

Capital gains taxes, agency costs, and closed-end fund discounts

Michael Brennan[#]

Ravi Jain^{*}

First Version: August 2006

This Version: October 2007

[#] Michael Brennan is Emeritus Professor at the Anderson School, UCLA and Professor of Finance at the Department of Accounting and Finance, University of Manchester. E-mail: michael.brennan@anderson.ucla.edu.

^{*} Corresponding author: Department of Finance, NUS Business School, National University of Singapore, 1 Business Link, Singapore 117592. Phone: +65 6516 7947. Fax: +65 6779 2083. E-mail: bizrj@nus.edu.sg.

Capital gains taxes, agency costs, and closed-end fund discounts

Abstract

We test two hypotheses about the determinants of closed-end fund premia and discounts using a comprehensive sample of non-taxable and taxable funds for the period 1988 to 2002. We test whether fund premia reflect *agency costs*, and the potential tax liability associated with *unrealized capital gains* by examining changes in fund premia around the *declaration day* of large dividend and capital gain distributions. We provide further evidence on the effect of the tax liability from unrealized capital gains by examining changes in the premium around the *ex-day* of capital gain distributions. Our results lend support to both agency cost and the capital gains tax explanations for fund premia and discounts. We also find that the market prices of municipal bond funds (which pay tax-free dividends) are more sensitive to capital gains tax liabilities than are the prices of taxable funds, which is consistent with the existence of tax clienteles among closed-end fund investors.

JEL classification: G10, G20

Keywords: Agency costs, capital gains, closed-end fund discounts, dividends, tax clienteles

1. Introduction

A closed-end fund is a fund that raises capital by issuing shares and borrowing, and invests the proceeds in a portfolio of securities. Unlike open-end mutual funds, the shares of closed-end funds are traded on an exchange, and the funds issue additional shares only infrequently. Investors trade closed-end fund shares at a market price (P) that is distinct from the underlying net asset value (N) of the shares, which is defined as the market value of the portfolio of securities held by the fund less any borrowing, divided by the number of shares outstanding. It is well documented that the fund premium ($PREM$), calculated as $(P-N)/N$, is typically negative, although positive premia are not uncommon.¹ Several theories have been advanced to explain the existence and variation of fund premia. However, empirical support for these theories has generally been weak and mixed, so that the pricing of closed-end funds remains a significant puzzle (see Dimson and Minio-Kozerski, 1999).

In this paper, we re-examine two previously proposed but generally overlooked explanations for closed-end fund premia and discounts: the contingent tax liability on unrealized capital gains on the fund portfolio, and agency costs. We test the agency cost and the capital gains tax explanations by examining the change in the fund premium around the declaration and ex-days for large cash distributions, including capital gain distributions. We argue that, if cash distributions reduce agency costs by reducing the assets under the fund manager's control and if agency costs are reflected in the market price, then the fund premium should increase around the declaration of large cash distributions, unless offset by unfavorable tax effects. Similarly, if

¹ A negative premium is commonly referred to as a discount. In some prior studies the discount is calculated as $(N-P)/N$, so a negative discount represents a premium (see, e.g. Malkiel, 1977; Brickley, Manaster, and Schallheim, 1991; Lee, Shleifer, and Thaler, 1991; Gemmill and Thomas, 2002).

capital gains tax liabilities are reflected in market prices, then the fund premium should increase around the ex-day of capital gain distributions.

Using data on closed-end fund prices, distributions and net asset values for the period 1988 to 2002 we find strong evidence that both agency costs and capital gains tax liabilities are significant determinants of market prices of closed-end funds and therefore for fund premia and discounts. We report separate results for taxable and municipal bond ('muni') funds because, for the latter group of funds, dividend payments are not taxable while capital gains are taxable. The non-taxable feature of muni funds makes them especially attractive to investors with high marginal tax rates who are likely to be especially sensitive to the potential tax liability arising from unrealized capital gains. Consistent with the existence of a tax-clientele effect arising from the special tax treatment of muni funds, we find that the prices of these funds are more sensitive to capital gains distributions than are the prices of taxable funds.

The remainder of this paper is organized as follows. In the next section, we summarize the prior literature. In Section 3 we discuss the hypotheses to be tested and Section 4 details our data collection procedures. The empirical results are discussed in Section 5, and Section 6 summarizes and concludes.

2. Related Literature

In general, investors demand a lower price to buy assets upon which they have to pay capital gains in the future (Dai, Maydew, Shackelford, and Zhang, 2007). So we might expect that, all else equal, the prices of closed-end funds, and therefore fund premia, would be decreasing in the unrealized capital appreciation on their portfolios because of the potential investor tax liability

that arises when the gains are realized and paid out to investors.^{2,3} Malkiel (1977) tests this prediction by regressing fund discounts on unrealized appreciation (and other variables) separately for each year from 1967 to 1974, and finds that unrealized appreciation is positively related to fund discount in six of the eight years but the relation is significant in only three years, offering only mixed and weak support for the role of capital gains taxes in explaining fund discounts.

Subsequent empirical studies find evidence, based on very small samples of funds, that is generally inconsistent with the capital gains tax explanation. Lee, Shleifer, and Thaler (1991) argue that the finding of Brauer (1984) and Brickley and Schallheim (1985) that share prices tend to move up to net asset values rather than the net asset values falling down to the share price on open-ending or liquidation is inconsistent with the capital gains tax explanation, because the tax liability associated with selling assets which have appreciated in value should reduce the liquidation value of the fund's assets.⁴ Brickley *et al.* (1991) show that unrealized gains are negatively correlated with the discount, which is inconsistent with both the capital gains tax explanation of the discount and the results of Malkiel (1977). Lee, Shleifer, and Thaler (1991) find that the correlation between returns on the market and changes in discounts is close to zero,

² However, Pratt (1966) argues that this account neglects the potential tax benefit to an investor who sells his shares after the ex-day of a capital gain distribution when the price can be expected to fall by an amount approximately equal to the capital gain distribution. When this is taken into account, the net tax effect of capital gains realizations will also depend on the holding period of the investor which determines whether the gains and losses are classified as long or short term. Malkiel (1977) shows that, for a fund whose unrealized capital gains represent 25% of its assets, in the extreme case in which the fund realizes all the capital gains in the first year and the investor holds the shares forever, the discount due to the capital gains tax liability on unrealized appreciation should be 5.73%. Since the discount is likely to be substantially smaller for more plausible scenarios, Malkiel concludes that unrealized capital gains can explain only a small part of prevailing discounts.

