# Redeemability as Governance: A Study of Closed-end and Open-end Funds under Common Management

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## Abstract

The option shareholders have to liquidate their firm's assets as an ultimate recourse is a powerful corporate governance mechanism. We test this hypothesis using a natural experiment in Chinese securities regulation and detailed data on investment-fund holdings and trades. Specifically, we investigate whether redeemable and non-redeemable (open-end and closed-end) investment funds managed by the same fund family are run differently. We find that fund families favor the performance of their open-end funds over their closed-end funds by channeling superior trades and resources toward open-end funds. This evidence confirms that shareholders' ability to remove assets from managerial control is a key dimension of corporate governance.

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**Abstract**

The option shareholders have to liquidate their firm's assets as an ultimate recourse is a powerful corporate governance mechanism. We test this hypothesis using a natural experiment in Chinese securities regulation and detailed data on investment-fund holdings and trades. Specifically, we investigate whether redeemable and non-redeemable (open-end and closed-end) investment funds managed by the same fund family are run differently. We find that fund families favor the performance of their open-end funds over their closed-end funds by channeling superior trades and resources toward open-end funds. This evidence confirms that shareholders' ability to remove assets from managerial control is a key dimension of corporate governance.

## 1. Introduction

The ability to reclaim resources from managers is perhaps the most direct way to moderate principal-agent relations. This point is made by Fama and Jensen (1983a, b, 1985) who argue that the option shareholders have to liquidate an organization's assets as an ultimate recourse acts as a powerful corporate governance mechanism. Despite its appeal, this argument has received little attention in the literature.[1] Instead, most research studies the role of board structure, large shareholders, and managerial ownership in aligning claimant interests, particularly within non-financial firms.

We examine the importance of reclaimable assets as a governance mechanism by comparing the performance and operation of redeemable and non-redeemable assets under common management, namely, open- and closed-end funds run by the same investment-fund company (fund family). We hypothesize that the difference in share redeemability across funds within a family induces managers to favor their open-end funds over their closed-end funds (favoritism). This might entail channeling superior trades and resources toward their open-end funds, a hypothesis we also test.

Our research design draws on four features of investment funds in China. First, non-redeemable closed-end funds and redeemable open-end funds have been allowed to operate since 1998 and 2001, respectively. In many cases, open- and closed-end funds belong to the same fund family. Importantly, opening closed-end funds was not allowed until 2006. This stark difference between open- and closed-end funds in China avoids the identification and endogeneity problems that plague the U.S. setting. Thus, the years 2001 to 2006 offer a natural experiment where completely redeemable and completely non-redeemable shares often fell under common management.

[1] Admati and Pfleiderer (2005) examine the discipline that large informed shareholders can exert by selling shares. However, in their analysis assets are transferred to new shareholders, not removed from managerial control.

Second, unlike the U.S., where investment funds need only disclose their security holdings, investment funds in China must also report securities bought or sold. Thus, in addition to comparing the performance of affiliated open- and closed-end funds, these disclosure rules allow us to test whether any detectable family favoritism can be linked to cross-fund subsidization strategies such as trade coordination.

Thirdly, unlike the U.S., where fees and redemption conditions vary widely, even within families, fund fees and redemption conditions in China are regulated – and therefore uniform – which greatly simplifies the comparison of fund performance. Finally, Chinese fund families are centralized, with a single board of directors and common research and trading departments servicing all affiliated funds. Therefore, although each fund is headed by its own management team, the organization of Chinese fund families is such that coordination among funds is greatly facilitated.

Thus, while one might at first hesitate to use Chinese data to study investment funds and corporate governance, it turns out that the regulatory environment, the availability of detailed data, the uniformity of fees and redemption conditions, and the centralized organization of investment fund families in China present us with a unique laboratory to analyze the role of reclaimable assets in corporate governance. The ideal test would isolate the effect of favoritism while controlling for all other systematic differences between affiliated open-end funds and closed-end funds. We propose a variety of approaches to this test, which we present in ascending order of reliability and, as it turns out, by increasing order of statistical and economic significance.

First, we run simple difference tests between open- and closed-end funds, where we compare the funds in terms of financial performance (raw investor returns, market-adjusted and three-factor adjusted returns, holding returns, and return gap) and

in terms of accounting performance (net profit per share). Second, we run multivariate regressions where, besides controlling for fund and family characteristics, we test whether the difference in returns of paired open- and closed-end funds depends not only on family affiliation but also on the resources a family has to support favoritism, namely, the combined assets of its non-redeemable, closed-end funds.

Third, following Gaspar, Massa, and Matos (2006), we refine the paired-fund differences approach by replacing each fund by an unaffiliated style- and size-matched fund. Because cross-fund subsidization is more likely to be concealed in interim trades than reflected in portfolio holdings, we repeat the matched paired-fund approach using the return gap (investor returns minus holding returns) instead of investor returns. Finally, we avoid comparing open- and closed-end funds altogether by investigating whether the closed-end fund discount relates to family affiliation and family resources.

The empirical results support our hypotheses, regardless of estimation method. First, we find that open-end funds out-perform closed-end funds in general, which suggests that open-end funds have stronger incentives to perform, either because they are better rewarded for performance (inflows chase performance) or because their governance structure is better, perhaps thanks to the redeemable nature of their shares.

Second, the difference in performance is significantly greater when open- and closed-end funds are affiliated, and even more so when closed-end (open-end) funds represent a large (small) fraction of family assets. This suggests that investment-fund families deliberately enhance the performance of their open-end funds to the detriment of their closed-end funds. This finding supports our conjecture that redeemability is a prime determinant of the differential performance of investment funds in particular and that reclaimable assets are a key dimension of corporate governance in general.

How is cross-fund subsidization – or favoritism – actually achieved? First, fund families might engage in tandem trades where a given security is bought or sold, first by the open-end fund, then by the closed-end fund. In this way, the closed-end fund supports prices (provides liquidity) to the benefit of the open-end fund, at the expense of its own performance. Although our data do not identify transaction dates precisely, we find that returns on comparable trades (interim trades involving the same security) yield significantly higher returns for open-end funds than for their closed-end siblings. This is evidence of cross-fund subsidization through trade coordination.

Second, fund families might direct better resources to their open-end funds. Consistent with this hypothesis, we find that managerial turnover is lower for closed-end funds than for open-end funds within the same fund family. More specifically, we find that the probability that a closed-end fund manager is replaced is not sensitive to past fund performance but that the probability that an open-end fund manager is replaced is inversely related to past performance. This suggests that fund families rationally direct their best talent to the funds where accountability and the incentive to perform well are greatest, namely, their redeemable-share, open-end funds.

Our study adds to the nascent empirical literature on favoritism that documents preferential allocation of IPO's (Löffler, 2003), human resources (Guedj and Papastaikoudi, 2004), and trades (Gaspar et al., 2006) among affiliated funds. But, given the obligation funds have to maximize shareholder value, why do fund families appear to favor the performance of one fund over another? Why does favoritism occur?

The literature implies that because fund compensation depends more on assets under management than on performance, behavioral biases such as return chasing (Nanda, Wang, and Zheng, 2004) and convex flow-performance sensitivity (Chevalier

and Ellison, 1997 and Sirri and Tufano, 1998) can rationalize favoritism. Alternatively, affiliated funds might have different performance incentives (Nohel, Wang, and Zheng, 2006). While we agree that differences in incentives are important, we believe that the definition of incentives must extend to all facets of governance, not just compensation. Differences in governance – and accountability – across affiliated funds, say between redeemable and non-redeemable shares, thus offer a broader explanation of favoritism.

The study most closely related to ours is Nohel et al. (2006), who establish that hedge funds and mutual funds run by the same manager respectively under-perform and out-perform their peers. This is contrary to their prediction that the higher-powered compensation structure of hedge funds would induce managers to prioritize the performance of hedge funds over that of mutual funds. We suggest that this *prima-facie* surprising result supports the thesis and findings of our study. Specifically, we argue that the lengthy lock-in period imposed by hedge funds represents a substantial reduction in the redeemability of investors' assets which compromises governance and lowers hedge fund performance, despite the incentive of high-powered compensation.[2]

This paper makes three contributions. First, we link share redeemability to fund performance and governance. Second, we provide evidence of favoritism in a controlled, non-U.S. setting thanks to detailed data on investment funds in China. Last, we propose favoritism as a new agency explanation for the closed-end fund discount.

