

# Operational Risk, Fund Performance and Investors Protection: Evidence from China

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## Abstract

This paper investigates the operational risk, fund performance and investor protection in the seven years subsequent to the 2001 liberalisation of the Chinese open-end funds market. The empirical results indicate that the fund type and fund manager's qualification are positively associated with selecting the Big 4 auditing firms, while the size and profitability of open-end funds are not. The results also indicate that the open-end funds audited by the Big 4 firms do not outperform the funds audited by non-Big 4 firms.

**Keywords:** Big 4 Firms; Investor protection; Open-end funds; Operational risk; China

## Introduction

As the investment fund industry has grown explosively, so too has the list of fund failure. One of the famous examples of hedge fund failure is the Long Term Capital Fund managed by the Long-Term Capital Management (LTCM)<sup>1</sup>. In September 2006, another large hedge fund, Amaranth, reported losses of more than \$6 billion apparently incurred in only one month, representing a negative return over that month of roughly 66 percent [1]. A recent example is the Madoff scandal. On December 11, 2008, the Securities and Exchange Commission (SEC) charged Bernie Madoff and his firm, Bernard L. Madoff Investment Securities LLC, with securities fraud for a \$65 billion dollar Ponzi scheme<sup>2</sup>.

To better understand why investment funds, including both the hedge funds and mutual funds, fail and how these failures could be avoided, researchers attempt to predict the fraud and other operational risks in financial firms. Brown, Goetzmann, Liang, and Schwarz [2,3] use a contemporaneous cross-section of hedge funds' Form ADV filings with a summary of historical violations to create a measure of operational risk based on the correlations between historically available hedge fund data and Form ADV variables. They then test if this measure is associated with hedge fund death, flows, and returns.

Hedges IV [4] concludes that the primary cause of fund's failure attributed to one of three categories of risk, investment risk, business risk, and operational risk. Operational risks are associated with supporting the operating environment of the fund. The operating environment includes trade processing, accounting, administration, valuation, and reporting. These are the types of risks that investors do not intend to take as part of their investment strategy. For example, it could be the risk that an investment might be fraudulent, or that managers might misrepresent performance. The most common operational issues related to investment fund losses have been misrepresentation of fund investments, misappropriation of investor funds, unauthorized trading, and inadequate resources. The most significant operational issue is the misrepresentation of investments, which is defined as the act of creating or causing the generation of reports and valuations with false and misleading information. This may be due to deliberate deception or to operational errors.

It is widely believed that the internal fraud and operational risk are alleviated by selecting a good external auditor and larger and more

prestigious auditors have greater incentives to monitor the firms closely. The auditor selection can be viewed as an indication of firm's willingness to control the operational risk [5,6].

Nevertheless, most of the existing auditor selection literature ignores the financial companies or investment companies because there is no comparability between them and normal companies. In the present study, I investigate the choice of auditor and investor protection in China's open-end fund market over the period 2001-2007. The present study contributes to the literature in a number of ways. First, the 2001 liberalisation of open-end funds market in China provides an environment for the study of auditor selection in the fast-growing investment industry. It is thus possible to investigate which slices of the fund audit market the international firms gained in the booming Chinese funds market. Second, previous studies suggest that high-quality auditors provide a source of protection for equity investors in the US and other developed countries<sup>3</sup>. This study sheds light on this issue in an emerging market. In particular it explores the question whether the Big 4 auditors are associated with the open-end funds which have abnormal returns.

In the present paper, I first investigate the determinants of choice of auditor by developing several hypotheses based on characteristics of China's open-end funds, such as fund type, fund manager's qualification, fund size and profitability. In the second step, I study whether the Big

<sup>1</sup>LTCM was founded by a number of star traders and Nobel laureate economists in 1994. The fund was spectacularly successful until the middle of 1998 with an average annually return of 33.4% during the period of 1995-1997. It had capital of \$4.8 billion and assets of \$120 billion at the beginning of 1998. In the aftermath of the Russian crisis in August 1998, the fund lost almost all its capital in one month.

