Essays on Institutional Investors' Trading Behaviours

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Abstract

This research is the first comprehensive academic endeavour to explore the trading behaviours for both domestic and foreign institutional investors in China, the world largest emerging market, using a unique data set. In 2003, Chinese regulatory authorities established a scheme named Qualified Foreign Institutional Investors (QFIIs), which allows foreign institutional investors to directly trade in "A" shares. Before then, no foreign investors were allowed to do so. According to numerous media reports and anecdotes, QFIIs in China have been much more successful than their Chinese counterparts. These have aroused a great deal of curiosity among academics and practitioners. Thus, it is of great interest to examine the trading activities engaged by both domestic and foreign institutional investors in China.

This research embraces three subprojects for three essays respectively. The first essay investigates the preferences and stock characteristics of domestic and foreign institutional holdings in China. The results indicate that they have similar preferences regarding certain stock characteristics, but different preferences when it comes to industry allocations. The results also highlight the differences regarding corporate governance and stock picking patterns. The panel regression suggests that firms with institutional holdings in the previous period perform better in the following period. This phenomenon is stronger for domestic holdings, indicating that domestic institutional investors have an edge in stock picking over foreign institutional investors. This study also finds that ownership concentration plays a positive role in firm performance. The second essay conducts a comprehensive performance evaluation of Chinese mutual funds and style investment. Using a characteristic-based benchmark, results indicate that mutual fund managers have stock picking talents over time, with relative weak ability to time the market. Style investments contribute the most to funds' gross returns. Active funds exhibit lower style consistency but still realise better net returns compared to their passive counterparts. This essay further suggests that mutual fund managers who concentrate their holdings in certain industries perform better after controlling for common risk factors. The second essay also concludes that Chinese mutual fund managers have the ability to select superior industries. The third essay examines the fund performance by sorting the equity holdings into deciles based on the style consistency and industry concentration. Results suggest that fund managers with consistent investment styles and concentrated industry holdings outperform the others. This positive style-performance relation remains statistically significant after controlling for various fund characteristics. Small funds and growth funds exhibit stronger style effects. Funds investing more in state-owned stocks have inferior returns. The stocks purchased by fund managers perform better than the stocks sold. Similar results are observed for stocks held by the foreign institutional investors (QFIIs).

This thesis contributes to the existing literature by examining the trading behaviour of both the domestic institutional and the foreign institutional investors in China. It sheds extra light on issues related to the Qualified Foreign Institutional Investors scheme, which has contributed largely to the reform of the Chinese financial market since 2003. The analysis of the investment styles of institutional investors has important implications for academics, practitioners and, in particular, policy makers, and enables China to further enhance its financial market liberalisation with the rest of the world.

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Chapter 1 Motivation and Overview

1.1 Introduction

The majority of global assets are managed by financial institutions which suggests the crucial role institutional investors play in global capital markets. Their growing importance in monitoring corporate management and in improving firm performance has led to an increasing number of studies by academics, investors, and practitioners, which focus on institutional investors and the issues that relate to them, especially in emerging economies. Since China's capital market has risen to become the third largest emerging capital market in the world, the mutual fund industry in China has become one of the focuses of these inquiries. The proportion of stock trading by Chinese domestic funds made up 28% of the total Chinese equity market in 2007 (Yu & Du, 2008). Over the last 17 years, the total number of mutual funds increased to 4444 as of June 2017, in which about 839 are equity mutual funds and 2035 are hybrid funds.

As the counterparts of these domestic institutions, foreign institutional investors were not allowed to invest in the Chinese securities markets until 2003, when the Qualified Foreign Institutional Investors (QFII) Scheme was introduced. To fulfil the requirements as a member of the World Trade Organization (WTO), since 2001 the Chinese government has implemented numerous measures to liberalise China's economy and improve its investment environment. The QFII scheme enables foreign institutional investors direct access to China's A-share market on a selective basis through a quota system. The total quota increased to USD 79 billion in 2015 and there were 307 licensed QFIIs by the end of May 2018.

This QFII scheme, coupled with the rapid development of the Chinese mutual fund market and non-tradable share reform, provides an excellent platform to investigate the trading behaviours of domestic and foreign institutional investors in China.

Although there have been abundant studies on institutional investors' trading behaviours in developed markets, little research has been conducted on this behaviour in emerging markets, especially in China. Empirical studies on foreign institutional investors in emerging markets are limited. Bardhan (2000) notes the lack of sophisticated market institutions in emerging markets and the lack of reliable information for foreign investors in these markets. However, numerous media reports and online articles claim that QFIIs meet with great success in investing in equities. However, it needs to be asked: Are QFIIs more successful than their domestic counterparts, in general, over a long period of time? What are the preference differences for stock selection between domestic and foreign institutional holdings? These untouched questions call for comprehensive and in-depth studies.

By using a unique, quarterly dataset of QFIIs, manually collected from the 4th quarter of 2003 to the 2nd quarter of 2017, Chapter 2 of this thesis firstly investigates the preferences of stock characteristics, at the firm level, in domestic and foreign institutional holdings. This chapter also analyses industry allocation and the difference in corporate governance between domestic and foreign institutional holdings. Chapter 2 employs a logit model to examine the relationship between institutional holdings and the various types of stock characteristics. In addition, the chapter applies panel regression to examine firm-level performance and investigates whether firms perform better in the following period if they were held, to a larger extent, by institutional investors in the previous period.

If an institution maintains its stock picking preferences over time, it then becomes subject to "style investing". Malkiel (1995) demonstrates that a fund's ability to outperform the benchmark relates to its objective classification. However, Chan, Chen and Lakonishok (2002) find that fund managers are often not keen to stick to their stated investment style due to the freedom they have in making investment decisions. More than half of the funds depart from their claims and over one third of the funds are severely misclassified (Kim & Shukla, 2000). This raises the question: Does style drift or inconsistency have any impact on the performance of institutional investors? There is little research on the relationship between consistency of investment style and mutual fund performance. Inspired by the empirical work of Brown, Harlow and Zhang (2009) on the US markets, Chapter 3 (the second study) undertakes a more comprehensive study of the variance scores of the characteristics (size, value and prior return) of fund stock holdings for Chinese mutual funds.

In addition to stock characteristics, the industry allocation of a fund's stock holdings provides an alternative measure of investment style. Azriel and Miles (1995) find that fund managers usually concentrate their portfolio holdings on specific industries if they are well informed. Investigating actively managed mutual funds in the US from 1984 to 1999, Kacperczyk, Sialm and Zheng (2005) find that, on average, more concentrated mutual funds perform better after controlling for risk and style differences using various performance measures. However, it remains unclear whether Chinese mutual fund managers have the stock picking skills for selected industries with concentrated stock holdings. Thus, Chapter 3 also examines the extent of industry concentration of funds' stock holdings and investigates industry concentration as another attribute of holding-based style-consistency. This chapter contributes to existing literature by shedding light on the relationship between investment style and fund performance.

Using CSMAR quarterly stock holding data of Chinese domestic funds from 1998 to 2018, Chapter 3 firstly examines the performance of overall funds sampled through the distinct holding-based and factor-based measures on a portfolio level. Then, decomposing fund holding-based performance, Chapter 3 also investigates fund managers' stock selectivity, characteristic timing ability, industry selectivity and industry timing ability. By controlling fund characteristics in the multivariate regressions, Chapter 3 lastly investigates the impact of style investing on various fund performance measures. This is done to explore whether fund managers can benefit by consistently 'tilting' their investments into groups of stocks with similar characteristics, or by concentrating their stock holdings in certain industries.

Continuing on from Chapter 3, Chapter 4 (the third study) examines the style-performance relation of funds at an aggregate level and asks: How does the performance of funds vary as a result of the differences in fund managers' investment styles? The chapter goes on to examine the effect on fund performance of funds' consistent investment in similar stocks or certain industries. It also furthers the study carried out in Chapter 3 by ranking the measures of style consistency (the Holding-based Style Consistency Score) and industry concentration (the Industry Concentration Index). Abundant empirical works have reported that size is a factor affecting funds' ability to outperform the benchmark, but the evidence of this size effect is mixed. Chen, Hong, Huang, and Kubik (2004) find that smaller funds tend to outperform larger funds due to diseconomies of scale. However, Tang, Wang and Xu (2012) document an inverted U-shaped relationship between fund size and fund performance. My study is particularly interested in whether the style effect varies with size. Therefore, I further sort domestic funds into quintile portfolios according to their total net assets and then examine the style-performance effect using fund size quintile portfolios. Other

robustness checks are carried out for the style-performance relation by further controlling fund categories and state-owned stock holdings, bringing more depth to my analysis.

Another question naturally arises which is also worth exploring: Do domestic and foreign institutions perform differently or similarly when it comes to investment style? Or, more specifically: Does a style-performance relation exist with QFIIs? Therefore, Chapter 4 investigates the investment style of QFIIs, their performance and their style-performance relation. Under the QFII scheme, a QFII is only required to disclose equity investment in China, not their investment assets allocation in other countries. Therefore, the QFII analysis is based on the data of their holdings as investment portfolios to facilitate the comparison with domestic funds. The QFIIs' performance and their style-performance relation are also examined using both the factor-based and holding-based performance measures.

1.2 Main Findings and Contributions to the Literature

This section outlines the main findings and contributions of Chapters 2, 3 and 4 that comprise the core part of this thesis.

Chapter 2 investigates the preferences and stock characteristics of domestic and foreign institutional holdings in China. The results suggest that in China, over the sample period of 2003 to 2014, both domestic and foreign institutional investors preferred to invest in firms with a larger size, relatively higher stock price and turnover, lower systematic risk, lower current and quick ratios, better accounting performance, and those that are under-valued and actively traded, relative to the benchmark of the A-share market. However, foreign and domestic institutions exhibit significant differences in industry allocation, corporate governance (ownership concentration), and firm-level performance.

When Tobin's Q is applied as a firm performance measure, there is no strong evidence to suggest that firms held by institutional investors outperform the overall market. On the other hand, the results suggest that firms held by domestic institutional investors perform better than those held by foreign institutional investors. This may be due to the disproportionate number of investments these foreign institutional investors make in some industries, such as insurance, banks, transportation, commercial and professional services, technology and equipment, which are considered to be 'blue chips' in China. These firms usually have poor performance when domestic investors (particularly retail investors) target smaller shares in pursuit of quick profits. However, domestic institutions heavily invest in the following industries: insurance, banks, consumer durables and apparel, utilities, materials, energy and capital goods.

Regarding the corporate governance characteristics comparison, Chapter 2 also finds that foreign institutional investors tend to invest in stocks with relatively higher ownership concentrations, but no significant results were obtained for domestic institutional holdings. The results of the logit model show that institutional holdings prefer certain stock characteristics. Applying panel regression on firm-level performance, Chapter 2 illustrates that firms held by institutional investors in the previous quarter perform better in the following quarter. Moreover, this positive effect of institutional holdings on firm performance is more significant for domestic institutional investors. This indicates that domestic institutional investors have an edge over foreign institutional investors when it comes to stock picking, which is contrary to media reports. In addition, the results from the panel regression analysis provide evidence that state ownership has no effect on firm performance. However, ownership concentration and tangibility play a positive role in impacting.

Chapter 2 makes a number of contributions. First, it employs a longer sample period and more time-series observations than previous studies, which significantly mitigates the small-sample bias

in regression analysis. Furthermore, the equity holding data for QFIIs are on a quarterly basis. This unique quarterly dataset enables my empirical work to capture and incorporate the quarterly variation of institutional investors' activities (such as portfolio rebalancing) required by CSRC for disclosure. Third, both the accounting-based and the market-based measure are applied for the examination of stock characteristics. Fourth, the study employs more appropriate methodologies to investigate stock characteristics and firm-level performance, such as the logit model and the panel regression method. These methodologies render my results more informative, robust and rigorous, and most of the results are not found in prior studies on the Chinese market.

Continuing on from the firm-level analysis of stock characteristics, Chapters 3 and 4 turn to the performance of institutional investors and their style investing on a portfolio level. Firstly, Chapter 3 examines the performance of all domestic funds by comparing various performance measures. The average net annual return of domestic funds, after expenses, is lower than fund gross returns which is calculated from equity holdings. This indicates that fund managers are capable of picking outperforming stocks, and an overall lower net realised return may be due to non-stock assets and transaction costs, consistent with the results reported by Wermers (2000). On the basis of re-classification for 'actively managed mutual funds' by 'trades' and 'turnover', Chapter 3 shows that Chinese actively managed funds exhibit statistically significant positive returns in the Carhart four-factor model. The abnormal return remains robust after controlling time-varying, macro-economic conditions using the Ferson-Schat model. The performance measure is also employed, and the decomposition of holding-based performance implies that fund managers have stock picking talent, but weaker abilities when it comes to rebalancing their stockholdings with market variation.

Secondly, Chapter 3 employs the holding-based measures for investment style. Characteristics-related style is measured by the score variance of stock characteristics (size, value and past return)

over a 36-month period and is referred to as Holding-based Style consistency (HSC). The industry-related style is measured by the Industry Concentration Index (ICI) which captures the degree to which a mutual fund deviates from the benchmark market portfolio for a particular industry.

The results demonstrate that actively managed funds differ substantially in style consistency and industry concentration. Controlling for fund characteristics, such as a fund's total net assets, turnover, fund flow, age and expenses, the results from multivariate regressions show that mutual fund performance is positively related to style consistency over the sample period. This indicates that fund managers can benefit by consistently 'tilting' their investments into groups of stocks with similar scores for size, value and past returns. On the other hand, funds that concentrate their stock holdings in certain industries outperform diversified funds. This superior performance of concentrated funds may be due to the information advantages of these portfolio managers. This style-performance relation remains robust after adjusting the idiosyncratic risk for fund performance. Both the factor-based and holding-based fund performance measures exhibit consistent results: that style consistency and industry concentration are positively correlated with fund returns.

Chapter 4 investigates the style-performance relation more in-depth by sorting actively managed mutual funds into portfolios that have different HSCs and ICIs. This enables the study to measure the magnitude of performance difference due to different degrees of fund style consistency and industry concentration. The results show that the most style-consistent decile funds outperform the funds with the most style-drift by 3.72% per year before expenses. The average annual return of the most concentrated portfolio outperforms the most diversified portfolio by 3.88% per year before expenses. Chapter 4 also finds that the style-performance relation is more significant for small funds and growth funds. Moreover, at the portfolio level, funds that invest more in stocks

with higher state ownership, generate inferior further returns. Additionally, Chapter 4 illustrates that the average return of stocks pursued by actively managed funds is significantly greater than the average return of stocks they sold, and this difference increases as fund style consistency and industry concentration increase.

Lastly, Chapter 4 presents results of the style-performance discussion on QFIIs and suggests that QFIIs that consistently invest in stocks with similar characteristics, and score and concentrate their holdings in certain industries, also generate superior performance. QFIIs produce statistically significant positive abnormal returns in both the unconditional (Carhart) and the conditional (Ferson Fachat) four factor models.

Chapters 3 and 4 make several contributions to the existing literature. Firstly, although the investment style of fund managers has been explored over a long period of time in developed markets, my work is a more comprehensive study on the style-performance relation of institutional investors in the Chinese equity market. Secondly, this thesis investigates domestic funds over a longer time period (from 1998 to 2017) than previous studies and employs a richer dataset which renders the results more informative, robust and rigorous. Thirdly, this thesis is the first study to attempt to explore QFIIs' investment style and the industry concentration of their investments, based on their quarterly holdings via comparisons with domestic funds. The holding-based approaches to measuring performance and style enable analysis of QFIIs to be as portfolios. Fourthly, this thesis is also the first study to use industry concentration to capture investment style, rather than just looking at stock holding size, value and past returns. Finally, the study considers the uniqueness of the Chinese equity market by considering state ownership of equity held by institutional investors in the style-performance relation. The results, which show that funds that

hold fewer state-owned stocks demonstrate a more significant style effect, are not seen in earlier China-related studies.

1.3 Structure of the Dissertation

The core part of this dissertation comprises three essays, each building upon the trading behaviour of domestic and foreign institutional investors. In order to present the dissertation in a methodical manner, these three essays will appear as three independent chapters. The structure of this dissertation is briefly described as follows.

Chapter 2 examines the stock characteristic preferences of domestic institutional investors and foreign institutional investors. This analysis focuses on the stocks held by these investors in terms of their characteristics and performance at the firm level. Chapter 3 builds upon these characteristics of stock holdings and extends upon Chapter 2 to include characteristic-based style analysis of domestic fund managers. This chapter also takes industry concentration as one of the dimensions of trading style. Chapter 4 further examines the style-performance of domestic mutual funds and explores the holding-based performance of QFIIs and the effect of their trading style in comparison with domestic mutual funds. Chapter 5 concludes and discusses the intended direction of future research.

Chapter 2 The Stock Preference of Domestic versus Foreign Investors: Evidence from Qualified Foreign Institutional Investors (QFIIs) in China[1]

2.1 Introduction

On February 10, 2014, PwC released its projection on global assets under management (AUM): it will rise to roughly $102 trillion by 2020, from $64 trillion in 2012. The majority of these assets are managed by financial institutions, suggesting that the role of institutional investors is crucial to global capital markets. Perceiving this growing importance, researchers have paid increasing attention to studying the issues related to institutional investors, especially in emerging economies. China has become one of the focuses of these inquiries. This is not only because it is the largest emerging economy and now the second largest economy in the world, but also because its financial reforms have been successful, and its financial markets have attracted more international attention over time. One notable contributory factor has been, without doubt, the introduction of the Qualified Foreign Institutional Investors (QFIIs) scheme. This scheme, coupled with the rapid development of the Chinese mutual fund markets, provides an excellent platform to investigate the trading behaviours of domestic and foreign institutional investors in China, which the present study centres on.

One of the motivations of the present study stems from the large number of media reports and online articles about China's QFIIs over the past decade or so. Though not consistent throughout, in most of these years they reported that foreign institutional investors outperformed their Chinese counterparts − i.e., domestic institutional investors. For instance, in 2014 QFIIs as a whole were

[1] A paper based on this chapter, entitled "The stock preference of domestic versus foreign investors evidence from Qualified Foreign Institutional Investors" was published in the *Journal of Multinational Financial Management* 37 (2016).

reported to expand businesses by 45%, exceeding domestic equity funds' 32.02%; and in the 4th quarter of 2005 alone, QFIIs were said to enjoy a total floating profit of 12 billion RMB over 10 heavily-invested stocks to become the champion among all China's institutional investors in terms of profitability.[2] These media-reported success stories should arouse great interest in China's QFIIs from academics, practitioners and regulators. The immediate intriguing questions would be: Have the QFIIs really been more successful than their domestic counterparts in general over a long period of time? If so (not), what have made the former (latter) excel in equity investments? Describing aggregate statistics for a particular and short period of time, which media reports and online articles rely on, can only offer a partial and superficial picture, not general conclusions, nor the underlying reasons. This suggests that solid, rigorous, detailed and in-depth studies are called for. This study, therefore, seeks to answer the above two general questions by probing into several specific ones as follows: 1. What are the preferences for stock characteristics in domestic and foreign institutional holdings? 2. What are the industry allocations in domestic and foreign institutional holdings? 3. Are there any differences in corporate governances between domestic and foreign institutional holdings? 4. Does formal econometric evidence exist in ascertaining which group of investors, domestic or foreign, has an edge over the other?