The paper is organized as follows. Section 2 develops our hypotheses. Section 3 describes the data. Sections 4 and 5 relate family affiliation to fund performance differences and the closed-end fund discount. Section 6 links favoritism to trade coordination and resource allocation. Section 7 concludes.

[2] It is not uncommon for hedge funds to close, which makes them even more akin to traditional closed-end funds.

## 2. Hypothesis Development

Favoritism will occur when fund families have both the incentive and scope to pursue cross-fund subsidization strategies. First, the incentive arises when the fund family owners (its residual claimants, not its fund participants) surmise that they are better off if they boost the performance of some of their funds over others. Thus, since a fund family's main source of profit is the fees it earns on assets under management, any strategy that maximizes *family* inflows (or minimizes outflows) might make sense.[3] Second, the scope for cross-fund subsidization arises when fund families are not fully accountable to their fund shareholders. Lack of accountability could result from limited disclosure, such as when trading activity is not reported (e.g. the U.S.), or from differences in governance across funds, such as when a family manages both redeemable open-end funds and non-redeemable closed-end funds (e.g. China) or when a mutual fund manager also runs a hedge fund (Nohel et al., 2006).

The literature already offers examples of favoritism in the context of limited disclosure, namely, in the U.S. setting. For instance, Nanda, Wang, and Zheng (2004) argue that because investors seem first to pick a fund family and then the individual fund within that family, running a "star" performing fund can have positive spillover effects on the inflows of the other funds in the same family. In other words, fund families might be better off running one above-average fund and several under-average funds than average funds only.

This argument is bolstered by Chevalier and Ellison (1997) and Sirri and Tufano (1998), who show that fund inflows are more sensitive to good performance than outflows are to bad performance. Clearly, whether convex or not, the flow-

[3] We say *might* make sense to acknowledge that legal and ethical considerations also weigh in the equation.

performance sensitivity of open-end funds is greater than that of closed-end funds, where inflows and outflows are ruled out by definition. Put differently, favoritism is hard-wired in fund families that manage both open-end funds and closed-end funds.

In this study, we stress the lack of accountability that results from differences in governance rather than from limited disclosure. This is not to say that investment funds in China are subject to full disclosure of their trading activity. However, the data are revealing enough to allow us to test whether the cross-fund subsidization strategies we can detect favor funds subject to strong governance (redeemable open-end funds) over funds subject to weak governance (non-redeemable closed-end funds). What's more, open- and closed-end funds in China are subject to the same disclosure rules. This means that the lack of accountability linked to incomplete disclosure is the same for both types of funds, i.e., the rest is attributable to differences in governance.

*2.1 Hypotheses on the Detection of Favoritism*

In light of the preceding discussion, we formulate the following hypotheses:

*Hypothesis 1*: All else equal, open-end funds should out-perform closed-end funds in general, i.e., regardless of family affiliation.

This hypothesis follows directly from Fama and Jensen (1983a, 1983b, 1985), who argue that by exerting constant discipline on managers, redeemable shares represent a powerful form of governance, especially compared to non-redeemable shares. Thus, redeemable open-end funds should out-perform non-redeemable closed-end funds.

*Hypothesis 2*: All else equal, open-end funds should out-perform *affiliated* closed-end funds, above and beyond any difference explained by hypothesis 1.

This hypothesis follows from the idea that fund families may be better off if they treat their funds differently rather than evenly. Thus, families having both the incentive and

the scope to engage in favoritism probably will. The incentive arises from differences in flow-performance sensitivity and accountability (redeemability) across funds in a family. The scope arises when a family manages both open-end funds and closed-end funds, which opens up cross-fund subsidization strategies not available to unaffiliated funds. Consequently, open-end funds should not simply out-perform affiliated closed-end funds, they should out-perform them beyond any general difference between the performance of open- and closed-end funds (i.e., that explained by hypothesis 1).

*Hypothesis 3*: All else equal, the difference in performance between affiliated open- and closed-end funds should rise (fall) as the fraction of family assets represented by closed-end (open-end) funds rises.

This hypothesis reflects the idea that cross-fund subsidization strategies, such as trade coordination, tax a family's resources. Viewing closed-end fund assets as the *supply* of resources and open-end fund assets as the *demand* of resources, it follows that the relative supply and demand of resources determines the scope a family has to favor the performance of its open-end funds. Thus, open-end funds in families where open-end funds represent a small (large) fraction of total family assets should out-perform their closed-end siblings to a greater (lesser) extent.

Finally, we also consider two corollaries of the previous hypotheses.

*Hypothesis 2a*: All else equal, open-end funds in families that also manage closed-end funds should out-perform open-end funds in families that do not.

*Hypothesis 2b*: All else equal, closed-end funds in families that also manage open-end funds should under-perform closed-end funds in families that do not.

These hypotheses follow from hypotheses 2 and 3, which imply that open-end funds without affiliated closed-end funds cannot be subsidized by resources from the latter. We consider these corollary hypotheses to partly address the concern that even though we control for likely differences between open- and closed-end funds, it is hard to rule

out the possibility that other factors besides favoritism might explain why open-end funds out-perform affiliated closed-end funds. Thus, comparing open-end (closed-end) funds among themselves serves to mitigate this possibility.

*2.2 Hypotheses on How Favoritism Might Work*

Suppose we do find evidence of favoritism in the data. What more can we say? Can we test whether plausible cross-fund subsidization strategies are also supported? The answer is yes. First, thanks to the availability of data on funds' trading activity we are able to test for trade coordination that favors the open-end funds within a family. Second, by collecting data on managerial turnover, we can also test whether families tend to allocate their best talent to their open-end funds. Answering these questions also serves as check on our first set of hypotheses as it is doubtful we would conclude that families are channeling superior trades and talent to their open-end funds if they were not trying to favor these funds in the first place. We reserve the details of these tests for section 6, but the corresponding hypotheses are straightforward:

*Hypothesis 4*: All else equal, families that manage both open-end funds and closed-end funds will engage in trade coordination strategies that benefit the open-end fund at the expense of the closed-end fund.

*Hypothesis 5*: All else equal, families that manage both open-end funds and closed-end funds will assign better managers to their open-end funds.

**3. Data**

*3.1. Data Sources and Sample Selection*

We obtain investment funds' periodic reports (quarterly, interim, and annual) from the Shanghai and Shenzhen stock exchange websites and from fund companies' own websites. Monthly data on fund and stock performance are from Tinysoft.NET, a

Chinese financial data provider. Fund type and style classifications are from Morningstar China. Stock-market index data are from the CITIC Security Company.

Chinese investment funds produce quarterly, interim, and annual reports. The quarterly reports contain data on quarterly returns, Total Net Assets (TNA), expense ratios, load fees, fund launch dates, etc. We use TNA to measure fund size, which is net asset value (NAV) per share times the number of shares at the end of the quarter. The interim (semi-annual) and annual reports contain data on trading activity during the reporting period, which a key feature of the Chinese data, not available for U.S. funds. Combining the interim and annual reports allows us to construct a semi-annual times series of funds' trading activity, which we later use to test for trade coordination.

The first Chinese closed-end fund went to market on March 27, 1998, and the first open-end fund was launched on September 11, 2001. Our sample period runs from January 2002 through June 2005. We start the sample in January 2002 to ensure that both open- and closed-end funds were available for at least a few months. We end the sample in June 2005 to make sure every fund had at least 6 months of data as of early 2006. There were then 181 Chinese investment funds in existence.

Of these 181 funds, three funds have dual-class shares, which we exclude. To clearly delineate between redeemable and non-redeemable funds we also drop five listed open-end funds and another one offered as an exchange-traded fund (ETF).