³ The capital gains tax explanation does not apply to U.K. closed-end funds, which also exhibit anomalous behavior even though capital gain distributions have not been taxed in the U.K. since 1980 (see Gemmill and Thomas, 2002). We do not claim that the potential tax liability due to unrealized capital appreciation is the *only* explanation for closed-end fund discounts. So, notwithstanding the U.K. evidence, it is plausibly one of many factors that explain the discounts of U.S. closed-end funds.

⁴ However, closed-end funds that reorganize tend to be ones that performed poorly in the past so we expect the net capital gains from sales of assets to be very small or non-existent for such funds.

and argue that this is inconsistent with the capital gains tax explanation which predicts that discounts should widen when the market rises to reflect the increase in unrealized capital gains.⁵ Finally Pontiff (1995), who uses NAV appreciation as a proxy for the potential capital gains tax liability, shows that past NAV returns *net of the market return*, are more strongly related to the current premium than are simple NAV returns. He argues that this is inconsistent with the capital gains explanation since capital gains are a function of raw returns, not net returns.

The agency cost explanation of discounts predicts that the fund premium will be negatively related to fund expenses. The models of Ross (2002) and Cherkes (2003) imply that, since expenses are typically a fixed proportion of assets, cash distributions reduce agency costs by reducing the asset base that determines expenses. The implication of these models, that the fund premium should be positively related to cash distributions,⁶ finds weak support in Gemmill and Thomas (2002) who find some evidence that U.K. closed-end fund discounts are negatively related to the dividend yield. Johnson, Li, and Song (2006) report that funds that adopt minimum payout policies committing them to pay dividends of at least a specified percentage of net assets experience reductions in the discounts (i.e. increases in the premiums) which they interpret as being broadly consistent with the view that agency costs increase closed-end fund discounts, and that funds can signal low agency costs by their dividend policy. However, Wang and Nanda (2007) claim that fund premiums increase after the adoption of a minimum payout policy not so much because of agency or signaling but because naïve investors mistake payout for performance.

⁵ This assumes that the asset value of fund will increase with the return on the market. However, in addition to common stock, many closed-end funds hold other assets such as bonds and foreign stocks, or even specialize in sectors such as metals or minerals whose returns may not be highly correlated with the U.S. stock market.

⁶ Pontiff (1996) contends that the *absolute* value of the fund premium may also be affected by the fund's distribution policy as a fund's price is more likely to deviate from its net asset value if it pays smaller dividends. Consistent with this contention, he finds that dividend yield is negatively related to the absolute premium.

Our analysis differs from these papers in using evidence on changes in fund premia around the announcement and payment of cash distributions to construct stronger tests of the effects of agency costs and taxes on fund premiums and discounts.

3. Cash Distributions and Changes in Premiums

Under the Internal Revenue Code, closed-end funds are required to distribute all (or almost all) of their portfolio income to shareholders in the form of dividends and net capital gains in order to preserve their tax-favored status. Fund shareholders pay taxes on the distributions they receive. Since coupon payments on municipal bonds are exempt from federal taxes, as well as from state and local taxes for investors who reside in the state of issuance, dividend payments made by muni funds are treated in a correspondingly favorable manner while, during our sample period, dividend payments made by all other funds are taxed at the shareholder's ordinary income tax rate. However, there is no difference between the funds in the taxation of capital gains distributions.

3.1. Hypotheses related to premium changes around the declaration day

If cash distributions reduce agency costs then, to the extent that they are unanticipated, the declaration of distributions should increase the market price of fund shares, and therefore the fund premium, on the declaration day. The effect should be increasing in the size of the distribution, both because of the greater reduction in agency costs, and because bigger distributions are likely to contain a larger component of hard-to-forecast capital gains which will

not be so well reflected in the share price.⁷ Therefore, to the extent that cash distributions are not perfectly reflected in the share price prior to the declaration, agency cost considerations imply the following around the declaration day:

Implication 1 (Agency) *The fund premium increases on the declaration day of a cash distribution by an amount that is increasing in the size of the distribution.*

Taxes also have implications for changes in the fund premium around the declaration day to the extent that distributions are not perfectly reflected in the share price. Consider the situation for a capital gains distribution. The announcement of such a distribution implies that the corresponding gains have been realized. The earlier that capital gains are realized and distributed to investors, the heavier is the tax burden on the taxable investor, and the burden is directly proportional to the investor's marginal tax rate.⁸ Therefore the declaration of an unexpectedly large capital gain distribution/realization is bad news for taxable investors and should reduce the fund price and premium.

For muni funds regular dividends have no tax implications;⁹ therefore for these funds we expect an increase in the fund price and premium around regular dividend announcements; and, since an equal distribution in regular dividends or capital gains has the same agency cost implications for a given fund, we conclude that for muni funds the change in the premium will be

⁷ Funds are required to report their portfolio holdings every quarter which helps investors to forecast regular dividends. Long-term capital gain distributions may be made no more than once every 12 months unless an exemption is obtained from Section 19 of The Investment Company Act. Therefore, prior to the declaration of a long term capital gain distribution investors will typically have knowledge of the fund's net capital gains realizations over the previous three quarters. However, there remains uncertainty as to the net realizations during the declaration quarter.