These questions are largely related to the investment styles or the stock-picking skills of institutional investors in China. Institutional investors in China are chosen due to the following considerations: Institutional investors are deemed to be more sophisticated than retail investors, and have been found to engage heavily in style investing. For instance, according to Froot and Teo (2008), institutional investors reallocate across style groupings more intensively than across

[2] http://search.10jqka.com.cn/snapshot/news/661b911d3187650f.html?qs=stockpickbnewsmoretrack&tid=stockpick, http://finance.qq.com/a/20121201/000369.htm, http://news.ifeng.com/gundong/detail 2013 12/12/32071747 0.shtml.

random stock groupings. They also found that style investing of different types helps to forecast positively or negatively future stock returns. Thus, style investing, by rotation among different " styles", is supposed to be important for successful investment. If foreign institutional investors indeed have better stock-picking skills than domestic institutional investors, the former ' s investment styles should be different from (better than) the latter's, and vice versa. Uncovering the differences amounts to disclosing the trading strategies that can be learnt and further improved by other market participants. Another consideration, albeit not directly relevant to the present study, is that style investing may generate misevaluation or return co-movements among individual securities and portfolios (Barberis & Shleifer, 2003; Chang et al., 2013). The findings of style investing by China's institutional investors could provide some motivation for further examining the Chinese financial markets on such co-movements, from, for example, the behavioural perspective.

Studies of developed markets on the preferences of institutional investors and the stock characteristics of their holdings are abundant. On the contrary, however, few studies have been done for emerging markets, especially the Chinese market. This is mainly due to the short history of institutional investors and hence the resultant difficulty in obtaining reliable and reasonably high frequency data. Note, however, that the majority of previous studies on developed markets have used higher-than-annual-frequency data. One obvious reason is that annual data will inevitably lose a large amount of important and useful information where investors rebalance their portfolios on, say, a quarterly basis, thereby making the results less reliable and less informative. In fact, the China Securities Regulatory Commission (CSRC) trading rules require that institutions (both domestic and foreign) release their equity ownership holdings on a quarterly basis. In view

of these, this thesis utilises a unique quarterly dataset of QFIIs' equity ownerships, which was manually collected over the period from the 4th quarter of 2003 to the 4th quarter of 2014. The dataset enables me to conduct a richer analysis, which has not been done in the Chinese setting and this helps to fill a gap in the existing literature.

This study first investigates the stock characteristics of domestic and foreign institutional holdings. The results suggest that, over the 45-quarter sample period, both domestic funds and QFIIs tend to hold large firms, firms with relatively higher share prices, firms with better accounting performances, and firms which are under-valued and actively traded. On the other hand, they both prefer firms with relatively lower systematic risk and lower current and quick ratios ~~liquidity~~. Domestic institutional investors also prefer firms with shorter history (younger firm age), while foreign institutional investors favour firms with longer history. At the firm level, there is no evidence to show firms held by institutional investors out-perform the overall market, when measured by Tobin's Q. However, the results indicate that firm-level performances for domestic institutional holdings are better than those for foreign institutional holdings.

Next, the results reveal that foreign institutional investors prefer to invest in sectors such as financial, transportation, professional services, and technology, which have long been perceived to be 'blue chips' in China. Using the Bloomberg 24 industry classification, foreign investors disproportionately invest more in the following specific industries: 'Banks', 'Insurance', Transportation', 'Consumer Durables & Apparel', 'Technology Hardware & Equipment' and 'Commercial & Professional Services'. All the rest of the industry categories are under-weighted by foreign institutional investors. However, domestic institutional holdings exhibit a completely different picture. They disproportionately put more weight towards a majority of the industries,

such as ‘Food Beverage & Tobacco’, ‘Pharmaceuticals, Biotechnology & Life Science’, ‘Real Estate’, ‘Retailing’, ‘Technology Hardware & Equipment’ and ‘Software and Services’. ~~T~~This study also investigates the corporate governance characteristics of domestic and foreign institutional holdings. This study finds that foreign institutional investors tend to hold stocks with relatively higher ownership concentrations, but no significant results were observed for domestic institutional holdings.

Going beyond investigating the stock characteristics of the domestic and foreign institutional holdings, this employs a logit model to examine the relations between institutional holdings and the various types of stock characteristics. The findings about the preferences of institutional holdings for stock characteristics are confirmed to be accurate by the logit analysis. This study then applies a panel regression to examine the firm-level performance to answer the following question: Do firms perform better in the next period if they have institutional ownerships from the previous period? The results suggest that firms held by institutional investors in the previous period do perform better in the following period. This phenomenon is stronger for firms with domestic institutional holdings compared to firms with foreign institutional holdings, suggesting that domestic institutional investors have an edge in stock picking skills over foreign institutional investors, who have been considered to be more successful than locals by many media reports. The results also demonstrate that state ownership is inefficient on firm performances, but the ownership concentration and the firm's tangibility have positive impacts on firm performances.

The rest of the paper is organized as follows. Section 2.2 presents the institutional background about the introduction and the development of the Qualified Foreign Institutional Investors (QFIIs) Scheme in China. Section 2.3 reviews relevant literature on trading behaviours of domestic and foreign institutional investors, both in developed markets and in emerging markets. Section 2.4

describes data used in this study and presents detailed descriptive statistics. In Section 2.5, this study employs the logit model to formally test the preferences on stock characteristics by domestic and foreign institutional investors. It also applies a panel regression model to investigate if firms perform better in the next period with institutional ownerships from the previous period. Finally, Section 2.6 provides concluding remarks.

2.2 Institutional Background

Since the early 1990s, there have been two categories of shares traded in the Chinese equity market: A-shares and B-shares. Foreigners (both individuals and institutions) were not allowed to trade directly in the A-shares market until 2003. In order to liberalize the Chinese financial markets and fulfil the World Trade Organization (WTO) requirements, the Chinese Security Regulatory Commission (CSRC), the People's Bank of China (PBC), and the State Administration of Foreign Exchange (SAFE) introduced in November 2002 a special trading scheme for Qualified Foreign Institutional Investors (QFIIs). The QFIIs scheme provides foreign institutional investors direct access to China's A-shares market, on a selective basis using a quota system.

The CSRC and the SAFE are the two government bodies regulating the investment activities conducted by QFIIs. The CSRC is responsible for overseeing all transactions and conducting annual inspections of the QFIIs. It also has the authority to grant a QFII status (the QFII licence). The SAFE's responsibilities are to supervise QFIIs' activities associated to foreign exchange operations, which include approving QFIIs' investment quotas, issuing foreign exchange certificates, and monitoring account management and foreign exchange settlements. The QFIIs scheme also allows foreign institutional investors to trade in treasury securities, corporate bonds, mutual funds, warrants and other financial products listed by the CSRC, in addition to Chinese A-shares.

Qualified Foreign Institutional Investors are classified into the following main categories: Asset Management, Insurance, Securities, and Commercial Banks. There are also other institutions such as pension funds, charity foundations, endowment funds, and sovereign wealth funds. To qualify as a licensed QFII, the candidate must have stable financials and a good credit history, and meet the minimum asset scale set by the CSRC. For example, asset management and insurance institutions should have a minimum Asset under Management (AUM) of USD 10 billion and a minimum operating requirement of two years. They also should not have any sanctions from the supervision system in the previous three years when lodging an application. For securities companies, the operating-history requirement is five years, and it increases to ten years for commercial banks. Over the years, the CSRC and the SAFE have gradually relaxed the QFII entry standard. For example, the AUM for the asset management institutions has been reduced from USD 10 billion to USD 5 billion. The shareholding ceiling has also been revised to allow QFIIs to hold more of total A-shares outstanding for any individual firm, for example, from 10% to 20%, and further to 30% in 2012. After receiving the licence, a QFII can then apply for the 'quota' (in USD). All QFIIs are required to apply to their own custodian banks as the primary connection between the CSRC, the SAFE and the QFII. Either Chinese commercial banks or Chinese branches of foreign banks can serve as the custodian bank.

The QFII scheme has been in operation for about 13 years, during which time both the number of QFIIs and the 'quota' have expanded steadily. At the beginning of the scheme in 2003, the quota was USD 424 million, and ten QFII licences were granted to initiate the pilot programme. These included institutions such as UBS AG, Nomura Securities, Citigroup Global Market, Morgan Stanley, Goldman Sachs, The Hong Kong and Shanghai Banking Corporation, Deutsche Bank, IN Bank, JP Morgan, and Credit Suisse (HK). Many efforts have been made by the CSRC and the

SAFE to expedite the QFII approval process. As of 28 September 2015, the quota increased to USD 79 billion and there were 277 licensed QFIIs. The CSRC has a preference for asset management institutions when granting licences, as evidenced by the highest percent-age (approximately 62 percent) given to the asset-management category. The second place is taken by commercial banks with about 14 percent. Fig. 1 below illustrates the proportion of various types of institutions in terms of obtaining the QFII licence.

QFIIs is the scheme which allows foreign institutional investors to trade stock in China A shares. From the perspective of each QFII, it is the overseas proportion of its equity investment portfolio, particularly in China. This proportion of their investments is the hypothetical foreign institutional portfolios, which are compared with their counterparts, domestic funds, at the level of institutional investors, not at the fund level.

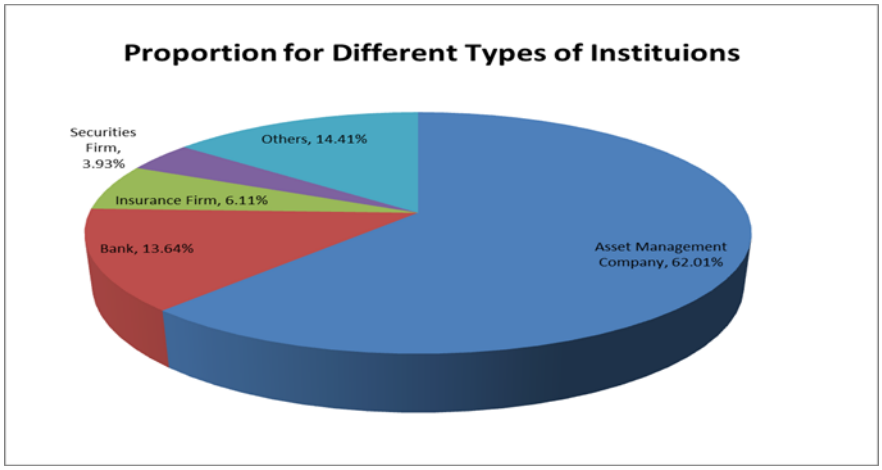

Figure 1 Percentage of Qualified Foreign Institutional Investors by Categories

Before the first Chinese equity open-end mutual fund was launched in September 2001, only 49 closed-end mutual funds traded in China's securities markets. Since then, the mutual fund industry has become one of the fastest growing industries in China. In 2007, a survey conducted by the

Chinese Securities Journal reported that 83% of 14,800 respondents would pick mutual funds as their first choice for wealth management (Tang et al., 2012). Yu and Du (2008) showed that equities held by funds accounted for approximately 28% of the total Chinese equity markets at the end of 2007. Over the last 14 years, the number of open-end mutual funds had increased to 2818 as at September 2015, in which about 516 are equity mutual funds and 1219 are hybrid funds.

Domestics funds are on an exact portfolio level for investing all categories of assets. Moreover, by further decomposing the funds into different subsets, it will be demonstrated in Chapter 3 (Panel C, Table 3.1 Mutual Fund Summary Statistics) that equity funds and hybrid funds averagely constitute 45.31% and 34.21% of the total Chinese fund market, respectively, from 1998 to 2017 and they both invest more than 65% of their portfolio assets in trading stocks.

Therefore, regardless of the various of objectives of domestic funds, essay one primarily examines the stock level preference of these two institutional investor groups and the main discussions are on the features of individual stocks in terms of their characteristics and industry styles. And particularly, the domestic funds that were not holding any stock at the end of the quarter are excluded from the dataset of essay one for sample selection.

2.3 Literature Review

Existing literatures have documented some interesting patterns in the stock preferences of institutional investors. Falkenstein (1996) investigated a cross-section of mutual funds equity holdings in the U.S. market from 1991 to 1992 and found that mutual funds have significant preferences towards stocks with high visibility, high idiosyncratic volatility, and low transaction costs (low-priced stocks). By focusing on the large U.S. institutions that are over $100 million AUM for a longer period from 1980 to 1996, Gompers and Metrick (2001) analysed found that large institutions holdings exhibited stocks with greater market capitalizations, higher liquidity, higher book to market ratios and lower return for the previous year.

However, Bennett et al. (2003) argued that over time institutional investors have shifted their preferences towards smaller, riskier securities. They also found that this shifting in their preferences generates a growing impact on the financial market and provides an explanation for the increasing liquidity and firm-specific risk of the market.

Do domestic and foreign institutional investors have similar preferences for stock characteristics? Kang and Stulz (1997) analyzed the shareholdings of foreigners in individual firms in Japan. They found that foreign investors underweight smaller and highly leveraged firms when investing in the Japanese market. Grinblatt and Keloharju (2000) investigated the trading behaviours of domestic and foreign investors in the Finnish market. They concluded that the degree of investors' sophistication matters. This explains why domestic investors, assumed to be less sophisticated, usually take the opposite position to that of more sophisticated foreign investors. Seasholes (2000) explored the differences between domestic institutional and retail investors in Thailand and Taiwan and documented both traders against foreign investors. Choe et al. (1999), however, found that Korean institutions generally follow foreign investors. Using

a rich dataset of Swedish firm equity ownerships, Dahlquist and Robertsson (2001) concluded that most of the features associated with foreign ownership are driven by the fact that foreign investors typically are mutual funds or other institutional investors. Therefore, they believe that there is an institutional investor bias rather than a foreign investor bias.

Are there differences in institutional holdings between developed markets and emerging markets? The literature for institutional holdings will be reviewed by various regions from developed countries first, and the studies emerging markets are discussed as the second part, followed by Asian regions' research and the Chinese market in particular at last.

Firstly, for developed markets, Previous empirical studies suggest that there are differences in preferences for stock characteristics between foreign and domestic funds. Covrig et al. (2006) investigated the stock preferences of domestic and foreign funds managers from 11 developed markets. Their results suggest that both domestic and foreign funds managers prefer stocks with high ROE, large turnover and low return variability. However, they also exhibit different investment behaviours. Domestic fund managers prefer firms with large dividend payments, low financial leverage and high growth potential. Foreign fund managers instead invest in firms with high visibility. Ferreira and Matos (2008) suggest that all institutional investors have strong preferences for large firms, and firms with good corporate governance. Foreign institutional investors tend to overweigh firms that are cross-listed in the U.S., and members of the Morgan Stanley Capital International World Index. This is consistent with Covrig et al.'s (2006) results.

Secondly, compared to the abundant research on institutional investors' stock-picking preferences in developed countries, empirical studies of institutional investors in emerging markets are limited. Khorana et al. (2005) studied mutual funds in 56 countries including developed economies and emerging economies. They document that the fund industry is larger

and more active in countries with stronger laws and regulations, while it is smaller and less active in countries where there are barriers to financial markets. Therefore, it is important to understand the differences in institutions and, in particular, in information for emerging markets (Frenkel & Menkhoff, 2004). Aggarwal et al. (2005) examined the portfolio preferences of actively-managed US mutual funds in emerging equity markets after the financial crisis of the 1990s. The analysis focused at both the country-level and the firm-level. At the country-level, results suggest that US funds invest more in open emerging markets with stronger accounting standards, shareholder rights, and legal frameworks. At the firm-level, US funds are found to invest more in firms with greater accounting transparency and the issuance of an ADR. Bardhan (2000) documented that there is a lack of sophisticated market institutions in emerging markets. There is also a lack of reliable information for foreign investors. The potential information asymmetries between local investors and foreign investors can result in an ineffective use of capital, which is particularly significant in emerging markets. Stiglitz (1989) characterizes emerging economies as imperfect financial markets. Therefore, Frenkel and Menkhoff (2004) argue that the relative position of foreign institutional investors is weakened when investing in these markets. As a consequence, the competitive advantage of institutional investors cannot be fully realised, and can even turn into a disadvantage relative to local investors. As noted by Gabriele, Baratav and Parikh (2000), volatility from the international capital flows to emerging markets has often been regarded as a source of financial crises. Institutional investment activities have been the main contributors to these international capital flows. The major conclusion which can be drawn from the crises is that successful capital liberalization entails reforming the domestic financial market (Bird & Rajan, 2001).

Thirdly, related studies of Asian markets appear later. The Qualified Foreign Institutional Investors scheme was first introduced in Taiwan in the late 1980s. In 1991, Korea introduced a similar scheme allowing foreign institutional investors to participate in the Korean equity market. Huang and Shiu (2009) examined the impact of qualified foreign institutional investors on stock markets and local company's performances in Taiwan (see also Lin and Chen (2006)). They revealed that stocks with high foreign ownership outperform stocks with low foreign ownership. Lin and Swanson (2003) investigated the trading behaviour of foreign investors in Taiwan. They found strong evidence that foreign investors employ momentum strategies of buying past winners and selling past losers. Foreign investors also favour large-size, high book-to-market, and high-tech stocks, but no evidence was found that foreign investors herd on market consensus. Lai et al. (2008) suggest that foreign investors in Taiwan are momentum traders and can positively predict future returns. This may be due to the fact that foreign investors have more information advantage than local investors. Lin and Shiu (2003) concluded that foreign investors prefer large firms and low book-to-market shares in Taiwan. Choe, Kho, and Stulz (2005) investigated foreign investors' trading behaviour in Korea. Their results indicate that domestic investors have an edge over foreign investors, because foreign investors pay more when they buy and receive less when they sell, compared to domestic investors in Korea.

Particularly, for Chinese institutional investors, fewer researchers conduct analysis of stock preferences and the trading behaviour of institutional investors. One study on China, Liu et al. (2015), employed annual equity ownership data over the period 2003 to 2009, to compare the investment styles between foreign funds operating under the QFIIs scheme and domestic funds. Their analysis revealed that QFIIs have preferences for such industries as transportation, metals and non-metals, and machinery, which have few requirements for local knowledge. The industry

allocations by domestic funds are distributed more evenly than foreign funds. They document that foreign funds invest in firms that are significantly different from those favoured by domestic funds in terms of size, profitability and compensation for management. Their findings also indicate that QFIIs prefer firms with a relatively high percentage of state ownership, which is inconsistent with the results from developed markets (Aggarwalet al., 2005; Dahlquist & Robertsson, 2001; Kang & Stulz, 1997). Since annual data frequency may contribute to the inconsistencies I utilize a unique quarterly dataset of QFIIs' equity ownerships to investigate the trading behaviour between domestic and foreign institutional investors in China.

Given the significant differences between the Chinese and developed markets, in terms of the accounting standards, culture, the financial and legal systems, the level of information asymmetry and the degree of market imperfection, I expect the trading behaviours of domestic and foreign institutional investors are different in China. The advantages of this study are as follows: First, utilizing a longer sample period and more time-series observations minimizes the concern of a small-sample bias in regression analysis. Second, fully capturing and incorporating the quarterly changes of investors' activities (such as portfolio rebalancing) which they must disclose as per the CSRC requirements. Third, including stock characteristics' variables based on both the accounting-based and the market-based measures. Fourth, employing more appropriate methodologies such as a logit model and a panel regression model to examine the stock characteristics and firm level performances, render the results to be more informative, comprehensive, robust and rigorous. Overall, I contribute to the existing literature by applying a unique quarterly dataset which has not been examined previously, and most of the results are not seen in early China-related studies.

