (0.15)	0.084 (1.10)	-0.001 (-0.33)
3 years ahead	0.790 (3.85)[a]	-0.004 (-1.83)	0.004 (0.02)	-0.553 (-2.65)[b]	-0.023 (-0.33)	-0.005 (-1.85)	-0.063 (-0.61)	-0.007 (-1.57)	0.068 (1.04)	-0.003 (-1.10)

[a]Significant at the 1% level.
[b]Significant at the 5% level.

Table 6

Premium adjusted for investor sentiment: Bond funds

Adjusted fund premium as a predictor of future managerial performance (January 1974 - December 1990) after purging the effect of investor sentiment.

$$PERF_{it} = a_0 + a_1\, ADJPREM_{i,\, t-1} + \varepsilon_{it}\,.$$

$PERF_{it}$ is the annual managerial performance for fund i during the subsequent three non-overlapping one-year periods starting in January of the year *t*. $ADJPREM_{i,\, t-1}$ is the adjusted premium of fund *i* at the end of year *t-1* after purging the effect of investor sentiment. $ADJPREM_{i,\, t-1}$ is estimated by first regressing each fund's premium on the value-weighted index of all bond funds' premiums:

$$PREM_{i,t-1} = \gamma_i + \delta_i\, VWPREM_{i,t-1} + \xi_{i,\, t-1}\,,$$

where $PREM_{i,\, t-1}$ is the premium of fund *i* at the end of year *t-1* and $VWPREM_{i,\, t-1}$ is the value-weighted index of all stock funds' premiums based on the total assets of each fund at the end of year *t-1*. This specification assumes that each fund has its own sensitivity to the investor sentiment index, i.e., δ_i. The adjusted premium, $ADJPREM_{i,\, t-1}$, then is estimated by adding the estimated intercept term to the residual for fund i at the end of year *t-1*:

$$ADJPREM_{i,t-1} = \hat{\gamma}_i + \hat{\xi}_{i,t-1}\,.$$

ADJPREM is at the end of December of each year starting in December 1973. $PERF_{it}$ is the annual managerial performance for fund i during the subsequent three non-overlapping one-year periods starting in January of the year *t*. $PREM_{i,\, t-1}$ is the premium of fund *i* at the end of year *t-1*. In Part A there is no risk adjustment. *PERF* is the continuously compounded return for the horizon. In Part B, *PERF* is computed using the CRSP equal-weighted market index. In Part C, *PERF* is computed using the Lehman Brothers government/corporate bond index. In Part D, *PERF* is computed using the conditional performance evaluation technique due to Ferson and Schadt (1996) with the Lehman Brothers government/corporate bond index as the benchmark. In Part E, *PERF* is computed using the CRSP value-weighted index return together with Fama and French (1993) bond factors: ex post values of term premium and default premium. For each year from 1974 through 1990, cross-sectional regressions are estimated and the averages of the parameter estimates are reported. *T*-statistics are in parentheses.

	Part A: No risk adjustment		*Part B:* CRSP equal-weighted index		*Part C:* Lehman Brothers bond index		*Part D:* Conditional CAPM with Lehman Brothers bond index		*Part E:* Fama-French bond factors with CRSP value-weighted index	
	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_0	$a_0 \times 100$	a_1	$a_0 \times 100$	a_0
1 year ahead	0.742 (3.73)[a]	0.005 (1.15)	-0.012 (-0.06)	0.006 (1.65)	-0.006 (-0.08)	0.005 (1.37)	-0.097 (-0.87)	0.001 (0.18)	0.037 (0.46)	0.004 (1.29)

	Part A: No risk adjustment		*Part B:* CRSP equal-weighted index		*Part C:* Lehman Brothers bond index		*Part D:* Conditional CAPM with Lehman Brothers bond index		*Part E:* Fama-French bond factors with CRSP value-weighted index	
	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_0	$a_0 \times 100$	a_1	$a_0 \times 100$	a_0
2 years ahead	0.836 (4.41)[a]	-0.003 (-0.96)	0.047 (0.24)	-0.0001 (-0.04)	0.045 (0.77)	-0.002 (-0.96)	-0.031 (-0.34)	-0.0003 (-0.06)	0.094 (1.41)	-0.002 (-0.85)
3 years ahead	0.806 (4.01)[a]	-0.004 (-1.52)	0.024 (0.12)	-0.004 (-1.64)	0.023 (0.40)	-0.003 (-1.35)	-0.037 (-0.39)	-0.006 (-1.32)	0.075 (1.10)	-0.006 (-1.79)

[a]Significant at the 1% level.
[b]Significant at the 5% level.

Table 7

Premium and NAV performance relation: Stock funds and bond funds combined

Fund premium as a predictor of future managerial performance (January 1966 - December 1985):

$$PERF_{it} = a_0 + a_1 PREM_{i,\,t-1} + \varepsilon_{it}.$$

$PERF_{it}$ is the annual managerial performance for fund i during the subsequent three non-overlapping one-year periods starting in January of the year *t*. $PREM_{i,\,t-1}$ is the premium of fund *i* at the end of year *t-1*. In Part A there is no risk adjustment. *PERF* is the continuously compounded return for the horizon. In Part B, *PERF* is computed using the CRSP equal-weighted market index. In Part C, *PERF* is estimated by the conditional CAPM with the CRSP value-weighted index (Ferson and Schadt, 1996). For each year from 1966 through 1985, cross-sectional regressions are estimated and the averages of the parameter estimates are reported. *T*-statistics are in parentheses.

	Part A: No risk adjustment		*Part B:* CRSP equal-weighted index		*Part C:* Conditional CAPM with CRSP VW	
	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1	$a_0 \times 100$	a_1
1 year ahead	0.744	0.008	0.068	0.013	0.290	0.008
	(2.83)[b]	(0.91)	(0.31)	(1.70)	(1.69)	(0.85)
2 years ahead	0.651	-0.003	-0.028	0.002	0.264	-0.003
	(2.31)[b]	(-0.42)	(-0.14)	(0.43)	(1.49)	(-0.51)
3 years ahead	0.611	-0.004	0.004	0.001	0.189	-0.008
	(2.08)	(0.45)	(0.02)	(0.12)	(0.91)	(-0.70)

[a]Significant at the 1% level.
[b]Significant at the 5% level.