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Abstract

Based on an extensive sample of U.S. closed end funds undergoing termination, this study offers a comprehensive analysis of closed end fund exiting behaviors. There are four ways for a fund to exit: merger into other closed-end fund, liquidation, conversion to open-end mutual fund and merger into open-end mutual fund. Closed-end funds that exit must choose the most efficient and optimal mechanisms corresponding to funds' characteristics and organizational forms. In this study, I find that closed-end funds exit optimally. First, funds with persistently larger discount and smaller size are more likely to exit and consistent with rational expectation, market incorporates open ending expectation into price/discount of closed-end funds. Discount level gradually adjusts to industry average before open ending, especially for liquidating funds; closed-end funds which are open-ended have larger discounts, larger cumulative abnormal returns CARs $_{(t-1,\ t,\ t+1)}$ and more significant relationships between CARs $_{(t-1,\ t,\ t+1)}$ and discounts than funds which are close-ended. Second, discount is not systematically predictive of liquidation probability; both merged funds and acquiring funds experience similar level of discount and the coefficients of discount for acquiring funds are not significantly different from that of merged funds. Third, dividend is negatively related with open ending but positively with closed ending; funds with high dividend yield are more likely to be acquired by other closed-end funds and less likely to liquidate or convert to mutual.

Key Words: Closed-end fund open ending arbitrage discount

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1. Introduction

A "closed-end fund," legally known as a "closed-end company," is a simple form of corporation which invests in a portfolio of various assets. A closed-end fund issues a fixed number of shares and uses the proceeds to invest in securities like stocks or bonds. The shares of closed-end funds are traded in stock exchanges and are not redeemed or issued on demand. Details of the investment portfolio is publicly disclosed quarterly with SEC and the value of the portfolio on a per share basis (known as "net asset value," NAV) is computed daily and reported at least weekly in the financial press. In an efficient market with rational investors, the share price of a closed end fund should equal its NAV, yet closed end funds are often found to trade at prices that deviate from their NAVs. The deviation of closed end fund prices from the NAV - the discount[1], has long remained a puzzle. Gemmill and Thomas (2002) provide evidence that it is not unusual for closed end funds to be trading at prices ranging from 5 percent above to 30 percent below their NAVs. Different from mutual funds, closed-end funds do not generally stand ready to provide liquidity to investors. Without incurring transaction cost associated with liquidity provision, closed-end funds are able to invest in a greater amount of "illiquid" securities than mutual funds. The above special organizational form results in some interesting features. First, closed-end funds behave like common public firms. Their fund shares usually trade at prices greater or less than the net asset values (NAV), so-called premium or discount puzzle. Second, closed-end funds have some common features with mutual funds. They charge fees and their underlying assets or fundamentals are known at any given

[1] "Discount" is the difference between the exchange-traded price and the underlying per share value of the portfolio of the fund given by its net asset value (NAV). The discount is positive if the price exceeds the NAV.

time. Third, closed-end funds have to meet liquidity provision by paying out dividend at certain level.

The legal structure of closed-end funds provides a stable asset base. This enables the portfolio manager of the closed-end fund to make longer-term investment decisions based on the fund's investment strategy without being concerned about potential redemption of shares by the shareholders. Open-end funds tend to have a fluctuating asset due to purchase and redemption requests by shareholders. Therefore, investor sentiment might affect the portfolio structure rather than the investment philosophy of the fund. This view is consistent with Lee, Shleifer and Thaler (1991). Another disadvantage of converting a close-end fund into an open-end fund is that closed-end funds can add leverage to their portfolio whereas open-end funds do not have this opportunity. A final difference between open-end and closed-end funds is that the latter are able to direct more investments into illiquid securities.

Generally there are four ways for a fund to exit: merger into other closed-end fund, liquidation, conversion to open-end mutual fund and merger into open-end mutual fund. Shareholders who hope to eliminate the share price discounts from net asset value usually initiate open-ending[2] events. Open-ending a closed-end fund is to eventually force fund to accept redemption of share for cash at NAV. Essentially a fund will exit from closed-end fund industry. Open ending includes three approaches: to liquidate, to merge into an open-end mutual and to convert to a mutual fund. Because open ending is in effect a partial or complete liquidation process for underlying assets, it forces any discount or premium to disappear as in mutual funds.

[2] The term "open-ending" refers to any of the events that terminate a closed-end fund: liquidation of the fund, conversion to an open-end fund, or merger with an open-ended fund.

Close-ending a closed-end fund is another way in which a fund exits from market place. To close-end a fund is equivalent to merge itself into another closed-end fund. After merger, the underlying assets remain closed-end to investors so that fund does not incur any costs associated with liquidating underlying assets, especially illiquid ones in a short period. Such transaction costs would otherwise be enormous for portfolios holding thin-traded securities such as municipal bond, high-yield corporate bond, emerging market stocks or mortgage-backed securities. Close ending has another advantage that fund management companies can keep fees collected from underlying asset. So most mergers should take place between two funds within the same fund family.

Whether a closed-end fund makes exiting choices optimally according to fundamentals as well as arbitrage opportunities are the main questions this study attempts to answer. As stated above, closed-end funds can exit through four mechanisms and all these exiting mechanisms have different economic rationales and therefore different institutional arrangements. If a fund is merged by another closed-end fund, the original fund shareholders will receive acquiring fund shares according to two funds' NAV. Such exiting decisions will not eliminate discount in fund share prices. Factors such as economy of scale and industry consolidation are likely to be the rationale for fund to engage merger activities. When a fund chooses open ending mechanisms such as liquidation, opening to mutual or merger into open-end mutual funds, the fund has to stand ready to provide liquidity for redemption shares at NAV at different levels. Choices in open ending must be associated with different motivations and economic rationales. Previous literature neither differentiates the various fund termination mechanisms, nor does it study merger and acquisition

among closed-end funds. This study will complement the literature by filling up the gap.

If open ending is systematically predictable and open ending eliminates discount in a short period, sophisticated investors can develop a trading strategy to exploit discount before open ending. As a result, these speculative activities will eliminate large abnormal discount of potential open-ending funds. In the equilibrium with rational expectation, there must be no relationship between open ending and discounts at announcement date, unless there are institutional arrangements to make arbitrager very costly. If open ending takes the form of liquidation, fund has to distribute all assets at NAV. In such a case, there should be no prior large and persistent discounts associated with fund share price. Otherwise arbitrageurs can simply buy the fund shares before a liquidation announcement and make handsome profits. In equilibrium with rational expectation, discount should not be systematically associated with fund liquidation choice. If a fund is merged into an open-end fund or open to mutual by itself, fund with large discount must have some institutional arrangements to make arbitrage costly in order to protect long-term investors. Usually a fund will charge a large redemption fee within a minimum redemption period to align the interest of short-term speculators with long-term investors.

What types of securities a fund holds should have impact on the choice for a fund to exit. Asset liquidity should be positively associated with the likelihood a fund going to open-end. Since more illiquid asset a fund holds, more transaction costs it incurs in the open-ending process. Open ending requires a fund to liquidate partial or all asset positions in a short period. Municipal bond fund, emerging market fund and mortgage fund have illiquid assets and they are specialized investment conduit, so they are less

likely to open-end or close-end. I use dummy for fund asset types to capture differences in the asset illiquidity. The dummies are municipal bond, high-yield corporate bond, emerging market equity, and mortgage-based securities.

Using a large sample of maximum 502 closed-end funds including 104 exiting funds during January 1994 through December 2006 period, this paper contribute to existing literature from several perspectives. First, this study updates the results of abnormal returns on closed end fund termination announcement events. To my best knowledge, the last study is by Brauer (1984) and Brickley and Schallheim (1985) both of which are more than two decades old and were based on relatively small samples of closed end funds. The advantage of using a large sample is the richness and depth of the data. The previous literature on closed-end funds only takes a small sample. The limitation is twofold. On the one hand, small sample results in selection biases; on the other hand, it may induce bias by using the wrong comparison group. The sample used by this study includes all closed-end fund observations in CRSP data set for the sample period from January 1994 to December 2004. Second, since there have been no empirical studies on close ending in closed-end fund industry, nor does the literature differentiate various choices of open ending, e.g., liquidation vs. conversion to mutual, this study fills in the gap of the literature and examines the economic determinants of fund exiting decisions. The analysis also takes into account arbitrage, fund characteristics, underlying assets and illiquidity issues.

The main findings of this study, based on a large sample of 104 closed end fund exiting events, are as follows. First, funds with persistently larger discount and smaller size are more likely to exit and consistent with rational expectation, market incorporates open ending expectation into price/discount of closed-end funds.