2.4 Data and Descriptive Statistics

2.4.1 Data

The quarterly stock holdings from domestic equity funds are collected from the CSMAR (The China Stock Market & Accounting Research) database for the period from the 4th quarter of 2003 to the 4th quarter of 2014, a total of 45 quarters. The quarterly stock holdings of Qualified Foreign Institutional Investors (QFIIs) are manually collected from the 'Stock Star' official website and cross checked with other sources, including the Shanghai Stock Exchange and the Shenzhen Stock Exchange, the CSRC, and others. 'Stock Star' is a subsidiary of China Finance Online, which was founded by an American company, IDG, and a Singaporean company, VERTEX, in August 1999. It was listed on the NASDAQ on 15 November 2004. All other data, including firm level accounting and financial data, and corporate governance data, were collected from CSMAR and Bloomberg database, for the same period.

2.4.2 Stock Characteristics

Table 2.1 presents descriptive statistics of the quarterly stock characteristics for both domestic and foreign institutional holdings. The stock characteristics include price (Share Price), ROA (Return On Assets), ROE (Return On Equity), EPS (Earnings Per Share), P/E (Price-to-Earnings Ratios), P/CF (Price-to-Cash Flow Ratios), P/S (Price-to-Sales Ratios), Tobin's Q (Asset Market Value to Book Value), Turnover (Trading Volume), Vol/Share (Trading Volume to Share Outstanding Ratios), Age (Firm Age in Months), Beta (Systematic Risk), Market Value, Market Cap, BV/MV (Book-to-Market Ratios), Current Ratio (Current Asset to Current Liability Ratios), and Quick Ratio (Current Asset Excluding Inventory to Current Liability Ratios). I also perform an analysis of mean for various stock characteristics between the holdings from QFIIs, domestic funds and the overall A-shares market. Columns 2 and 3 in Table 2.1 are the quarterly firm characteristics for

the QFII holdings and the domestic fund holdings, respectively. Columns 4, 5 and 6 are the average quarterly firm characteristics for the overall A-shares (denoted by A Share (1)), A-shares excluding the QFII holdings (denoted by A Share (2)), and A-shares excluding the domestic fund holdings (denoted by A Share (3)), respectively. Columns 7 and 8 are the analysis of mean between the QFII holdings and the overall A-shares excluding stocks held by QFIIs (denoted by QF-A Share (2)), and between the QFII holdings and the overall A-shares (denoted by QF-A Share), respectively. Columns 9 and 10 are the analysis of mean between the domestic fund holdings and the overall A-shares excluding stocks held by domestic funds (denoted by DF-A Share (3)), and between the domestic fund holdings and the overall A-shares (denoted by DF-A Share), respectively. Column 10 is the analysis of mean between the QFII holdings and the domestic fund holdings (denoted by QF-DF). T-statistics are presented for all mean analysis.

The descriptive statistics suggest that both domestic and foreign institutional investors prefer firms with higher transaction costs (higher share prices) compared to the overall A-shares market. Results are statistically significant at the 5% level for the foreign holdings, and at the 1% level for the domestic holdings. Both holdings have better accounting performance, when measured by ROA, ROE, and EPS, results are statistically significant at the 1% level for all measures. Firms held by both institutional investors are also big in size (measured by market value and market cap), and have relatively higher stock turnovers, results are statistically significant at the 1% level. They also prefer firms with higher book-to-market ratios and higher price-to-cash flow ratios, but firms with lower price-to-earnings ratios and lower price-to-cash flow ratios. For book-to-market ratios, results are statistically significant at the 1% level for the foreign holdings, and at the 5% level for the domestic holdings. For price-to-cash flow ratios, results are significant at the 1% level for the domestic holdings, but insignificant for the foreign holdings. For price-to-earnings and price-to-

cash flow ratios, results are significant at the 1% level. These results are consistent with most previous studies, indicating that both institutional investors prefer to hold undervalued firms.

However, both domestic and foreign institutional investors select stocks with lower beta, results are statistically significant at the 5% level for the foreign holdings, but insignificant for the domestic holdings. This suggests that foreign institutional investors' investment strategies are more driven by safety concerns compared to domestic institutional investors. This may be due to information asymmetry while domestic institutional investors have better local knowledge

Table 2. 1 Quarterly Firm Characteristics and the Analysis of Mean

This table presents stock characteristics from quarterly holdings by QFIIs, domestic fund managers, and the overall A-shares market. The stock characteristics include: price (in RMB), ROA, ROE, EPS, P/E, P/C (price-to-cash flow ratios), P/S (price-to-sales ratios), Tobin's Q, turnover (in billion RMB), Vol/Share, firm age (in months), beta, market value/cap, BV/MV, current ratio and quick ratio. The quarterly beta is downloaded from the Bloomberg database, which is calculated from the regression method. This beta estimates the degree a stock price will fluctuate based on a given movement in the representative market index. This value is derived from the calculation of overridable raw beta. Market cap and market value are both downloaded from the Bloomberg database and the units are millions of RMB. Market cap is calculated as the number of share outstanding multiplied by price at the quarter end. Market value takes more consideration in addition rather than stock holders' equity, such as outstanding bonds, corporate debts, taxes, and interest payments. Columns 2 and 3 are the average quarterly firm characteristics for QFIIs holdings and domestic funds holdings, respectively. Columns 4, 5 and 6 are the average quarterly firm characteristics for the overall A-shares, A-shares excluding QFIIs holding, and A-shares excluding domestic funds holdings, respectively. Columns 7 and 8 are the analysis of mean between QFII holdings, the overall A-shares excluding stocks held by QFIIs, and the overall A-shares. Columns 9 and 10 are the analysis of mean between domestic funds holdings, the overall A-shares excluding stocks held by domestic funds, and the overall A-shares. Column 10 is the analysis of mean between QFIIs holdings and domestic funds holdings. T-statistics are presented for all mean analysis. '***', '**', and '*' indicate t statistics for mean analysis are statistically significant at the 1%, 5%, and 10% level, respectively.

Characteristics	QFIIs	Domestic	A Share(1)	A Share(2)	A Share(3)	QF-A Share(2)	QF-A Share	DF-A Share(3)	DF-A Share	QF-DF
Price	13.8687	15.3874	11.8048	11.6500	8.7853	2.2392**	2.0816**	6.1438***	3.0299***	-1.2867
ROA	0.0425	0.0443	0.0302	0.0293	0.0187	3.3614***	3.1320***	6.2668***	3.5616***	-0.4357
ROE	0.0682	0.0715	0.0412	0.0391	0.0124	4.6473***	4.2917***	9.0036***	4.8287***	-0.4560
EPS	0.3477	0.3191	0.1921	0.1812	0.0774	5.0069***	4.6434***	9.6762***	4.6073***	0.7927
P/E	39.4484	43.0044	50.8255	51.6209	58.7139	-4.5776***	-4.3499***	-5.3977***	-2.9306***	-1.3255
P/C	22.0588	22.5625	20.2718	20.1832	16.2746	0.7791	0.7394	3.4695***	1.4000	-0.2018
P/S	4.3606	4.9251	5.9606	6.0831	8.2122	-4.1687***	-3.9043***	-5.4176***	-2.6909***	-1.4447
Tobin's Q	1.8197	2.0581	2.0325	2.0489	2.2877	-1.6235	-1.5221	-1.2936	0.1738	-1.7306*
Turnover	6.6539	6.7080	4.4461	4.2627	2.3684	2.9518***	2.6992***	5.8620***	2.7034***	-0.0557
Vol/Share	0.6798	0.7190	0.8058	0.8165	0.8759	-1.7850*	-1.6677*	-1.9210*	-1.1572	-0.5696
Age	177.2995	165.2143	173.2662	173.0221	183.8353	0.7492	0.7132	-3.2282***	-1.3272	2.2160**
Beta	0.9837	1.0209	1.0406	1.0465	1.0666	-2.0304**	-1.8542*	-1.4108	-0.7040	-1.2233
Market Value	20.5321	20.0069	10.8252	10.1035	3.7663	9.6967***	5.0375***	8.8320***	4.5371***	0.1784
Market Cap	20.9576	20.4735	10.6932	9.9079	2.8418	5.4473***	5.0370***	8.4592**	4.4992***	0.2014
BV/MV	1.4066	1.1181	1.0742	1.0512	0.9708	3.8686***	3.6179***	2.1240**	0.6681	3.1925***
Current Ratio	2.0349	2.4625	2.3262	2.3087	2.1198	-1.8860*	-1.7936*	2.0039**	0.8880	-2.7816***
Quick Ratio	1.5891	1.9534	1.8125	1.8267	1.6416	-1.6449	-1.5610	1.9856*	0.8825	-2.5006**

However, both domestic and foreign institutional investors select stocks with lower beta, results are statistically significant at the 5% level for the foreign holdings, but insignificant for the domestic holdings. This suggests that foreign institutional investors' investment strategies are driven by safety concerns compared to domestic institutional investors. This may be due to the information asymmetry while domestic institutional investors have better local knowledge compared to foreign institutional investors. Although the trading volumes for domestic and foreign institutional holdings are relative higher, the liquidity measured by Vol to Share ratios is lower for both holdings, but results are statistically significant at the 10% level for the foreign holdings and insignificant for the domestic holdings. In addition, firm-level performances measured by Tobin's are lower for both holdings when compared to the overall market; results however are statistically insignificant.

There are a few differences in stock preferences between the domestic and foreign holdings in terms of firm age, current ratio, and quick ratio. Foreign institutional investors tend to pick up stocks with lower current ratios and quick ratios, results are statistically significant at the 10% level for the current ratio and are insignificant for the quick ratio. They also prefer firms with longer firm history (greater firm age) indicating that QFIIs equity investment is focused on more mature firms, although results are statistically insignificant. For the domestic holdings, both the current ratio and the quick ratio are greater compared to the overall A-shares; results are statistically significant at the 5% level for the current ratio and at the 10% level for the quick ratio. Domestic funds also prefer firms with shorter history (younger firm age), results are significant at the 1% level.

When comparing the foreign holdings to the domestic holdings, I found that firms held by domestic holdings perform better than foreign holdings when measured by Tobin's Q, but it is statistically

significant at the 10% level. In addition, compared to domestic institutional holdings, foreign institutional investors prefer firms with greater book-to-market ratios and longer firm history, and results are statistically significant at the 1% level for the book-to-market ratio and at the 5%level for the firm age. These results are consistent with previous studies for developed markets, which is not surprising as all foreign institutional investors are from developed markets. Foreign institutional investors also select firms with lower current and quick ratios, compared to domestic holdings. Results are statistically significant at the 1% level for current ratios, and at the 5% level for quick ratios. Overall, results from Table 2.1 suggest that even domestic and foreign institutional investors have similar preferences on most characteristics; foreign institutional investors tend to follow the tradition from the developed markets by investing in under-valued firms and firms with longer history and lower systematic risk. This may contribute to the under-performance of firms held by foreign institutional investors.

Tables 2.2 and 2.3 illustrate the relationship between stock holdings and stock characteristics in the context of a simple sorting process. I apply two ways to sort the data: by the stock characteristic, and by the ownership percentage. Panels A and B in Table 2.2 present the domestic fund ownerships and the QFII ownerships quintiles, sorted by stock characteristics, and each of the characteristics with the mean ownership percentage of that quintile is listed. For panel A, stocks held by domestic funds are investigated and panel B presents the results for stocks held by QFIIs.

For domestic fund holdings presented in Panel A, the range of ownership percentage in various quintiles is between 1.68 and 9.05 percent. Stock characteristics including price, ROA, ROE, EPS, Tobin's Q, market value, and turnover exhibit ownership rising consistently among quintiles. Ownership percentage decreases among quintiles for BV/MV. Ownership percentage appears to

decrease slightly and then rise among ownership quintiles for P/S. Characteristics such as P/C, P/E,

Table 2. 2 Mean Ownership Sorted by Stock Characteristics

This table sorts stocks into five quintiles based on various stock characteristics. The stocks held by domestic fund (QFIIs) are sorted by stock characteristics into quintiles first and the ownership percentage of institutional holdings is calculated accordingly. For panel A, stocks held by domestic funds are investigated and the results show the domestic fund ownership of stocks for each characteristic quintile. For panel B, the result presents the QFII holdings mean value of stocks for each characteristic quintile. The stock characteristics include: price, ROA, ROE, EPS, P/E, P/C, P/S, Tobin's Q, Vol/Share, turnover, market value, BV/MV, age, beta, quick ratio, and current ratio. Each quintile is ranked by the specific stock characteristic, with mean value of ownership percentage listed for each characteristic. Price is in RMB, market value and turnover are in billions of RMB.

Panel A: Domestic Fund Holdings

Rank	Price	Ownings%	ROA	Owning%	ROE	Owning%	EPS	Owning%
Quintile1	5.46	1.68	-0.02	2.57	-2.74	2.30	-0.05	2.09
Quintile2	8.70	2.76	2.63	3.39	4.03	3.00	0.14	3.00
Quintile3	12.09	4.21	3.94	4.18	6.49	4.02	0.25	4.15
Quintile4	17.15	5.74	5.58	5.29	9.38	5.68	0.40	5.69
Quintile5	33.14	9.05	9.74	7.85	17.02	8.32	0.89	8.40
Rank	P/E	Owning%	P/C	Owning%	P/S	Owning%	Tobin's Q	Owning%
Quintile1	-4.51	4.09	-66.26	3.66	0.67	4.21	0.51	3.57
Quintile2	21.83	5.09	6.18	4.12	1.71	4.10	1.07	3.64
Quintile3	32.80	5.64	17.76	4.95	2.94	4.67	1.66	4.05
Quintile4	48.58	5.56	35.25	5.74	5.15	5.15	2.45	4.88
Quintile5	127.97	3.60	120.02	5.28	15.12	5.66	4.86	7.32
Rank	Vol/Share	Owning%	Turnover	Owning%	Market Value	Owning%	BV/MV	Owning%
Quintile1	0.23	5.25	1.29	2.88	2.01	1.89	0.27	7.30
Quintile2	0.45	5.52	2.44	3.78	3.40	3.14	0.47	4.89
Quintile3	0.65	4.93	3.84	4.43	5.26	4.51	0.70	4.08
Quintile4	0.92	4.35	6.42	5.48	9.18	6.34	1.08	3.63
Quintile5	1.54	3.52	19.91	6.85	71.98	7.56	3.11	3.56
Rank	Age	Owning%	Beta	Owning%	Quick Ratio	Owning%	Current Ratio	Owning%
Quintile1	64.80	3.32	0.00	6.08	0.39	4.04	0.68	4.01
Quintile2	94.99	5.34	0.68	4.87	0.73	4.49	1.16	4.62

Quintile3	145.48	5.19	1.00	4.28	1.08	5.10	1.57	5.24
Quintile4	199.49	4.79	1.34	4.40	1.80	5.30	2.40	5.09
Quintile5	256.24	4.81	2.17	4.52	7.11	4.43	8.00	4.39

Panel B: QFII Holdings

Rank	Price	Ownings%	ROA	Owning%	ROE	Owning%	EPS	Owning%
Quintile1	5.31	1.30	-0.16	1.69	-0.03	1.08	-0.05	1.04
Quintile2	8.19	1.49	2.54	1.17	0.04	1.12	0.14	1.19
Quintile3	11.49	1.57	3.88	1.23	0.07	1.16	0.26	1.11
Quintile4	16.13	1.31	5.52	1.21	0.10	1.51	0.41	1.56
Quintile5	32.98	1.57	9.45	1.24	0.17	2.21	1.02	2.32
Rank	P/E	Owning%	P/C	Owning%	P/S	Owning%	Tobin's Q	Owning%
Quintile1	-3.69	2.29	-52.13	1.85	0.72	1.28	0.46	2.48
Quintile2	19.19	1.47	7.94	1.84	1.61	1.20	0.99	1.26
Quintile3	28.98	1.28	16.01	1.19	2.72	1.76	1.53	1.16
Quintile4	43.67	1.20	30.40	1.33	4.57	1.86	2.30	1.12
Quintile5	122.14	1.10	107.28	1.11	13.61	1.18	4.51	1.23
Rank	Vol/Share	Owning%	Turnover	Owning%	Market Value	Owning%	BV/MV	Owning%
Quintile1	0.21	1.69	1.32	1.14	2.10	1.14	0.30	1.19
Quintile2	0.43	1.71	2.59	1.21	3.65	1.24	0.52	1.16
Quintile3	0.64	1.49	4.25	1.25	5.80	1.21	0.77	1.17
Quintile4	0.92	1.26	7.13	1.38	11.00	1.18	1.19	1.24
Quintile5	1.53	1.11	22.95	2.23	91.16	2.47	4.19	2.47
Rank	Age	Owning%	Beta	Owning%	Quick Ratio	Owning%	Current Ratio	Owning%
Quintile1	82.96	1.40	0.04	1.35	0.37	1.19	0.58	1.22
Quintile2	128.42	2.15	0.64	1.56	0.64	1.20	1.01	1.32
Quintile3	175.94	1.42	0.93	1.54	0.90	1.29	1.34	1.16
Quintile4	214.16	1.12	1.24	1.56	1.39	1.14	1.93	1.13
Quintile5	265.55	1.15	1.99	1.28	5.07	1.04	5.77	1.03

Table 2. 3 Mean Stock Characteristics Sorted by Ownership

This table sorts stocks into quintiles based on their ownership percentages. The institutional ownerships of each stocks are firstly ranked into quintiles and the mean values of stocks' characteristics are presented accordingly. For panel A, stocks held by domestic funds are investigated and the results show the characteristics mean value of each quintile sorted by "ownings". For panel B, the result presents the characteristic mean value of stocks held by QFIIs for each institutional ownership quintile. Each quintile is ranked by the ownership percentage, with mean value of stock characteristic listed. The stock characteristics include: price, ROA, ROE, EPS, P/E, P/C, P/S, Tobin's Q, Vol/Share, turnover, market value, BV/MV, age, beta, quick ratio, and current ratio. Price is in RMB, market value and turnover are in billions of RMB.

Panel A: Domestic Fund Stock Characteristics

Rank	Ownings%	Price	ROA%	ROE%	EPS	P/E	P/C	P/S	Tobin's Q
Quintile1	0.1280	11.5354	0.0315	0.0418	0.1865	50.8554	18.4431	5.0976	1.8469
Quintile2	0.7121	12.2854	0.0364	0.0515	0.2345	46.1385	19.5059	4.5628	1.8215
Quintile3	2.1034	13.6134	0.0408	0.0624	0.2859	45.9824	20.4534	5.0241	1.9208
Quintile4	5.2511	16.4510	0.0474	0.0776	0.3755	43.7315	24.2670	5.1053	2.1536
Quintile5	15.1258	22.5788	0.0626	0.1085	0.5447	40.3422	29.9742	5.7727	2.7939
Rank	Ownings%	Vol/Shares	Turnover	Market Value	BV/MV	Age	Beta	Quick Ratio	Current Ratio
Quintile1	0.1280	0.8028	4.8041	23.3949	1.1931	150	1.0744	2.2103	2.7578
Quintile2	0.7121	0.7846	5.5291	22.5356	1.2077	151	1.0840	2.3071	2.8527
Quintile3	2.1034	0.7842	6.1093	13.3507	1.1785	152	1.0603	2.2378	2.7874
Quintile4	5.2511	0.7576	7.8835	14.2252	1.1256	152	1.0260	2.2481	2.7751
Quintile5	15.1258	0.6708	9.5262	18.3772	0.9287	156	0.9536	2.1059	2.6253

Panel B: QFII Stock Characteristics

Rank	Ownings%	Price	ROA%	ROE%	EPS	P/E	P/C	P/S	Tobin's Q
Quintile1	0.1789	11.0076	0.0324	0.0510	0.1965	46.1514	18.9026	5.2471	1.8064
Quintile2	0.4231	14.6128	0.0395	0.0575	0.3130	45.0147	23.0902	5.4686	1.9504
Quintile3	0.7841	16.8559	0.0467	0.0766	0.3778	41.4286	23.6328	4.6032	2.1118
Quintile4	1.3919	16.2451	0.0510	0.0840	0.4344	40.1325	24.7794	4.2621	2.1056
Quintile5	4.4137	15.6234	0.0433	0.0772	0.4656	38.6474	19.2907	3.7678	1.8540
Rank	Ownings%	Vol/Shares	Turnover	Market Value	BV/MV	Age	Beta	Quick Ratio	Current Ratio
Quintile1	0.1789	0.6716	7.2604	31.3632	1.3240	167	0.9875	1.8058	2.2088
Quintile2	0.4231	0.7827	6.8514	16.1458	1.1697	175	1.0798	1.7304	2.1741
Quintile3	0.7841	0.7899	7.9827	15.3423	1.0109	176	1.0046	1.8165	2.3237
Quintile4	1.3919	0.7695	6.8460	14.7603	1.0621	180	0.8843	1.5347	1.9874
Quintile5	4.4137	0.7257	9.1961	33.8234	2.4211	167	0.9031	1.5375	1.9764

current ratio and quick ratio show ownership rising first, and then with small decreases when the forth/fifth quintile is reached. There were no clear patterns for Vol/Share (liquidity measured by volume to share outstanding ratios), firm age, and beta.