⁸ So long as the capital gains are unrealized and the tax liability is only potential, the investor is able to earn dividends on the tax liability. When the gains are realized and distributed the liability is crystallized and paid to the government, depriving the investor of the dividend yield he or she had been receiving on the tax payable. Chay, Choi, and Pontiff (2006) show that investors value the benefit of tax-timing capital gains, and estimate that \$1 of realized capital gains is equivalent to 93¢ of unrealized gains.

⁹ At least for 'in-state' investors.

smaller for declarations of capital gains distributions than for declarations of regular dividends. For taxable funds on the other hand we should expect the change in the premium to be larger for declarations of capital gains distributions than for declarations of regular dividends, since for these funds the taxation of capital gains is generally more favorable than for dividends.

Finally, since the dividends of muni funds have a tax favored status, these funds are particularly attractive to investors in high-tax brackets (Elton, Gruber, and Blake, 2005), for whom the burden of a capital gains realization is particularly onerous.¹⁰ Therefore, other things equal, we expect the change in the fund premium associated with the declaration of a given capital gains distribution to be lower for muni funds than for taxable funds. On the other hand, since muni fund dividends are not taxed while taxable fund dividends are taxed, we expect, if the agency cost considerations are the same, that the change in the premium around the declaration of regular dividends will be less for taxable funds than for muni funds.

In summary, agency cost considerations imply an increase in the premium around distribution announcements that is increasing in the size of the distribution announced. Tax considerations tend to imply the reverse. However, since muni fund regular dividends are not taxed, we expect the agency cost consideration to dominate for these and the fund premium to increase with the size of the distribution; since all distributions of a given size have the same agency cost implications, we expect the increase in the premium to be less for capital gains distributions of muni funds than for regular dividends of these funds. The sign of the change in the premium around a capital gains declaration is determined by the offsetting tax and agency

¹⁰ Direct evidence on the municipal bond fund holdings of wealthy investors is generally difficult to obtain. However, some anecdotal evidence of the attractiveness of such securities to wealthy investors is provided in the 2003 income tax filings of Teresa Heinz Kerry which were released by the presidential campaign of her husband, John Kerry in 2004. The filings show that Ms. Kerry earned \$2.8 million of tax-exempt interest income from securities such as state and municipal bonds, which are the underlying assets of municipal bond funds. This constituted a sizable portion of her total income of approximately \$5 million.

cost considerations. If taxes (agency costs) predominate, the sign will be negative (positive) and the change in the premium will be a decreasing (increasing) function of the size of the distribution. Since muni funds tend to be held by higher tax rate investors, the negative tax implications of a capital gains distribution tend to be more negative for these funds than for taxable funds. Therefore, assuming that the agency cost implications are the same for the two types of funds, we expect the change in the premium around capital gain announcements to be less for muni funds than for taxable funds. For taxable funds the sign of the change in the premium around the declaration of both a regular dividend and a capital gains distribution will be determined by the offsetting agency and tax considerations. However, if tax (agency) considerations predominate, the sign will be negative (positive) and the change in the premium will be a decreasing (increasing) function of the size of the distribution. We collect these predictions in the following hypothesis:

Hypothesis 1 (declaration day)

- (i) For muni funds:
 - a. the fund premium will increase around the declaration day of a regular dividend by an amount that is increasing in the size of the distribution.
 - b. the change in the premium around the declaration of a capital gains distribution may be positive or negative depending on whether agency cost or tax considerations predominate. However, if the change is positive (negative) on average, then it will be increasing (decreasing) in the size of the distribution.
 - c. the change in the premium will be less around the announcement of a capital gain distribution than the announcement of a regular dividend.

- (ii) For taxable funds:
 - a. the increase in the premium around the declaration of both regular dividends and capital gains distributions may be either positive or negative; if it is positive (negative) for a type of distribution, it will be increasing (decreasing) in the size of the distribution.
 - b. The increase in the premium will be greater for capital gains than for regular dividend declarations.
- (iii) For taxable and muni funds:
 - a. The increase in the premium around a regular dividend declaration will be greater for muni funds than for taxable funds.
 - b. The increase in the premium around a capital gains declaration will be greater for taxable funds than for muni funds.

We have implicitly assumed that the declaration of the cash distribution is unanticipated so that the market price of the fund reacts to the announcement. In reality of course the information will be partly reflected in the share price before the declaration day, and this will tend to attenuate the price and premium response to the declaration. This will make it more difficult to detect the effects that we have predicted.

3.2. Hypotheses related to premium changes around the ex-day

On the ex-day of a fund's *capital gain distribution*, while there is no change in expectations about future agency costs, the fund's capital gain per dollar of Net Asset Value is reduced so that the amount of the potential tax liability of a new taxable investor falls. Therefore we expect the market price per dollar of Net Asset Value to increase, which corresponds to an increase in the

premium; and we expect the increase in the premium to be an increasing function of the size of the distribution. In addition, we expect the change in the premium to be greater for muni funds than for taxable funds because capital gains are especially costly for the high tax rate clientele investors who are attracted to muni funds by their tax favored dividends.

Changes in the fund premium around the ex-day for *regular dividends* are not relevant for testing theories about the role of agency costs and unrealized appreciation for fund discounts. Moreover, since the pioneering paper of Elton and Gruber (1970) there has developed an extensive literature suggesting that the ex-day price (for regular dividends) may be influenced both by short-term traders and corporate traders who favor dividend income over capital gain income and by market microstructure effects.¹¹ The competing influences on ex-day prices lead Bonser-Neal *et al.* (1990), Pontiff (1995) and Wermers *et al.* (2004) to offer different predictions for the size of the expected price drop on the ex-day for closed end funds. For example, Pontiff assumes that the ex-day price change is affected by marginal tax rates whereas the other two sets of authors assume that the price drop is equal to the dividend payment. Our framework offers no new prediction about the ex-day behavior of the premium for regular dividends. For capital gains distributions we have the following hypothesis for the ex-day:

Hypothesis 2 (ex-day):

- (i) For both taxable and muni funds the fund premium will increase around the ex-day for a capital gains distribution, and the size of the increase will be an increasing function of the size of the distribution.
- (ii) The change in the premium will be greater for muni funds than for taxable funds.