Discount level gradually adjusts to industry average before open ending, especially for liquidating funds; closed-end funds which are open-ended have larger discounts, larger cumulative abnormal returns CARs $_{(t-1, t, t+1)}$ and more significant relationships between CARs $_{(t-1, t, t+1)}$ and discounts than funds which are close-ended. Second, discount is not systematically predictive of liquidation probability; both merged funds and acquiring funds experience similar level of discount and the coefficients of discount for acquiring funds are not significantly different from that of merged funds. Third, dividend is negatively related with open ending but positively with closed ending; funds with high dividend yield are more likely to be acquired by other closed-end funds and less likely to liquidate or convert to mutual.

The remainder of the paper proceeds as follows. Section II provides a brief summary of the related literature. Section III discusses the data collection method in detail, provides the summary statistics and introduces the methodology used by this study. Section IV describes the hypotheses proposed by this study and documents the main empirical findings. Section V concludes the paper.

2. Related Literature

There are two strands of literature on closed-end funds. One is on event study of IPO or open ending of closed-end funds and another is about pricing of closed-end funds. The limited research on the former topic, especially on open ending, may be attributed to the small size of the sample available. More research has been focused on the economic explanation of the existence of discount or premium on fund shares.

Most mutual funds are open-end funds in the sense that the fund stands ready to accept more money at any time and will redeem shares for current stockholders at the

"net asset value" of the fund, that is, the market value (per share) of the securities the fund holds. In the case of a closed-end fund, the management raises a certain amount of capital, say $100 million, buys a portfolio of securities which it will manage according to its charter, and then issues a fixed number of shares, say 10 million. The shares are traded on organized stock markets, including the New York Stock Exchange. Any stockholder who wants to liquidate must sell the shares at the market price. The share price, of course, is set by supply and demand, and therefore can diverge from the net asset value. Indeed, the stock prices of closed-end funds often do diverge from net asset values. Funds selling for less than their net asset value are said to trade at a discount, while those selling for more than net asset value are said to sell at a premium. During 1989 it was possible to find most of the funds selling at substantial discounts (greater than 30 percent) and others selling for enormous premia (in one case over 100 percent). In the case of closed-end funds, therefore, it is common to find that the price is wrong! This raises the question: how can mispricing of closed-end funds survive smart investors in the context of the efficient market hypothesis and rational agents? If closed-end funds are so clearly mispriced, can't a smart investor make money? Why don't rational traders buy the funds up at the bargain prices? The answer is that in buying a closed-end fund, even at a discount, a rational trader must bear two kinds of risk. The first is that the net asset value of the fund will underperform the market. The second risk is that when the rational trader wishes to sell the fund the discount may have widened, because noise traders have become even more pessimistic. This analysis implies that rational investors will only be willing to buy closed-end funds if they are compensated for the noise-trader risk, that is, if they can buy the funds at a discount! It should be stressed that this

explanation does not rely on the average pessimism of noise traders; it stems completely from the risk aversion of the rational investors. The fact that discounts disappear when funds are liquidated or open-ended also fits, since when either of these events happen, noise trader risk is eliminated. As discussed above, mispricing can occur because no riskless arbitrage opportunity exists, and the supply of rational investors willing to make long-term bets is limited.

Early studies (i.e. Malkiel, 1977; Brauer, 1984) hypothesize that the exchange-traded prices are different from the reported NAV because of hidden costs such as capital gain tax liability, illiquidity of the portfolio, and agency costs. Lee, Shleifer, and Thaler (1991) argue that such costs do not fluctuate much over short horizons while the closed end fund discounts fluctuate highly even on weekly interval; thus, the presence of hidden costs cannot provide sole explanation for the closed end fund discount. More recent explanations for the closed end fund discount include investor sentiment hypothesis (Lee, Shleifer, and Thaler, 1991), costly arbitrage hypothesis (Pontiff, 1996; Gemmill and Thomas, 2002), and signaling hypothesis (Johnson, Lin, and Song, 2006).

The investor sentiment hypothesis proposes that the discount is a mechanism by which closed end fund holders are compensated for the risk of their inability to sell the funds at the NAV, as noise traders become more pessimistic when closed end fund owners want to sell. The liquidation date is usually announced shortly following the first termination announcement. If noise traders are pessimistic during the period between announcement and actual liquidation, the holders of the soon-to-be liquidated closed end funds could simply wait for the liquidation event and achieve better price outcome. Also, if the holders of the closed end funds must sell

immediately, they should be able to do so at prices close to NAV since the buyers are also aware of the impending liquidation event. Investors will bid up the price based on the knowledge that they will be soon paid an amount equal to the NAV less liquidation expenses. The noise trader risk should be greatly reduced upon the termination announcement, and consequently, the role of investor sentiments in the structure of closed end fund discounts should be greatly attenuated after the liquidation announcement.

The costly arbitrage hypothesis posits that closed end fund discount exists because arbitrageurs do not adequately perform their roles in the presence of high transaction costs. If the arbitrageurs or active shareholders want to purchase majority of the shares and liquidate the closed end fund, they will require high upfront investment and they have to face with problems as below. First, borrowing shares is often very difficult, so one can't sell the funds short. This has been the case with closed-end fund IPO's, as well as with many country funds recently, whether from restricted or from unrestricted markets. Even if an investor could sell them short, the proceeds are not received immediately, [3] raising the cost of this trade. Second, even if an investor manages to sell a fund short and buy its portfolio, the premium can get larger before it gets smaller, leading to a capital loss on the position and the demand by the broker for more funds. If you shorted the Spain fund at a 20 percent premium, you might be broke as the premium rose to 100 percent. Unless the investor is very patient and has deep pockets, this arbitrage trade would not pay. Additionally, resistance from entrenched managers (see Bradley, Brav, Goldstein, and Jiang, 2007) will exacerbate

[3] An investor's proceeds on short sales are only paid, net of costs, when the position is closed. The credit position created by the short sale typically earns no interest for the investor.

the arbitrage costs as well as the probability of the failure of the strategy. These costs would discourage arbitrageurs from disciplining the market. In the presence of low costs, arbitrageurs may buy closed end fund shares and short sell the funds' portfolio. Lee et al (1991) argue that the dividend from the long position will entirely offset the dividend from the short position, enabling the investors to capture the discount as the arbitrage profit. However, because the closed end fund portfolio may not be easily replicable and the fund manager can change the structure of the portfolio composition by active trading, the arbitrageurs may be unable to mimic their short portfolio appropriately. And if the arbitrageurs must liquidate their short portfolio before the funds in their long portfolio are terminated, they are exposed to the risk that the discount may widen by the time they liquidate the portfolio. These costs of arbitrage may discourage arbitrageurs from disciplining the markets. Subsequent to the termination announcement it is expected that the arbitrage costs would be somewhat mitigated leading to weaker explanatory power over the remaining discount. Subsequent to the announcement, arbitrageurs do not require large upfront investment or buy majority of the funds or convince shareholders to liquidate the funds. Further, they are unlikely to face resistance from entrenched managers. Third, since the holding period is relatively short, the arbitrage strategy is easier and less risky to undertake. In other words, arbitrage strategies are less costly and much easier to conduct; hence, the portion of discount due to costly arbitrage should be greatly reduced after the termination announcement.

The signaling hypothesis argues that closed end fund discount exists due to asymmetric information between fund managers and investors. Closed end funds that commit to pay high dividends send a signal to investors about their superior

performance. Prior to the termination announcement, the holding period can be infinite and returns on investing in closed-end funds mainly rely on future performance of the funds. A good signal about future performance of the funds is therefore necessary. However, after termination announcement, the fund holding period becomes relatively short. The value of the closed end fund is less due to future performance of the funds, but more based on the current portfolio value. The signal assumes lower importance because investor will soon receive the liquidation value of the closed end fund portfolio.

In a typical open-ending, the board of directors requests an open-ending proposal from the management. Once the board approves restructuring, shareholders vote is required. The terms and conditions of open-endings by closed-end funds are declared via press releases and become public. Usually this occurs 5 to 7 months before the open-ending. Alternatively, the fund may announce that according to fund's prospectus, a sufficiently large discount exists for a specified time period to require a shareholder vote on open-ending. An example is provided in the following statement contained in the announcement by the Dessauer Global Equity Fund:

> *"…The Fund's prospectus provides that after 18 months from the date of the fund's initial public offering, the fund will automatically convert to an open-end investment company if its shares close at a market price that is at a 5% or greater discount to the net asset value of* the *fund on the last business day of any week and for each of the next 14 business days." (LexisNexis Archives, Open-ending Announcement, January, 6 1999).*

Brauer (1984) is among the first to study open-ending behavior of closed-end fund. He studies a sample of 14 closed-end funds that open-end and finds that open-ending behaviors correspond in predictable ways to the incentive to open-end and to potential

resistance to open-end. Discount is positively associated with open ending and fees negatively with open ending. Fund share prices begin to generate statistically positive abnormal return well in advance of the formal announcement of the open ending. Positive abnormal returns generated by reorganizing closed end funds allow shareholders to obtain the market value of the fund's assets and he documents an abnormal return of 9.3% during the announcement month and the following month. Brauer (1984) records that funds with high discount and low management expense ratios are more likely to open-end. He also documents that most of the positive abnormal return associated with open-ending is incorporated into the market price by the end of the announcement month. This timely market reaction is consistent with a market for closed-end funds that is generally efficient. Dimson and Minio-Paluello (2002) state that Draper (1989) found very similar results for U.K. closed-end funds.