Results in Panel B for the QFII holdings are somewhat different from the results in Panel A. The ownership percentage in various quintiles is from 1.03 to 2.3 percent. Ownership percentages increase among quintiles for ROE and turnover, while ownership percentages fall among quintiles for P/E. Ownership percentages increase at first then decrease for the following characteristics: Vol/Share, firm age, current ratio, and quick ratio. There are no clear patterns for price, ROA, EPS, P/C, P/Tobin's Q, market value, BV/MV, and beta.

Table 2.3 sorts stocks into quintiles based on their ownership percentage, and mean values of stock characteristics are listed in rows. Panel A presents results for domestic funds stock characteristics at each quintile. The ownership percentage ranges from 0.13% to 15.13%; price, ROA, ROE, EPS, P/C, turnover, and firm age appear increasing in ownership. P/E and Vol/Share are decreasing in ownership. P/S and Tobin's Q appear to decrease then rise among ownership quintiles. BV/MV and beta rise first then fall among ownership quintiles. No clear patterns are observed for market value, current ratio, and quick ratio.

Results for the QFII holdings are presented in Panel B. Ownership percentage ranges from 0.18% to 4.41%, which is relatively lower compared to the domestic fund holdings in Panel A. Only EPS exhibits an increasing pattern with ownership, while P/E is decreasing in ownership. Characteristics such as price, ROA, ROE, P/C, firm age, Tobin's Q, and Vol/Share appear to increase until the fourth/fifth quintile is reached. Overall, results in Table 2.2 and Table 2.3 indicate that there are obvious style differences in investment (i.e. stock picking) between domestic and

foreign institutional investors, even though the overall stock characteristics are similar between these two groups of institutional investors as in Table 2.1.

2.4.3 Industry Allocations

Next, I classify all sample firms into 24 industry categories using the Bloomberg industry classification code. Panel A in Table 2.4 summarises the number of firms held by QFIIs, domestic funds, and the overall A-shares in each industry category, followed by percentage weights. Panel B presents the market value of the holdings and their associated weights. The last two columns in both panels calculate the over (or under) weights relative to the overall A-shares market. As can be seen in Panel A, QFIIs disproportionately invest heavily in the following industries: 'Transportation', 'Material', and 'Banks', ranging from 2.5% to 3.61%. For domestic holdings in Panel A, similar patterns can be seen as for domestic funds, with domestic funds investing more in 'Transportation', 'Banks', and 'Energy', but the magnitude of the over-weight is much smaller than those for QFIIs, which range from 0.96% to 1.02%. The loose QFII initial market entry requirements of China for commercial banks and insurance companies compared with other regions ease their investments with limited annual quota, which enables QFIIs to invest more in finance particular industries. For commercial banks investment requirements, the Chinese government allows QFIIs to invest in the firms' managing securities assets of not less than 10 billion US dollars. However, this requirement in Taiwan is the firm must hold more than 30 billion US dollars (Tam, Zhang and Yu, 2010)

On the other hand, the scenario is slightly different when the market value and its weights are used in Panel B. From a market value view point, QFIIs disproportionately invest more in 'Banks' and 'Insurance', by 29.22% and 19.93%, respectively. 'IQFIIs also heavily invest in 'Transportation', with a 2.91% over-weight. The 'Material' category in Panel A disappears when the market value

measure is used. Instead, QFIIs under-invest in this industry category by 2.41%. QFIIs are also over investing in the following industries: ‘Consumer Durables & Apparel’ with 2.04%, ‘Technology Hardware & Equipment’ with 0.97% and ‘Commercial & Professional Services’ with 0.76%. FAll the rest of the industry categories are under-weighted by QFIIs. These indicate that foreign institutional investors prefer to invest in sectors such as financial, transportation, professional services, and technology, which have long been perceived to be ‘blue chips’ in China. These sectors contain companies that tend to have lower beta, because demand for their services (or products) tend to remain very stable. This is consistent with the findings in Table 2.1, that foreign institutional investors’ holdings have relatively lower beta.

However, the domestic holdings in Panel B exhibits a different picture compared to the foreign holdings. I found that domestic funds tend to over-invest in the following industries: ‘Food Beverage & Tobacco’, ‘‘Pharmaceuticals, Biotechnology & Life Science’, ‘Real Estate’, ‘Retailing’, ‘Technology Hardware & Equipment’ and ‘Software & Services’.

Table 2. 4 QFIIs and Domestic Funds Ownerships Industry Allocations

This table presents the QFII and domestic fund holdings industry allocations over the sample period. All firms are classified into 24 industry categories using the Bloomberg industry classification code. Panel A presents the average number of firms held by QFIIs, domestic funds, and the overall A-shares for each industry category. The weights are also presented. Panel B presents the average market value (in billions of RMB) of firms and the associated weights. The last two columns in both panels calculate the over/under weight relative to the overall A-shares from the QFIIs and domestic funds holdings.

Panel A: Industry Distribution (Firm Numbers)

	QFIIs		Domestic Funds		A-Share		QFIIs	Domestic Funds
Industry Categories	Number	Weight(%)	Number	Weight(%)	Number	Weight(%)	Over/Under Weight(%)	Over/Under Weight(%)
Utilities	5	4.06	36	4.37	73	4.34	-0.28	0.03
Transportation	10	7.47	38	4.88	66	3.86	3.61	1.02
Telecommunication Services	1	0.69	3	0.34	3	0.19	0.50	0.15
Technology Hardware & Equipment	7	5.85	68	6.25	120	6.44	-0.59	-0.19
Software & Services	3	2.15	33	3.02	49	2.56	-0.41	0.46
Semiconductors & Semiconductor Equipment	2	1.29	13	1.22	21	1.09	0.20	0.13
Retailing	5	3.23	32	3.49	67	3.97	-0.74	-0.48
Real Estate	8	6.23	58	6.26	136	8.20	-1.97	-1.94
Pharmaceuticals, Biotechnology & Life Sciences	8	5.96	63	6.85	105	6.02	-0.06	0.83
Media	2	1.17	14	1.55	23	1.35	-0.18	0.20
Materials	26	21.43	167	18.20	325	18.53	2.90	-0.33
Insurance	2	1.02	3	0.37	3	0.17	0.85	0.20
Household & Personal Products	1	1.16	5	0.59	10	0.60	0.56	-0.01
Health Care Equipment & Services	2	1.48	13	1.26	21	1.14	0.34	0.12
Food Beverage & Tobacco	10	7.16	55	6.18	100	5.79	1.37	0.39
Food & Staples Retailing	2	1.21	6	0.70	9	0.49	0.72	0.21
Energy	4	2.40	31	3.69	48	2.76	-0.36	0.93
Diversified Financials	1	0.91	11	1.03	16	0.89	0.02	0.14
Consumer Services	2	1.68	13	1.39	29	1.67	0.01	-0.28
Consumer Durables & Apparel	6	4.83	39	3.47	86	4.80	0.03	-1.33
Commercial & Professional Services	4	2.87	21	2.09	38	2.09	0.78	0.00
Capital Goods	23	17.02	179	17.76	334	18.56	-1.54	-0.80
Banks	4	3.17	12	1.63	12	0.67	2.50	0.96
Automobiles & Components	5	3.54	34	3.72	67	3.87	-0.33	-0.15

Panel B: Industry Distribution (Market Value)

	QFIIs		Domestic Funds		A Share		QFIIs	Domestic Funds
Industry Categories	MV	Weight(%)	MV	Weight(%)	MV	Weight(%)	Over/Under Weight(%)	Over/Under Weight(%)
Utilities	0.41	0.93	15.85	3.84	706.94	4.93	-4.00	-1.09
Transportation	2.02	8.60	24.48	6.02	912.68	5.69	2.91	0.33
Telecommunication Services	0.07	0.59	6.98	1.41	113.37	0.84	-0.25	0.57
Technology Hardware & Equipment	0.52	4.06	29.10	4.05	578.29	3.09	0.97	0.96
Software & Services	0.69	0.57	17.12	1.97	230.36	1.06	-0.49	0.91
Semiconductors & Semiconductor Equipment	0.08	0.09	3.90	0.49	96.92	0.47	-0.38	0.02
Retailing	0.47	0.51	27.85	3.49	293.89	1.68	-1.17	1.81
Real Estate	1.14	2.23	52.12	6.45	802.53	4.54	-2.31	1.91
Pharmaceuticals, Biotechnology & Life Sciences	0.75	1.01	53.65	6.38	625.67	3.21	-2.20	3.17
Media	0.04	0.08	7.54	1.04	156.50	0.86	-0.78	0.18
Materials	3.67	10.22	82.76	11.22	2229.55	12.63	-2.41	-1.41
Insurance	28.01	24.96	42.80	4.50	1274.45	5.03	19.93	-0.53
Household & Personal Products	0.08	0.18	4.32	0.51	42.33	0.24	-0.06	0.27
Health Care Equipment & Services	0.15	0.23	9.14	0.97	106.38	0.51	-0.28	0.46
Food Beverage & Tobacco	2.32	3.13	69.09	9.21	804.43	4.30	-1.17	4.91
Food & Staples Retailing	0.22	0.24	3.56	0.47	55.12	0.27	-0.03	0.20
Energy	0.55	0.98	42.92	6.21	3017.36	15.13	-14.15	-8.92
Diversified Financials	0.38	0.28	22.32	2.52	480.89	2.04	-1.76	0.48
Consumer Services	0.22	0.25	9.43	1.25	125.29	0.70	-0.45	0.55
Consumer Durables & Apparel	0.68	3.82	12.82	1.39	335.63	1.78	2.04	-0.39
Commercial & Professional Services	2.23	1.85	16.44	2.02	212.56	1.09	0.76	0.93
Capital Goods	2.18	3.51	83.12	9.79	2021.29	9.96	-6.45	-0.17
Banks	64.84	48.07	105.07	13.31	4356.58	18.85	29.22	-5.54
Automobiles & Components	0.88	1.34	20.58	3.08	470.06	2.54	-1.20	0.54

‘Commercial & Professional Services’, and ‘Consumer Services’. All industry categories over-weighted by domestic institutional investors are under-weighted by foreign institutional investors. These results suggest that there are significant differences in industry allocations between the domestic and foreign institutional holdings in China.

2.4.4 Corporate Governance

Although shareholders have played prominent roles in improving corporate governance for listed firms (Gillan & Starks, 2000; Karpoff et al., 1996), there is an endogeneity issue suggesting that institutional investors are good at investing in firms with better governance structure, resulting in a relationship between institutional presence and better-governed firms without active participation (Chen et al., 2007). Gompers and Metrick (2001) found that the corporate governance index score has no impact on institutions’ holding decisions. On the other hand, Leuz et al. (2009) concluded that foreigners invest less in firms with weak governance structures.

I apply three broad attributes to measure corporate governance for the sample firms. These include the ownership structure, the management structure, and the ownership concentration. The study uses ownership structure indicators such as percentage of state-owned shares and percentage of tradable shares, as suggested by Naughton (2006). The management structure includes the number of directors, the number of executives, and percentage of independent directors. The ownership concentration contains measures such as the ownership percentage of controlling shareholders, the equity concentration indicator (the shareholding percentage of the largest shareholder), the H index (the square of shareholding percentage of the largest shareholder), and the H5 index (sum of squares of shareholding percentage of top five shareholders).

The data for corporate governance characteristics are annual data due to the nature of the data. The study presents the comparative results for the corporate governance characteristics for firms held

by domestic funds, QFIIs, and the overall A-shares. For the ownership structure and the management structure, no statistically significant differences are found between the QFII holdings, the domestic fund holdings, and the overall A-shares market.[3] Therefore, the results for the ownership concentration are presented. Table 2.5 below presents the comparative results for various ownership concentration indicators, including the controlling shareholder percentage, the equity concentration indicator, the H index, and the H5 index, as described before. The t-statistics at the bottom of Table 2.5 are the analysis of mean. The first figure under each ownership concentration indicator is the t-statistic for the mean difference between the foreign holdings and the overall A-shares. The second is the t-statistic for the mean difference between the domestic holdings and the overall A-shares. The third is the mean difference between the foreign and the domestic fund holdings. Results indicate that stocks held by QFIIs have relative higher concentration levels compared to the overall A-shares. Results are statistically significant at the 5% level when measured by the ownership percentage of controlling shareholders and the H5 index. It is also significant at the 10% level when measured by the equity concentration indicator and the H index. This result is surprising because it might be expected that foreign institutional investors would prefer firms with better corporate governance. However, Chu et al. (2015) conclude that control-ownership divergence exhibits a negative impact on stock liquidity. Their results suggest that ownership concentration hugely reduces the bid-ask spread and adverse selection cost, and therefore help to enhance firm performance. This may help to explain why foreign institutional investors are in favour of concentrated firms in China. On the other hand, no significant results are found when comparing the domestic holdings to the overall A-shares.

[3] The descriptive statistics for the ownership structure and the management structure are presented in Appendix A1.

Table 2. 5 Corporate Governance

This table presents the ownership concentrations for QFIIs holdings, domestic funds holdings, and the overall A-shares market, respectively. The test for equality of means between QFIIs and A-Shares, DFs and A-Shares, and QFIIs and DFs are performed. The t statistics under 'QFIIs' is the test for equality of mean between QFIIs and the A-shares, the second one under 'DFs' is between DFs and the A-shares, and the third one under 'A-share' is between QFIIs and DFs. '**' and '*' indicate significance at the 5% and 10% level, respectively.

	Controlling shareholders			Equity concentration indicator			H index			H5 Index		
Year	QFIIs	DFs	A share	QFIIs	DFs	A share	QFIIs	DFs	A share	QFIIs	DFs	A share
2003	41.8379	45.6417	42.4490	42.4848	45.5203	42.4634	0.2065	0.2403	0.2097	0.2294	0.2601	0.2307
2004	47.0407	45.0636	41.8232	47.5949	44.8424	41.7484	0.2475	0.2313	0.2028	0.2652	0.2517	0.2251
2005	42.9538	42.3712	39.9354	42.8741	42.2341	39.9990	0.2130	0.2074	0.1861	0.2409	0.2279	0.2087
2006	38.2228	38.8547	36.4310	37.4902	38.4663	36.1529	0.1642	0.1718	0.1533	0.1864	0.1910	0.1724
2007	35.4477	38.5273	36.0156	35.3506	38.1046	35.5626	0.1466	0.1689	0.1498	0.1688	0.1889	0.1681
2008	38.4337	39.1513	36.5848	38.3406	38.4597	36.1747	0.1723	0.1730	0.1548	0.1982	0.1934	0.1728
2009	38.4630	38.0517	37.2460	37.6559	36.9946	36.0128	0.1678	0.1619	0.1544	0.1859	0.1802	0.1723
2010	37.8475	38.4415	37.7172	36.6188	36.9437	35.9913	0.1593	0.1617	0.1543	0.1765	0.1817	0.1738
2011	41.5110	38.3708	37.8016	38.6130	36.4483	35.9369	0.1791	0.1577	0.1538	0.1977	0.1788	0.1744
2012	41.0902	38.9731	38.1240	38.3926	36.7821	36.1718	0.1771	0.1602	0.1556	0.1964	0.1816	0.1765
2013	41.9110	38.2715	38.0965	39.9142	36.2149	35.8853	0.1871	0.1558	0.1536	0.2156	0.1759	0.1734
2014	41.9275	37.5015	37.3349	40.5343	35.4678	35.1765	0.1920	0.1495	0.1475	0.2169	0.1684	0.1665
t statistics	2.1294**	1.6319	0.5207	1.9580*	1.2938	0.5668	1.9484*	1.2595	0.5125	2.0893**	1.2403	0.6815

2.5 Model Estimation

2.5.1 Logit Model

I now formally test the relationship between firm-level characteristics and ownership holdings, using a logit model. Specifically, the dependent variable DF_{it} (or QF_{it}) equals to one if the firm is included in the domestic (or QFIIs) holdings for a particular quarter. Independent variables are various stock characteristics including price, ROA, ROE, EPS, P/E, Tobin's Q, turnover, liquidity (Vol/Shares), firm age, beta, market value, BV/MV, current ratio, and quick ratio. Four models are presented to reflect various combinations of independent variables.

Panel A in Table 2.6 presents the results for the domestic holdings. Results indicate that domestic institutional investors tend to hold firms with relatively higher transaction cost (higher price), better accounting performance (greater ROA, ROE and EPS), greater turnover, large size (greater market value), and higher BV to MV ratios. Coefficients with these characteristics are positive and statistically significant at the 1% level for all models. Domestic funds also tend to hold firms with relatively greater risk, but the coefficient is statistically significant at the 5% level for model 3, significant at the 10% level for models 1 and 4, and insignificant for model 2. On the other hand, domestic funds tend to hold firms with lower P/E ratios, lower current and quick ratios, younger firm age, and weaker performance when measured by Tobin's Q, and the results are statistically significant at the 1% level for all models. Results for current ratio and quick ratio are statistically insignificant.

Panel B reports the logit models of the foreign holdings and firm characteristics. QFIIs tend to hold firms with higher price, ROA, ROE, and large in size; all coefficients for these variables are statistically significant at the 1% level. Coefficients for P/E ratio, Tobin's Q are negative and statistically significant at the 1% level. Results for EPS, BV/MV, liquidity (measured by

Vol/shares) and quick ratio are insignificant. QFIIs also prefer to hold stocks with longer history and lower risk, and the coefficients are statistically significant at the 1% level. The coefficients for current ratios are negative and statistically significant at the 5% level. Overall, it is concluded that results from Table 2.6 are in line with the findings in Table 2.1. Therefore, the findings about the preferences of institutional holdings for stock characteristics are confirmed to be accurate by the logit analysis.

Table 2. 6 The Logit Models of Stock Holdings and Firm Characteristics

This table presents logit estimations of the determinants of firm-level fund holdings. The dependent variable in all four models is a dummy variable equal to one if either domestic funds or QFIIs invest in the firm, and zero otherwise. The independent variables are firm characteristics including: price, ROA, ROE, EPS, P/E, Tobin's Q, turnover, liquidity (Vol/Shares), firm age, beta, market value, BV/MV, current ratio, and quick ratio. Four models are presented to reflect various combinations of independent variables. '***', '**' and '*' denote significant at the 1%, 5 %, and 10% level, respectively.