Since part of our analysis relies on Morningstar China's classification of domestic equity fund styles, and because data on securities other than stocks are hard to obtain, we drop bond, money-market, and capital-protection funds, retaining only stock and hybrid funds that primarily invest in equity securities. This leaves us with an

unbalanced panel of 142 funds, of which 54 are closed-end and 88 are open-end. Note that the sample is free of survivor bias since no fund has yet de-listed in China.

We compile the sample funds' investment styles from Morningstar China, which includes the following possible styles: BlendLarge, BlendMid, BlendSmall, GrowthLarge, GrowthMid, GrowthSmall, ValueLarge, ValueMid, and ValueSmall.

Table 1 presents descriptive statistics for our sample funds (Panel A) and the fund families that manage them (Panel B). The first thing to note is that the number of funds and families grew dramatically over a short period, going from 54 funds offered by 15 families in June 2002 to 95 funds offered by 25 families in December 2003. However, almost all of this growth is explained by open-end funds, which went from three in June 2002 to 41 by December 2003. Notice that by December 2003, not a single fund family only managed closed-end funds; most of them offered both open- and closed-end funds, and eight of the ten new families only operate open-end funds.

[Insert Table 1 here]

In support of our claim that the fee structure is very uniform among Chinese investment funds, the last two columns of Panel A show that fund management and load fees vary very little over time (note the lack of time trends) or across funds (note the standard deviations at each point in time). This uniformity in fees is why they can be safely ignored. For closed- and open-end funds alike, dividends are assumed to be reinvested in the shares held in the fund at the end of the month they are distributed.

*3.2. Performance Measures*

Partly for economic reasons and partly for robustness, we ground our analysis both on several market-based and accounting-based measures of fund performance.

Within our market-based measures we distinguish between *investor* returns, what the investor earns by owning a share of the fund, and *holding* returns, the returns hypothetically earned on the fund's holdings. For open-end funds, investor returns are given by the percentage change in the fund's NAV (net asset value) per share. Investor returns can also be computed this way for closed-end funds but they are more accurately computed from the market price per share. This is because a closed-end fund's NAV is notional since its shares cannot be redeemed but must instead be traded at the going market price. NAV-based returns and price-based returns only differ if the closed-end fund discount changes over the return period. To guard against this possibility, and to ensure that we capture true investor returns, we use NAV-based returns for open-end funds and price-based returns for closed-end funds.

The crux of our analysis lies in comparing the performance of open-end funds and closed-end funds, whose returns might differ for many reasons besides favoritism. As a first stab attempt at controlling for confounding effects, we also use market-factor adjusted returns and Fama and French (1993) three-factor adjusted returns.[4]

We implement the market- and three-factor models using style indexes from CITIC to construct factor mimicking portfolios. We estimate the following regressions to obtain the factor loadings (betas) and excess returns (alphas) for each fund:[5]

$$R_{it} - RF_t = \alpha_i + \beta_{iRMRF} RMRF_t + \beta_{iSMB} SMB + \beta_{iHML} HML + e_{it}$$

where $R_{it}$ is the return of fund *i* in month *t*, $RF_t$ is the one-month inter-bank rate, $R_{mt}$ is the return on the market factor, $RMRF_t \equiv R_{mt} - RF_t$ is the excess market return, $SMB_t$ (small minus big) is the return on the size factor mimicking portfolio, $HML_t$

[4] Much of this study aims to control for confounding effects through a variety of approaches presented later.

[5] For the market-model, we simply set $\beta_{iSML}$ and $\beta_{iHML}$ to zero.

(high B/M minus low B/M) is the return on the book-to-market factor mimicking portfolio, $\alpha$ is the three-factor model excess return, the $\beta$'s are the factor loadings, and $e_{it}$ is the residual for fund *i* in month *t*. Following Nanda, Wang, and Zheng (2004) and others, we use the sample data, the estimated coefficients ($\hat{\alpha}_i$, $\hat{\beta}_i$), and the residuals ($\hat{e}_{it}$) to compute the three-factor adjusted return ($\hat{\alpha}_{it}$) for fund *i* in month *t* as:

$$\hat{\alpha}_{it} \equiv \hat{\alpha}_i + \hat{e}_{it}$$

The market-factor return is based on the CITIC Composite Index, which is a free-float value-weighted average of all A shares (only available to Chinese nationals). The risk-free rate is the repurchase (repo) rate on government bonds. The size-factor return (SMB) is the difference in returns on the CITIC Small-cap Index and the CITIC Large-cap Index. The book-to-market factor return (HML) is the difference in returns on the CITIC Value Index and the CITIC Growth Index.

Investor returns are useful in that they reflect all factors driving performance. This is something of a liability in trying to detect favoritism since cross-fund subsidization is likely to operate through covert trade coordination strategies rather than through differences in reported holdings, which we control for anyway by adjusting for factor loadings and other observables. Chen, Jegadeesh, and Wermers (2000) suggest another reason why it might be preferable to strip away holding returns. They argue that managers' active stock trades reflect more strongly-held views than those reflected in passive stock positions, especially as the latter might be driven by non-performance-related factors such as concerns over transactions costs and taxes. Thus, stock selection ability should be more discernible in trades than in holdings.

One way to neutralize the effect of portfolio holdings on fund performance is to use the return gap, namely, investor returns minus holding returns.[6] The return gap suits our purpose because, as Kacperczyk, Sialm, and Zheng (2006) argue, it measures how much of a fund's performance derives from unobservable actions by managers, such as interim trades, as opposed to observable portfolio holdings.

Another way to remove passive holding decisions from fund performance is to use accounting-based measure "net profit per share", which reflects capital gains and losses on securities sold, interest and dividend income earned, and expenses such as management fees. Net profit per share is a good indicator of managers' trading ability because it not only reflects gains and losses on long-term holdings (securities on record since at least the last reporting date) but also, more importantly, gains and losses on interim trades (securities bought and sold since the last reporting date). What net profit per share usefully *excludes* is the change in market value of fund holdings.

## 4. Family Effects and Fund Performance

### *4.1. Basic Performance Comparisons*

As a first set of tests of our hypotheses on favoritism, Table 2 presents sample averages for all the proposed performance measures across various fund groupings.

Panel A compares the performance of open- and closed-end funds in general. This tests our first hypothesis, which holds that because redeemability is a powerful form of governance, redeemable open-end funds should out-perform non-redeemable closed-end funds in general, i.e., regardless of family affiliation. Except for NAV returns and unrealized profit per share, our results show that open-end funds

[6] The idea of comparing investor returns to holding returns dates back to Grinblatt and Titman (1989) who use the approach to study mutual-fund transaction costs. The return gap has since been used to investigate stock-picking talent and investment style (Wermers, 2000), window-dressing (Meir and Schaumburg, 2004), the effect of tick size on trading costs (Bollen and Buse, 2006), and hidden actions (Kacperczyk, Sialm, and Zheng 2006).

significantly out-perform closed-end funds, both statistically and economically. For instance, monthly market-adjusted (three-factor adjusted) returns average 0.0086% (0.0065%) for open funds and 0.0079% (0.0052%) for closed funds, a difference of 9% (25%). Closed-end funds do poorly, even in absolute terms, with monthly share-price returns averaging -1.05% and an average semi-annual net realized profit per share of -1.55% (versus 2.12% for open-end funds).

[Insert Table 2 here]

Panel B also compares open- and closed-end funds performance but restricts the sample to fund families that manage both open- and closed-end funds. We find very similar results as in Panel A, which reflects the fact that this sample contains most of the observations found in the broader sample. The samples largely overlap because all fund families launched open-end funds shortly after they were allowed to do so, i.e., when open-end funds were instituted by Chinese securities regulation in 2002. Thus, a direct comparison of panels A and B is not a powerful test of our central prediction (hypothesis 2) that open-end funds should out-perform affiliated closed-end funds, above and beyond any general difference in performance. The sections which follow propose more powerful tests, which overcome this limitation of the sample.