Brauer (1988) studies information content of discount and finds that discount partially incorporate the likelihood of open ending. In his study, he focuses on the potential for open-ending. He states that a trading strategy can be profitable if it identifies candidates for open-ending, the likelihood of which depends on the size of the discount and the management expense ratio. This finding suggests that closed-end funds' discounts contain information that can be used in a model to predict open-ending activity.

Brickley and Schallheim (1985) assess 16 closed-end funds that reorganize and find positive abnormal returns in response to the announcement and report an average abnormal return of 15.3% by investing on the last day of the month in which the announcement is made and holding until the fund is reorganized. These abnormal returns *after* the announcement of open-ending is not consistent with the joint

hypothesis that the market is efficient and that the market model is the correct return benchmark for funds undertaking reorganizations.

Deaves and Krinsky (1994) investigated the evidence that discounts and managerial performance are not negatively related. More specifically, they argued that investors may attach an increased probability to open-ending for funds with poor managerial performance, which by definition moves the price toward the NAV, in which case, the discount narrows as managerial performance declines. Akhigbe, Madura and Tucker (2005) study the motivation and performance following open ending of closed-end funds. They find funds with more pronounced discount, larger size, more volatility and higher expense ratios are more likely to open-end. Guercio, Dann and Partch (2003) assess the governance in closed-end funds and finds restructuring in closed-end funds are related with governance arrangement. Khorana, Wahal and Zenner (2002) find that fund with larger premium are more likely to have right offerings. Weiss (1989) finds that closed-end funds usually start out at premium of about 10% on IPOs and that, on average, these funds move to 10 percent discount within four months.

Lee, Shleifer and Thaler (1991) propose an investor sentiment factor to explain closed-end fund discount. The systemic existence of discount or premium in closed-end funds has attracted a lot of academic interest. Pontiff (1996) suggests that costly arbitrage can drive prices of securities to deviate from their fundamental values. He concludes that closed-end funds that are difficult to replicate, pay smaller dividends and have larger bid-ask spreads are more likely to exhibit pronounced mispricings. ‘These factors explain about a quarter of mispricing variation’ [Pontiff (1996, p. 1150)]. Pontiff (1997) finds that return volatility of closed-end fund is higher than its

underlying assets. Chordia and Swaminathan (1997) argue that market segmentation and asymmetric information lead to closed-end fund discounts. Cherkes, Sagi and Stanton (2005) propose a liquidity-based model for closed-end fund discount. They argues that closed-end fund provides means for investors to buy illiquid securities, without facing the costs associated with direct trading should they later need to liquidate their positions. Xia, Wu and Jain (2005) relate discounts or premiums in closed-end country funds with market illiquidity measures. They find that illiquidity in asset (share) market positively (negatively) affects premium in segmented capital markets. Bradley, Brav, Goldstein and Jiang (2005) show that shareholder activism aimed at open-ending closed-end funds has become more frequent since SEC's reform of proxy rules in 1992. Wermers, Wu and Zechner (2005) study the dynamics of discount in closed-end fund before manager turnovers. They find that discount/price incorporates managerial turnover information and that discount adjusts to average level well before turnover.

Another stream of literature analyzing open-ending closed-end funds examines block ownership and governance issues. Barclay, Holderness and Pontiff (1993) report a stable and strong cross-sectional relation between the discounts and the concentration of stock ownership. As the fraction of stock owned by management increases, the discount to net asset value becomes larger. They also argue that blockholders resist to open-ending decision mainly because they do not want to lose their private benefits. In a more recent study, Del Guercio, Dann and Partch (2003) find evidence that board independence and structure are associated with the effectiveness of the board representing shareholders interests. Using discounts and expense ratios as a measure of board effectiveness, they report that more independent boards are more likely to

restructure the fund in the face of large discounts from net asset value. However, contrary to the evidence in Barclay, Holderness and Pontiff (1993), they do not find a relation between blockholdings and fund discounts and blockholdings and the probability of a restructuring event.

In this study, I restrict my focus to the abnormal return generated by the termination announcement and the behavior of discount and since there have been no empirical studies on close ending in closed-end fund industry, nor does the literature differentiate various choices of open ending, e.g., liquidation vs. conversion to mutual, therefore, it is meaningful for this study to examine how closed-end funds will be ended, what are the determinants for the choices of the ways that they are ended and whether a choice of close ending vs. open ending by a fund is optimal in that a fund makes exiting decision relevant to its organizational form, underlying assets, performance, management and arbitrage. This paper does not attempt to provide economic rationales for pervasiveness of discounts in closed-end funds; rather it takes discounts or premiums as given factors when a fund makes termination decisions. One hypothesis of this study is that discounts should not be significantly associated with the probability for a fund to open-end, unless there are some market frictions to make arbitrage in open ending costly. A direct implication is that there is no predictive power of discount for open ending probability. Since fund can impose transaction fees in cases of conversion to mutual or merger into mutual fund, predictive power of discount should be strong. The previous findings that discounts predict open ending in the literature are mainly driven by the latter two cases. Similar with Wermers, Wu and Zechner (2005), this study finds that there is persistently

larger discount for funds to exit and that discount goes to average level when funds announce the exiting decision.

3. Data, Statistics Description and Methodology

A. Data

I obtain data on all closed-end fund returns, price and volume from CRSP and data on fund NAV and other characteristics from CRSP and Compustat merged data set. The sample period is from January 1994 through December 2004 as CRSP and Compustat merged data set starts to report NAV for closed-end funds at end of year 1993. I also obtain additional fund information such as fund exit or reorganization, fund age, asset holdings and fund charter provisions from SEC Edgar file. The total sample consists of 506 closed-end funds (maximum number) with 104 exiting funds, among which there are 32 funds to close-end, 29 funds to liquidate, 24 funds to convert to open-end mutual funds and 19 funds to be merged into mutual funds. Among all mergers, only five happen across different fund families. For each merger announcement, a target fund and acquiring fund are identified, along with a termination date for the target fund. The monthly and quarterly data includes fund price, return, fund NAV, dividend, shares outstanding and shares traded. I calculate annually compounded fund return, NAV compounded return, annually average dividend yield, discount or premium, fund market values using monthly data. I also hand collect fund annual expense ratio and turnover ratio from SEC website.

B. Methodology:

To test if the termination announcements generate abnormal returns and how different are the abnormal return magnitudes across different fund groups that exhibiting in different ways on the closed end fund share price, I employ a standard event study approach. The open-ending announcement date is treated day zero in event time. I estimate the market model using price returns. The estimation period is from –250 to –21, and the market model is estimated with CRSP equally weighted index. The abnormal returns, $AR_{i,t}$, is defined as the difference between the realized returns and the expected returns based on the estimated parameters from the market model:

$$AR_{i,t}=R_{i,t} - (a_i + b_iR_{m,t}) \qquad (1)$$

The average abnormal returns by different portfolios are computed across event dates. The cumulative average abnormal daily return over a period is: $CAR_{t_0}^{T} = \sum_{t_0}^{T} AR_t$ To examine the statistical significance of the abnormal returns, a *z* – statistic is computed as: $z = \sqrt{n}\,\overline{SAR_t}$, where *n* is the sample size, and $\overline{SAR_t}$ is the average standardized abnormal return on day *t*.[4]

[4] Let σ_I denote the standard deviation of the residuals in the market model estimation period; T_i the number of days in the estimation period; R_{mt} the return to the equally –weighted market portfolio on day *t*, and $\overline{R}_m$ the mean return to the market portfolio over the estimation period. The standardized abnormal return (*SAR*) on day *t* is computed as:

$$SAR_{it} = AR_{it} \Bigg/ \left[\sigma_i \left(1 + \frac{1}{T_i} + \frac{(R_{mt} - \overline{R}_m)^2}{\sum_{\tau}^{T_i} (R_{m\tau} - \overline{R}_m)^2} \right)^{1/2} \right]$$

The share price discount is conventionally calculated as :

$$Discount_{i,t}=(NAV_{i,t}-PRICE_{i,t})/NAV_{i,t}, \quad (2)$$

where NAV is the net asset value and a discount is, of course, simply a negative number here. So premium will have a positive sign.