Panel A: Domestic Fund Holdings

Variables	Model 1	Model 2	Model 3	Model 4
Price	0.3947***	0.6414***	0.6051***	0.3575***
ROA	3.0141***		7.8099***	
ROE		1.1380***		0.2860***
EPS	1.1275***			1.4448***
P/E		-0.0012***	-0.0010***	
Tobin's Q	-0.0686***	-0.0853**	-0.1180***	-0.0567***
Turnover	0.0368***			0.0370***
Vol/shares		-0.1385***	-0.1106***	
Age	-0.4211***	-0.3756***	-0.3780***	-0.4227***
Beta	0.0171*	0.0132	0.0210**	0.0158*
Market value	1.0518***	1.1217***	1.0949***	1.0521***
BV/MV	0.1521***	0.1272***	0.1276***	0.1444***
Current Ratio	0.0020			0.0010
Quick Ratio		-0.0005	0.0012	
McFadden R-squared	0.2411	0.2298	0.2390	0.2397
NO.of Observations	74445	72230	72331	74338

Panel B: QFII Holdings

Variables	Model 1	Model 2	Model 3	Model 4
Price	0.3363***	0.3146***	0.3121***	0.3201***
ROA	1.3670***		1.1483***	
ROE		0.3226***		0.3030***
EPS	-0.0125			0.0425
P/E		-0.0011***	-0.0011***	
Tobin's Q	-0.0790***	-0.0550***	-0.0615***	-0.0698***
Turnover	-0.0295*			-0.0310*
Vol/shares		0.0067	0.0107	
Age	0.4390***	0.4544***	0.4537***	0.4362***
Beta	-0.1078***	-0.1082***	-0.1075***	-0.1079***
Market value	0.4521***	0.4267***	0.4244***	0.4536***
BV/MV	0.0245	0.0247	0.0254	0.0210
Current Ratio	-0.0109**			-0.0110**
Quick Ratio		-0.0030	-0.0031	
McFadden R-squared	0.0559	0.0552	0.0556	0.0554
NO.of Observations	74445	72230	72331	74338

2.5.2 Panel Regression

Next, the hypothesis that domestic and foreign institutional ownership contributes to firm performance is tested. A market-based measure (Tobin's Q) and an accounting-based measure (OROA) to measure firm performances, as suggested by Yuan et al. (2008), are used. Tobin's Q is computed as (market value of equity + book value of long-term debt + book value of short-term debt) divided by the book value of total assets. OROA is the operating profit divided by the year-end book value of total assets. Adjusted Tobin's Q and adjusted OROA are industry-median adjusted values. The following regression model is applied:

$$Tobin's\ Q\ (adjusted\ Q)_{\ it}\ or\ OROA(adjusted\ OROA)_{\ it} = \alpha + \beta_{\ 1} DF_{\ it-1}(or/and\ QF_{\ it-1}) + \beta_{\ 2} C_{\ it-1} + \varepsilon_{\ it-1} \quad (1)$$

DF_{it-1} (or QF_{it-1}) is a dummy variable taking the value of one if a firm is held by either domestic or foreign institutional investors. C_i are the control variables including STATEO, the measurement of State Ownership; H_5, the Herfindahl Index, is the measurement of ownership concentration: the sum of squared percentage of shares held by each of the top five shareholders. TANG (tangibility) is the ratio of net fixed assets and inventory over total assets, LEVE (leverage) is the total value of debt divided by the book value of total assets, SIZE is the natural logarithm of firm's market value, ADJR is the market-adjusted annual stock return: the market index is either the Shanghai or Shenzhen Composite Stock Index, depending on the location of listing. I use the one-period lag values of fund ownerships and other explanatory variables to control endogeneity problems as explained by Yuan et al. (2008).

Table 2.7 below reports the Pearson correlation coefficients between variables. Results suggest that the domestic and foreign institutional holdings have significant and positive correlations with

adjusted OROA, but exhibit no significant correlation with adjusted Tobin's Q[4]. Yuan et al. (2008) suggested that Tobin's Q and OROA generally have different correlations with various factors affecting firm performance, suggesting that the market and accounting based measures are different in nature. Therefore, both performance measures are used in the regression analysis in the later section. All correlations in Table 2.7 are relatively low, thus it is believed that multicollinearity is unlikely to be a problem for this study.

According to Yuan et al. (2008), there is a positive effect of mutual fund ownership on firm performance in China for a number of reasons. First, mutual funds do not have significant business relationships with their portfolio firms. Therefore, the monitoring and control activities are less pressure-sensitive than other institutions, so are relatively free from conflicts of interest. Second, mutual funds are subject to scrutiny from regulators, investors and the public. They are required to make quarterly disclosure of portfolio holdings and keep the pre-determined investment styles and objectives. Third, fund managers are under pressure to deliver better returns as the management fees depend on performance and fund size, and also investors can choose to redeem the fund unit and this creates a market disciplinary mechanism for fund managers (Yuan et al., 2008).

Table 2.8 presents panel regression results using domestic and foreign institutional holdings as dummy variables in Eq. (1). It is hypothesized that funds' ownership from the previous period must have positive effects on a firm's performance for the next period. The hypothesis is supported by the positive and significant coefficients (at the 1% level) of DF_Dummy (domestic institutional ownerships) for all four performance measures. The coefficients for the QF_Dummy (foreign

[4] I also only use the adjusted Tobin's Q and the adjusted OROA, as in Yuan et al. (2008).

Table 2. 7 Correlation Coefficients

This table presents Pearson correlation coefficients: Tobin's Q is computed as (market value of equity + book value of long-term debt + book value of short-term debt)/book value of total assets. Adjusted Q is industry-median adjusted Q; OROA is operating profit divided by the year-end book value of total assets. Adjusted OROA is industry-median adjusted ROA; DF is the ratio of the number of shares held by domestic funds to the total number of shares on issue; QF is the ratio of the number of shares held by QFIIs to the total number of shares on issue; STATEO is the state ownership, the ratio of the number of shares owned by the state to the total number of shares on issue; H_5 (ownership concentration) is the Herfindahl index, the sum of squared percentage of shares held by each of the top five shareholders; TANG is tangibility, the ratio of net fixed assets and inventory over total assets; LEVE is leverage, the total value of debt divided by the book value of total assets; SIZE is firm size, the natural logarithm of firm's market value; ADJR is the market-adjusted stock return. '***', '**', and '*' represent significance at the 1%, 5%, and 10% level for two-tailed tests.

		1	2	3	4	5	6	7	8	9	10
Adj. Tobin's Q	1	1.0000									
Adj. OROA	2	0.0109***	1.0000								
DF	3	-0.0037	0.0990***	1.0000							
QF	4	-0.0014	0.0259***	0.0933***	1.0000						
STATEO	5	-0.0063*	0.0121***	-0.0282***	0.0153***	1.0000					
H_5	6	-0.0090**	0.0428***	-0.0526***	-0.0105***	0.3986***	1.0000				
TANG	7	0.0436***	-0.0022	-0.0083**	0.0174***	0.0968***	0.0568***	1.0000			
LEVE	8	-0.0080**	-0.0376***	0.0670***	-0.0635*	0.0653***	-0.0057	0.02670***	1.0000		
SIZE	9	-0.0546***	0.0670***	0.2010***	0.0786***	0.0485***	0.2406***	-0.0551***	-0.0349***	1.0000	
ADJR	10	-0.0020	0.0163***	-0.0140***	-0.0069	-0.0014	0.0101**	-0.0084*	-0.0200***	-0.0253***	1.0000

Table 2. 8 Panel Regression on Firm Performance

This table presents results when using domestic funds and QFIIs holdings as dummy variables in the regression model. The dependent variable is the performance measure (Tobin's Q, adjusted Q, OROA, and adjusted OROA) for all stocks. The independent variables also include a number of control variables: STATEO is the state ownership, the ratio of the number of shares owned by the state to the total number of shares on issue; H_5 is the Herfindahl index, the sum of squared percentage of shares held by each of the top five shareholders; TANG is tangibility, the ratio of net fixed assets and inventory over total assets; LEVE is leverage, the total value of debt divided by the book value of total assets; SIZE is firm size, the natural logarithm of firm's market value; ADJR is the market-adjusted stock return. This research applies fixed effect panel regression adjusted for 'white cross-section' standard errors to avoid heteroscedasticity and serial correlation. Coefficients are presented followed by t statistics. '***', '**', and '*' represent significant at the 1%, 5%, and 10% level, respectively.

	Tobin's Q*i,t*	Adj. Q*i,t*	OROA*i,t*	Adj. OROA*i,t*
DF_Dummy $_{i,t-1}$	0.6316***	0.5010***	0.0135***	0.0132***
	8.9464	7.8601	7.8173	7.3627
QF_Dummy $_{i,t-1}$	0.1883***	0.1741***	0.0038***	0.0038
	3.9090	3.6722	2.8366	1.1923
STATEO $_{i,t-1}$	-0.0338	-0.0018	0.0013	-0.0002
	-0.4965	-0.0267	0.3369	-0.0384
H_5$_{i,t-1}$	1.0064***	1.1065***	0.0245***	0.0238***
	6.6199	8.6857	3.3101	3.4851
TANG $_{i,t-1}$	0.0026***	0.0028***	0.0000	0.0000
	3.6957	3.9340	0.1646	-0.2804
LEVE $_{i,t-1}$	-0.6787**	-0.4373*	-0.0161***	-0.0148***
	-1.7246	-1.2799	-3.1064	-4.7745
SIZE $_{i,t-1}$	-0.6064***	-0.5356***	0.0009	0.0010*
	-18.5341	-17.0613	0.4748	1.6255
ADJR $_{i,t-1}$	0.4601***	0.4192***	0.0045**	0.0035*
	3.5714	3.5082	2.1800	1.8613
CONSTANT	12.3482***	9.4376***	-0.0070	-0.0215**
	22.0623	17.6683	-0.2092	-2.1944
Adjusted-R square	0.2687	0.1575	0.0057	0.0043
No. of observations	37002	37002	37486	37486

ownerships) are positive and statistically significant at the 1% level when performances are measured by Tobin's Q, the adjusted Q, and the OROA, the coefficient for the adjusted OROA is insignificant. These results suggest that firms held by domestic and foreign institutional investors from the previous period do perform better in the next period. This highlights the importance of institutional ownership on firm performance. In addition, comparing the magnitudes of the coefficients on DF_{it-1} and $QF_{it-1,}$ the results show that domestic institutional ownership generates a greater economic significance at 0.6316 for Tobin's Q and it becomes only 0.1883 for QFIIs' ownership. The impact of foreign institutional investor ownership becomes relatively weaker at 0.0038 when OROA is employed as the firm performance measure. Therefore, this study concludes that domestic institutional ownership has stronger impacts on firm performance than foreign ownership, as the magnitudes for all coefficients are greater for the domestic holdings than those for the foreign holdings. This proves that domestic institutional investors do have an edge in their stock picking skills over foreign institutional investors in China, who have always been considered to have superior investment skills around the world.

Prior studies (Qi et al., 2000; Sun & Tong, 2003; Xu & Wang, 1999; Yuan et al., 2008) report the coefficients' estimates of state ownership are negative and statistically significant in the regression using adjusted OROA as the performance measure. The results of this study are similar to those concluded by Yuan et al. (2008), as the state ownership coefficients are negative. The negative coefficients can be interpreted as the state ownership being inefficient, but have little impact on the firm performances as they are statistically insignificant. The H_5 variable measures the ownership concentration and the coefficient for this concentration variable is positive and statistically significant at the 1% level, indicating that the ownership concentration does play a positive role in firm performance. This helps to explain why foreign institutional investors prefer firms with a relatively higher ownership concentration. It is also

found that tangibility has positive impacts on firm performance, when Tobin's Q and adjusted Q measures are used, and the coefficients are statistically significant at the 1% level. In addition, firms with lower leverage tend to perform better. The results for firm size are mixed, when measured by Tobin's Q and the adjusted Q. It was found that small firms perform better, and the coefficients are statistically significant at the 1% level. However, when measured by OROA and the adjusted OROA, large firms perform better, but the results are statistically insignificant for OROA and at the 10% level for the adjusted OROA. The differences for these mixed results are due to the fact that Tobin's Q is a market-based performance measure, and the OROA is an accounting-based measure. The coefficients for market-adjusted stock returns are positive and statistically significant at the 1% level for Tobin's Q and adjusted Q; they are positive and statistically significant at the 5% level for OROA and at the 10% level for the adjusted OROA. The results for the market-adjusted return suggest that firms likely perform better if they perform well in the previous period with institutional holdings. This indicates that both domestic and foreign institutional investors are momentum traders, which is consistent with previous studies on developed markets.

2.6 Conclusion

Using a unique quarterly dataset on equity ownerships and firm characteristics, this study investigates the preferences of, and the stock characteristics in, domestic and foreign institutional holdings in China. The results suggest that over the 45-quarter sample period, both domestic and foreign institutional investors tend to hold big firms, firms with relative higher stock price and turnover, and better accounting performance, and firms which are under-valued, compared to the overall A-shares market. On the other hand, they both prefer firms with relatively lower risk. Domestic institutional investors tend to hold firms with shorter history. In contrast, foreign institutional investors tend to hold firms with longer history. Regarding firm-level performance, strong evidence was not found to support the out-performance from

domestic and foreign institutional holdings compared to the overall market. However, the results suggest that firms held by domestic institutional investors exhibit better performance than foreign institutional investors. This may be due to the fact that foreign institutional investors are in favour of industries such as insurance, banks, transportation, commercial and professional services, technology and equipment, which are considered to be 'blue chips' in China. These firms usually have relatively weak performance when domestic investors (particularly retail investors) target smaller shares in pursuit of quick profits.

There are significant differences in industry preferences between domestic and foreign institutional investors. Domestic institutional holdings exhibit a completely different picture in industry preferences as opposed to foreign holdings. Those industries which are heavily invested by foreign institutional investors are under-invested by domestic institutional investors. The corporate governance characteristics for firms held by domestic and foreign institutional holdings were also investigated. There were no significant differences in terms of the ownership structure and the management structure. However, the results indicate that firms held by foreign institutional holdings have a relatively higher concentration level than domestic institutional holdings and the overall A-shares market. Chu et al. (2015) documented that the ownership concentration divergence shows a negative impact on firm performance. This may help to explain why foreign institutional investors prefer firms with significantly higher ownership concentration levels. I then ranked firms with different stock characteristics and with institutional holding percentages, the results suggesting that there are style differences in investment patterns (i.e. stock picking patterns) between domestic and foreign institutional investors, even though their overall stock characteristics are similar.

The relationship between firm-level characteristics and ownership holdings were then formally tested by using a logit model. The findings about the preferences of institutional holdings for stock characteristics were confirmed to be accurate by the logit analysis. It is hypothesized that

institutional ownership from the previous period should have positive effects on firm performance in the next period. This hypothesis is supported by the positive and significant coefficients for domestic and foreign institutional ownership variables in the panel regression model. These results indicate that firms held by institutional investors in the previous period do perform better in the next period. In addition, the results suggest that domestic institutional ownership has a stronger impact on firm performance than foreign institutional ownership. This indicates that domestic institutional investors do have an edge in stock picking skills over foreign institutional investors in China. A number of control variables are also used in the panel regression analysis. These include measurements for state ownership, ownership concentration, tangibility of the firm, the firm's leverage, the firm's size, and the adjusted annual return. It is concluded that state ownership is considered to be inefficient on firm performance. The ownership concentration plays a positive role on performance, and so do the tangibility and the adjusted annual returns. In addition, firms with lower leverage tend to perform better.

Overall, the results suggest that there are significant differences in stock picking styles between domestic and foreign institutional investors. There are also significant differences in industry allocations, corporate governance (ownership concentration), and firm-level performances. The results help to shed extra light on issues related to the introduction and development of the Qualified Foreign Institutional Investors scheme in China, which contributed largely to Chinese financial market reform after 2003. The findings have important implications to academics, practitioners, and particularly to policy makers, which enable China to further enhance its financial market liberalization with the rest of the world.

The study and the results may be taken as laying the foundation for further investigation of style investing and style consistency among institutional investors in the Chinese setting. These issues, untouched yet, are important because style investing may generate misevaluation or return co-movements among individual securities and portfolios (Barberis & Shleifer, 2003;

Chang et al., 2013). However, without first understanding the stock preferences of all the institutional investors in China, a main task accomplished by this study, no further studies on the issues could be undertaken.

Chapter 3 The Investment Style and Industry Concentration of Chinese Domestic Funds

3.1 Introduction

The role of institutional shareholders in monitoring corporate management and improving firm performance has been well documented in recent years. Since China's capital market has risen to become the third largest in the world, the mutual fund industry in China is drawing increasing attention from academics, investors, and practitioners, particularly regarding some fast-growing industries (Tang, Wang, & Xu, 2012). Equities held by domestic funds made up approximately 28% of the total Chinese equity market at the end of 2007 (Yu & Du, 2008), and the total net assets of all domestic funds, which includes equity, currency, bond and index funds, reached approximately two trillion Chinese Yuan under management by the end of the first half of 2010 (Tang et al., 2012). Since the non-tradable share reform of 2005, the Chinese equity market has become more efficient, resulting in a lower probability of investors taking advantage of serial correlation to make abnormal returns (Chong, Lam, & Yan, 2012). This, along with the extremely high volatility and liquidity of the Chinese equity market, has made it more difficult for professional institutional investors to make profits. Furthermore, the role of government policy has more significant impacts in China than in less regulated markets like the US, where institutional investors are encouraged to actively manage and time their holdings on major macroeconomic events.

While it has been documented that Chinese retail investors exhibit significant behavioural biases while trading, evidence shows that these biases are weaker for professional institutional investors (Lee, Li, & Wang, 2010). It is becoming increasingly difficult for retail investors to arbitrage mispriced equities, as the short sale is constrained in China (Chen, Kim, Yao, & Yu, 2010). It is believed that sophisticated investors that actively manage their portfolio holdings

can produce superior abnormal returns with information advantages. The unique challenge and advantage of trading in an immature market provides an avenue to explore whether Chinese domestic fund managers are capable of producing abnormal returns compared to those in well developed markets.

Using the quarterly stock holding data of all Chinese domestic funds from June 1998 to June 2017, this chapter provides a comprehensive investigation of Chinese domestic mutual funds at the fund level and the underlying stock holdings level. The first closed-end fund in China, Fund Kai Yuan, was issued and publicly listed in April 1998 to offer an alternative investment vehicle for both individual and institutional investors. The first open-end fund in China, Hua An Innovation, was established in September 2001. With the introduction of a series of favourable policies, the total number of Chinese domestic funds remarkably grew to 4,444 with the total fund asset value reaching 41.81 trillion yuan by the end of the 2nd quarter of 2017. On average, equity funds contribute 45% to the total funds market value, 34% from hybrid funds, and 23% from money-market funds. Hybrid funds are more competitive regarding fund numbers and their annualized return compared to equity funds. Especially for active hybrid funds, they produced a relatively higher net realised return at 13.43% per annum. Based on the analysis of the fund managers' trading activity, this chapter concludes that passive equity funds defined by CSMAR exhibit higher '*trades*' and '*turnover*' than their active counterparts. This suggests that these passive equity fund managers re-balance their stockholdings more frequently, indicating that they may not always trade within their initially defined investment styles. Therefore, in this chapter, the 'active funds' are re-categorized according to the funds actual '*trades*' and '*turnover*'.