<sup>2</sup>SEC Charges Bernard L. Madoff for Multi-Billion Dollar Ponzi Scheme. US Securities and Exchange commission.

<sup>3</sup>See, Khurana and Raman [33], Leuz et al. [31], and Newman et al. [35].

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4 auditors protect the open-end funds investors by extending Krishnan [7] and Francis and Wang [8] method.

The rest of this paper is organised as follows. Section "Literature Review" reviews the related literature. Section "Hypotheses Development and Models" develops the hypotheses and models. Section 4 presents the data and empirical results. Conclusion is in the last section.

## Literature Review

Early researches on the investment funds have centred on the performance persistence of investment funds<sup>4</sup> and the investor behaviour and cash flows to funds<sup>5</sup>. Operational risk and illegal behaviour by fund managers were ignored in these studies.

Several recent papers examine the returns manipulation of hedge fund manager and illegal behaviour conducted by mutual fund managers. Agarwal, et al. [9,10], Bollen and Pool [10,11] present strong evidence that hedge funds' manipulate their reported returns. Zitzewitz [12] shows that late trading in mutual funds was widespread. Goetzmann, et al. [13] develop pricing rules that prevent investors from late trading. Choi and Kahan [14], Houge and Wellman [15] show that fund families that allowed late trading suffered significant outflows.

A number of other studies investigate the operational risk in lending institutions. The overall conclusion of these papers is that operational risk is a major source of risk for lending institutions and internal fraud is the largest component of operational risk. Chernobai, et al. [16] find financial institutions with weak corporate governance are more likely to have operational events. Perry and de Fontnouvelle [17] test stock price reactions to operational risk events at lending institutions. For internal fraud, the firms' market capitalization drops by double the value of the loss. For other operational losses, the market capitalization only drops by the value of the loss.

It is widely believed that the internal fraud and operational risk can be alleviated by using a good external auditor and larger and more prestigious auditors have greater incentives to monitor the firms. The auditor selection is motivated from three possible sources - client characteristics, audit firm characteristics or the audit environment [5,6]. The existing literature has concentrated on exploring how either auditor or client characteristics determine auditor choice. Auditor selection research has been conducted in the U.S. and other developed countries<sup>6</sup>. DeFond [18] summarises the previous literature and concludes that larger companies and those making securities issues are more likely to select larger or higher reputation (as proxied by Big Six)<sup>7</sup> audit firms. DeFond [18] also finds support for the propositions that companies with lower management ownership and those with higher gearing tend to select larger audit firms. Firth and Smith [19] find similar variables significant for the New Zealand companies in the new issue market.

In addition to the choice of auditor, the association between earnings quality and large international accounting firms has also been investigated extensively. DeAngelo [5] documents that higher audit quality is associated with Big six auditors, where audit quality is defined as the joint probability of detecting and reporting material financial statement errors. Francis and Krishnan [20] argue that investor may perceive Big 4 auditors as having higher quality because these auditors have more of the observable characteristics associated with quality,

such as specialised training and peer reviews, than non-Big 4 auditors.

There is evidence that earnings of U.S. companies with Big 4 auditors are of higher quality and that the stock market values earnings surprises of Big 4 clients more highly than earnings surprises of firms with non-Big 4 auditors [21,22]. Kinney and Martin [23] analyse nine data sets of audit-related adjustments from more than 1,500 audits across 15 years, and conclude that audit-related adjustments are overwhelmingly negative on pre-audit net earnings and net assets. Another reason investors have greater confidence in the reported earnings of Big 4 clients is that Big 4 auditors are more likely to issue going concern warnings than non-Big 4 auditors for the same set of client circumstances [24].

## Hypotheses Development and Models

### Auditor selection

The first set of hypotheses (H1a to H1d) test what are the determinants of choice of auditor in China's open-end funds market.