Panel C of Table 2 tests one of our corollary predictions (hypothesis 2a), namely, that all else equal, open-end funds in families that also manage closed-end funds (type II) should out-perform open-end funds in families that manage open-end funds only (type I). We run this test to partly address the concern that even though we control for likely differences between open- and closed-end funds, such as different factor loadings, it is possible that other factors besides favoritism explain why open-end funds out-perform affiliated closed-end funds.

At one level, the results in Panel C show that this concern is justified since we find no statistical difference in the return-based measures of performance across the two categories of open-end funds. However, we find that the hypothesis is supported based on accounting performance: Average net realized profit per share is 1.39% for type I funds, which is significantly lower than the 2.43% observed for type II funds. We view the difference in results across financial and accounting measures of performance as a clue that strategies aimed at favoring open-end funds are primarily conducted through trading activity and are therefore concentrated in net realized profit.

We might also want to contrast the performance of closed-end funds in families that also manage open-end funds and closed-end funds in families that do not (this would be a test of our corollary hypothesis 2a). However, because there are so few cases when families only closed-end funds, we omit the test for lack of power.

Given the limitations of these essentially univariate tests of fund performance, we propose a series of multivariate tests that examine the role of family affiliation in explaining the difference in performance between pairs of open- and closed-end funds.

*4.2. Paired-fund Performance Differences*

Although we account for some of the possible differences between open- and closed-end funds (e.g. market-adjusted and three-factor adjusted returns), open-end funds might out-perform affiliated closed-end funds for reasons other than favoritism. In this section, we check whether our results survive the addition of control variables such as fund and family size and age and year fixed effects. Because we are interested in explaining the differences in fund performance rather than fund performance itself, we adopt a paired-fund approach from this point onwards. As explained below, the

way we pair open- and close-end funds depends on whether we simply test for family effects with the addition of control variables or if we also match on fund style and size.

*4.2.1 Multivariate Analysis of Paired-fund Return Differences*

We construct a sample of paired funds as follows. For every month in the sample period (January 2002 through June 2005), each open-end fund is paired with every closed-end fund in the sample – they need not belong to the same family. For instance, if there are 50 open-end funds and 10 closed-end funds in a given month, then our pairing procedure generates 500 fund pairs for that month. This yields a total of 85,261 fund-pair months for the entire sample period.

We difference the paired funds' returns and run the following regression:

$$Open\_end\_return_{i,t} - Closed\_end\_return_{j,t} = \alpha + \beta\, Open\&Closed + controls + \varepsilon,$$

where $Open\_end\_return_{i,t}$ is the return for open-end fund $i$ in month $t$, and $Closed\_end\_return_{j,t}$ is the contemporaneous return for closed-end fund $j$. The indicator variable *Open&Closed* is set to one if the open-end fund belongs to a family that manages both open-end and closed-end funds, and zero otherwise. A positive $\beta$ would support our hypothesis that fund families favor open-end funds over their close-end siblings. We use the same control variables as Gaspar, Massa, and Matos (2006), namely, the size and age of each fund in the differenced pair (four variables), the size and age of the families managing the paired funds (four variables), and three year dummies. The fund- and family-age controls allow for the possibility that funds are managed differently at various stages of their development, particularly near inception.

Hypothesis 3 states that open-end funds should out-perform affiliated closed-end funds most dramatically when the scope for cross-subsidization is greatest. This

would happen when closed-end fund assets represent a large fraction of total family assets under management. We test this hypothesis using the following regression:

$$Open\_end\_return_{i,t} - Closed\_end\_return_{j,t} = \alpha + \beta\, Family\_CF\_size + controls + \varepsilon,$$

where *Family_CF_size* is the sum of closed-end fund total net assets (TNA) managed by the open-end fund's family. The set of control variables is the same as above. According to hypothesis 3, $\beta$ should be positive.

The sample of paired funds is constructed differently than before. This time, each open-end fund is paired with every closed-end fund *in the same fund family* (before we matched to every closed-end fund *in the sample*). For instance, if a family has 2 open-end funds and 3 closed-end funds, then our procedure generates 6 fund pairs for this family. This sample can be viewed as a subset of the previous sample in the sense that non-family pairings are excluded and only multi-fund families' fund pairs are retained. This yields a sample of 57,289 fund pair months.

Table 3 reports results for raw fund returns and three-factor adjusted returns. Consistent with our hypotheses, the $\beta$'s are positive and statistically significant. The results are stronger for raw fund returns but remain statistically significant for three-factor adjusted returns. Thus, results in Panel A support the hypothesis that families with closed-end funds subsidize their open-end funds. Results in Panel B support the hypothesis that families with a larger fraction of closed-end fund assets to total family assets can draw on greater resources to support their cross-subsidization strategies, which leads to greater performance differences.

[Insert Table 3 here]

*4.2.2 Multivariate Analysis of Matched Fund-pair Return Differences*

The control variables included in the previous section might not exhaust the ways in which affiliated open- and closed-end funds can differ. We therefore propose a matching algorithm inspired from Gaspar, Massa, and Matos (2006) to improve the paired-fund differences approach by matching funds on management style and size.

We then apply a matching routine to this sample of family-paired funds where each fund is replaced by an unaffiliated, style- and size-matched fund.[7] For instance, suppose a particular fund pair contains a large-cap growth open-end fund and a mid-cap value closed-end fund. The open-end fund is replaced by the large-cap growth open-end fund that is closest in size (TNA) but does not belong to the same family. Similarly, the closed-end fund is replaced by the mid-cap value closed-end fund that is closest in size (TNA) but does not belong to the same family. We then difference the matched paired-funds' returns and run the following regression:

$$Open\_end\_return_{i,t} - Closed\_end\_return_{j,t} = \alpha + \beta\, Affiliated + controls + \varepsilon,$$

where the indicator variable *Affiliated* is set to one if the paired funds belong to the same family. Under hypothesis 1, we expect $\beta$ to be positive.

Table 4 (Panel A) presents our results. As in Table 3, statistical significance is higher for raw fund returns than for three-factor adjusted returns, but the results are significant at conventional levels in either case. These findings for matched paired-funds return differences corroborate our earlier results in suggesting that open-end funds out-perform affiliated closed-end funds thanks to favoritism within families.

[Insert Table 4 here]

[7] Note that the set of candidate matching funds is not restricted to multi-family funds. However, because not every fund can be matched on style and size, some fund pairs drop out of the sample, leaving 32,891 fund-pair months.

*4.2.3. Multivariate Analysis of Matched Fund-pair Return Gap Differences*

The pursuit of strategies that favor the performance of open-end funds over their closed-ends funds should be reflect in funds' trading activity and give rise to abnormal returns that cannot be explained by their portfolio holdings. In other words, the effects of such strategies should be concentrated in the return gap, i.e., the difference between investor returns and holding returns.

We therefore adapt the previous section's analysis by using differences in the return gaps of matched fund pairs instead of differences in investor returns. In other words, we strip away holding returns from investor returns. We implement this test by estimating the following regression:

$$Open\_end\_ReturnGap_{i,t} - Closed\_end\_ReturnGap_{j,t} = \alpha + \beta\, Affiliated + controls + \varepsilon,$$

The only difference between this specification and the previous one in is in the dependent variable, which is now computed from return gaps rather than investor returns. As before, hypothesis 1 implies that $\beta$ should be positive and significant.

Table 4 (Panel B) presents our results. This time, the statistical significance for raw fund returns is only slightly higher than for three-factor adjusted returns, and in both cases the results are significant at the 1% confidence level. These findings form the strongest and most convincing evidence so far that open-end funds out-perform affiliated closed-end funds, and that some type of cross-fund subsidization is at work.

**5. Family Effects and the Closed-end Fund Discount**

Despite our attempts to control for confounding effects, one still might worry that the difference in performance we document between affiliated open- and closed-end funds is caused not by favoritism but by an omitted correlated factor. We address

this concern by proposing a test that relies solely on the cross-section of closed-end fund discounts rather than the comparison of open- and closed-end fund performance.