Mutual funds have long attempted to inform potential investors about their intended investment strategy by committing to a specific objective classification, usually referred to as the fund investment style. Mutual funds' investment styles are defined as a fund's investment strategy

or investment philosophy, which may fall into various categories based on their stated objectives. Traditional classifications of the fund investment styles are more objective and usually categorised into aggressive growth, growth and income, balanced, global, etc. Sharpe (1992) reports that appropriate style classification enables investors to meet their desired objectives effectively. Such classifications categorise funds into different investment strategies based on certain criteria, for example, aggressive or conservative funds, the level of return, and ways of diversification. The early funds objective categories, which can be quite subjective and may not always be the actual representation of a fund's actual holdings, appear to have fallen out of favour. Therefore, a method of categorising mutual funds by decomposition of their security holdings has been proposed. Two pioneer studies by Basu (1977) and Banz (1981) examined the profitability of forming equity portfolios that emphasise firm-specific attributes, such as price-earnings ratios and market capitalisation. Similarly, Roll (2003) explored the risk premium of portfolios sorted by market capitalisation, price-earnings ratio, and price-book ratio, and illustrates that using the traditional categories is inappropriate. Malkiel (1995) documents that a fund's ability to outperform a benchmark also relates to its objective classification.

Inspired by the empirical work of Brown, Harlow and Zhang (2009) on the US market, this chapter offers a more comprehensive study exploring the characteristics (size, value and prior return) variance score of funds stock holdings for Chinese mutual funds, which is defined as a "Holding-based Style Consistency" (HSC) score. This Holding-based Style Consistency is then applied to measure the degree of style drift: a higher HSC score indicates a fund investment style is less consistent over time, while a lower HSC suggests a fund is more style consistent. In addition to the stock characteristics, the industry allocation of funds' stock holding offers an alternative measure of investment style. It is commonly believed that investors can reduce their portfolio idiosyncratic risk by widely diversifying their holdings across industries. However,

fund managers may choose to concentrate their portfolio holdings if they believe they are fully informed, as this enables them to select certain stocks within some specific industries (Azriel & Miles, 1995). Results of previous studies are mixed on mutual funds industry allocations; therefore, it remains unclear if Chinese mutual fund managers are skilled at stock picking for selected industries with concentrated stock holdings. This chapter serves to answer this question by looking at the industry concentration of Chinese mutual funds. Specifically, the Industry Concentration Index (ICI) is computed as the squared difference of industry weight between a fund and the market portfolio. This chapter contributes to the existing literature by incorporating industry concentration as another dimension of HSC attribute to investigate fund performance. Few studies have been conducted on the relationship between investment style consistency and mutual fund performance, particularly in the Chinese setting. Therefore, this chapter serves to fill this gap by examining the relationship between style consistency (style drift) and fund performance.

Both the factor-based (Carhart four-factor and Ferson-Schadt) and the holding-based (Characteristic-based Measure and Industry-based Measure) performance measures are applied to investigate mutual funds performances. Specifically, the characteristic-based fund performance measures are decomposed into Characteristic Selectivity (CS), Characteristic Timing (CT) and Average Style (AS) to examine the institutional investors' stock picking talent, their ability to time the market, and their tendency to hold stocks with certain characteristics. The performance measure is further adjusted for transaction costs as a robustness test. The industry-based performance analysis examines whether fund managers are competent in industry selection, defined as Industry Stock Selectivity (IS), and their ability to select better-performed stocks within a particular industry, defined as Industry Timing (IT).Using CSMAR quarterly stock holding data and the net return of Chinese domestic funds from 1998 to 2008, firstly, this chapter concludes that Chinese actively managed funds exhibit

statistically significant positive returns from the Carhart four-factor model. The abnormal return remains robust after controlling the time-varying macro-economic conditions (Ferson-Schadt model). The macro-economic variables include the 1-month Treasury-Bill yield, the Treasury-Bond yield spread (long- minus short-term bonds), and the quality spread in the corporate bond market (low- minus high-grade bonds). The dividend yield of the CSI 300 Index, a capitalization-weighted stock market index replicating the performance of the top 300 A-share stocks listed on the Shanghai and Shenzhen stock exchanges, is also included in the Ferson-Schadt model. Irrespective of whether expenses are deducted from the fund net return, abnormal returns from both the four-factor model and the F-S model provided consistent results after controlling these common risk factors.

Secondly, holding-based performance measures are employed to examine the relationship between fund investment style consistency and fund performance. Based on the decomposition of fund performance, a positive Characteristic Selectivity (CS) indicates the significant stock-picking skills of these fund managers and the abnormal return of fund performance after controlling for the Cahart four-factor. The positive Industry Timing demonstrates fund managers are capable of selecting well-performing industries. However, these fund managers are far less adept at selecting stocks within these industries, illustrated by the lower value of Industry Selectivity compared with Industry Timing over the same sample period. This is also confirmed by the regression result with the relatively smaller abnormal return measured by Industry Timing.

The quarterly stock holding data enables this study with a precise characterization of the style of the fund managers in stock selection. This also, in turn, allows the precise design of a characteristic benchmark that controls that style compared with the style defined from the fund net return after transaction costs. Another advantage of this study conferred with periodic stock holding data is that it allows the estimation of trading costs (Keim & Madhavan, 1997). In

addition, with the calculation of fund realised net return, this chapter enables the analysis of the friction generated along with the implementation of the fund style investment (Wermers, 2000). Therefore, this chapter provides a precise analysis of mutual fund managers' stock-picking talents, which was not possible with the dataset only containing either stock holdings data or net returns.

Thirdly, results in this chapter also exhibit that actively managed funds differ substantially in style consistency and industry concentration. By controlling fund characteristics (total net asset, turnover, fund flow, age and expense) the results from the multivariate regression indicate that fund managers can benefit from consistently 'tilting' their investment into groups of stocks with similar scores for size, value and past returns. This trading strategy produces superior future returns for funds with higher holding-based consistency and is statistically significant over the sample period. On the other hand, funds with higher industry concentrations produce greater future abnormal returns. These fund managers outperform funds with more diversified portfolio holdings. The style-performance relation examined by both the factor-based and holding-based fund performance measures consistently illustrate style consistency and industry concentration are positively correlated with fund returns. The results remain robust after adjusting the idiosyncratic risk.

This chapter makes several contributions to the existing literature. This chapter explores Chinese overall mutual funds with a more comprehensive scope. All funds categories, including equity funds, hybrid funds, bond funds and money market funds, are examined regarding their characteristics on the portfolio level and also their fund performance decomposition. Furthermore, this study re-classifies Chinese actively managed funds by examining the magnitude of change in the portfolio weight of stock holdings to capture the exact trading activities of fund managers. Although the developed market has been explored for style investing, this study provides the first style-performance study of institutional

investors in the Chinese equity market by employing a richer dataset for domestic funds with a longer time horizon from 1998 to 2017. This chapter also investigates fund investment style not only from the perspective of the characteristics of fund stockholdings but also industry concentration. It sheds extra light on issues related to industry concentration as an alternative dimension of investment style.

3.2 Literature Review

3.2.1 Overall Performance

There is a large and growing interest devoted to measuring fund performance in developed markets. The empirical results on whether investors should invest in index or actively managed mutual funds are mixed. However, most studies now conclude that actively managed funds, on average, underperform compared to their passively managed counterparts. It was estimated that from 1985 to 1994 active mutual funds underperformed compared to the passive market indices by about 65 basis points per year (Gruber, 1996). This result is further confirmed by Carhart (1997), who documented that net returns were negatively correlated with expense levels, which were generally much higher for actively managed funds. Carhart (1997) also demonstrated that more actively managed funds resulted in lower benchmark-adjusted net returns. Grinblatt and Titman (1989) used the 1975-84 quarterly holdings of a sample of mutual funds to construct an estimate of their gross returns. They tested for the existence of abnormal performance and found that the risk-adjusted gross returns of some funds are significantly positive. They also suggest that mutual funds with the highest expenses that their actual returns, net of all expenses, do not exhibit abnormal performance. This indicates that investors cannot take advantage of the superior abilities of portfolio managers by purchasing shares in their mutual funds. More recent studies show the underperformance of mutual funds in international markets. Mutual funds from the UK (Cuthbertson, Nitzsche, & O'Sullivan, 2008) and Hong Kong (Abdel-Kader & Qing, 2007) exhibit inferior risk-adjusted performance.

Other researchers have found contrary results. Ippolito (1989) evaluated investment performance in the mutual fund industry over a 20-year period and found evidence that it is consistent with optimal trading in efficient markets. Risk-adjusted returns in the mutual fund industry, and expenses, are found to be comparable to returns available in index funds. Otten and Bams (2002) presented an overview of the European mutual fund industry and investigated mutual fund performance by controlling the survivorship bias of the five most important mutual fund countries. They find that small cap funds are able to add value, as indicated by their positive cost adjusted alphas. This result differs from US studies documenting that mutual funds underperformance is mainly due to the expenses they charge. Fortin and Michelson (2002) performed a study using both the total returns and the after-tax total returns of eight classes of mutual fund categories, from 1976 to 2000, and found that actively managed mutual funds significantly outperformed index funds.

3.2.2 Fund style classification

It has been demonstrated that investment style has a direct impact on fund returns. From the perspective of institutional investors, there are two competing viewpoints. The first is that fund managers' superior expertise and connections with corporate executives create economies-of-style specialisation. The second view is that fund managers with superior performance are specialists who possess talent in identifying underpriced stocks in several style categories (Wermers, 2012). Therefore, it is important to address the influence of style factors on the performance of equity portfolios, and the resultant relative returns.

There is an increasing awareness of the connection between fund performance and style consistency. Standard mutual fund categories are generally broad enough to allow for a wide range of investment policies. As previously stated, traditional classifications of fund investment styles are more objective and are by definition aggressive growth, growth and income, balanced, global and etc. Sharpe (1992) reports that appropriate style classification

enables investors to meet their desired objectives effectively. Such classifications include aggressive and conservative, levels of return, and diversification. He shows that portfolio performance is driven by a portfolio's asset-class allocation, and equity should be classified on the basis of the equity style characteristics, such as market-to-book ratio and company size. Some fund objective categories, which can be quite subjective and may not always be the representation of a fund's actual holdings, appear to have fallen out of favour. Chay and Trzcinka (1999) listed the general problems of investment style measurement approaches, which include the portfolio-based approach, the factor model approach, and effective mix, and concluded that there are no generally accepted standards for style classifications.

A method of categorising mutual funds by decomposition of their security holdings has been proposed by two pioneer studies, Basu (1977) and Banz (1981) examined the profitability of forming equity portfolios that emphasise firm-specific attributes such as price-earnings ratio and market capitalisation. Similarly, Roll (2003) explored the risk premium for portfolios sorted by market capitalisation, price-earnings, and price-book ratio, and concluded that some traditional classification may be inappropriate. Brown and Goetzmann (1997) proposed a new empirical approach to define a fund manager's investment style. Their approach captures the nonlinear patterns of returns that result from virtually all active portfolio management styles. They demonstrated that this classification is superior to the common industry classification in predicting cross-sectional future performance and past returns. Based on discussions of investment style and classifications of mutual funds, style-consistent funds can be defined as those which adhere to their mandated investment style over time. Fund managers generally prefer to break equity investment down into four classes: large-cap growth stocks, small-cap growth stocks, large-cap value stocks, and small-cap value stocks (Chan, Chen, & Lakonishok, 2002). Previous literature suggests that investment portfolios and equity indices can be defined by two dimensions: firm size and value-growth characteristics. These are measured by the

market value of a firm's outstanding equity and the relative price-earning or price-book ratios of a fund's holdings, respectively. Prior research results concluded that these two dimensions are important for capturing the variations in stock returns.

Previous literature also provides a number of insights into the relationship between style consistency and fund performance. The favourable evidence on the positive relationship of style consistent investment and portfolio performance is found in several empirical works. Baberis and Shleifer (2003) found that fund managers who commit to a more consistent investment style are less likely to make asset allocation and security selection errors. Style consistent funds also exhibit less portfolio turnover and thus lower transaction costs than those funds whose managers switch between various styles more often. According to Huang, Sialm, and Zhang (2011), risk shifting may be caused by ill-motivated trades from unskilled or agency-prone fund managers. This supports the notion that higher consistency in style produces superior performance. Furthermore, for market participants who are outside of fund trading, the evaluation accuracy of managers with consistent style is more achievable. Brown, Harlow, and Zhang (2009) demonstrated that, on average, more style-consistent funds significantly outperform less style-consistent funds on a risk-adjusted basis. They found a negative relationship between portfolio style consistency and portfolio turnover, and a positive relationship between funds that are managed with a consistent style and actual risk-adjusted returns, for US mutual funds under a wide variety of test conditions. The "style drift" concept, which is the tendency of managers to drift away from their stated investment styles, has been put forward as an inverse measurement of style concentration. It is defined as the shift in loadings on common style factors (Fama & French, 1993), or style characteristics (Daniel, Grinblatt, Titman, & Wermers, 1997).

Regarding portfolio managers' stock picking talent, it has been demonstrated that managers with higher levels of career portfolio turnover are more likely to engage in more frequent trades.

These frequent trades usually cause further style drift with superior future portfolio performance. However, these managers are also more likely to be overconfident on their ability to identify a broad variety of under-priced stocks (Wermers, 2012). Superior performance from actively traded shares in a portfolio has been confirmed by Cremers and Petajisto (2009), where they document that fund managers who stray further from their benchmarks provide higher risk-adjusted returns and outperform portfolio managers who simply hold stocks with large tracking errors relative to benchmarks.

Therefore, these fund managers can produce superior performance by actively re-balancing their stockholdings and drift their investment styles to chase the most favourable potential profits. Accordingly, it is also possible that fund managers who implement the strategy designed to stick on a style benchmark or factor model loading could underachieve compared with those managers that alter their holdings among equities with distinct characteristics. Asness, Friedman, Krail, and Liew (2000) proposed a new model based on value-growth and earning spreads and found that the quarterly rebalancing of portfolio holdings, whose managers employ varying styles, mitigated the efforts of short-term return reversals that can upwardly influence value strategy returns. Furthermore, this study found that portfolios formed around growth characteristics outperform those with consistent value-oriented strategies by approximately 30 percent during the sample period. Therefore, Asness et al. (2000) concluded that more style-drift portfolios may perform better. This is due to the less adequate rebalancing of "style drifting" approaches to capture the return premiums that can be generated by a fund manager's stock picking talent and timing in the market (Swinkels & Tjonga-Tjoe, 2007).

In recent years, more combined approaches have been applied for both holding-based and returns-based measures, to analyse the relationship between style drift and performance. Wermers (2012) found evidence that managers with the best stock picking abilities often

implement strategies that involve a significant amount of equity style drift. This provides an interesting contrast to the study of Brown et al. (2009).

3.2.3 Style consistency measurements

There is inadequate literature regarding style consistency measurements. Early research developed a return-based method for fund style classification, which is a straightforward application of an asset class factor model. This approach compares fund returns to the returns of a set of indices representing different investment styles or style benchmark portfolios. The higher a fund's return correlated with a given style index, the greater the weight that investment style is allocated. Sharpe (1992) return-based style analysis uses a set of benchmark indices, such as the Russell style indices, and determines the loadings on each of the indices. The R^2 from the return-based style analysis can be interpreted as the fraction of the variation in fund returns that is attributed to its style, and 1-R^2may serve as a measure of style consistency as in Brown et al. (2009). The coefficient of determination, R square, is applied as a cross-sectional measure of style consistency in the research, subject to robustness check on the specification of the underlying factor model used to generate expected returns.

Idzorek and Bertsch (2004) classify the returns-based style measure into two categories. The first is "tracking error", which measures the standard deviation of the difference between fund returns and the return from a predetermined stock index or a style benchmark. The second is the "style benchmark turnover". The time-independent loadings on the benchmark indices for the return-based style analysis are further developed by using a three-year rolling window, which represents the tracking error to determine the style benchmark turnover (Meier & Rombouts, 2009). The style benchmark turnover captures the rebalancing required to replicate the loadings on the style benchmark indices as they change over time. However, the second method fails to accurately measure those portfolios that have high benchmark turnovers and

whose managers remain consistent in style by picking stocks with similar characteristics, move within relatively limited areas, and remain the same to the original declared investment style.

In response to the weakness of these two returns-based style approaches, Idzorek and Bertsch (2004) developed an alternative statistical measure which creates a style drift score to measure the variability of style through time and requires a returns-based style analysis for a rolling window. The score is calculated as the square root of the sum of the variance of the assets class coefficients. A low (high) number represents low (high) amounts of style drift. This style drift score makes evaluation of numerous rolling-window graphs unnecessary by providing a screening statistic to identify a subset of managers for further study.

Holmes and Faff (2007) analysed stock markets using the style drift score approach. They found that the level of style drift is positively related to selectivity performance. They discuss the relationship between style change, fund flows and fund size by analysing a sample of Australian multi-sector trusts from 1990 to 1999. The study found that managers that are more successful at stock selection tend to be less consistent with respect to style. Their evidence shows that successful stock pickers, measured by alpha performance, tend to have more variation in style, and this variability is not related to fund flow volatility.

Meier and Rombouts (2009) proposed a holding-based measure of style rotation to investigate the relationship between performance persistence and changes in style. This measure is also referred to a characteristic-based approach, and is based on the fundamental characteristics of stocks in a portfolio rather than those estimated from past returns. Meier and Rombouts (2009) use Style Box coordinates, provided by Morningstarand calculate the determinants of the covariance matrix of the quarterly size and value-growth scores of funds. A high style rotation measure means that a fund manager has tried to improve fund performance by rebalancing the portfolio weight in favour of stocks with other characteristics along the size or value-growth

dimensions. On the other hand, a small score indicates that a fund manager has kept to a consistent style. Meier and Rombouts (2009) suggest that this style rotation measure is an ideal method to analyse the impact of style rotation on performance as it does not rely on a measure that uses the same fund return history to infer the degree of style rotation that they already use to evaluate fund performance.

3.2.4 Industry Concentration and Fund Performance

Conventional wisdom suggests that investors should widely diversify their holdings across industries to reduce the idiosyncratic risk of their portfolios. It has been shown that a relatively concentrated portfolio manager is featured with superior information by a mean-variance frame-work demonstration (Levy & Livingston, 1995). Previous literature has proposed various explanations on portfolio concentration. Kacperczyk, Sialm, and Zheng (2005) stated that investors concentrate their holdings due to specialisation or access to private information. They found that US domestic equities that are concentrated on specific industries, outperform less concentrated funds. This illustrates that some fund managers have superior information and knowledge regarding specific industries. There is supporting evidence for Australian equity funds, where concentration has been found to increase portfolio performance (Brands, Brown, & Gallagher, 2009).

Furthermore, the extent of portfolio concentration varies with their prediction on information choice during different business cycles (Kacperczyk, Nieuwerburgh, & Veldkamp, 2014). It has been found that managers successfully pick stocks in booms and time the market in recessions on the state of the business cycle, and conclude that portfolio concentration increases during recessions. Consistent with previous empirical research, it is expected that fund managers with stock picking talent tend to hold more concentrated portfolios in order to pursue return premiums by taking advantage of superior information.

However, the agent problem still exists which causes a conflict of interest between fund managers and investors. Consequently, fund managers, especially those with lower investment abilities, may be motivated to apply volatile trading strategies and take high risks by concentrating their portfolios on a small number of stocks or industries, as investors are not penalised for poor performance. Another reason for stock holding concentration is that overconfident fund managers can take advantage of the asymmetric relationship between fund flow and performance (Goetzmann & Kumar, 2008).

3.2.5 Chinese Fund Management

Since the fast-economic development in China, equity investment has become more changeling for both domestic and foreign institutional investors. Li, Yan and Lin (2011) found that Chinese funds outperform the stock market benchmark significantly with their Sharpe ratio values, but it becomes weak when the performance is measured by the asset pricing model. However, a more recent study conducted by Yang and Liu (2017) found that no fund in China can outperform the market regardless whether the performance is a return-based or holding-based measure.