Theoretical studies have shown that larger or more prestigious accounting firms have greater incentives not to perform a low-quality service at a high-quality price because they have more wealth [25] and more valuable reputations [5]. The fund managers who have obtained the relevant degrees from developed countries or the professional certifications, such as Chartered Financial Analyst (CFA), are deemed to have stronger links with the Big 4 firms. I therefore expect the open-end fund with its manager is a Chartered Financial Analyst (CFA) or has an overseas qualification to be more likely to select a Big 4 auditor. This leads to the following hypothesis:

*H1a: There is a positive relationship between an open-end fund manager is a Chartered Financial Analyst (CFA) charter holder or has relevant qualification from overseas and the likelihood of selecting a Big 4 auditor.*

There are four types of open-end funds in China. Stock funds are investing heavily on common stocks and the objective of this type of funds is long-term growth through capital appreciation. The other three categories include bond funds, money market funds and hybrid funds. These funds have a more diversified portfolio containing bonds, money market instruments and other assets. Kelley [26] and Granzin [27] compare the value and growth indices based on the behaviour of value and growth funds and report higher volatility of the funds investing heavily on the growth stocks. In the present study, I divide the open-end funds into two groups, stock funds and non-stock funds, which include bond funds, money market funds and hybrid funds. Non-stock funds have lower risk given the nature of the instruments they invested. In the light of the above discussion, I expect that the stock funds tend to

<sup>4</sup>See Hendricks et al. [36] and Brown and Goetzman [37].

<sup>5</sup>See Gruber [38] and Zheng [39].

<sup>6</sup>Craswell [40] studies the auditor selection in Australia. Firth and Smith [19] and Beattie and Fearnley [41] investigate the similar issue in New Zealand and UK, respectively.

<sup>7</sup>The Big Six accounting firms were Arthur Andersen, Coopers and Lybrand, Deloitte, Ernst and Young, KPMG, and Price Waterhouse prior to the merger of Price Waterhouse and Coopers and Lybrand in 1997. Arthur Andersen collapsed in 2002. The remaining Big 4 accounting firms are Deloitte, Ernst and Young, KPMG, and PricewaterhouseCoopers. We use the term Big 4 throughout the paper to refer to the above set of large international accounting firms.

select a local auditor because of the embedded risk in their investment portfolio. This hypothesis is formulated in the alternative form as:

*H1b: There is a positive relationship between an open-end fund being a non-stock type fund and the likelihood of selecting a Big 4 auditor.*

Previous auditor selection studies have generally included a client size measure as a control variable [18,19]. There are some good reasons that the large open-end funds to be targeted by the Big 4 firms. First, targeting large open-end funds would have been an effective way of gaining market share quickly. Second, such open-end funds may have been considered less risky and may be able to afford high-quality auditing fees. For similar reasons they may be expected to have sought funds with relatively better performance as clients. These hypotheses are formulated in the alternative form as:

*H1c: There is a positive relationship between the size of an open-end fund and the likelihood of selecting a Big 4 auditor.*

*H1d: There is a positive relationship between the profitability of an open-end fund and the likelihood of selecting a Big 4 auditor.*

These hypotheses are tested by running a binomial logistic regression. It takes the following form:

$$FIRM_{it} = \logit(\lambda_0 + \lambda_1 FUNDTP_{it} + \lambda_2 COE_{it} + \lambda_3 \Delta NAV_{it} + \lambda_4 ASSET_{it}) \quad (1)$$

Where, from H1a to H1d,

$FIRM = 1$  if auditor is Big 4

$=0$  otherwise

$FUNDTP = 1$  if the fund is a stock fund

$=0$  otherwise

$COE = 1$  if the fund manager is a Chartered Financial Analyst (CFA) or educated overseas