It is now well established that closed-end funds typically trade at a discount to the market value of their holdings, i.e., below their net asset value (NAV).[8] As many before us have argued, the closed-end fund discount – the difference between NAV per share and market price per share – should reflect the severity of the agency problems that depress a closed-end fund's market value. In line with this reasoning, we conjecture that the incentive and scope fund families have to engage in cross-fund subsidization will be reflected in the closed-end fund discount.

We formulate two empirical predictions corresponding to hypotheses 2 and 3. First, we predict that closed-end funds managed by families that also manage open-end funds trade at a deeper discount than those without open-end fund siblings. Second, we predict that the closed-end fund discount increases and decreases with the supply and demand of resources involved in cross-fund subsidization strategies. We measure the *supply* of resources as the sum of closed-end fund assets (own fund excluded) in the closed-end fund's family (*CFSIZE*) and the *demand* of resources as the sum of open-end fund assets in the closed-end fund's family (*OFSIZE*). Both *CFSIZE* and *OFSIZE* equal the number of shares in the fund times NAV per share.

This specification serves several functions. First, subsumed in the *OFSIZE* variable is a test of the base prediction that the discount deepens when closed-end funds are affiliated with open-end funds. This is because *OFSIZE* takes on a value of zero if the closed-end fund has no open-end fund sibling, but a positive value

[8] See Berk and Stanton (2007) for a review of the stylized facts on closed-end fund pricing and a theory relating the dynamics of the discount to managerial ability and incentives.

otherwise. Second, although *CFSIZE* and *OFSIZE* are expressed in absolute terms rather than normalized by family TNA, including both of them together achieves the same purpose. Finally, by including *CFSIZE* and *OFSIZE* together, we account for all the assets within a family and therefore control for overall family size.

We compute the fund discount as:

$$DISC_{i,t} = \frac{NAV_{i,t} - PRICE_{i,t}}{NAV_{i,t}}$$

where $DISC_{i,t}$ is the discount for closed-end fund *i* at the end of quarter *t*, $PRICE_{i,t}$ is the fund's share price and $NAV_{i,t}$ is its net asset value (NAV). A positive (negative) value of $DISC_{i,t}$ indicates that the fund is trading at a discount (premium) to NAV.

Our proposed specification is therefore:

$$DISC_{i,t} = \alpha + \beta_O OFSIZE + \beta_C CFSIZE + controls + \varepsilon$$

where the control variables are suggested by prior literature, such as those used by Chan, Kot, and Li (2005) in their study of Chinese closed-end funds, namely, fund size (using the fund's TNA), liquidity (number shares traded in the quarter divided by the number of shares outstanding, *TURNOVER*), industry concentration (weight of the top-five industries held by the fund, *TOP5_IND*), and portfolio concentration (weight of the top-ten stocks held by the fund, *TOP10_STOCK*). Since closed-end funds have a contractual maturity, which determines when a fund's assets can finally be redeemed, we also control for the number of years until maturity (*TIME_TO_MATURITY*).

For this test, we extend the sample period back to the first quarter of 2001, when only closed-end funds were available in China (as before, the sample ends with the second quarter of 2005). This introduces additional variation in the sample in the

sense that the *OFSIZE* variable is set to zero for quarters prior to 2002. In other words, this allows the sample to reflect not only cross-sectional variation in the size of open-end funds but also the time-series effect of their introduction in September 2001.

The sample uses different data than those used in our earlier tests. First, we collect quarterly data on fund prices, fund trading volume, and net asset values. Second, we compute the top-5 industry and top-10 stock portfolio weightings for each fund using hand-collected data from quarterly reports. Third, we obtain fund name, size, years to maturity, and family affiliation from Tinysoft.NET.

Our results are reported in Table 5. We find a positive relation between the closed-end discount and the size of the fund family's open-end funds (*OFSIZE*). The relation is significant whether we control for fund size and liquidity alone (Model 1) or additionally control for the fund's industry and portfolio concentration (Model 3). This finding supports our prediction that the discount deepens when closed-end funds are affiliated with open-end funds and confirms our earlier evidence of favoritism.

[Insert Table 5 here]

We find a negative relation between the closed-end discount and *CFSIZE*, which is statistically significant, regardless of what controls are included (Model 1 or Model 3). Consistent with the idea that cross-subsidization strategies tax the resources of affiliated closed-end funds, this finding suggests that the burden favoritism imposes on any one closed-end fund lowers – the discount falls – as the portion of closed-end funds in a family increases.

As an alternative proxy for the relative importance of open- and closed-end funds in a family, we use the number of funds of each type (*CF_NO* and *OF_NO*) instead of their assets. As Model 2 shows, this yields qualitatively similar results.

Finally, consistent with the idea that a fund's maturity reflects its redeemability, we find that the closed-end discount is significantly deeper when time to maturity is longer: Governance is weaker when fund assets will not be released for a long time.

## 6. How Might Favoritism Work? Some Cross-fund Subsidization Strategies

Although our evidence strongly suggests that open-end funds significantly outperform affiliated closed-end funds, our claim that this outcome is the result of cross-fund subsidization remains conjectural. In this section, we seek to test more directly that the difference in performance actually does derive from cross-fund subsidization. We consider two fund family strategies that could favor open-end funds over affiliated closed-end funds, namely, trade coordination and resource allocation.

### *6.1. Trade Coordination*

Suppose a fund family wished to draw on the resources of its non-redeemable closed-end funds to boost the performance of its redeemable open-end funds.[9] How might it proceed? First, it probably would wish to do so covertly, which suggests that cross-fund subsidization strategies are likely to center on hidden trading activity rather than publicly-disclosed portfolio holdings. The previous sections support this hypothesis in that differences in affiliated open- and closed-end fund performance are stronger for measures of unobserved actions (e.g. net realized profit per share, return

[9] We confine our analysis to strategies that we believe are legal (in the strictest sense) but ethically questionable in that they favor open-end fund shareholders over affiliated closed-end fund shareholders. In other words, we rule out outright fraud and accounting manipulation as possible strategies. Implicit in our analysis is that cross-fund subsidization strategies make economic sense – and are therefore discernable – to the extent they serve to maximize the value of the residual claims of the fund family, although not each fund individually. It is this basic assumption – that cross-fund subsidization makes sense and is discernable – that our results so far support.

gap) than measures of observed actions (e.g. unrealized profit per share, holding returns). By the same logic, strategies that can be completed within a reporting period, i.e., interim trades, should be preferred over strategies that overlap reporting periods. This is because the latter would appear as reported portfolio holdings, and therefore be detectable, whereas interim trades need never be revealed, at least not in detail.[10]

Fund families might coordinate trades to favor their open-end funds through a pump-and-dump strategy, which we call a tandem trade. A tandem trade involves a sequence of four transactions. First, the open-end fund buys a security, which the closed-end fund then also buys. Second, the trade is reversed: the open-end fund sells the security and the closed-end follows suit. In this way, the closed-end fund is used – to its own detriment – to nudge prices up to benefit the open-end fund. To the extent these trades are quick to execute and profitable for the open-end fund, they can be done on several illiquid securities at once or repeated many times within a reporting period without being disclosed (interim trades). This is true in the U.S. context, but in China these trades may leave a paper trail, which we use to test for trade coordination.

The trading data used in our paper represents a substantial improvement over the quarterly portfolio-holdings data typically found in literature. For example, Gaspar, Massa, and Matos (2006) investigate intra-family trade coordination by testing for opposite trades, which occurs when one fund sells the same security that a sibling fund

[10] This is true for the U.S. but in China interim trades must be reported, although not exhaustively and key data is omitted when they are divulged. The Chinese disclosure rules can be summarized as follows. Until 2003, funds had to disclose the *number* of shares (not the prices) of each security bought or sold in a reporting period. Since 2004, they must report the market value paid and received for securities sold if they belong to the fund's top-20 holdings or if they represent more than 1% of beginning-of-period net total assets (TNA). One way funds can avoid reporting interim trades (securities bought and sold between reporting dates) is to hold a token amount of the security. For instance, if a fund buys 10,000 shares and sells 9,900 shares of stock A between reporting dates, if need only report a position of 100 shares at the next reporting date, without divulging the large shadow interim trade involving the other 9,900 shares. (Some funds in the sample report some unusually small, odd-lot holdings that seem to betray this practice). The gain or loss on the trade would be reflected in the period's net profit, however, it would be impossible for outsiders to detect the shadow interim trade or isolate the associated gain or loss. In short, only interim trades that are fully closed out are reported. This quirk in the disclosure rules means that the reported interim trades represent a lower bound on the true level of trading activity.

buys during a given reporting period. They resort to this rough measure of trade coordination because interim trade data are not available for the U.S., so comparing quarter-to-quarter portfolio-holding reports is the only option.[11] For China, select data on interim trades *are* available, which leads us to propose tandem trades as a finer measure of intra-family trade coordination.