The return of a fund's net asset value can be computed from the discount and stock return information. Specifically,

$$NAV\ R_{i,t}=(1+RX_{i,t})(1-Discount_{i,t-1})/(1-Discount_{i,t})+(R_{i,t}-RX_{i,t})(1-Discount_{i,t})-1 \quad (3)$$

where RX is stock return without dividend, R is stock return. In months when no dividend is paid, the second term is zero.

The other variables used in the regressions are fund return, dividend yield, fund market value, fund age and dummy for asset classes and interactive terms between asset class dummy and discount. Fund return is measured as the annually holding period return of the fund before the time t, where t represents the termination announcement date. Fund size is the monthly average of market value for the fund one year before time t. Fund age is the log value of fund existing years since its inception year.

I construct the variables so that they reflect the decision making process by management. All the dependent variables are formed using the averages one year before time t, at which time fund board approves exiting decisions. So at each time t, fund faces choices of whether and how to exit using past year information.

Consistent with other literature on fund merger or reorganization studies, we employ multi-logit regression to analyze fund exit decisions. Specifically, probability:

$$(\text{Fund Exit Dummy})_{i,t} = \exp(\beta' X_{i,t}) / [1+\exp(\beta' X_{i,t})], \quad (4)$$

$$\beta' X_{i,t} = \alpha + \beta_{1i}(R_{i,t}) + \beta_2(NAV\ R_{i,t}) + \beta_{3i}(Discount_{i,t}) + \beta_{4i}(Dividend\ Yield_{i,t}) + \beta_{5i}(Fund\ Size_{i,t}) + \beta_{6i}(Fund\ Age_{i,t}) + \beta_{7i}(Expense\ ratioe_{i,t}) + \beta_{8i}(Turnover_{i,t}) + \beta_{9i}(Asset\ Class_{i,t}) + \beta_{10i}(Asset\ Class*Discount_{i,t}) + e_{i,t} \quad (5)$$

C. Sample Description

Table I reports the distributions of funds that exit by year. There are totally 104 funds that exit for the period from January 1994 through December 2004. Among them, 32 funds choose to close-end by merging into other closed-end funds. There are 72 open-ending funds. Among them, 29 funds choose to liquidate, 24 convert themselves to mutual funds, and 19 merge into open-end mutual funds. Most of the mergers (including merger by closed-end fund and open-end fund) take places within same fund family. Among all 51 mergers, there are only 5 mergers that happen across different families. In all 29 liquidated funds there are 13 funds to liquidate when they reach maturity date according to the charters.

Table 1: Summary for closed-end fund merger, open-ending and liquidation

Distribution of the 104 close-end funds sample that announced exiting decisions during the period from January 1994 to December 2004.

Year	**Close-ended close-end funds**	Liquidated (Open-ended)	Opened to mutual (Open-ended)	Merged into open-end funds (Open-ended)	**Total Open-ended close-end funds**	**Total Funds**
1994	0	0	0	0	0	450
1995	0	0	0	1	1	469
1996	4	1	4	1	6	513
1997	3	2	6	0	8	534
1998	1	4	2	6	12	502
1999	5	5	1	2	8	452
2000	9	4	5	4	13	410
2001	4	1	3	3	7	433
2002	3	8	1	2	11	448
2003	1	2	1	0	3	485
2004	2	2	1	0	3	347
Total	**32**	29	24	19	**72**	

Table II reports the distribution of funds by investment objectives. Panel A reports the distribution of all funds by investment objectives from year January 1994 through December 2004. Municipal bond funds are the most common ones in this sample and represent 33.5 percent. Emerging market stock funds are the second mostly represented group, which contribute up to 15 percent of the whole sample. Other bond fund objectives such as corporate high yield represent 7 percent of the sample. Mortgage backed securities funds represent 3% of the sample. Panel B shows the distribution of exiting funds by investment objectives. 21 Municipal bond funds choose to close-end while only 6 Municipal funds open-end. There are 23 Emerging market funds to open-end while only 4 to close-end.

Table 2: Distribution of Funds by main asset classes for the sample period from January 1994 to December 2004.

Panel A: For all close-end funds

Year	Municipal bond	High-yield bond	Convertible bond	Emerging equity	International equity	Mortgage	Total
1994	143	26	8	53	17	20	450
1995	143	31	11	80	16	21	469
1996	143	31	11	83	15	17	513
1997	144	33	9	84	15	17	534
1998	149	34	8	81	11	16	502
1999	154	33	9	71	12	12	452
2000	148	31	8	68	9	11	410
2001	144	31	7	61	9	10	433
2002	165	33	7	57	8	11	448
2003	179	32	8	53	7	11	485
2004	176	31	8	50	6	12	347

Panel B: For all close-end funds that are terminated (open-ended/close ended) during the sample period

Exiting Options	Municipal Bond	Corporate High-yield	Convertible Bond	Emerging market equity	International equity	Government Mortgage
End	27	7	2	27	1	10
Close-end	21	2	1	4	0	1
Open-end	6	5	1	23	1	9
Liquidate	3	2	0	8	0	3
Open to mutual	1	0	1	9	0	0
Merge into mutual	2	3	0	6	1	6

Table III reports the summary statistics for fund NAV, price, compounded annual return, NAV compounded annual return, annual discount level, annual dividend yield, fund market value (fund size) and age. The full sample is divided into sub-samples according to the funds exiting approaches. I find marked differences among sub-samples. First, the mean discount of funds that exit is much larger than those in existence. The average annual discount for the whole sample is 4.8 percent, compared with an average annual discount before termination of 7.04 percent for funds to close-end and 10.28 percent for funds to open-end. The average market value (fund size) of the whole sample is about 210.74 million, much larger than 121.533 million of close-ended funds and 146.39 million of open-ended funds. The underlying performance of funds that exit is economically and statistically worse than that of existence. The closed-ended funds have a mean NAV compounded annual return of 0.1 percent and the open-ended funds have a mean NAV compounded annual return of 0.3 percent. The whole sample funds perform much better with a monthly NAV return of 0.9 percent. The statistics in this table show firstly that funds with persistently larger discount and smaller size are more likely to exit. Secondly, funds with high dividend yield are more likely to be acquired by other closed-end funds and less likely to liquidate or convert to mutual.

Table 3: Summary statistics for fund characteristics

	Mean	Median	Min	Max	SD
Panel A. Sample of all close-end funds					
NAV	13.982	13.676	1.696	267.003	10.61
Price	13.068	12.477	1.849	246.489	9.814
Return	.0013	.0022	-0.129	0.1715	.0162
NAV return	.0089	.0067	-1.9157	1.4729	.1927

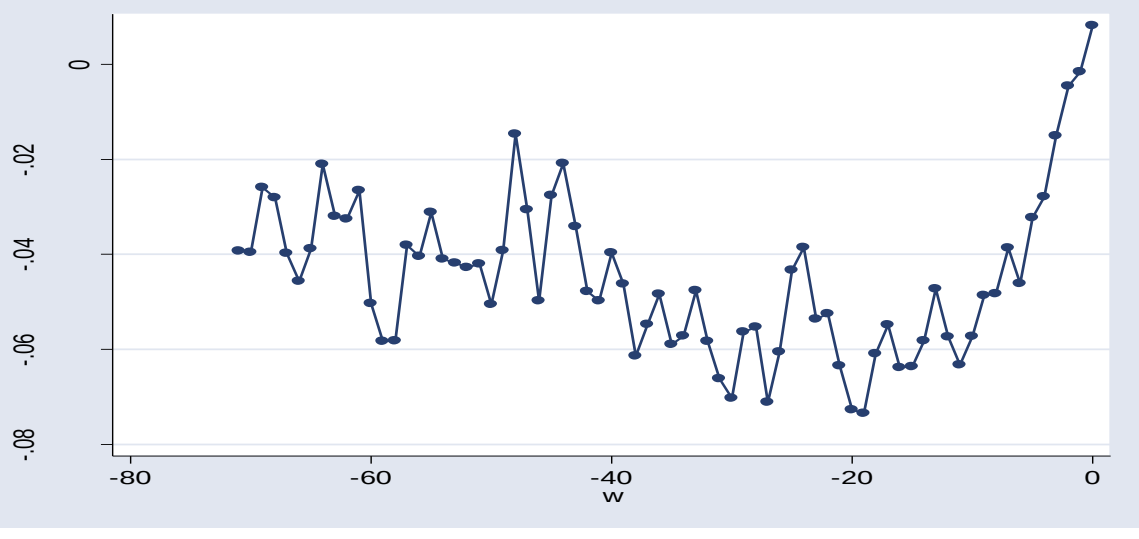
Discount	.0482	-.0629	-.4356	.8166	.0965
Dividend yield	.0197	.0174	0	.1383	.013
Age	10.04	11	1	19	5.28
Size (Million)	210.742	126.882	9.536	2613.434	262.99
Panel B. Sample of close-end funds that are close-ended (merged into other close-end funds)					
NAV	14.34	13.79	7.16	56.43	7.77
Price	13.19	12.76	6.20	48.86	6.65
Return	.004	.0086	-.131	.0788	.0418
NAV return	.0009	-.0011	-.0335	.0627	.0187
Discount	.0704	-.0624	-.2303	.0553	.059
Dividend yield	.0199	.0163	.0006	.0464	.0112
Age	6.868	6	1	19	5.94
Size	121.533	78.6665	15.512	669.913	138.307
Panel C. Sample of close-end funds that are open-ended					
NAV	14.71	11.87	5.41	162.29	19.05
Price	13.07	10.48	4.47	147.78	17.32
Return	.0076	.0135	-.077	.0617	.0289
NAV return	.0032	.0006	-.0159	.1015	.017
Discount	.1028	-.1087	-.2260	.4395	.092
Dividend yield	.0127	.0137	0	.056	.0104
Share traded	53.61	52.67	15.75	154.22	53.61
Age	8.22	8	2	18	3.77
Size	146.396	101.677	149.825	515.904	127.841
Panel D. Sample of close-end funds that are opened to mutual					
NAV	13.33	14.28	7.34	31.80	5.40
Price	12.64	11.33	6.20	28.63	4.69
Return	.0106	.0206	-.0771	.0618	.038
NAV return	.0114	.0081	-.0159	.1015	.0256