$=0$  otherwise

$$\Delta NAV = (NAV_{t+1} - NAV_t) / [(NAV_{t+1} + NAV_t) / 2]$$

$ASSET =$ total assets

### Investor protection

Subsequent set of hypothesis tests whether the Big 4 firms protect the open-end funds investors in China. It is widely accepted that Big 4 firms in the US impose a high level of earnings quality in order to protect their brand name reputation from legal exposure and reputations risk which can arise from misleading financial reports by

clients [5]. However, cross-country comparative accounting studies show that the Big 4 firms' behaviour with respect to client earnings and investor protection varies systematically with the incentives in different institutional environments [28-34]. A more recent study by Francis and Wang [8] investigates the joint effect of investor protection and Big 4 audits on earnings quality for a large sample of firms from 42 countries. They find that earnings quality increases for firms with Big 4 auditors when a country's investor protection regime gives stronger protection to investors. In the light of the above discussion, I expect that the open-end funds audited by Big 4 firm offer higher return to the investors because of investor protection associated with the high-quality audits. This hypothesis is formulated in the alternative form as:

*H1e: An open-end fund being a Big 4 firm's client tend to provide higher return to the investors.*

Following Krishnan [7] and Francis and Wang [8], I pool the clients of Big 4 auditors and other auditors, and add an additional dummy variable  $DR_{it}$  in the regression. This model directly examines whether the contemporaneous association between earnings and negative returns is statistically different for clients of Big 4 firms and clients of other auditors.

$$\Delta NAV_{it} = \alpha_0 + \alpha_1 DR_{it} + \alpha_2 FIRM_{it} + \alpha_3 DR_{it} \times FIRM_{it} + \beta_0 R_{it} + \beta_1 R_{it} \times DR_{it} + \beta_2 R_{it} \times FIRM_{it} + \beta_3 R_{it} \times DR_{it} \times FIRM_{it} + \varepsilon_i \quad (2)$$

Where  $\Delta NAV_{it}$  is the change of net asset value per share for fund  $i$  in year  $t$ ;  $R_{it}$  is annual market return calculated over a 12-month period; and  $DR_{it}$  is a dummy variable that equals 1 if  $R_{it} < 0$  and 0 otherwise.  $FIRM_{it}$  equals 1 for clients of Big 4 firms and 0 for other auditors' clients.

### Data and Results

My sample consists of 902 fund-year observations between 2001 and 2007 obtained from CSMAR Open-end Fund database. Investment funds were not available to Chinese investors until the late 1990s. A number of closed-end funds emerged after the government passed the *Provisional Measures of the Administration of Securities Investment Funds* in November 1997. This guideline for institutional stock trading was replaced by the *Securities Investment Funds Law* promulgated on 28 October 2003 and effective as of 1 June 2004. A detailed *Administration of Securities Investment Fund Operations Procedures* was then passed by the China Securities Regulatory Commission (CSRC) on 16 September 2004 and implemented on 1 October 2004.

The first two closed-funds emerged with 20 per cent of their capital in bonds and 80 per cent in stocks in April 1998. As of June 2000, there were 22 closed-end funds with total assets of 50.5 billion Renminbi (RMB). China's first open-end fund, Hua-An Innovation open-end

	Number of open-end funds	Deloitte	Ernst and Young	KPMG	PWC	Big 4 Total	Big 4 Market Share	Number of Non-Big 4 Auditors	Non-Big 4 Market share
2001	2	-	-	-	2	2	100%	-	-
2002	13	-	3	-	10	13	100%	-	-
2003	50	3	9	1	33	46	92%	4	8%
2004	99	6	21	3	56	86	87%	13	13%
2005	157	14	35	5	81	135	86%	22	14%
2006	249	20	58	10	124	212	85%	37	15%
2007	332	26	73	14	169	282	85%	50	15%

Note: Data are obtained from CSMAR Open-end Fund database for the years 2001-2007. The Big 4 firms include Deloitte, Ernst and Young, KPMG and PricewaterhouseCoopers (PWC). Da-Hua CPAs was one of the oldest CPA firms in Shanghai, China. It reached an agreement with Ernst and Young to form a join firm at the end of 2001. The newly established firm was registered under the name Ernst and Young Da-Hua with the Chinese government in February 2002. The number of open-end funds audited by Ernst and Young Da-Hua is included into that of Ernst and Young.