There are increasing studies exploring Chinese mutual fund managers' stock selectivity and market timing ability. Bodson, Cavenaile and Sougne (2013) found that Chinese fund managers' market timing skills primarily cause more market exposure dynamics than other sources and there are on average 6% of mutual funds exhibiting return market timing abilities, which is attributed to volatility and liquidity market timing. By separating accounts of institutional and individual investors' new money flowing in to and out of mutual funds, Feng, Zhou and Chan (2014) found that institutional investors have the ability to move new money into (out of) stocks with higher (lower) future returns. This timing ability of Chinese mutual fund managers is confirmed by Liao, Zhang and Zhang (2017) and their study demonstrated top timers

outperform bottom timers by 6% to 7% annually in out-of-sample tests. Furthermore, Yi, Liu, He, Qin and Gan (2018) suggest that Chinese mutual funds 'timing abilities vary with different investment objectives'. Balanced funds generate the most significant volatility timing while growth funds generate the most significant liquidity timing ability.

Hsin-Hung Chen and Long-Hui Chen (2015) investigated the investment concentration and performance of equity mutual funds in China and found that mutual funds with lower NAV typically tend to be aggressive, to take more risks and have higher concentration. The industry concentration and risk levels have significantly positive impact on stock picking ability in China. However, the industry concentration levels have no obvious significant effect on the market timing abilities of Chinese mutual funds. They also found the performance persistence of the fund with higher concentration generated more superior returns than the diversified returns.

The mutual fund classification system in China is imperfect, as it only makes a fundamental classification on the basis of the primary investing assets, stock mutual funds, bond mutual funds, etc. This research applies the holdings-based style measure to calculate its industry and characteristic consistency. Furthermore, each Chinese stock mutual fund is required to disclose their investment style and investment composition to the public as this is required by the China Security Committee. However, there is no explicit requirement for this disclosure frequency. Therefore, the actual equity holding might drift from initial investment style as they stated when the fund was established. The investors of the mutual funds which actual style drifts away from its original, take extra risks without the awareness of these risks. Liu and Zhang (2010) found that the style of Chinese equity funds has a significant drift due to market volatility and herding effect. This drift further effects funds' stock holdings and consequently the volatility

of the stock market. They also provide suggestions about the establishment of supervision mechanisms on investment style from a government perspective.

3.3 Data and Summary Statistics

3.3.1 Data

Quarterly equity holdings for all Chinese domestic funds have been collected from CSMAR, for the period June 1998 to June 2007. The dataset contains information on funds' equity holdings, categories, total net assets under management, and pre-defined investment objectives at the end of each quarter. The equity holding data for each fund has been cross-checked with Morningstar, Wind and Bloomberg to enhance its accuracy[5]. These four databases are merged to provide a complete record of equity holdings for any given fund. Overall, there are 4,444 domestic mutual funds included in this study across various categories: equity funds, hybrid funds, bond funds and money market funds. This extensive sample is free from survivorship bias as it includes all funds, regardless of their status, i.e. dead or inactive. The sample spans a relatively longer time-period from 1998 to 2017, which also covers the period of the recent global financial crisis.

In addition, the sample contains data concerning other fund characteristics, such as daily and monthly net asset value growth, expense ratios, quarterly equity and the fixed income portion of each fund, fund returns, fund trades and turnovers. Individual stock data and several macro-economic indicators, including monthly returns, market capitalisation, book-to-market ratio, treasury-bill yield, and corporate bond yield, are also collected from CSMAR for the same period.

[5] The Morningstar and Wind databases provide "snapshots" of mutual funds holding data on a semi-annual basis from June 2001 onwards. Bloomberg contains quarterly equity holding data for the period December 2004 to June 2017. These sources are used to ensure the accuracy and the completeness of the data collected from CSMAR.

3.3.2 Summary Statistics

Table 3.1 presents the summary statistics for all the mutual funds during the sample period. Panel A illustrates the number of funds in each category. As mentioned previously, there are various types of funds available in the market. They are classified as equity funds, hybrid funds, bond funds and money market funds. A fund is defined as an equity fund if its equity holdings are more than 60% of the total asset value[6]. A hybrid fund contains less equity holdings than an equity fund but includes fixed-income assets. For equity and hybrid funds, a fund can be pre-specified as either active or passive. The number of equity funds increased from five funds in 1998 to 839 funds in 2017, and the number of hybrid funds increased from one fund in 2000 to 2001 funds in 2017.

Overall, there are more funds defined as passive funds for both equity and hybrid funds. In addition, fixed-income funds also experienced rapid growth, increasing from two in 2002 to 1219 in 2017. Panel A also presents information on the number of open-end/closed-end funds in the market over the sample period. Although the Chinese mutual funds industry started in 1991 with the establishment of the first closed-end fund, it became stagnant due to lack of product diversity and investor interest. There were no open-end funds before 2001. However, since the introduction of the Interim Regulation on Securities Investment Funds in 1997, a new framework for fund development has been established. After China joined the WTO in 2001, and with the introduction of a series of favourable policies, open-end funds grew to 4,401 funds in 2017, compared to 43 closed-end funds in the same year.

Panel B of Table 3.1 reports the total fund asset value over the sample period. In 1998, the total fund asset value was 23 Billion RMB, compared to 41,813 Billion in 2017. Panel C of Table 3.1 shows that, on average, equity funds contributed approximately 45% to the total funds

[6] This threshold was increased to 80% in August 2015.

market value, 34% coming from hybrid funds, 8.8% from bond funds, and 23% from money-market funds. However, the weight from equity funds deteriorated from 100% in 1998 to 18.26% in 2017. The weight of hybrid funds increased to 59.34% in 2010 and then decreased to 20% in 2017. The weights of both bond and money-market funds experienced steady growth over the sample period. Open-end funds became popular after the non-tradable share reform in 2004. Panel D presents the average fund asset value under each category over the sample period. The average hybrid fund asset value is 3.16 billion, compared to 2.60 billion for equity funds. The money-market fund asset value is by far the highest with an average of 8.28 billion. Panel E calculates the annualised net fund flow over the sample period. The net fund flow is defined using a similar approach as Sirri and Tufano (1998). Specifically, it is calculated as:

$$FLOW_{j,t} = \frac{TNA_{j,t} - TNA_{j,t-1} * (1 + R_{i,t})}{TNA_{j,t-1}} \quad (2)$$

where $TNA_{j,t}$ is fund *j*'s total net assets or the dollar value of all shares outstanding at quarter *t*, and $R_{j,t}$ is a fund's return over the prior year [7]. The fund flow reflects the percentage growth of the fund in excess of the growth that would have occurred had no new funds flowed in and all dividends had been reinvested. Flow into, or out of, mutual funds is strongly related to the lagged measure of excess return (Chevalier & Ellison, 1997). This is confirmed with the response of fund flow to performance, illustrating that capital flows to investments with the highest productivity (Berk & Green, 2004). Significant amounts of new flow may cause a manager to trade more frequently incurring more transaction costs. Edelen (1999) and Rakowski (2003) found that fund flow can constrain a fund manager from adhering to an optimal investment strategy. In addition, they found that a fund demonstrating style inconsistency may discourage further investment and, therefore, result in fund outflow. As a

[7] This measure assumes that the flow occurs at the end of the period as funds' TNA and returns are simultaneously calculated at the end of each quarter. It is demonstrated that the results are not affected by recalculating this measure of flows at the beginning, half-way through, or continuously throughout the year.

result, fund flows in this study are further controlled by the evaluation of the relationship between investment style and fund performance. As can be seen in Panel E, on average, hybrid funds exhibit relatively higher flows at 5.07% than equity funds at 2.58%. This provides motivation to examine fund performance by controlling fund flow.

Table 3.1 Mutual Fund Summary Statistics

Summary statistics are presented for all Chinese mutual funds over the sample period. All mutual funds are classified under a distinct fund category: equity, hybrid, bond and money market funds. Panel A provides the number of funds for each calendar year under different fund categories. Panel B reports the total assets of funds under different classifications. Panel C provides the weight of each fund category that contributes to the overall funds market. Panel D presents the average asset value for each fund. Panel E calculates the fund net flow, which is defined as the net growth in fund assets. Formally, it is calculated as $FLOW_{j,t} = \frac{TNA_{j,t} - TNA_{j,t-1} * (1+R_{i,t})}{TNA_{j,t-1}}$, where $TNA_{j,t}$ is fund j's total net assets or the dollar value of all shares outstanding at quarter t, and $R_{j,t}$ is a fund's return over the prior year.

Panel A: Number of Mutual Funds

Year	Equity fund			Hybrid fund			Bond fund	Money Market fund	Open-end fund	Closed-end fund	All funds
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					
1998	5	0	5	0	0	0	0	0	0	5	5
1999	14	2	16	0	0	0	0	0	0	16	16
2000	29	3	32	1	0	1	0	0	0	33	33
2001	45	3	48	1	0	1	0	0	2	47	49
2002	53	3	56	9	0	9	2	0	13	54	67
2003	61	7	68	24	0	24	11	1	50	54	104
2004	73	10	83	47	0	47	15	8	99	54	153
2005	73	15	88	77	0	77	17	24	152	54	206
2006	81	19	100	124	0	124	24	40	234	54	288
2007	87	23	110	187	0	187	26	40	313	51	364
2008	77	24	101	230	0	230	51	40	390	34	424
2009	82	44	126	281	1	282	80	43	503	30	533
2010	102	75	177	327	8	335	96	45	628	28	656
2011	121	121	242	401	24	425	145	49	845	28	873
2012	137	177	314	472	29	501	229	53	1085	27	1112
2013	146	226	372	551	30	581	412	89	1446	26	1472
2014	173	267	440	668	31	699	515	160	1809	23	1832
2015	254	429	683	1042	32	1074	565	204	2534	11	2545
2016	296	455	751	1532	33	1565	856	254	3419	29	3448
2017	335	504	839	2001	34	2035	1219	326	4401	43	4444
Average	112	127	233	443	25	455	266	92	1054	35	931

Panel B: Total Assets of Funds (Bn)

Year	Equity fund			Hybrid fund			Bond fund	Money Market fund	Open-end fund	Closed-end fund	All funds
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					
1998	23	na	23	na	na	na	na	na	na	23	23
1999	116	12	128	na	na	na	na	na	na	128	128
2000	242	47	290	16	na	16	na	na	na	305	305
2001	226	40	266	13	na	13	na	na	9	270	279
2002	282	35	317	51	na	51	8	na	82	294	376
2003	326	50	376	120	na	120	42	0	220	318	538
2004	458	83	541	355	na	355	38	184	769	349	1118
2005	448	110	558	427	na	427	52	781	1493	326	1819
2006	600	125	725	833	na	833	117	580	1732	524	2256
2007	1926	663	2589	6163	na	6163	204	325	8371	940	9311
2008	1440	576	2016	5113	na	5113	504	833	8129	410	8539
2009	1918	1256	3174	6943	2	6945	520	1078	11327	471	11798
2010	2163	1979	4143	8176	127	8302	696	757	13487	505	13992
2011	1919	1995	3914	7382	127	7509	1153	1159	13401	434	13834
2012	1692	2228	3920	6641	124	6764	2171	2692	15257	386	15643
2013	1587	2245	3832	6737	100	6837	3475	3304	17193	341	17534
2014	1405	2399	3804	6499	89	6589	3237	10916	24386	236	24622
2015	2331	3616	5947	12214	99	12314	4453	20413	42927	258	43185
2016	2019	3035	5054	11473	84	11558	8569	26980	51942	308	52251
2017	1386	2067	3452	8308	64	8372	8680	21230	41515	296	41813
Average	1125	1187	2253	4859	91	4904	2120	6082	14838	392	12968

Panel C: Fund Assets Weights of Total Fund Market (%)

Year	Equity fund	Hybrid fund	Bond fund	Money Market fund	Open-end fund	Closed-end fund
1998	100.00	na	na	na	na	100.00
1999	100.00	na	na	na	na	100.00
2000	94.90	5.10	na	na	na	100.00
2001	95.50	4.50	na	na	3.07	96.93
2002	84.45	13.50	2.05	na	21.76	78.24
2003	69.84	22.27	7.82	0.06	40.91	59.09
2004	48.41	31.73	3.38	16.48	68.81	31.19
2005	30.68	23.47	2.89	42.97	82.06	17.94
2006	32.15	36.94	5.20	25.71	76.78	23.22
2007	27.81	66.19	2.19	3.49	89.90	10.10
2008	23.60	59.87	5.90	9.76	95.20	4.80
2009	26.91	58.86	4.41	9.14	96.01	3.99
2010	29.61	59.34	4.98	5.41	96.39	3.61
2011	28.29	54.28	8.34	8.37	96.87	3.13
2012	25.06	43.24	13.88	17.21	97.53	2.47

2013	21.85	39.00	19.82	18.84	98.05	1.95
2014	15.45	26.76	13.14	44.33	99.04	0.96
2015	13.77	28.51	10.31	47.27	99.40	0.60
2016	19.67	22.12	16.40	51.64	99.41	0.59
2017	18.26	20.02	20.76	50.77	99.29	0.71
Average	45.31	34.21	8.84%	23.43	80.03	19.97

Panel D: Average Total Assets of Each Fund (Bn)

Year	Equity fund			Hybrid fund			Bond fund	Money Market fund	Open-end fund	Closed-end fund	All funds
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					
1998	2.06	na	2.06	na	na	na	na	na	na	2.06	2.06
1999	2.77	2.95	2.79	na	na	na	na	na	na	2.79	2.79
2000	2.55	3.95	2.71	3.89	na	3.89	na	na	na	2.75	2.75
2001	1.57	3.34	1.71	3.14	na	3.14	na	na	4.28	1.71	1.74
2002	1.42	2.94	1.51	2.99	na	2.99	3.85	na	3.41	1.43	1.64
2003	1.42	2.37	1.50	1.79	na	1.79	1.69	0.33	1.72	1.47	1.57
2004	1.67	2.44	1.76	2.45	na	2.45	0.69	6.58	2.40	1.61	2.09
2005	1.53	2.08	1.62	1.61	na	1.61	0.85	10.02	2.80	1.51	2.43
2006	1.97	1.74	1.93	1.98	na	1.98	1.38	4.20	2.15	2.45	2.21
2007	6.42	7.45	6.66	9.13	na	9.13	2.02	2.03	7.26	5.43	7.02
2008	4.97	6.13	5.25	6.24	na	6.24	3.27	5.21	5.83	3.18	5.61
2009	4.87	7.18	5.58	5.26	1.08	5.25	1.40	5.14	4.85	3.18	4.75
2010	3.85	4.97	4.32	4.36	3.52	4.34	1.33	2.87	3.85	3.01	3.81
2011	2.82	3.11	2.96	3.28	1.13	3.17	1.48	3.97	2.88	2.61	2.87
2012	2.15	2.37	2.27	2.48	0.78	2.38	1.87	8.63	2.56	2.41	2.55
2013	1.91	1.80	1.84	2.16	0.56	2.07	1.64	6.88	2.17	2.55	2.17
2014	1.55	1.64	1.60	1.77	0.49	1.71	1.14	14.10	2.47	2.75	2.48
2015	1.72	1.67	1.69	2.27	0.52	2.21	1.38	17.97	3.18	4.10	3.18
2016	1.18	1.16	1.16	1.41	0.43	1.38	1.96	19.09	2.81	2.68	2.81
2017	1.10	1.07	1.08	1.10	0.48	1.09	1.92	17.20	2.51	1.92	2.50
Average	2.48	3.18	2.60	3.18	1.00	3.16	1.74	8.28	3.36	2.58	2.95

Panel E: Fund Flow (%)

	Equity fund			Hybrid fund			Bond fund	Money Market Funds	Open-end fund	Closed-end fund	All funds
Year	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					
1998	-7.07	na	-7.07	na	na	na	na	-7.07	-7.07	-7.07	na
1999	-0.04	13.86	0.85	na	na	na	na	0.85	0.85	-0.04	13.86
2000	27.94	19.39	26.51	28.91	na	28.91	na	28.91	28.91	27.94	19.39
2001	22.26	24.88	22.50	29.99	na	29.99	na	22.69	22.69	22.26	24.88
2002	11.27	10.82	11.24	18.53	na	5.81	10.35	11.32	11.26	11.27	10.82
2003	-16.84	-6.11	-10.02	-13.09	na	-13.09	14.42	-18.64	-8.84	-16.84	-6.11
2004	10.84	9.28	10.69	16.86	na	16.86	16.42	10.76	13.58	10.84	9.28
2005	-0.70	-1.18	-0.76	2.95	na	2.95	1.90	3.05	2.50	-0.70	-1.18

2006	17.06	32.55	17.91	14.59	na	14.59	15.64	10.48	13.06	17.06	32.55
2007	-24.46	-20.16	-23.63	-22.38	na	-22.38	-27.25	-25.67	-26.79	-24.46	-20.16
2008	-35.71	-43.63	-37.20	-29.03	na	-29.03	-39.72	-44.57	-40.22	-35.71	-43.63
2009	-25.91	-28.07	-26.04	-29.92	-27.39	-29.12	-28.14	-23.15	-29.73	-25.91	-28.07
2010	12.24	21.43	18.24	5.36	15.01	8.04	14.57	10.05	13.59	12.24	21.43
2011	13.40	18.49	14.70	14.06	-12.83	13.96	16.56	11.41	15.39	13.40	18.49
2012	2.06	-1.33	1.32	6.93	19.07	7.17	2.52	1.65	1.77	2.06	-1.33
2013	3.83	2.45	3.06	19.89	3.52	1.57	9.88	7.34	9.56	3.83	2.45
2014	-6.70	-8.00	-7.47	-5.40	-5.78	-5.72	-5.73	-13.64	-6.80	-6.70	-8.00
2015	26.85	16.45	20.20	39.99	15.25	25.79	20.47	14.30	20.05	26.85	16.45
2016	7.74	2.87	6.04	21.74	14.13	16.26	6.64	5.44	6.60	7.74	2.87
2017	11.67	9.72	10.48	19.31	17.60	18.78	14.27	9.53	13.16	11.67	9.72
Average	2.49	3.88	2.58	7.74	4.29	5.07	2.68	0.75	2.68	2.49	3.88

Panel A of Table 3.2 presents descriptive statistics of the asset allocation of each mutual fund at the end of each calendar year for different classifications. This allocation analysis primarily focuses on the equity and fixed-income proportions of the total fund assets for each fund. Over time, equity funds are composed of 74.09% equity holdings and 9.73% fixed-income assets. The passive equity funds have relatively higher weights of equity holdings at 79.86%, compared to 71.78% for active equity funds. This indicates that passive equity funds indeed put more weight on equity holdings. Hybrid funds, on the other hand, put 64.52% of their assets on equity and 17.42% on fixed-income. However, on average, passive hybrid funds only put 15.31% weight on equity holdings, compared to 65.43% from active hybrid funds. This raises the question of whether a passive fund is indeed passive. In Section 3.5.4, the classification of active/passive funds will be redefined using actual trade and turnover data. The comparable high equity weight of active hybrid funds also highlights the need for further investigation into the redefinition of equity funds. Bond funds allocate 76.94% of their investments on fix-income and they are excluded from the following fund style analysis since then. Considering all fund categories, the Chinese overall fund market averagely invests 61.36% of their total assets in equity trading, which addresses the importance of the investigation on these fund managers' stock selection and portfolio management.