¹¹ See, for example, Graham (2003) for a review of the related literature.

4. Data

Our sample period is January 1988 to December 2002. The closed-end fund data were provided to us by Lipper. Funds are classified as either non-taxable (munis) or taxable. There are 360 funds that Lipper classifies as municipal bond funds: dividend payments of these funds are not taxable but the capital gain distributions are. Using Lipper's classification we identified 302 taxable funds of which 155 are equity funds (including foreign equity and mixed equity funds) and 147 are non-municipal bond funds (including federal government and corporate bond funds).¹² For the taxable funds, both dividend and capital gain distributions are taxed in the hands of the investor at the corresponding rate for dividends or capital gains.¹³

Information on cash distributions is taken from CRSP: cash distributions include pure dividend distributions, pure capital gain distributions, and concurrent capital gain and dividend distributions. We combine into a single observation a fund's cash distributions that share the same ex-day. We exclude dividend distributions by a fund that is classified as a non-taxable (taxable) fund if the distribution code on CRSP indicates that the dividend is taxable (non-taxable). We also exclude a distribution if the fund made another type of distribution (such as a return of capital) on the same day, or if there was a concurrent change in the number of shares outstanding due to a stock issuance, dividend, or split. We do not use declaration day and ex-day observations corresponding to cases in which funds announce multiple ex-distribution days on a

¹² We obtain similar results when we exclude foreign funds from our taxable fund sample.

¹³ During our sample period short-term capital gains and taxable dividends were taxed as ordinary income, and long-term capital gains were taxed at a rate equal to or lower than that on short-term capital gains. As CRSP does not distinguish between long-term and short-term capital gain distributions, we also treat these distributions in the same manner. This is not of concern in the initial part of our sample period when all capital gains (short-term or long-term) were taxed equally. However, for a brief period in 1997, there were three categories of tax rates on capital gains and after the passage of The 1998 Tax Reform, capital gains were differentially taxed depending on whether they were long-term or short-term. We examined the financial statements of a few randomly chosen funds that had made capital gain distributions and found that these distributions tend to be all or mostly in the form of long-term capital gains.

single declaration day. To minimize the effects of well documented patterns in fund premia in the initial and late stages of a fund's life, we exclude all observations for a fund in the first and last 100 trading days of its existence. We only include observations for which there were non-zero trades on the pre-declaration day, the declaration day, the cum-day, and the ex-day. We also require that the price of the fund on all of these days be at least five dollars. We exclude an observation if the CRSP reported declaration day was the same as the (last) cum-distribution day, or if the cum-distribution day was 50 days or more after the declaration day. Similarly, we require that the payment day be after, but not more than 50 days after, the ex-distribution day. Our initial sample of muni funds (taxable funds) consists of 21,873 (15,997) pure dividend distribution observations, 40 (201) pure capital gain distribution observations, and 674 (691) concurrent capital gain and dividend distribution observations for 360 (302) funds.

The fund premium is calculated using the price and net asset value data from Lipper. The pre-declaration day premium ($PREM_{D-}$) is the premium on the day prior to the declaration day or the closest available day prior to this day; the declaration day premium ($PREM_D$) is the premium on the declaration day or the closest available day after the declaration day; the cum-day premium ($PREM_C$) is the premium on the cum-day or the closest available day prior to the cum-day; and the ex-day premium ($PREM_E$) is the premium on the ex-day or the closest available day after the ex-day. We use only observations for which we have premium data available for the period around both the declaration day and the ex-day. If there are no data on the fund premium within the four days prior to the pre-declaration day and the cum-day or within the four days following the declaration day and the ex-day, the observation is deleted from the sample.¹⁴ We do not want the declaration and ex-day results to be contaminated by cases in which the

¹⁴ Lipper typically reports fund net asset value and price at the end of each week and at the end of each month. For some funds and in some time periods, Lipper reports the net asset value and price more frequently, e.g., on a daily basis, or around ex-days. In the majority of cases we obtain premium data within one trading day of the event day.

declaration day and ex-day are too close to each other to permit separate identification of the premium changes. This issue is of particular concern because premium data are not always available on the declaration day or the cum-day itself, as discussed earlier. Therefore we omit any observation if either the day on which $PREM_D$ is calculated falls on or after the cum-distribution day or the day on which $PREM_C$ is calculated falls on or before the declaration day. We compared a randomly selected subset of Lipper data with corresponding data reported in the Wall Street Journal (which reports end of week closed-end fund prices and net asset values) and conclude that the Lipper data are largely error-free. However, to reduce the likelihood of data errors, we exclude an observation if the absolute difference between either $PREM_D$ and $PREM_D$, or $PREM_C$ and $PREM_E$ is greater than 10%. After applying these additional screens we are able to match fund premium data for muni funds (taxable funds), for 21,325 (15,291) pure dividend distribution observations, 26 (184) pure capital gain distribution observations, and 669 (632) concurrent capital gain and dividend distribution observations which amounts to more than 96% of the observations in our initial sample

The size of the distribution is very small in many cases; there are several distributions of less than a penny and the smallest distribution paid by the funds in our sample is six-hundredths of a penny.¹⁵ In these cases the effect of the distribution on the fund price and therefore the premium will be small relative to the noise introduced by the bid-ask spread.¹⁶ Therefore we omit observations corresponding to total distributions of less than 10 cents. After making this adjustment, our final sample for muni funds consists of 115 pure dividend distributions, 12 pure

¹⁵ This is primarily because bond funds typically pay monthly dividends so that each individual distribution is small.