So, how do we test for trade coordination in this study? We simply apply the measure developed by Gaspar et al. (2006) to our interim trade data instead of the period-to-period changes in fund portfolio holdings used in their study. There are two facets to the measure, which reflect the frequency and relative importance of similar interim trades executed by the funds in a given pair of open- and closed-end funds.[12] Keep in mind that although we know the number of shares involved in each reported interim trade, we do not know the dates or prices of the purchase or sale.

For instance, suppose open-end fund O reports that it bought and sold 50 shares of stock X and 200 shares of stock Y, and paired closed-end fund C reports that it bought and sold 100 shares of stock X and 100 shares of stock Z during the same reporting period. In this case, only the round-trip trades involving stock X represent a potential tandem trade. We note this as one matched interim trade. If C had traded in stock Y instead of stock Z we would note two matched interim trades.

We express the relative importance of matched interim trades by dividing the value of the securities traded by each fund (number of shares times the end-of-period price) by its TNA. Since this yields two fractions (one for each fund), we record only

[11] Given the punctual nature of holdings data and our conjecture that fear of detection vies against trade coordination strategies that can be traced through holdings, it is all the more remarkable that any type of trade coordination can be inferred from portfolio-holding reports.

[12] Note that, as in section 6.2, we again consider all possible pairings of open- and closed-end funds and capture family affiliation through a family indicator variable.

the lesser of the two. This follows Gaspar et al. (2006) and represents a conservative estimate of the potential trade coordination reflected in a given matched interim trade.

Continuing our example, suppose that funds O and C each have a TNA of $1,000 and that stocks X and Y are trading for $1 and $0.80 at the end of the reporting period. Then the trade involving X represents 5% of fund O's TNA ($1 × 50 ÷ $1,000) and 10% of fund C's TNA ($1 × 100 ÷ $1,000). We therefore associate a value of 5% with this matched interim trade. If C had traded in stock Y instead of stock Z we would note a second matched interim trade, with an associated a value of 8%: The minimum of 16% = $0.80 × 200 ÷ $1,000 (stock Y's relative importance to fund O) and 8% = $0.80 × 100 ÷ $1,000 (stock Y's relative importance to fund C). Because fund pairs can share many matched interim trades, we sum the relative importance of all matched interim trades noted for a given fund pair (e.g. 13% = 5% + 8%) to gauge total potential trade coordination between these funds (the *Coordination* variable).

This leads us to the following regression specification:

$$OF\_performance_{i,t} - CF\_performance_{j,t} =$$

$$\alpha + \beta\, Affiliated + \gamma\, Coordination + \theta\, Affiliated \mid Coordination + controls + \varepsilon$$

where the indicator variable *Affiliated* is set to one if the paired funds belong to the same family, *Coordination* measures trade coordination, and *Affiliated* × *Coordination* is their interaction, which is actually the variable of interest. Indeed, we want to know whether trade coordination by affiliated funds can explain why open-end funds out-perform closed-end funds. If so, $\theta$ should be positive and significant.

Since our previous analyses show that favoritism appears to be concentrated in trading returns rather than holding returns, we only show results for net profit, which we alternatively divide by beginning-of-period NAV or number of shares outstanding.

We again need to adjust our sample compared to earlier sections of the paper. First, trading data is only reported semi-annually, so the frequency of the data is now semi-annual. Second, since the disclosure rules changed at the beginning of 2004, we restrict the sample to 2002-2003 to avoid mixing periods that span a structural break in disclosure rules. Since the disclosure rules that took effect in 2004 require funds to report more detail than before, we plan to later refine our tests to use the richer data.

Results are presented in Table 6, where we find that the interaction variable, *Affiliated* × *Coordination* is indeed positive and statistically significant. This supports our prediction that coordinated trades between affiliated funds serve to boost the performance of the open-end fund over at the expense of the closed-end fund.

[Insert Table 6 here]

*6.2. Resource Allocation*

One of the key resources a fund family can allocate across funds is managerial talent. This is corroborated by the fact that managerial turnover during our sample period is high relative to the number of funds in circulation: We observe 170 changes in fund management for closed-end funds and 102 for open-end fund.[13]

We propose to examine whether managerial talent is preferentially allocated to open-end funds by testing whether the probability a manager is replaced (retained) following bad (good) performance is higher for open-end funds than closed-end funds.

[13] Ideally, we would like to distinguish between promotions and demotions, voluntary departures and terminations. However, our data only allow us to identify changes in management, regardless of the cause of replacement.

We reason that because redeemability increases accountability, fund families watch the performance of their open-end funds closely, quickly dismissing bad managers and retaining their stars. Conversely, because non-redeemability decreases accountability, families have little incentive to monitor or act upon the performance of their closed-end fund managers. We therefore specify the following logit model to test whether the probability of replacing a fund manager depends on past fund performance:

$$\Pr(\textit{Manager\_changed}) = \Lambda[\beta_1 + \beta_2 ret_t + \beta_3 ret_{t-1} + \beta_4 TNA_t + \beta_5 TNA_{t-1}]$$

where *ret* is the monthly three-factor adjusted return and *TNA* controls for fund size. We consider both current and lagged returns since it is not clear how quickly fund performance will affect the manager's fate. $\Lambda$ denotes the log-likelihood function (logit assumes the residuals follow a standard logistic distribution). We estimate the model using monthly data from January 2002 through June 2005. The dummy variable *Manager_changed* is set to one if fund management has changed and zero otherwise. We run separate regressions for closed-end funds and open-end funds and test whether the coefficients for returns ($\beta_2$ and $\beta_3$) differ significantly across the two sub-samples.

Results are presented in Table 7. For closed-end funds, the probably that management changes is not sensitive to performance; both $\beta_2$ and $\beta_3$ are insignificantly different from zero. However, for open-end funds, the probably that management changes is inversely related to past fund returns: Bad (good) past performance makes changes in management more (less) likely. These results support our hypothesis that fund families care more about their open-end funds and their closed-end funds, and that because of this, they tend to skew their management policy in favor of the former.

## 8. Conclusions

This paper examines the role of reclaimable assets in corporate governance. Specifically, we investigate the idea advanced by Fama and Jensen (1983a, 1983b, 1985) that the ability holders of redeemable shares have to unilaterally remove assets from managerial control exerts a strong discipline over management and is therefore a powerful form of governance. Absent the discipline of redeemable shares, managers become less accountable and governance weakens. We test the implications of Fama and Jensen's argument by comparing the performance and operations of redeemable open-end funds and non redeemable closed-end funds under common management.

Our analysis draws on a natural experiment surrounding investment funds in China where, unlike the U.S., the institutional setting allows us to make a relatively clean comparison between open- and closed-end funds. Through a variety of empirical strategies, we make the case that open-end funds out-perform closed-end funds in general, and affiliated closed-end funds in particular. The difference in performance is even higher when families have large pools of closed-end fund assets available to boost the performance of their open-end funds. Perhaps most convincingly, we find that the closed-end fund discount deepens for funds with affiliated open-end funds.

Corroborating our evidence of favoritism, we find that fund families appear to coordinate trades that help their open-end funds but hurt their closed-end funds. Fund families also appear to direct their best managerial talent to their open-end funds. We argue that these cross-fund subsidization strategies arise rationally when governance is skewed, which causes accountability and incentives to vary across funds in a family.