**Table 1:** Descriptive information on the number of open-end funds and their auditors.

	Number of open-end funds	Fund Type				CFA and Overseas Education (COE)			
		Stock Fund	%	Non-Stock Fund	%	Yes	%	No	%
2001	2	1	50.00%	1	50.00%	2	100.00%	-	-
2002	13	6	46.15%	7	53.85%	6	46.15%	7	53.85%
2003	50	23	46.00%	27	54.00%	22	44.00%	28	56.00%
2004	99	40	40.40%	59	59.60%	40	40.40%	59	59.60%
2005	157	56	35.67%	101	64.33%	60	38.22%	97	61.78%
2006	249	96	38.55%	153	61.45%	86	34.54%	163	65.46%
2007	332	151	45.48%	181	54.52%	109	32.83%	223	67.17%
Total	902	373	41.35%	529	58.65%	325	36.03%	577	63.97%

Note: Non-stock fund includes bond fund, money market fund and hybrid fund.

Table 2: Descriptive information on the characteristics of open-end funds.

	Variables		
	$\Delta NAV$	ASSET	R
Mean	0.1167	4.7947	0.6872
Median	0.0219	1.8373	0.9666
Maximum	1.3122	48.1740	1.3043
Minimum	-1.1673	0.0197	-0.2062
Std.Dev	0.3081	7.1722	0.5888
Skewness	0.4289	2.5745	-0.4607
Kurtosis	4.4907	10.3577	1.4545
Observations	902	902	7

Note:  $\Delta NAV$  is the percentage change of funds' net asset value. ASSET is the market value of open-end funds in billion RMB. R is the market return computed based on Shanghai Composite Index

Table 3: Descriptive information on the characteristics of open-end funds.

Independent Variables	Variables		
	Coefficient	Std. Error	Prob.
Intercept ( $\lambda_0$ )	1.3395	0.2924	0
FUNDTP ( $\lambda_1$ )	0.4860	0.2911	0.095*
COE ( $\lambda_2$ )	0.6564	0.3111	0.0348**
$\Delta NAV$ ( $\lambda_3$ )	-0.0725	0.0793	0.3607
$Ln(ASSET)$ ( $\lambda_4$ )	0.1258	0.0919	0.1711
LR statistic: 9.9079 Prob (LR stat): 0.042			

Notes: The standard errors are estimated using quasi-maximum likelihood (Huber/White) method. Parameter estimates are obtained using quadratic hill-climbing algorithm. \*\*\*, \*\*, \* stand for 1%, 5%, and 10% significance level, respectively. The unit of ASSET is 1 billion RMB.

FIRM = 1 if auditor is Big 4; =0 otherwise

FUNDTP = 1 if the fund is a stock fund; =0 otherwise

COE = 1 if the fund manager is a Chartered Financial Analyst (CFA) or educated overseas; =0 otherwise

$$\Delta NAV = (NAV_{it} - NAV_{it-1}) / ((NAV_{it} + NAV_{it-1}) / 2)$$

ASSET = total assets

Table 4: Regression analysis of auditor selection.

fund (fund code: 040001), was established in September 2001. The open-end funds thrived in the period of 2001 to 2007. The number surged from 2 to 332 and the total assets managed soared from 8.56 billion RMB to 3,063.09 billion RMB.

Table 1 presents the number of open-end funds and the number of funds audited by the Big 4 on an annual basis. It demonstrates that the Big 4 firms dominate the auditing market of open-end funds in China in the sample period. However, the percentage of funds audited by the Big 4 exhibits a decline over time from 100 per cent in 2001 to 85 per cent in 2007. PricewaterhouseCoopers has always been the major player in this market. The other three Big 4 accounting firms, Deloitte, Ernst and

Young, and KPMG, have similar market shares with a number of local accounting firms. One of the oldest CPA firms in China, Da-Hua CPAs, reached an agreement with Ernst and Young to form a joint firm at the end of 2001. The newly established firm was registered under the name Ernst and Young Da-Hua with the Chinese government in February 2002. The number of open-end funds audited by Ernst and Young Da-Hua is included into that of Ernst and Young.