¹⁶ See Frank and Jagannathan (1988) and Bali and Hite (1988). During most of the sample, the prevailing (effective) bid-ask spreads were relatively high. For the NYSE, where most U.S.-based closed-end funds are traded, the minimum bid-ask spread was \$0.1250 (1/8) in the 1988 to June 23, 1997 period and \$0.0625 (1/16) in the June 24, 1997 to August 26, 2000 period. Subsequently, decimalization was gradually introduced and all stocks began trading with a *minimum* bid-ask spread of a penny from January 29, 2001 onwards. However, according to a 2001 NYSE report, decimal pricing reduced bid-ask spreads but the spreads did not usually fall to a penny (see *Decimalization of trading on the New York Stock Exchange: A report to the Securities and Exchange Commission*).

capital gain distributions, and 430 concurrent capital gain and dividend distributions. For taxable funds that declared distributions of at least 10 cents, we obtain 4,519 pure dividend distributions, 138 pure capital gain distributions, and 439 concurrent capital gain and dividend distribution observations. The subsample corresponding to pure capital gain distributions is very small, especially for muni funds. Therefore, for the remainder of this paper, we combine this subsample with the corresponding subsample of concurrent capital gain and dividend distributions. Our final sample of all observations that include a capital gain distribution, with or without a concurrent dividend distribution, consists of 442 (577) observations for muni funds (taxable funds).

We calculate the following variables using data from CRSP and Lipper. CGRAT is the proportion of capital gains in the total distribution; TOTYLD and CGYLD are the amounts of the total distribution and capital gains distribution expressed as a proportion of the net asset value on the pre-declaration day; SIZE is the fund's market capitalization on the pre-declaration day; and $\Delta\text{PREM}_{D,D}$ and $\Delta\text{PREM}_{C,E}$ are the changes in the premium around the declaration- and ex-day, respectively.

Summary statistics for the final sample of muni and taxable funds are reported in Table 1. For pure dividend distributions, the average distribution is 0.87% of NAV for muni funds and 1.42% for taxable funds. For capital gain distributions, which may be combined distributions of capital gains and regular dividend, the average distribution is 1.4% of NAV for muni funds and 5.2% for taxable funds. Recalling that the capital gain distributions often coincide with regular dividend payments, the proportion of these 'capital gain distributions' that are actually regular dividends averages 46% for the muni funds and 34% for the taxable funds. Thus, we should think of the capital gain distributions as containing a substantial proportion of regular dividends.

5. Empirical Results

In our empirical tests, we examine the association between both pure dividend and (mixed) capital gain distributions and the mean change in the fund premium around both the declaration and the ex-day, for muni and taxable funds. The primary results for the declaration day are contained in Table 2, and Table 3 compares the premium changes of muni and taxable funds on the declaration day for both pure dividend and (mixed) capital gain distributions. The corresponding results for the ex-day are contained in Tables 4 and 5, respectively.

5.1. Premium changes around the declaration day

Consider first Hypothesis 1 for the declaration day. The results for muni funds are reported in Panel A of Table 2. Consistent with the predictions of the hypothesis, we find that the fund premium increases by 0.56% for pure dividend distributions (t-statistic: 4.44). For capital gain distributions the prediction is that, if the average change is negative (tax effects outweigh agency effects), then the change in the premium will be decreasing in the size of the distribution. We find that the average change is negative (t-statistic: 1.63), and that the change is monotonically decreasing across the three distribution sizes with a t-statistic for the difference between the Large and Small categories of 2.53. The final prediction is that the change in the premium will be less around the announcement of a capital gain distribution than the announcement of a pure dividend distribution. Consistent with this, the average change is -0.12% for a capital gain distribution and 0.56% for a pure dividend distribution, and the t-statistic for the difference is 4.65. We were not able to test the prediction that the change in the premium is an increasing function of the size of a pure dividend distribution because of the lack of dispersion in the size of

the pure dividend distributions. With this exception, all of the predictions of the Hypothesis 1 for muni funds are confirmed.

The results for taxable funds are reported in Panel B of Table 2. Prediction (iia) implies that if the average change in the premium is positive (agency cost considerations outweigh taxes) then the change in the premium will be increasing in the size of the distribution. For both pure dividend and capital gain declarations the average changes are positive, 0.20% and 0.43%, with t-statistics of 6.92 and 4.40 respectively. And, consistent with the prediction, for pure dividend announcements, the size of the change is monotonically increasing across the three distribution size categories and the t-statistic for the difference between the High and Low distribution categories is 1.67. For capital gains distributions, the size of the change is not monotonic; however the size of the change for the High distribution category is close to twice as large as that for the Low distribution category although the t-statistic for the difference is only 1.28. It is possible that the somewhat weaker results for the capital gains distributions are the result of contamination by concurrent dividend distributions: a changing mix of dividends and capital gains across the size categories is a potential source of error. Prediction (iib) states that the increase in the premium will be greater for capital gains distributions than for dividend distributions. The difference is 0.23% with a t-statistic of 2.28, and the difference is positive, although not statistically significant, for 2 out of the three size categories.

Prediction (iiia) states that for regular dividends, the increase in the premium will be greater for muni funds than for taxable funds, while (iiib) predicts the opposite relation for capital gains distributions. Consistent with the prediction, Table 3 Panel A shows that for pure dividends the change for muni funds exceeds that for taxable funds by 0.36% with a t-statistic of 2.78, and Table 3 Panel B shows that for capital gains distributions the change for taxable funds

exceeds that for muni funds by 0.55% with a t-statistic of 4.48. While the lack of dispersion in size of dividend distributions does not permit a meaningful analysis for different size categories, for capital gains the difference is positive for all three size categories and is statistically significant for two out of three of them.

In summary, not one of the predictions of Hypothesis 1 is rejected by the data and in many cases the null hypothesis that the change in the premium or the difference between two changes is zero is strongly rejected. The primary cause for lack of significance arises from the distribution size predictions for pure dividends because of the lack of dispersion in the size of the dividend distributions.