Discount	.1002	-.1348	-.1913	.4395	.1283
Dividend yield	.0071	.0049	0	0.028	.0083
Share traded	64.52	58.96	17.96	154.22	32.68
Age	8	8.30	2	18	3.84
Size	177.791	176.613	243.385	515.390	136.987
Panel E. Sample of close-end funds that are liquidated					
NAV	17.29	11.22	5.41	162.29	29.73
Price	15.32	10.01	4.47	147.78	27.11
Return	.0059	.0137	-.0544	.0322	.0217
NAV return	-.0001	.0004	-.0153	.0161	.0065
Discount	.1146	-.1223	-.2260	.0201	.0623
Dividend yield	.0139	.0152	0	.0254	.0076
Share traded	47.90	43.87	15.75	94.98	23.76
Age	9.15	9	4	18	3.68
Size	118.687	843.07	149.182	446.858	108.852
Panel F. Sample of close-end funds that are merged into other open-end mutual funds					
NAV	11.16	11.34	6.51	15.12	2.49
Price	10.03	9.96	6.78	12.72	1.86
Return	.0059	.0062	-.0644	.0507	.0258
NAV return	-.0032	-.0032	-.0139	.0106	.0067
Discount	.087	-.0924	-.1833	.1228	.068
Dividend yield	.0186	.0175	0	.0562	.0135
Share traded	47.21	42.45	25.25	85.42	20.66
Age	6.56	5	3	15	3.44
Size	148.093	925.117	255.997	471.598	140.615

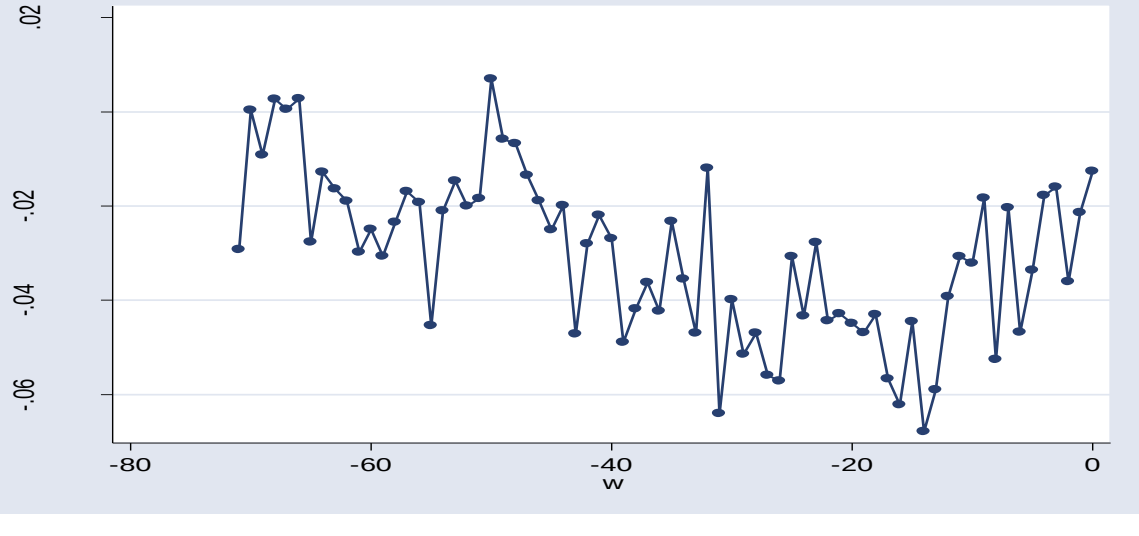
Figure 1 below shows the discounts adjustments of close-end funds before exiting. Discount decreases before open ending and is close to zero on the event date, while there is still a discount of about 10 percent for close ending funds even though discount amount decreases also. Discount for liquidating close-end funds approaches to zero on the event date, while for close-end funds that are converged to mutual or merged into other mutual funds, discount remains at about 5 percent on the event date.

Figure 1. Discount Adjustment by Termination Methods Before Exiting

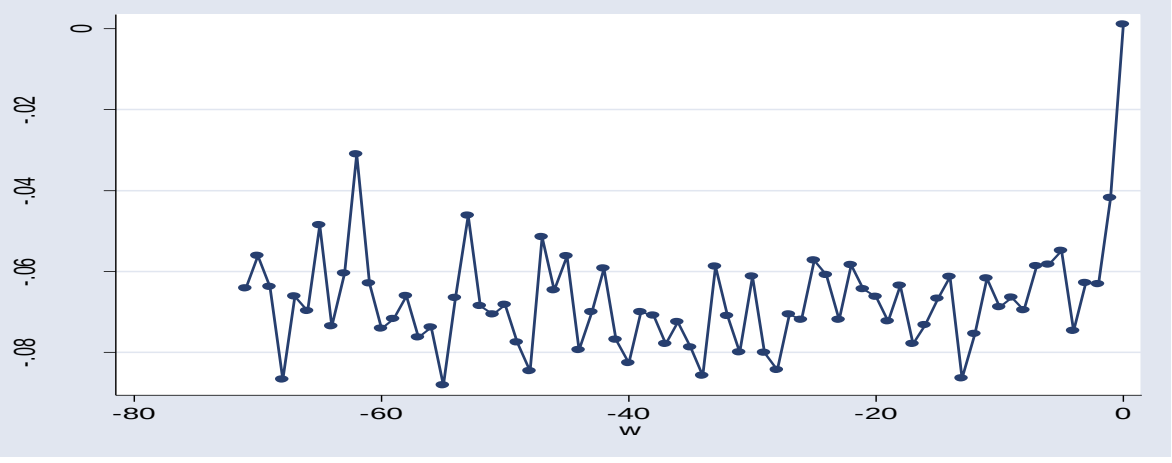
Panel A. Discount adjustment before open-ending of close-end funds



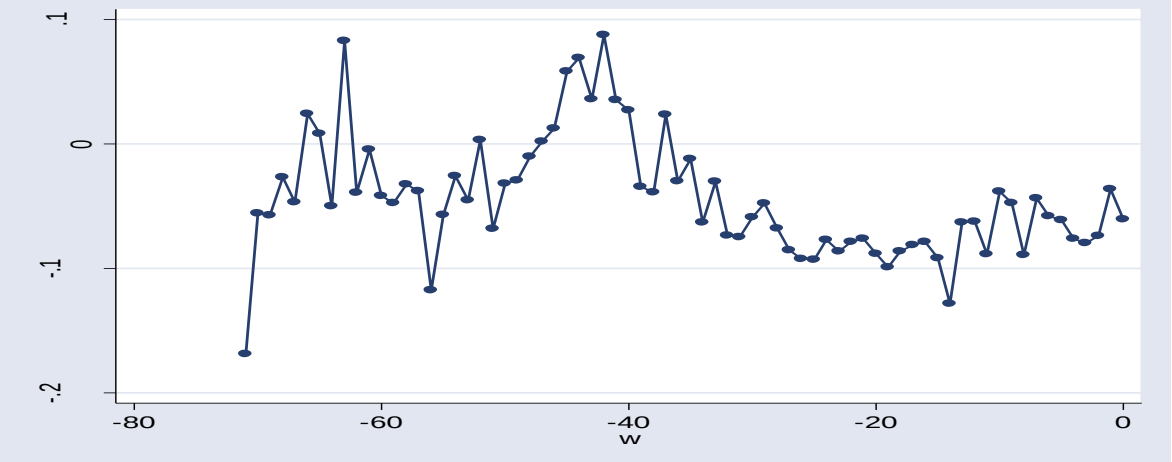
Panel B. Discount adjustment before close-ending of close-end funds