Table 2 presents the summary statistics of two binomial variables of 902 fund-year observations on an annual basis. For the full sample, 41 per cent of the open-end funds are stock funds, which are mainly investing on stocks, and the rest of 59 per cent are non-stock funds, including bond funds, money market funds, and hybrid funds. The other binomial variable is the CFA and Overseas Education (COE). The fund managers who are a CFA charter holder or obtain undergraduate or postgraduate degree from an overseas university manage one third of the open-end funds in China.

Table 3 reports the summary statistics of other key variables. During the period of 2001-2007, the open-end funds in China have obtained an annual return of 11.67% measured by the percentage change of funds net asset value. The average total assets value is 4.79 billion RMB. R is the market return computed based on Shanghai Composite Index in the sample period. Chinese stock market has been booming since 2001. The index was 1645.97 at the end of 2001 and surged to 5261.56 at the end of 2007. Therefore it is not a surprise that the mean of market return is nearly 69%.

In order to test the significance of the above four determinants in the presence of the others, I run the logistic regression for the pooled data from 2001-2007. The result is shown in Table 4. The regression is statistically significant at 5% level on an overall basis, with one individual variable significant at 5% level and one individual variable significant at 10% level. As expected, there is a positive relationship between the fund manager's qualification and the likelihood of selecting a Big 4 auditor. The fund type is marginally significant at 10% level. However, the empirical result is not able to provide support for the positive relationship between the size and profitability of open-end funds and the likelihood of selecting a Big 4 auditor.

The investor protection analysis is reported in Table 5. The model (2) is insignificant with adjusted R-squared of around 12%, and the significance levels of individual coefficients are reported as two-tail p-values. The terms R and  $R \times DR$  are positive and significant at 1% level. This illustrates the co-movement of open-end funds' return and market return. The three-way interaction term  $R \times DR \times FIRM$  tests the investor protection of Big 4 clients relative to non-Big 4 clients. The coefficient is negative and insignificant. Overall the evidence indicates that the open-end funds audited by the Big 4 firms do not outperform



Independent Variables	Variables		
	Coefficient	Std. Error	Prob.
Intercept ( $\alpha_0$ )	-0.1856	0.1131	0.1012
$DR(\alpha_1)$	0.2768	0.1160	0.0173**
$FIRM(\alpha_2)$	0.1120	0.1093	0.3060
$DR \times FIRM(\alpha_3)$	-0.1117	0.1127	0.3216
$R(\beta_0)$	0.2943	0.1015	0.0038***
$R \times DR(\beta_1)$	0.6640	0.2510	0.0083***
$R \times FIRM(\beta_2)$	-0.0491	0.0979	0.6164
$R \times DR \times FIRM(\beta_3)$	-0.0434	0.2682	0.8713

Adj. R-squared: 0.1165 Durbin-Watson: 1.8147

Note: The heteroskedasticity consistent covariances are estimated using Newey-West method. \*\*\*, \*\*, \* stand for 1%, 5%, and 10% significance level, respectively

**Table 5:** Regression analysis of investor protection.

the funds audited by non-Big 4 firms. Therefore Big 4 firms do not provide any investor protection apart from their high-quality auditing service.

## Concluding Remarks

In recent years, the Chinese investment funds market has emerged as one of the fastest growing emerging markets in the world. The investment funds, especially the open-end funds, are becoming the major institutional investors in China's stock and bond markets. There are a few systematic studies, however, on the operational risk, fund performance and investor protection on the investment funds in China.

In this paper, I investigate the determinants of auditor selection using a sample of China's open-end funds from 2001-2007. The results indicate that the fund type and fund manager's qualification are positively associated with the Big 4 firms, while the size and profitability of open-end funds do not have any positive relationship with the likelihood of selecting Big 4 auditor.

Unlike the previous studies, I am not able to identify the investor protection effect in China's open-end funds market. The empirical results also indicate that the open-end funds audited by the Big 4 firms do not outperform the funds audited by non-Big 4 firms. It indicates that the operational risk is not effectively alleviated in the Chinese investment fund industry by selecting the auditors.

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