We have found evidence of both agency and tax effects in the changes in fund premiums around dividend and capital gains declaration days. For regular dividends on both muni funds (for which tax effects should be negligible) and taxable funds, agency effects outweigh tax effects and the premium rises on the declaration day. For capital gain distributions, the agency effect dominates for taxable funds, but the tax effect dominates for muni funds whose shareholders, we have argued, are likely to be in high tax brackets.

5.2. Premium changes around the ex-day

Consider next Hypothesis 2 for the ex-day. The first prediction is that for both types of funds the premium will increase as the capital gains tax liability associated with the gains is rolled off, and that the increase will be increasing in the size of the capital gain distribution. Panel B of Table 4 shows an average increase of 0.23% with a t-statistic of 2.14 for taxable funds; the increase is monotonically increasing in the size of the distribution so that for the large distribution category the increase is 0.38%, and the t-statistic for the difference between the high and low size group is

1.47. The results for muni funds shown in Panel A of Table 4 are a little weaker. The average premium change is actually negative, though insignificant. However, this result is driven entirely by the small distribution category (distribution less than 1% of NAV). For the medium and large distributions the average change is 0.21% and 1.04% respectively, and the t-statistic for the large category is 4.16. The size of the premium change is monotonically increasing across the distribution size categories, the difference between the high and low distribution categories being 1.33% with a t-statistic of 4.99.

The second prediction of Hypothesis 2 is that for capital gain distributions the size of the premium increase around the ex-day will be greater for muni funds than for taxable funds because of the presumed higher tax rates of investors in muni funds. Panel B of Table 5 shows that this prediction is rejected for all observations – the average change is 0.29% higher for taxable funds than for munis with a t-statistic of 2.14. However, this result is again driven entirely by the low capital gain distribution size category. The average change is higher for muni funds for the other two size categories: for large distributions the average change is 0.66% higher for muni funds than for taxable funds and the t-statistic is 2.17.

We have found additional evidence that the tax liability due to capital gains affects the premium on closed end funds. Instead of considering the potential liability due to unrealized capital gains, we have considered the liability associated with the capital gains that have been realized but have not yet been distributed. When the gains are distributed on the ex-day we have found that the premium increases and that the increase is an increasing function of the size of the distribution. The only exception we found was for very small distributions of capital gains by muni funds where the premium decreased. We also found evidence that (except again for the very small distributions) the effect was larger for muni funds: this is consistent with these funds

having a clientele of high marginal tax rate investors for whom the tax liability associated with a given capital gain is more onerous.

For completeness we report in Tables 4 and 5 the changes in the fund premium around the ex-day for pure dividend distributions although these changes do not bear on our hypotheses about the agency cost and capital gains tax effects on fund premia and discounts. The changes for both muni and taxable funds are small and statistically insignificant: the finding for the taxable funds is consistent with the existence of short term tax arbitrage trading, and for the muni funds is consistent with the tax-exempt status of the dividends.

6. Conclusion

In this paper we have provided new evidence that the discounts and premiums on closed-end funds are influenced by both the potential tax liability on unrealized capital gains agency cost considerations. Our evidence comes from an analysis of changes in fund premia around the declaration and ex-dividend days for large cash distributions. We find that a pure dividend announcement leads to an increase in the premium for tax-exempt municipal bond funds, and a similar but smaller effect is observed for taxable funds: this is consistent with the dividend reducing the assets under management and hence the future management fees and agency costs, and with the effect being reduced for taxable funds because of the tax burden of the dividend for investors in these funds. We find that a capital gain announcement increases the premium for taxable funds and decreases it for tax-exempt funds, both effects increasing with the size of the distribution: this is consistent with the capital gains distribution reducing agency costs and increasing the tax burden for investors in both types of fund. For taxable funds the agency cost effect outweighs the tax effect of the gains realization, while the reverse is true for tax-exempt

muni funds. The higher implied tax effect for tax exempt funds is what we should expect if fund investors sort themselves into clienteles according to their tax status, and high marginal tax investors for whom the realization of capital gains imposes a greater tax burden are the major investors in muni funds.

The behavior of the premium around the ex-day provides direct evidence on the tax effect alone since the expected future agency costs do not change around the ex-date. We expect the fund premium to rise around the ex-day of capital gains distributions as the share price ceases to reflect the shareholder tax liability on the impending gains distribution, and for the effect to be larger for muni funds because of the clientele effect mentioned above. That is what we find, except for very small capital gain distributions for muni funds which appear anomalous.

Our analysis does not exclude a role for other variables that may affect fund premia, such as sentiment and the relative liquidity of the fund portfolio and its own shares. However, it does point to the importance of including proxies for both the potential tax due to unrealized appreciation on the fund's portfolio and agency costs in models of the discount.

References

- Bali, Rakesh, and Gailen L. Hite, 1998, Ex-dividend day stock price behavior: Discreteness or tax-induced clienteles?, *Journal of Financial Economics* 47, 127-159.
- Bonser-Neal, Catherine, Gregory Brauer, Robert Neal, and Simon Wheatley, 1990, International investment restrictions and closed-end country fund prices, *Journal of Finance* 45, 523-547.
- Brauer, Gregory A., 1984, 'Open-ending' closed-end funds, *Journal of Financial Economics* 13, 491-507.
- Brickley, James, Steven Manaster, and James Schallheim, 1991, The tax-timing option and the premiums on closed-end investment companies, *Journal of Business* 64, 287-312.
- Brickley, James A. and James S. Schallheim, 1985, Lifting the lid on closed-end investment companies: A case of abnormal returns, *Journal of Financial and Quantitative Analysis* 20, 107-117.
- Chay, J. B., Dosoung Choi, and Jeffrey Pontiff, 2006, Market valuation of tax-timing options: Evidence from capital gains distributions, *Journal of Finance* 61, 837-865.
- Cherkes, Martin, 2003, A positive theory of closed-end funds as an investment vehicle, Working Paper, Princeton University.
- Dai, Zhonglan, Edward Maydew, Douglas A. Shackelford, and Harold H. Zhang, 2007, Capital gains taxes and asset prices: Capitalization or lock-in?, *Journal of Finance*, forthcoming.
- Dimson, Elroy, and Carolina Minio-Kozerski, 1999, Closed-end funds: A survey, *Financial Markets, Institutions and Instruments* 9, 1-41.
- Elton, Edwin J., Martin J. Gruber, 1970, Marginal stockholders tax rates and the clientele effect, *Review of Economics and Statistics* 52, 68-74.
- Elton, Edwin J., Martin J. Gruber, and Christopher R. Blake, 2005, Marginal stockholder tax effects and ex-dividend-day price behavior: Evidence from taxable versus non-taxable closed-end funds, *Review of Economics and Statistics* 87, 579-586.
- Frank, Murray, and Ravi Jagannathan, 1998, Why do stock prices drop by less than the value of the dividend? Evidence from a country without taxes, *Journal of Financial Economics* 47, 161-188.
- Gemmill, Gordon, and Dylan C. Thomas, 2002, Noise trading, costly arbitrage, and asset prices: Evidence from closed-end funds, *Journal of Finance* 57, 2571-2594.