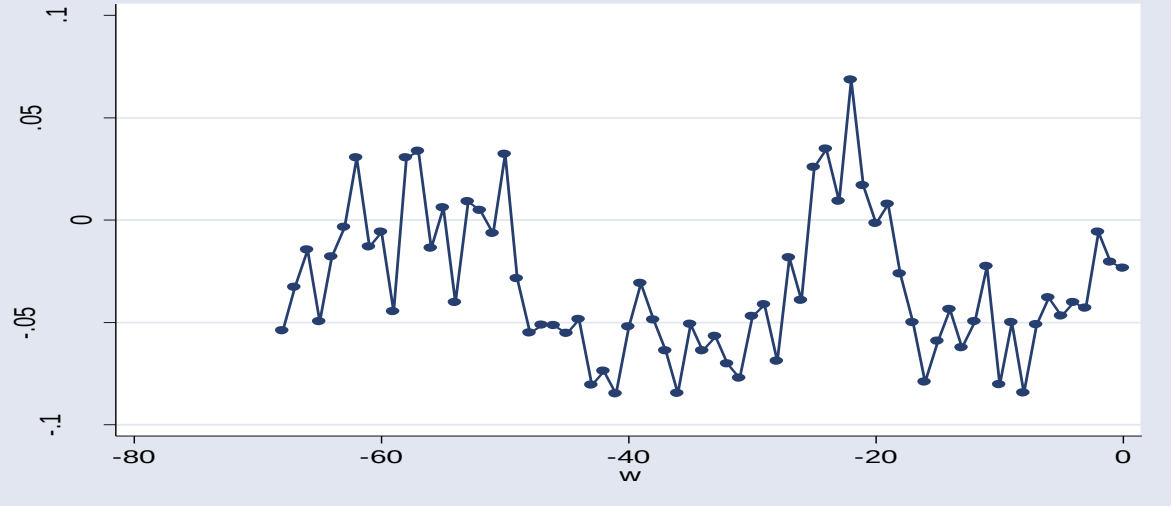
Panel C. Discount adjustment before Liquidation of close-end funds



Panel D. Discount adjustment before conversion to mutual of close-end funds



Panel E. Discount adjustment before merger into mutual of close-end funds



4. Hypothesis and Main result

A. Hypotheses

1. A testable hypothesis consistent with incentive to open-end a close-end fund consequently is that terminating close-end funds that are open-ended have larger discounts than those that are close-ended.

H1: $Discount_{open\text{-}ended} > Discount_{close\text{-}ended}$

This hypothesis can be easily tested using a Wald test in multi-logit regressions. The dummies are 0 if fund continues to live, 1 if a fund is closed-ended and 2 if a fund is open-end.

2. Sequentially comes with the hypothesis that funds that are open-ended should have a larger 3-day around the termination announcement day cumulative abnormal return $CAR_{(t-1,\ t,\ t+1)}$ than funds that are close-ended.

H2: $CAR_{(t-1,\ t,\ t+1),\ open\text{-}ended} > CAR_{(t-1,\ t,\ t+1),\ close\text{-}ended}$

3. Moreover, discounts are almost eliminated when close-end funds are open-ended as indicated previously in figure 1, while there still remains a certain amount of discounts for funds that are close-ended, therefore, a third testable hypothesis is that funds that are close-ended should have a less significant relationship between CAR and discount than funds that are open-ended.

H3: $\beta_{(CAR,\ Discount),\ open\text{-}ended} > \beta_{(CAR,\ Discount),\ close\text{-}ended}$

This hypothesis can be tested by running a multivariate analysis with the CAR as dependent variable, discount and dummy variables for close-ended funds vs. open-ended funds as independent variables, size and liquidity as control variables. To

further test this hypothesis we can also run the regression by including more variables such as the average past twelve month return, return volatility and bid-ask spread ect.

4. Consistent with open-ending motivation and arbitrage, another testable hypothesis is that discount is not systematically predictive of liquidation probability.

H4: $\beta_{(discount,\ liquidation)} = 0$

To test this hypothesis, we set dummy variables equal to 0 if a fund continues to live, 1 if a fund is close-ended, 2 if a fund is liquidated, 3 if a fund opens to mutual and 4 if a fund merges into another mutual fund in the multi-factor regressions.

5. Dividend payment plays an important role in close-end funds that can be thought as investment vehicles for income. A typical close-end fund adopts a target distribution policy that commits to payout a large proportion of net asset. As long as a fund generates reasonable dividend yield, it is less likely to be open-ended. A testable hypothesis is that dividend should be negatively related with open ending but positively with close ending.

H5: $\beta_{(dividend,\ close\text{-}ended)} > 0$ **and** $\beta_{(dividend,\ open\text{-}ended)} < 0$

6. Likewise, as long as a fund generates reasonable return/NAV return, it is less likely to be open-ended. A testable hypothesis is that there should be a negative and significant relationship between return/NAV return and the likelihood of open ending.

H6: $\beta_{(return/NAV\ return,\ open\text{-}ended)} < 0$

7. If discount is caused by stochastic investor sentiments, such shock must be industry-wide and affects funds of same sector. Both merged funds and acquiring funds should experience similar level of discount. A testable hypothesis is that the

coefficients of discount for acquiring funds are not significantly different from that of merged funds.

H7: $\beta_{(discount,\ acquiring)} = \beta_{(discount,\ merger)}$

This differs from common stock merger and acquisition in which relative valuations of target and acquiring firms are important factors. In close-end fund merger and acquisition, NAV is known to both fund managers and investors.

B. Main Results

As the hypotheses discussed above, we expect that funds of significant discounts are more likely to open-end. We also expect that funds with under-performance in NAV or lower dividend yields are more likely to open-end. Funds of larger size and older age are less likely to exit since fund family tends to keep these funds for fees and reputation capital. Municipal bond funds and high yield bond funds are less likely to open-end since the cost would be high in providing liquidity.

Table IV presents the results of the multi-logit regressions, in which the indexing dependent variable equals one if a fund is merged into other close-end fund, two if a fund converts itself to mutual fund, three if a fund liquidates and four if a fund is merged into an open-end fund. In this study, I consider three regression models and report the results respectively. Panel A in Table 5 reports the regression without control dummies for asset classes. Panel B shows the results of regression with only control dummies for asset classes and Panel C shows the results of regression with control dummies and interactive terms between asset classes and discounts.

Table 5:

Panel A. Multi-logit regression

This table reports a simple multi-logit regression for funds to exit in different mechanisms. The dependent variables are dummies: 0 if a fund continues to live, 1 if a fund chooses to close-end, 2 if a fund liquidates, 3 if a fund opens itself to mutual and 4 if a fund merges into other mutual funds. The independent variables are past yearly compounded return, yearly NAV compounded return, past annual average discount level, past yearly compounded dividend yield, fund market value, age, past annual expense ratio and turnover rate. The sample period is from January 1994 to Dec 2004 and the sample includes all close-end funds in CRSP data. Total sample observations are 9413, which include 104 terminated close-end funds. The robust standard errors are reported in parentheses.

	Close-ended close-end funds	Liquidated (Open-ended)	Opened to mutual (Open-	Merged into open-end funds (Open-ended)
Return	16.411 (15.77)	**-18.536** **(8.71)**	**-28.763** **(11.58)**	**-64.512** **(20.293)**
NAV Return	-0.506 (1.507)	**-2.255** **(1.109)**	**-1.496** **(0.63)**	**-4.86** **(2.19)**
Discount	3.017 (1.895)	**-2.457** **(1.051)**	-4.492 (2.917)	**-3.955** **(1.668)**
Dividend Yield	5.922 (1.757)	**-23.746** **(6.477)**	**-39.324** **(16.439)**	4.717 (6.011)
Fund Size	**-1.001** **(0.452)**	**-1.161** **(0.255)**	-0.293 (0.423)	-0.267 (0.309)
Fund Age	**-0.837** **(0.294)**	-0.41 (0.311)	-0.246 (0.46)	0.049 (0.389)
Expense Ratio	-7.531 (32.46)	-7.904 (27.853)	-26.39 (61.943)	-153.224 (74.745)
Turnover	0.066 (0.136)	-0.627 (0.564)	0.393 (0.102)	-0.576 (0.606)
Constant	-2.523 (1.692)	-2.782 (1.442)	-3.602 (2.829)	-0.29 (1.901)
Pseudo R^2	0.52			
Total Observations	9413 (104 terminated close-end funds in total)			

Panel B. Multi-logit regression controlling for fund asset classes

This table reports a simple multi-logit regression for funds to exit in different mechanisms. The dependent variables are dummies: 0 if a fund continues to live, 1 if a fund chooses to close-end, 2 if a fund liquidates, 3 if a fund opens itself to mutual and 4 if a fund merges into other mutual funds. The independent variables are past yearly compounded return, yearly NAV compounded return, past annual average discount level, past annual average dividend yield, fund market value, age, past annual expense ratio and turnover rate. Other independent variables are dummies for different asset classes. The sample period is from January 1994 to Dec 2004 and the sample includes all close-end funds in CRSP data. Total sample observations are 9413. The robust standard errors are reported in parentheses.