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## Table 1
## Descriptive Statistics – Funds and Fund Families

Shown are descriptive statistics for funds (Panel A) and fund families (Panel B) in China. Although the entire sample runs from January 2002 through June 2005, the data presented are a subset of that period (2002-2003). For comparability, the sample only includes equity funds (money-market, bond, and capital-protection funds are excluded). *Total Net Assets* (TNA) is the weekly closing market value of fund assets under management, in millions of yuan, computed as NAV per share times the number of shares outstanding. Standard deviations are reported in parentheses. * *This figure only includes families with both open- and open-end funds.*

### A) Funds

| Date | Number of funds | Number of open-end funds | Number of closed-end funds | Total Net Assets (TNA) | Value of stocks held | Fund age | Management fees | Front- and back-end load fees |
|---|---|---|---|---|---|---|---|---|
| 20020630 | 54 | 3 | 51 | 1661.55 | 1068.62 | 2.22 | 1.5 | 2.8 |
| | | | | (1192.83) | (738.50) | (1.04) | (0) | (1.04) |
| 20021231 | 66 | 12 | 54 | 1629.82 | 835.85 | 2.30 | 1.49 | 2.55 |
| | | | | (1131.56) | (584.10) | (1.31) | (0.09) | (0.86) |
| 20030630 | 70 | 16 | 54 | 1603.19 | 987.41 | 2.67 | 1.48 | 2.42 |
| | | | | (1015.75) | (670.60) | (1.36) | (0.11) | (0.81) |
| 20031231 | 95 | 41 | 54 | 1574.12 | 1079.31 | 2.46 | 1.45 | 2.07 |
| | | | | (1076.30) | (759.72) | (1.68) | (0.17) | (0.61) |

### B) Fund Families

| Date | Number of families | Families with both open- and closed-end funds | Families with open-end funds only | Families with closed-end funds only | Number of funds per family | No of closed-end funds per family | No of open-end funds per family | Average TNA per family | Average closed-end funds' TNA per family* | Average open-end funds' TNA per family* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3.6 | 3.4 | 1 | 5981.57 | 6487.94 | 3992.80 |
| 20020630 | 15 | 3 | 0 | 12 | (1.59) | (1.40) | (0) | (3080.88) | (334.20) | (667.62) |
| | | | | | 3.88 | 3.18 | 1.09 | 6327.53 | 4834.30 | 3260.01 |
| 20021231 | 17 | 11 | 0 | 6 | (1.87) | (1.47) | (0.30) | (3381.03) | (1435.40) | (1568.33) |
| | | | | | 4.12 | 3.18 | 1.47 | 6601.36 | 5186.645 | 2367.30 |
| 20030630 | 17 | 14 | 0 | 3 | (1.83) | (1.47) | (0.36) | (3238.44) | (1719.27) | (1444.69) |
| | | | | | 3.8 | 3.18 | 1.64 | 5981.67 | 5070.53 | 2894.84 |
| 20031231 | 25 | 17 | 8 | 0 | (2.08) | (1.47) | (0.76) | (4516.03) | (2182.73) | (2517.61) |

## Table 2
## Closed-end versus Open-end Funds

Reported are average performance measures and fund size (*Total Net Assets, TNA*) for a sample of 142 Chinese investment funds from January 2002 to June 2005. Panel A compares closed- and open-end funds in general. Panel B compares affiliated funds, i.e., closed- and open-end funds under common management. Panel C compares open-end funds in families that manage open-end funds only and open-end funds in families that manage both closed- and open-end funds. *Share-price return* (only available for closed-end funds) is the percentage change in the fund's market price per share. *NAV return* is the percentage change in the fund's net asset value (NAV) per share. *Market-adjusted return* accounts for the return on the stock-market index (using the CITIC A-share index as the market proxy). *Three-factor adjusted return* accounts for market return, size (SMB), and book-to-market (HML). *Net realized profit* is capital gains and losses on securities sold plus interest and dividend income earned, minus all expenses such as management fees. *Unrealized profit* is the change in the market value of securities held since the fund's last reporting date. *Total Net Assets (TNA)* is closing market value, in millions of yuan, computed as NAV per share times the number of shares outstanding. Returns are monthly (months), TNA is quarterly (qtr), and profits are semi-annual (s-a).

### A: Closed-end versus Open-end Funds in General

| | Closed-end Funds | Open-end Funds | Difference p-value |
|---|---|---|---|
| Share-price return | -1.0507 | n/a | n/a |
| NAV return | 0.1030 | 0.2868 | 0.4083 |
| Market-adjusted return | 0.0079 | 0.0086 | 0.0000 |
| Three-factor adjusted return | 0.0052 | 0.0065 | 0.0000 |
| Net realized profit per share | -0.0155 | 0.0212 | 0.0000 |
| Unrealized profit per share | 0.0712 | 0.0680 | 0.8534 |
| Total Net Assets (TNA) | 1,499 | 2,527 | 0.0000 |
| Observations (months/qrt/s-a) | 2285/748/375 | 1659/585/321 | |

### B: Closed-end and Open-end Funds under Common Management

| | Closed-end funds | Open-end funds | Difference p-value |
|---|---|---|---|
| Share-price return | -1.0169 | n/a | n/a |
| NAV return | 0.1224 | 0.2715 | 0.4173 |
| Market-adjusted return | 0.0080 | 0.0087 | 0.0000 |
| Three-factor adjusted return | 0.0053 | 0.0062 | 0.0000 |
| Net realized profit per share | -0.0158 | 0.0243 | 0.0000 |
| Unrealized profit per share | 0.0710 | 0.0721 | 0.7592 |
| Total Net Assets (TNA) | 1,492 | 2,527 | 0.0000 |
| Observations (months/qrt/s-a) | 1901/646/338 | 1066/373/202 | |

### C: Open-end Funds in Different Fund-Family Types

| | Open funds in families managing open funds only | Open funds in families managing open & closed funds | Difference p-value |
|---|---|---|---|
| NAV return | 0.2396 | 0.2715 | 0.4834 |
| Market-adjusted return | 0.0086 | 0.0087 | 0.3119 |
| Three-factor adjusted return | 0.0076 | 0.0062 | 0.9990 |
| Net realized profit per share | 0.0139 | 0.0243 | 0.0402 |
| Unrealized profit per share | 0.0546 | 0.0721 | 0.1204 |
| Total Net Assets (TNA) | 1,828 | 2,527 | 0.0002 |
| Observations (months/qrt/s-a) | 593/212/119 | 1066/373/202 | |

## Table 3
## Family Effects and Paired-Fund Performance Differences

Reported are multivariate regression results on the role of family affiliation (Panel A) and family resources (Panel B) in explaining the difference in returns between paired open- and closed-end funds. The sample used in Panel A is constructed as follows: For every month in the sample period (January 2002 through June 2005), each open-end fund is paired with every closed-end fund in the sample – they need not belong to the same family. In Panel B, each open-end fund is paired with every closed-end fund *in the same fund family* rather than every closed-end fund in the sample. The dependent variable for both panels is the difference between the paired funds' returns, alternatively measured in terms of raw returns (left column) and three-factor adjusted returns (right column). The variable *Open&Closed* is set to one if the open-end fund belongs to a family that manages both open- and closed-end funds, and zero otherwise. This variable tests whether open-end funds out-perform affiliated closed-end funds. The variable *Family_CF_size* is the sum of closed-end fund total net assets (TNA) managed by the open-end fund's family. This variable tests whether open-end funds out-perform affiliated closed-end funds more if the family has more resources (closed-end assets) to support cross-fund subsidization strategies. The regressions include unreported control variables, namely, the size and age of each fund in the paired funds (four variables), the size and age of the families managing the paired funds (four variables), and three year dummies. t-statistics appear in parentheses. *a*, *b*, and c indicate statistical significance at the 1%, 5%, and 10% confidence levels or better.