- Graham, John R., 2003, Taxes and corporate finance: A review, *Review of Financial Studies* 16, 1075-1129.
- Johnson, Shane A., Ji-Chai Lin, and Kyojik Song, 2006, Dividend policy, signaling, and discounts on closed-end funds, *Journal of Financial Economics* 81, 539-562.
- Lee, Charles M.C., Andrei Shleifer, and Richard H. Thaler, 1991, Investor sentiment and the closed-end fund puzzle, *Journal of Finance* 46, 76-110.
- Malkiel, Burton G., 1977, The valuation of closed-end investment-company shares, *Journal of Finance* 32, 847-858.
- Pontiff, Jeffrey, 1995, Closed-end fund premiums and returns: Implications for financial market equilibrium, *Journal of Financial Economics* 37, 341-367.
- Pontiff, Jeffrey, 1996, Costly arbitrage: Evidence from closed-end funds, *Quarterly Journal of Economics*, 111, 1135-1151.
- Pratt, Eugene J., 1966, Myths associated with closed-end investment company premiums, *Financial Analysts Journal* 22, 79-82.
- Ross, Stephen A., 2002, A neoclassical look at behavioral finance: Closed end funds, *European Financial Management* 8, 129-137.
- Wang, Jay Z., and Vikram Nanda, 2007, Why do aggressive payout policies reduce fund discounts – is it performance or investor naiveté?, Working Paper, University of Illinois and Arizona State University.
- Wermers, Russ, Youchang Wu, and Josef Zechner, 2004, Closed-end fund governance, portfolio performance, and the discount, Working Paper, University of Maryland and University of Vienna.

Table 1. Summary Statistics

Summary statistics on dividend and capital gain distributions by closed-end funds in the period 1988-2002. The sample includes only those observations for which the total distribution is at least 10 cents. TOTYLD and CGYLD are the amounts of the total distribution and capital gains distribution, scaled by the net asset value on the pre-declaration day; PREM is the pre-declaration day fund premium; SIZE is the market capitalization on the pre-declaration day. All variables are expressed as percentages except SIZE which is in \$million.

A. Municipal Bond Funds

	Mean	Median	Std. Deviation	Minimum	Maximum
<i>A1. Pure dividend distributions (N=115)</i>					
TOTYLD	0.87	0.72	0.60	0.60	5.52
PREM	1.92	2.59	4.34	-11.61	10.18
SIZE (\$m)	378.32	217.16	306.45	25.80	1242.30
<i>A2. All capital gain distributions, including those with a concurrent dividend distribution (N=442)</i>					
CGRAT	54.19	54.21	20.76	12.56	100.00
TOTYLD	1.40	1.12	0.79	0.59	4.88
CGYLD	0.89	0.61	0.81	0.09	4.44
PREM	-2.83	-3.18	5.17	-18.61	12.78
SIZE (\$m)	254.75	162.97	274.37	13.28	1852.10

B. Taxable Funds

	Mean	Median	Std. Deviation	Minimum	Maximum
<i>B1. Pure dividend distributions (N=4519)</i>					
TOTYLD	1.42	1.06	1.08	0.39	20.02
PREM	-1.94	-2.12	9.82	-41.85	49.87
SIZE (\$m)	175.45	119.86	168.27	7.06	1416.80
<i>B2. All capital gain distributions, including those with a concurrent dividend distribution (N=577)</i>					
CGRAT	65.72	76.31	32.22	1.00	100.00
TOTYLD	5.20	3.49	4.91	0.43	31.12
CGYLD	4.08	2.29	4.78	0.01	31.12
PREM	-8.21	-10.21	10.77	-30.93	45.13
SIZE (\$m)	223.69	140.03	239.73	9.12	1215.30

Table 2. Changes in Fund Premiums around Declarations of Dividend and Capital Gain Distributions

Mean values of the change in premium of (A) municipal bond and (B) taxable closed-end funds around the declaration day ($\Delta\text{PREM}_{D,D}$) for distributions greater than or equal to 10 cents for the period January 1988 to December 2002. Separate results are shown for subsamples based on the size of the distribution: Low denotes distributions scaled by the net asset value on the pre-declaration day of less than 1%, Medium between 1% and 2%, and Large greater than 2%. t-ratios in parentheses.