	Close-ended close-end funds	Liquidated (Open-ended)	Opened to mutual (Open-ended)	Merged into open-end funds (Open-ended)
Return	2.667 (1.992)	**-2.987** **(1.468)**	**-4.749** **(1.741)**	**-7.389** **(2.695)**
NAV Return	-1.661 (2.26)	**-3.063** **(1.284)**	**-3.845** **(1.860)**	**-5.441** **(2.051)**
Discount	4.254 (2.387)	**-2.452** **(1.177)**	-3.508 (1.937)	-3.258 (4.703)
Dividend Yield	6.034 (2.260)	**-19.069** **(5.592)**	**-33.111** **(12.466)**	3.203 (7.656)
Fund Size	**-0.64** **(0.243)**	-0.138 (0.275)	-0.284 (0.438)	-1.717 (0.392)
Fund Age	**-0.932** **(0.328)**	-0.901 (0.308)	-0.721 (0.427)	0.052 (0.582)
Expense Ratio	8.339 (25.551)	-13.674 (26.681)	-25.712 (53.565)	-226.195 (92.639)
Turnover	0.067 (0.148)	-0.988 (0.651)	0.3 (0.096)	-0.972 (0.914)
Municipal dummy	0.085 (0.499)	**-2.314** **(0.600)**	**-37.514** **(0.588)**	-0.419 (0.958)
Emerging dummy	-1.244 (0.764)	-1.2 (0.840)	-1.266 (0.962)	**1.916** **(0.877)**
High yield dummy	0.087 (0.803)	**-37.004** **(0.422)**	**-36.219** **(0.647)**	0.436 (1.052)
Mortgage dummy	-0.032 (1.051)	**-37.849** **(0.510)**	**-36.641** **(0.860)**	**3.24** **(1.003)**
Constant	-2.746 (1.652)	-0.542 -1.37	-1.584 -2.917	2.141 -2.882
Pseudo R^2	0.61			
Total Observations	9413 (104 terminated close-end funds in total)			

Panel C. Multi-logit regression controlling for asset classes and discounts interactive terms

	Close-ended close-end funds	Liquidated (Open-ended)	Opened to mutual (Open-ended)	Merged into open-end funds (Open-ended)
Return	2.553 (1.909)	**-2.791** **(1.094)**	**-4.691** **(1.708)**	**-7.858** **(2.788)**
NAV Return	-1.46 (2.21)	**-3.887** **(1.494)**	**-3.627** **(1.796)**	**-7.999** **(3.058)**
Discount	0.78 (2.814)	-2.804 (1.706)	5.432 (3.485)	**16.032** **(8.337)**
Dividend Yield	5.684 (2.949)	**-23.79** **(6.504)**	**-31.567** **(13.100)**	5.19 (7.355)
Fund Size	**-0.651** **(0.245)**	-0.209 (0.286)	-0.274 (0.44)	**-1.762** **(0.410)**
Fund Age	-0.392 (0.339)	**-1.09** **(0.333)**	-0.669 (0.436)	0.032 (0.571)
Expense Ratio	4.817 (28.758)	-18.035 (28.559)	-25.34 (54.827)	-200.334 (103.313)
Turnover	0.071 (0.151)	-0.945 (0.631)	0.307 (0.096)	-1.131 (1.057)
Municipal dummy	-0.696 (0.577)	**-2.407** **(0.601)**	**-34.859** **(0.695)**	2.371 (1.835)
Emerging dummy	-2.35 (1.407)	-1.408 (0.778)	-0.771 (0.938)	**5.004** **(1.578)**
High yield dummy	-0.151 (0.231)	**-34.813** **(0.431)**	**-33.74** **(0.713)**	3.564 (1.866)
Mortgage Dummy	-0.042 (1.121)	**-31.809** **(0.632)**	**-32.521** **(0.899)**	**2.96** **(1.119)**
Municipal*discount	-0.117 (0.857)	**-35.679** **(0.538)**	**-34.074** **(0.842)**	2.662 (1.665)
Emerging*Discount	8.136 (4.890)	-2.658 (2.907)	-6.868 (3.786)	-22.262 (16.154)
High yield*discount	2.997 (6.108)	4.736 (3.084)	-3.31 (3.946)	-9.113 (7.024)
Mortgage*discount	-0.197 (5.942)	2.192 (2.947)	-5.606 (3.858)	-13.833 (11.450)
Constant	-0.852 (-6.06)	4.53 (-4.497)	-4.702 (-6.212)	-6.496 (9.726)
Pseudo R^2	0.67			
Total Observations	9413 (104 terminated close-end funds in total)			

Consistent with our prior, we find a negative and statistically significant relationship between discount and the likelihood of a liquidation or merger into mutual fund. However, discount is not significantly associated with the likelihood of a merger into other closed-end fund or conversion to mutual fund. We also find a negative and significant relationship between NAV return and the likelihood of open ending. Size of fund is negatively associated with the likelihood of liquidation. The larger the fund size is, the more loss with liquidation for fund management company. We also find negative and significant coefficients for both size and age in close-ending funds. Fund performance or return is negatively associated with the likelihood to open-end. Dividend yield is only significantly negatively associated with the likelihood to convert to open-end fund and to liquidate while it is not significant in the likelihood to merge into mutual fund.

Consistent with asset classes, we find in Panel B of Table IV that municipal dummy and mortgage dummy are negative and significant in predicting the likelihood to open to mutual fund or liquidate. Municipal dummy is positive but not significant in predicting the likelihood to close-end. More importantly, when the asset classes are controlled, the discount is not significantly related with the likelihood to merge into mutual fund. Emerging market fund and mortgage-backed securities fund are more likely to merge into open-end mutual funds.

In Panel C, the discount is only marginally significant at case of merger into open-end fund; consistent with our hypothesis that discount should not systematically relate with open ending. The interactive term between municipal bond dummy and discount is negative and significant in predicting the likelihood to liquidate or open to mutual.

The intuition is that conditional on a fund investing in municipal bond, the more discount, the less likely for it to liquidate.

By calculating the 3-day around the termination announcement day cumulative abnormal return CAR $_{(t-1,\ t,\ t+1)}$ across funds exiting in different ways and running a regression test on the open-end/close-end announcement dummy variable, table 6 documents significant abnormal returns to the funds 3-day around the termination announcement day. The mean 3-day cumulative abnormal return CAR $_{(t-1,\ t,\ t+1)}$ for the whole sample is 9.12 percent and the CARs $_{(t-1,\ t,\ t+1)}$ for funds exiting in different ways are different. Funds which choose to open-end have a higher mean CAR $_{(t-1,\ t,\ t+1)}$ than funds that choose to close-end and the difference is significant. Close-ended funds have an mean CAR $_{(t-1,\ t,\ t+1)}$ of 5.08 percent, while open-ended funds have a mean CAR $_{(t-1,\ t,\ t+1)}$ of 14.67 percent.

Table 6: Mean CAR $_{(t-1,\ t,\ t+1)}$ across funds exiting in different ways

This table reports the 3-day cumulative abnormal returns for funds to exit in different mechanisms. The sample period is from January 1994 to Dec 2004 and the sample includes all closed-end funds in CRSP data. There are 104 funds terminated during the sample period.

	Close-ended close-end funds	**All open-ended close-end funds**	Liquidated (Open-ended)	Opened to mutual (Open-ended)	Merged into open-end funds (Open-ended)	**Pooled (all terminated close-end funds)**
Mean $CAR_{(t-1,t,t+1)}$	**0.0508**	**0.1467**	0.1308	0.1876	0.1136	**0.0912**
Total Observations	104 terminated close-end funds in total					

By running an OLS analysis with the CAR as dependent variable, discount and dummy variables for close-ended vs. open-ended as independent variables, size and liquidity indicators as control variables, Table 7 shows that funds that are close-ended have a less significant relationship between CAR and discount while funds that are open-ended exhibit a more significant relationship between CAR and discount. To further investigate and run the regression again by including more variables such as the average past twelve month return, return volatility and bid-ask spread, again Panel B in Table 7 further shows that funds that are close-ended have a less significant relationship between CAR and discount than funds that are open-ended.