### A) Family Affiliation

| | Raw Returns | Three-factor Adjusted Returns |
|---|---|---|
| Open&Closed | 0.3750 [a] | 0.0020 [a] |
| | (6.61) | (3.40) |
| Adjusted R-square | 0.0719 | 0.1431 |
| Observations (fund-pair months) | 85,261 | 85,261 |

### B) Family Resources

| | Raw Returns | Three-factor Adjusted Returns |
|---|---|---|
| Family_CF_Size | 0.3681 [a] | 0.0013 [c] |
| | (4.91) | (1.74) |
| Adjusted R-square | 0.0285 | 0.0735 |
| Observations (fund-pair months) | 57,289 | 57,289 |

## Table 4
## Family Effects and Matched Paired-Funds Performance Differences

Reported are multivariate regression results on the role of family affiliation in explaining the difference in returns between style- and size-matched pairs of open- and closed-end funds. Panel A uses investor returns (what investors earn by owning the fund) and Panel B uses the return gap (the difference between investor returns and the hypothetical returns earned on the fund's holdings; viz. Grinblatt and Titman, 1989). The sample period runs from January 2002 through June 2005 and each open-end fund is paired with every closed-end fund in its fund family. Following Gaspar et al. (2006), we then replace each paired fund by an unaffiliated, style- and size-matched fund. Funds without a suitable style match are dropped from the sample. The dependent variable is the difference between the matched paired-funds' returns, alternatively measured in terms of raw returns (left column) and three-factor adjusted returns (right column). The variable *Affiliated* is set to one if both funds in the matched pair belong to the same family. This variable tests whether open-end funds out-perform affiliated closed-end funds. The regressions include unreported control variables, namely, the size and age of each fund in the paired funds (four variables), the size and age of the families managing the paired funds (four variables), and three year dummies. t-statistics appear in parentheses. *a*, *b*, and c indicate statistical significance at the 1%, 5%, and 10% confidence levels or better.

### A) Matched Paired-Funds Return Differences

| | Raw Returns | Three-factor Adjusted Returns |
|---|---|---|
| Affiliated | 0.3023 [a] | 0.0021 [b] |
| | (2.95) | (1.92) |
| Adjusted R square | 0.0575 | 0.1012 |
| Observations (fund-pair months) | 32,891 | 32,891 |

### B) Matched Paired-Funds Return Gap Differences

| | Raw Returns | Three-factor Adjusted Returns |
|---|---|---|
| Affiliated | 0.5517 [a] | 0.4163 [a] |
| | (4.24) | (3.86) |
| Adjusted R square | 0.1243 | 0.1957 |
| Observations (fund-pair months) | 32,891 | 32,891 |

## Table 5
## Family Effects and the Closed-end Fund Discount

Reported are multivariate regression results relating the closed-end fund discount to fund family effects. The dependent variable is the closed-end fund discount, namely, the difference between a fund's NAV per share and its market price per share, divided by its NAV per share. *CF_SIZE* is the sum of closed-end fund assets (TNA) within the closed-end fund's family (own fund excluded). *OF_SIZE* is the sum of open-end fund assets (TNA) within the closed-end fund's family. TNA (total net assets) equals the number of shares in a fund times its NAV per share. These variables measure the supply (*CF_SIZE*) and demand (*OF_SIZE*) of resources potentially associated with cross-fund subsidization strategies by the closed-end fund's family. *CF_NO* (*OF_NO*) is the number of closed-end (open-end) funds managed by a family. *FUND_SIZE* is the closed-end fund's TNA. *TURNOVER* is the number of shares traded in the quarter divided by the number of shares outstanding. *TOP5_IND* measures industry concentration (weight of the top-five industries held by the fund). *TOP10_STOCK* measures portfolio concentration (weight of the top-ten stocks held by the fund). *TIME_TO_MATURITY* is the number of years until the closed-end fund matures. *a*, *b*, and c indicate statistical significance at the 1%, 5%, and 10% confidence levels or better.

| | Model 1 | Model2 | Model 3 |
|---|---|---|---|
| CF_SIZE | -0.7958 [a] | | -0.8430 [a] |
| | (-4.49) | | (-4.71) |
| OF_SIZE | 0.7226 [b] | | 0.7835 [a] |
| | (2.34) | | (2.49) |
| CF_NO | | -0.5047 [a] | |
| | | (-2.75) | |
| OF_NO | | 0.7498 [b] | |
| | | (2.43) | |
| FUND_SIZE | 0.0019 [a] | 0.0017 [a] | 0.0020 [a] |
| | (4.50) | (4.10) | (4.65) |
| TURNOVER | -0.0770 [a] | -0.0774 [a] | -0.0761 [a] |
| | (-11.37) | (-11.25) | (-11.13) |
| TOP5_IND | | | 0.0594 [c] |
| | | | (1.71) |
| TOP10_STOCK | | | -0.0576 [c] |
| | | | (-1.65) |
| TIME_TO_MATURITY | 0.4147 [a] | 0.4742 [a] | 0.4097 [a] |
| | (3.48) | (3.98) | (3.43) |
| Adjusted R square | 0.8204 | 0.8179 | 0.8209 |
| Observations (fund-months) | 748 | 748 | 746 |

## Table 6
## Family Effects and Trade Coordination

Reported are multivariate regression results on the role of family affiliation and trade coordination in explaining the difference in performance between paired open- and closed-end funds. For every six-month reporting period between 2002 and 2003 (disclosure rules changed in 2004, which is why we use a restricted sample for this test), each open-end fund is paired with every closed-end fund in the sample – they need not belong to the same family. The dependent variable is the difference in paired fund performance, measured as net profit divided by NAV (Panel A) and net profit per share (Panel B). *Coordination* is our proxy for trade coordination, which we construct as follows: We note whether the paired-funds report interim trades involving the same security (we call these matched interim trades). If so, we express the relative importance of the trade to each fund in the pair by dividing the value of the trade (number of shares times the end-of-period stock price) by the fund's TNA. Since this yields two fractions (one for each fund), we record only the lesser of the two as a conservative estimate of trade coordination. Finally, we sum the minimum relative importance of all the matched interim trades noted for a given pair of funds (the *Coordination* variable). The variable *Affiliated* is set to one if both funds in the pair belong to the same family. The interaction variable *Affiliated* × *Coordination* tests whether trade coordination among affiliated funds can explain why open-end funds out-perform closed-end funds. *a*, *b*, and c indicate statistical significance at the 1%, 5%, and 10% confidence levels or better.

### A) Performance Measure: Net Profit Divided by Net Asset Value

| | Coefficient | t-statistic |
|---|---|---|
| Intercept | 0.0537 [a] | 11.39 |
| Affiliated | -0.0025 | -0.37 |
| Coordination | 0.3460 [c] | 1.64 |
| Affiliated × Coordination | 3.4465 [b] | 2.16 |
| Adjusted R square | 0.1360 | |
| Observations (fund-pair half-years) | 3,857 | |

### B) Performance Measure: Net Profit per Share

| | Coefficient | t-statistic |
|---|---|---|
| Intercept | 0.0439 [a] | 11.39 |
| Affiliated | -0.0032 | -0.50 |
| Coordination | 0.4174 [b] | 2.07 |
| Affiliated × Coordination | 3.3601 [b] | 2.20 |
| Adjusted R square | 0.1384 | |
| Observations (fund-pair half-years) | 3,857 | |

## Table 7
## Family Effects and Resource Allocation

Reported are multivariate logistic regression results relating managerial turnover to performance in open-end and closed-end funds. The dependent variable is set to one if fund management has changed and zero otherwise. The independent variable *ret* is the monthly three-factor adjusted return and *TNA* controls for fund size. We estimate the model using monthly data from January 2002 through June 2005. Z-statistics are reported in parentheses.

| | $ret_t$ | $ret_{t-1}$ | $TNA_t$ | $TNA_{t-1}$ |
|---|---|---|---|---|
| Closed-end funds | 1.50 | 0.04 | 0.36 | -0.22 |
| | (0.71) | (0.02) | (0.38) | (-0.23) |
| Open-end funds | 1.35 | -6.06 [c] | -0.22 | 0.10 |
| | (0.35) | (-1.62) | (-0.41) | (0.20) |