Panel A: Declaration Day: $\Delta\text{PREM}_{D,D}$ for municipal bond funds

	All observations	Distribution Size			Difference: (L) - (S)
		Small (S)	Medium (M)	Large (L)	
(1) Pure dividend distributions: $\Delta\text{PREM}_{D,D}$	(N=115) 0.56 (4.44)	(N=103) 0.60 (4.31)	(N=9) 0.42 -	(N=3) -0.36 -	- -
(2) All capital gain distributions: $\Delta\text{PREM}_{D,D}$	(N=442) -0.12 -(1.63)	(N=307) 0.05 (0.58)	(N=91) -0.49 -(2.56)	(N=44) -0.56 -(2.48)	-0.61 -(2.53)
Difference: (1) - (2)	0.68 (4.65)	0.55 (3.37)	- -	- -	

Panel B: Declaration Day: $\Delta\text{PREM}_{D,D}$ for taxable funds

	All observations	Distribution Size			Difference: (L) - (S)
		Small (S)	Medium (M)	Large (L)	
(1) Pure dividend distributions: $\Delta\text{PREM}_{D,D}$	(N=4519) 0.20 (6.92)	(N=2032) 0.16 (3.88)	(N=1654) 0.20 (4.12)	(N=833) 0.29 (4.11)	0.14 (1.67)
(2) All capital gain distributions: $\Delta\text{PREM}_{D,D}$	(N=577) 0.43 (4.40)	(N=181) 0.34 (2.92)	(N=86) 0.02 (0.09)	(N=310) 0.60 (3.81)	0.25 (1.28)
Difference: (2) - (1)	0.23 (2.28)	0.19 (1.51)	-0.18 (0.78)	0.30 (1.76)	

Table 3. Differences in Δ PREM between municipal bond and taxable funds around the declaration day

Differences in the change in the premium of municipal bond and taxable funds around the declaration day (Δ PREM_{D,D}) of (A) pure dividend distributions and (B) all capital gain distributions, with or without a concurrent dividend distribution, where the total distribution is greater than or equal to 10 cents. TOTYLD (CGYLD) is the amount of the total (capital gain) distribution divided by the net asset value prior to its declaration. The sample period is from January 1988 to December 2002. t-ratios in parentheses.

Panel A: Declaration Day: Δ PREM_{D,D} for pure dividend distributions

	All observations	TOTYLD < 1%	1% ≤ TOTYLD < 2%	TOTYLD ≥ 2%
Taxable <i>minus</i>	-0.36	-0.44	1	1
muni funds	(2.78)	(3.05)		

¹ Insufficient observations

Panel B: Declaration Day: Δ PREM_{D,D} for all capital gain distributions

	All observations	CGYLD < 1%	1% ≤ CGYLD < 2%	CGYLD ≥ 2%
Taxable <i>minus</i>	0.55	0.30	0.51	1.16
muni funds	(4.48)	(2.03)	(1.72)	(4.21)

Table 4. Changes in Fund Premiums around Payments of Dividend and Capital Gain Distributions

Mean values of the change in premium of (A) municipal bond and (B) taxable closed-end funds around the ex-day ($\Delta\text{PREM}_{C,E}$) for distributions greater than or equal to 10 cents for the period January 1988 to December 2002. Separate results are shown for subsamples based on the size of the distribution: Low denotes distributions scaled by the net asset value on the pre-declaration day of less than 1%, Medium between 1% and 2%, and Large greater than 2%. t-ratios in parentheses.

Panel A: Ex-day: $\Delta\text{PREM}_{C,E}$ for municipal bond funds

	All observations	Distribution Size			Difference: (L) - (S)
		Small (S)	Medium (M)	Large (L)	
(1) Pure dividend distributions: $\Delta\text{PREM}_{C,E}$	(N=115) -0.12 -(1.21)	(N=103) -0.11 -(1.03)	(N=9) -0.03 -	(N=3) -0.68 -	- -
(2) All capital gain distributions: $\Delta\text{PREM}_{C,E}$	(N=442) -0.05 -(0.69)	(N=307) -0.29 -(3.14)	(N=91) 0.21 (1.22)	(N=44) 1.04 (4.16)	1.33 (4.99)
Difference: (1) - (2)	-0.06 -(0.51)	0.18 (1.27)	- -	- -	

Panel B: Ex-day: $\Delta\text{PREM}_{C,E}$ for taxable funds

	All observations	Distribution Size			Difference: (L) - (S)
		Small (S)	Medium (M)	Large (L)	
(1) Pure dividend distributions: $\Delta\text{PREM}_{C,E}$	(N=4519) -0.04 -(1.53)	(N=2032) -0.07 -(1.78)	(N=1654) 0.01 (0.29)	(N=833) -0.10 -(1.25)	-0.04 -(0.42)
(2) All capital gain distributions: $\Delta\text{PREM}_{C,E}$	(N=577) 0.23 (2.14)	(N=181) 0.05 (0.32)	(N=86) 0.11 (0.46)	(N=310) 0.38 (2.18)	0.33 (1.47)
Difference: (2) - (1)	0.28 (2.46)	0.11 (0.75)	0.10 (0.40)	0.48 (2.51)	

Table 5. Differences in ΔPREM between municipal bond and taxable funds around the ex-day

Differences in the change in the premium of municipal bond and taxable funds around the ex-day ($\Delta\text{PREM}_{C,E}$) of (A) pure dividend distributions and (B) all capital gain distributions, with or without a concurrent dividend distribution, where the total distribution is greater than or equal to 10 cents. TOTYLD (CGYLD) is the amount of the total (capital gain) distribution divided by the net asset value prior to its declaration. The sample period is from January 1988 to December 2002. t-ratios in parentheses.

Panel A: Ex-day: $\Delta\text{PREM}_{C,E}$ for pure dividend distributions

	All observations	TOTYLD < 1%	1% ≤ TOTYLD < 2%	TOTYLD ≥ 2%
Taxable <i>minus</i>	-0.08	-0.05	1	1
muni funds	(0.74)	(0.40)		

¹ Insufficient observations

Panel B: Ex-day: $\Delta\text{PREM}_{C,E}$ for all capital gain distributions

	All observations	CGYLD < 1%	1% ≤ CGYLD < 2%	CGYLD ≥ 2%
Taxable <i>minus</i>	0.29	0.34	-0.10	-0.66
muni funds	(2.14)	(1.96)	(0.34)	(2.17)