Table 7:

Panel A: OLS regression with CAR as dependent variable

This table reports a simple OLS regression for funds to exit in different mechanisms. The dependent variable is CAR and independent variables are dummies: 0 if a close-end fund is open-ended and 1 if a close-end fund chooses to be close-ended. The control variables are the liquidity indicator (Voldivsize) and the fund size indicator. The sample period is from January 1994 to Dec 2004 and the sample includes all close-end funds in CRSP data. There are 104 funds terminated during the sample period. The robust z-statistics are reported in parentheses.

	Intercept	Voldivsize (volume/size)	Logsize Log(size)	Discount
Close-ended close-end funds (R^2=0.11)	-0.77	-1.68 (10.34)	0.17 (114.07)	2.70 (8.62)
Open-ended close-end funds (R^2=0.26)	1.20	-2.01 (13.76)	-0.26 (7.63)	4.53 (91.02)
Total Observations	104 terminated close-end funds in total			

Panel B: OLS regression with more control variables

This table reports a simple OLS regression for funds to exit in different mechanisms. The dependent variable is CAR and independent variables are dummies: 0 if a fund is open-ended and 1 if a fund chooses to close-end. The control variables are the liquidity indicator (Voldivsize), the fund size indicator, mean return, mean spread, as well as return volatility indicator. The sample period is from January 1994 to Dec 2004 and the sample includes all close-end funds in CRSP data. There are 104 funds terminated during the sample period. The robust z-statistics are reported in parentheses.

	Close-ended close-end funds	Open-ended close-end funds
Intercept	-1.20 (10.34)	0.18 (7.63)
Voldivsize (volume/size)	-0.37 (10.34)	-0.39 (7.63)
Logsize Log(size)	0.21 (114.04)	-0.09 (91.02)
Discount	0.66 (8.62)	2.30 (13.76)
Meanret (mean return)	8.95 (0.47)	4.28 (4.72)
Volret (return volatility)	1.59 (12.82)	8.13 (12.12)
Meanspr (mean spread)	0.29 (16.62)	-0.02 (5.81)
R^2	0.27	0.40
Total Observations	104 terminated close-end funds in total	

I also run a multi-logit regression to test hypothesis H7. The dependent variables are dummies: 0 if a fund continues to live, 1 if a close-end fund acquires another close-end fund and 2 if a close-end fund is acquired by another close-end fund. Panel A in table 8 reports the results when asset class dummies are not included. Consistent with the hypothesis, the coefficients on discount variables for acquiring and merger funds are not significantly different. The Wald test has a p-value of 0.6. Panel B in table 8 reports the results when both asset class dummies and interactive terms between asset

class dummies and discount are included. Again, the results are similar; the individual Wald test does not reject the null hypothesis that coefficients are different.

Table 8: Test of Shleifer and Vishny (1999)

This table shows the results of multi-logit regressions to test Shleifer and Vishny (1999). The dependent variables are dummies: 0 if a fund continues to live, 1 if a fund acquires another fund, and 2 if a fund merges into others. The sample includes all funds from CRSP data for the period from Jan 1994 through Dec 2004. The robust standard errors are reported in the parentheses. The last column of the table reports the p-value for the Wald test to examine whether the two coefficients are different.

Panel A

	Acquirer	Merger	Test difference
Return	-12.941 (24.019)	19.613 (15.186)	
NAV Return	0.985 (1.812)	-1.36 (1.562)	
Discount	2.471 (2.161)	3.872 (1.937)	$\beta_{Discount, Acq}=\beta_{Discount,Merger}$ Prob>Chi2=0.624
Dividend Yield	2.922 (2.193)	5.587 (1.784)	
Fund Size	0.126 (0.321)	-0.566 (0.253)	
Fund Age	-0.467 (0.444)	-0.107 (0.305)	
Expense Ratio	-10.549 (75.232)	-11.617 (33.738)	
Turnover	0.263 (0.121)	0.027 (0.142)	
Constant	-5.676 (2.606)	-3.491 (1.785)	
Total Observations (Pseudo R^2 = 0.48)	51 terminated close-end funds merged by other close-end/open-end funds in total (51 pairs M&A)		

Panel B. Multi-factor regression controlling for asset classes

	Acquisition	Merger	Test difference
Return	-0.278 (2.388)	2.969 (1.865)	
NAV Return	0.187 (2.392)	-2.653 (2.242)	
Discount	0.144 (4.229)	1.153 (2.905)	$\beta_{Discount,\ Acq}=\beta_{Discount,Merger}$ Prob>Chi2=0.799
Dividend Yield	4.956 (4.046)	5.126 (2.815)	
Fund Size	0.133 (0.279)	-0.534 (0.245)	
Fund Age	-0.224 (0.515)	-0.21 (0.337)	
Expense Ratio	20.809 (52.827)	-0.145 (29.46)	
Turnover	0.33 (0.123)	0.027 (0.162)	
Municipal dummy	0.199 (0.627)	-0.725 (0.584)	
Emerging dummy	-5.713 (1.226)	-4.462 (1.132)	
High yield dummy	-35.768 (0.514)	0.208 (0.7)	
Mortgage dummy	-35.804 (0.634)	-0.021 (0.885)	
Municipal*discount	10.724 (6.042)	8.99 (5.082)	$\beta_{Discount,\ Acq}=\beta_{Discount,Merger}$ Prob>Chi2=0.826
Emerging*Discount	22.607 (5.441)	20.733 (5.229)	$\beta_{Discount,\ Acq}=\beta_{Discount,Merger}$ Prob>Chi2=0.784
High yield*discount	2.808 (5.141)	1.517 (5.826)	$\beta_{Discount,\ Acq}=\beta_{Discount,Merger}$ Prob>Chi2=0.862
Mortgage*discount	-0.695 (5.886)	-1.67 (5.831)	$\beta_{Discount,\ Acq}=\beta_{Discount,Merger}$ Prob>Chi2=0.873
Constant	-6.932 (2.136)	-3.191 (1.716)	
Total Observations (Pseudo R^2 = 0.56)	51 terminated close-end funds merged by other close-end/open-end funds in total (51 pairs M&A)		

5. Conclusion

Using a large sample of closed-end funds from CRSP, the paper provides an analysis of the determinants of exiting decisions in closed-end funds. Consistent with previous literature, funds with larger discount and smaller size are more likely to exit. Larger discount is more strongly associated with the probability for a fund to both open-end and close-end. Funds with higher dividend yields are more likely to be merged by other closed-end fund since keeping such underlying assets closed-end is optimal. On the contrary, dividend yield is negatively related to open ending.

Existing evidence on open-ending of close-end funds relies on two early studies with very small sample sizes of 14 firms. Using a much larger sample of 104 funds that exit for the period from January 1994 through December 2004, among which, 32 funds chose to close-end by merging into other closed-end funds and 72 open ended, this study documents a significant cumulative abnormal return of 5.08 percent for funds that close ended and an average of above 12 percent for funds that open ended during the announcement period.

If event such as open ending is analytically predictive, rational market should incorporate this information into price or discount of closed-end fund. Consistent with this hypothesis, we find that discount of funds to open end converges to average level well before announcement of such open ending decisions.

Open ending decision has to take into account rational expectation and arbitrage in market. Liquidating funds will fully provide liquidity to redemption, while in case of conversion to mutual and merger by mutual, funds are able to impose restrictions to make short-term transactions costly. The resulting equilibrium is that discount is

unrelated with liquidation but is still associated with other two open-ending methods. The evidence supports these predictions. 25 funds among 45 liquidating funds take place according to corporate charter.

If industry-wide investor sentiments affect all the closed-end funds in the same industry, both acquiring and merger funds within the same industry will experience similar level of discounts. Therefore the merger and acquisition in closed-end funds are less likely to be market-driven. Rather it is likely to be in the discretion of fund management firms. Factors such as scale of economy are likely to be the rationale for merger and acquisition in closed-end funds. 55 funds among 61 mergers take place within same fund management companies, suggesting fund management companies play important role in closed-end fund governance.

To continue with this study, further research should address the value of the actual distribution to the closed-end fund investors to verify whether this final discount represents errors in the reported NAVs or whether there are other costs such as redemption fees tacked on to the closed-end fund shares that may provide an explanation of the discount. Further studies can also explore the investor gain /redemption fee differences for closed-end funds that choose different exiting methods and examine the role of fund governance on the pricing behavior during the termination process.

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