Panel B presents the average number of stocks held by each fund under different categories. On average, equity funds hold 54 stocks each quarter, and hybrid funds hold 38 stocks each quarter. The number of stocks held by passive funds is relatively higher than those held by active funds. Sapp and Yan (2008) provided favourable evidence that passive fund managers exhibit more diversified stock investments compared to their passively managed counterparts. The closed-end fund displays a competitive number of quarterly stockholdings with open-end funds over the sample period. For overall fund markets, there are still 39 stocks traded per quarter over the sample period, demonstrating the significance of equity trading for Chinese mutual funds.

Table 3.2 Stock Holding and Equity Weight of Mutual Fund by Year

This table reports the descriptive statistics of the equity weight under different fund categories for the sample period 1998 to 2017. The results are presented for the value at the end of each calendar year. Panel A provides the average equity proportion to the total fund assets. Other assets of each fund are: fix income, depository receipts, deposit reserve, precious metals, REIT, and derivatives. Panel B provides the average number of stocks held by each fund for all Chinese mutual funds. They are broken down into different classifications in order to further investigate the equity investment of domestic institutional traders.

	Equity Fund			Hybrid Fund			Bond Fund	Open-end Fund	Total Funds
	Active	Passive	Total Equity Funds	Active	Passive	Total Hybrid Funds			
1998	57.89	na	57.89	na	na	na	na	57.89	57.89
1999	72.34	71.02	72.23	na	na	na	na	72.23	72.23
2000	70.87	73.57	71.18	70.64	na	70.64	na	71.16	71.16
2001	54.32	61.87	54.9	67.39	na	67.39	na	55.63	55.21
2002	59.45	63.36	59.67	49.26	na	49.26	1.88	60.32	58.39
2003	65.25	70.62	65.7	55.33	na	55.33	8.23	66.29	59.61
2004	69.35	73.98	69.86	60.31	na	60.31	9.67	71.32	57.87
2005	69.86	77.58	71.04	61.4	na	61.4	10.03	70.24	55.21
2006	72.87	84.11	75.02	71.8	na	71.8	9.54	72.58	58.07
2007	73.18	84.97	75.88	75.24	na	75.24	8.69	71.54	61.29
2008	64.98	81.91	69.13	64.74	na	64.74	3.5	61.22	52.79
2009	75.52	86.72	78.97	76.87	93.33	76.89	8.52	71	66.98
2010	74.84	87.85	80.21	75.55	3.06	74.19	9.42	72.2	66.39
2011	77.12	87.62	82.18	74.55	2.11	71.22	6.76	72.05	64.46
2012	78.24	86.75	82.84	74.12	0.97	70.89	6.59	72.23	66.99
2013	76.99	86.34	82.55	71.11	2.13	67.96	6.37	68.32	66.92
2014	79.39	86.63	83.8	69.07	9.42	66.89	6.71	66.62	65.8
2015	79	83.35	81.64	59.02	8.07	57.45	7.62	67.66	58.96
2016	81.09	83.77	82.7	50.22	9.48	49.41	8.04	49.73	55.65
2017	83.1	85.23	84.38	51.05	9.26	50.37	9.04	46.66	55.37
Average	71.78	79.86	74.09	65.43	15.31	64.52	7.54	65.84	61.36

Panel B :Average Number of Stocks Held by Fund

Year	Equity fund			Hybrid fund			Bond fund	Open-end fund	Closed-end fund	All funds
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund				
1998	18	0	0	0	0	0	0	0	18	18
1999	11	4	0	0	0	0	0	0	10	10
2000	56	35	43	46	0	46	0	0	54	54
2001	29	13	22	48	0	48	0	22	29	29
2002	56	75	57	44	0	44	14	41	58	55
2003	32	30	28	23	0	23	9	22	33	28
2004	35	44	38	31	0	31	14	31	35	32
2005	49	55	54	42	0	42	20	43	47	44
2006	32	38	31	29	0	29	15	28	34	30
2007	32	37	37	44	0	44	17	40	30	38
2008	37	42	39	40	0	40	12	36	35	36
2009	39	69	52	42	47	42	16	39	42	40
2010	49	130	87	60	37	60	26	61	62	61
2011	33	75	56	36	31	36	9	37	39	37
2012	36	80	62	37	43	38	9	41	44	41
2013	34	80	63	33	33	33	7	40	40	40
2014	32	82	64	33	47	34	9	40	21	40
2015	52	108	87	43	65	44	14	54	48	54
2016	43	79	65	34	53	35	13	42	21	41
2017	48	85	71	42	60	42	17	47	26	47
Average	38	61	54	39	46	38	14	39	36	39

Table 3.3 presents summary statistics of the mutual funds transaction costs over the sample period. There are two major components to fund expenses: sales charges and fund management fees. Sales charges include the initial subscription fee (front-end load and back-end load), purchase fees, redemption fees, and fund conversion fees. Fund management fees contain administrative and operating expenses, including account auditing fees, custodian services, and marketing expenses.

Panel A provides information on the expense ratio for all mutual funds under different classifications. The expense ratio is defined as the operating expense divided by the dollar value of the fund asset value, and is calculated on an annual basis. Depending on the type of fund, operating expenses vary. The largest component of operating expenses is the fee paid to fund managers for their services. Other costs and expenses include record keeping, custodial

services, taxes, legal expenses, and accounting and auditing fees. Panel A suggests that passive funds, for both equity and hybrid funds, have relatively lower expense ratios than active funds. The expense ratio of active equity funds increases over time and reached 3.32% in 2017 with an average value of 2.54%. This is 0.84% greater than that of passive equity funds. Similar results are observed for hybrid funds where passive funds cost less than active hybrid funds. Overall, hybrid funds have a higher expense ratio at 2.42% than equity funds at 2.11%. The results also indicate that the closed-end funds are charged more at 3.12% compared with open-end funds with 1.99% per annum and this is due to the higher front-end load of closed-end funds that are not redeemable in the fund market.

Panel B presents the fund loads for the entire sample. The fund load is calculated by dividing the sum of the initial sales charge (as the front-end loads) and the deferred sales charge (as the back-end loads) by average fund assets. The fund load exhibits a similar pattern as the expense ratio. Active funds have higher loads than passive funds due to frequent trading activities, while equity funds have more sales charge at 1.29%. The results in Panel B also indicate that hybrid funds charge more administrative and management fees than equity funds.

Table 3.3 Transaction Costs, Expense Ratios and Loads of Mutual Funds

Table 3.3 presents summary statistics of mutual funds transaction costs over the sample period. There are two major components of fund expenses: sales charges and fund management fees. Sales charges include the initial subscription fee (front-end load and back-end load), purchase fees, redemption fees and fund conversion fees. Fund management fees contain a variety of administrative and operating expenses which include account auditing fees, custodian services and marketing expenses. Panel A provides the results on the expense ratio for all mutual funds under different classifications. The expense ratio is the annual fee that all funds charge their shareholders. It is the percentage of assets deducted each fiscal year for fund expenses, including 12-1 fees, management fees, administrative fees, operating costs and all other asset-based costs incurred by the fund. Portfolio transaction fees and brokerage costs are not included in the expense ratio. Panel B documents the fund loads of all Chinese mutual funds from 1998 to 2017. The load is calculated by dividing the sum of the initial sales charge (as the front-end loads) and the deferred sales charge (as the back-end loads) by average fund assets.

Panel A: Expense Ratio (%)

Year	Equity fund			Hybrid fund			Bond fund	Money Market fund	Open-end fund	Closed-end fund	All funds
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					
1998	na	na	na	na	na	na	na	na	na	na	na
1999	na	na	na	na	na	na	na	na	na	na	na
2000	na	na	na	na	na	na	na	na	na	na	na
2001	2.10	na	2.10	2.50	na	2.50	na	na	2.23	na	2.23
2002	0.99	0.90	0.97	1.16	na	1.16	0.62	na	1.02	na	1.02
2003	1.13	1.17	1.14	1.03	na	1.03	1.26	0.36	1.04	na	1.04
2004	1.90	1.27	1.75	1.16	na	1.16	0.77	0.36	1.21	na	1.21
2005	1.23	0.93	1.08	1.24	na	1.24	0.83	0.30	1.00	na	1.00
2006	3.12	2.39	2.86	2.91	na	2.91	1.45	0.54	2.40	na	2.40
2007	2.93	2.11	2.67	2.83	na	2.83	1.48	0.67	2.41	na	2.41
2008	2.90	2.09	2.65	2.84	na	2.84	1.50	0.67	2.39	na	2.39
2009	2.86	2.00	2.47	2.75	1.46	2.74	1.49	0.66	2.33	na	2.33
2010	2.87	1.84	2.34	2.72	1.61	2.68	1.48	0.67	2.29	na	2.29
2011	2.79	1.87	2.27	2.70	1.43	2.63	1.50	0.68	2.25	na	2.25
2012	2.72	1.84	2.19	2.66	1.35	2.59	1.39	0.68	2.11	na	2.11
2013	2.71	1.71	2.06	2.65	1.32	2.58	1.35	0.67	1.98	na	1.98
2014	2.85	1.62	2.08	2.69	1.31	2.64	1.31	0.64	1.95	3.35	1.95
2015	3.60	1.91	2.55	3.44	1.73	3.40	1.53	0.63	2.55	2.29	2.55
2016	3.22	1.75	2.32	3.21	1.60	3.18	1.58	0.59	2.38	3.65	2.39
2017	3.32	1.75	2.38	3.05	1.64	3.03	1.48	0.59	2.30	3.20	2.31
Average	2.54	1.70	2.11	2.44	1.50	2.42	1.31	0.58	1.99	3.12	1.99

Panel B: Fund loads (%)

Year	Equity fund			Hybrid fund			Bond fund	Money market fund	Open-end fund	Closed-end fund	All funds
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					
1998	na	na	na	na	na	na	na	na	na	na	na
1999	na	na	na	na	na	na	na	na	na	na	na
2000	na	na	na	na	na	na	na	na	na	na	na
2001	2.10	na	2.10	2.50	na	2.50	na	na	2.23	na	2.23
2002	0.99	0.90	0.97	1.16	na	1.16	0.62	na	1.02	na	1.02
2003	1.13	1.17	1.14	1.03	na	1.03	1.17	0.16	1.00	na	1.00
2004	1.90	1.27	1.75	1.07	na	1.07	0.77	0.14	1.14	na	1.14
2005	0.98	0.93	0.96	1.03	na	1.03	0.57	0.00	0.78	na	0.78
2006	1.43	1.36	1.40	1.20	na	1.20	0.51	0.02	1.00	na	1.00
2007	1.15	1.10	1.14	1.09	na	1.09	0.46	0.00	0.91	na	0.91
2008	1.16	1.04	1.12	1.08	na	1.08	0.47	0.00	0.89	na	0.89
2009	1.11	1.08	1.10	1.00	0.86	1.00	0.37	0.00	0.84	na	0.84
2010	1.11	0.97	1.04	0.97	1.01	0.97	0.35	0.00	0.83	na	0.83
2011	1.02	1.00	1.01	0.95	0.83	0.95	0.37	0.00	0.82	na	0.82
2012	0.99	0.93	0.95	0.94	0.74	0.93	0.37	0.01	0.76	na	0.76
2013	0.97	0.81	0.87	0.94	0.68	0.93	0.39	0.01	0.70	na	0.70
2014	1.11	0.72	0.87	0.99	0.64	0.97	0.33	0.01	0.68	1.80	0.68
2015	1.86	0.97	1.31	1.80	1.06	1.78	0.56	0.01	1.25	0.94	1.25
2016	1.45	0.80	1.05	1.66	0.92	1.64	0.68	0.00	1.14	1.98	1.15
2017	1.53	0.78	1.09	1.54	0.86	1.53	0.63	0.02	1.09	1.56	1.09
Average	1.29	0.99	1.17	1.23	0.84	1.23	0.54	0.03	1.00	1.57	1.00

3.4 Methodology

There is ample evidence to suggest that fund investment style has a certain impact on fund performance. In addition, it is commonly believed that style consistency also plays a role in determining the performance of funds. In order to analyse the relationship between investment style consistency and fund performance, this section presents two approaches to measure fund style consistency. The first one is the Holding-Based Style Consistency (HSC) measure, and this methodology, also known as the characteristic-based measure, is used to examine whether quarterly equity holdings are significantly different from benchmark portfolio holdings, as classified by various characteristics. The second style consistency measure uses the Industry Concentration Index (ICI) to investigate whether fund managers concentrate their equity holdings in certain industries. The characteristic-based performance measure and the industry-

based performance measure are employed to calculate fund performances. In addition, various types of factor-based performance measures are also introduced such as the Carhart four-factor (Carhart, 1997) and Ferson-Schadt's (1996) conditional measure.

3.4.1 Style Consistency Measures

This section discusses both holding-based and industry-based measures. These two measures analyse fund style drift by calculating a fund's stock holdings style score or weight that deviates from characteristic-based benchmark portfolios and industry-based benchmark portfolios over time, respectively.

3.4.1.1 Holding-based Style Consistency Measure (HSC)

The HSC measure evaluates a fund's style consistency by examining how the characteristics of stocks held by a fund vary over time. Firstly, characteristic-based style benchmark portfolios are constructed for all equities. Following Daniel et al. (1997), all stocks listed in the Shanghai and Shenzhen stock exchanges are ranked into quintiles by three characteristics: size, book-to-market ratio, and prior-year return (momentum). This three-way ranking procedure results in 125 fractile portfolios with distinct combinations of size, book-to-market ratio, and momentum characteristics. Secondly, the score assigning system proposed by Brown et al. (2009) is used to assign a score for each stock from the 125 fractile portfolios. For each characteristic, a score of five is assigned to a stock that falls into the quintile containing the highest value (i.e., largest stock, highest book-to-market ratio, highest prior-year return) and a score of one is assigned to a stock in the lowest quintile. Thirdly, the weighted-average scores are calculated for size, book-to-market, and momentum across each sample mutual fund for the most recent reported holdings on a monthly basis, as proposed by Kacperczk et al. (2005). Finally, the standard deviation of a fund's average score is used to capture how the characteristic ranking (holding-based style consistency) varies over time. For each characteristic *c*:

which captures the nature of style decisions. Specifically, all stocks listed in the Shanghai and Shenzhen stock exchanges are ranked by three characteristics: size, book-to-market ratio, and prior-year return (momentum). All listed stocks that have information on size, book-to-market ratio, and prior-year returns from the end of each June, are ranked into quintile portfolios by their size (market capitalisation). Then, for each size quintile portfolio, each portfolio is then divided into book-to-market quintiles at the end of the December immediately prior to the ranking year, resulting in 25 fractile portfolios. Each of the 25 fractile portfolios are further divided into quintiles based on the past 12-month returns, resulting in 125 fractile portfolios. Therefore, this three-way ranking procedure results in 125 fractile portfolios with distinct combinations of size, book-to-market, and momentum characteristics. This process allows every stock listed in China A shares has its specific annual characteristics style classification by structuring these 125 characteristic-based benchmarked portfolios.

Secondly, the score assigning system proposed by Brown et al. (2009) is used to assign a score for each stock from the 125 fractile portfolios. For each characteristic, a score of 5 is assigned to a stock that falls into the quintile containing the highest value (i.e., largest stock, highest book-to-market ratio, highest prior-year return) and a score of 1 is assigned to a stock in the lowest quintile. Thirdly, on an aggregate level, the weighted-averages scores are calculated for size, book-to-market, and the momentum across the entire portfolio for the most recent reported holdings on a monthly basis, as proposed by Kacperczk et al. (2005). For each given fund, the monthly holding data is used from the most recently reported quarterly holdings (i.e., equity holdings reported at the end of September are used to calculate rankings for portfolios in October, November and December).

Consequently, the monthly change of the value of the existing stock holdings, the quarterly change of the fund composition, and the annual change of the characteristic-based benchmark are all factors which may affect the fund style consistency score. Lastly, the standard deviation

of a fund's average ranking (style score) is used to capture how the characteristic ranking (holding-based style consistency) varies over time. For each characteristic *c*:

$$\sigma_{c,j,t} = \{\sum_{n=0}^{35} \frac{(Rank_{c,j,t-n} - MRank_{c,j})^2}{(36-1)}\}^{1/2} \quad (3)$$

where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score during the 36-month measurement period. Then, the holding-based style consistency (HSC) score is computed as the following:

$$\mathrm{HSC}_{j,t} = \sum_{c=1}^{3} \frac{\sigma_{c,j,t}}{3} \quad (4)$$

The essence of the holding-based measure of style consistency is to track how the ranking of characteristics varies over time. A fund's HSC is used as a proxy for a fund manager's style decisions to analyse the actual characteristics of the underlying portfolio holdings on a monthly basis. A fund with a high HSC indicates low style consistency with more frequent changes of stock holdings which differ from their original characteristic attributes (style drift). Although a fund with a higher HSC is usually associated with a higher turnover, a fund's investment style drift is not necessarily driven by significant trading among different stocks, unless they have distinct characteristic attributes. Therefore, this method allows for a more precise investigation of the reasons for style drift as it determines whether the drift is the result of active portfolio rebalancing by fund managers as a result of particular investment characteristics. Wermers (2002) put forward an alternative style drift score that calculates the absolute difference in a fund's characteristic ranking for each investment attribute within one year. The HSC measure, however, captures the volatility of fund managers' style decisions over a three-year period, therefore, it is considered to be a better way.

3.4.1.2 Industry Concentration Measure (ICI)

The industry allocation is an alternative characteristic that fund managers take into consideration when they allocate the underlying stock holdings. Both academics and practitioners are interested in whether mutual fund managers widely diversify their holdings across industries to reduce their portfolios' idiosyncratic risk or whether they concentrate their portfolio holdings in certain industries. Thus, an Industry Concentration Index, proposed by Kacperczk et al. (2005), is constructed based on quarterly fund equity holdings.

There are six primary industries classified by CSMAR for all listed stocks in China: Finance, Industrial, Public Utilities, Conglomerates, Commerce, and Properties. The composition of these Chinese industries is presented in the Appendix.

Chapter 3 adopts the CSMAR industry classification rather than maintain the same classification from Bloomberg as 24 subgroups in Chapter 2 because of the calculation on the Industry Concentration Index. This calculation requires more general industry groups that enables the value weight of stock holdings from each industry to be extracted for weight deviation from the benchmark. ICI might be overvalued if the weight of stock holdings for each fund cannot be proportionally calculated under a more elaborate industry classification. However, under the CSMAR industry classification, the subgroups of these six industries are different and they contain 20 industry sub classifications as displayed in Appendix A2.

Each stock held by a mutual fund is assigned to one of the six industries. The ICI is defined as the deviation of a fund portfolio from the market portfolio for a particular industry. The ICI at time *t* for a mutual fund is calculated as the sum of the squared deviations of the value weight for each of the six industries held by a mutual fund, relative to the industry weight in the total stock market. The ICI becomes zero with the condition that a fund has the same industry

allocation of stock holdings as the market portfolio. Specifically, for each mutual fund, ICI is calculated as:

$$ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F} - W_{j,t}^{M})^2 \quad (5)$$

$W_{j,t}^{F}$ is the value weight of stock holdings from industry *j* and is calculated by the total market value of all stocks held by the fund at time *t*, divided by the total equity value of the fund in the same quarter. $W_{j,t}^{M}$ is the value weight of all listed A shares assigned into industry *j* at time *t*. The ICI captures the degree to which a mutual fund portfolio deviates from benchmark market portfolios for a particular industry. Compared to the Herfindal Index[8], the ICI provides a more accurate measure for the calculation of industry concentration. The ICI also takes into consideration that industry weight is time-variant, by subtracting the value weight of market industry benchmarks. In addition, the Herfindahl Index sometimes provides a biased estimation (i.e. a relatively lower value) if a mutual fund is more equally invested in different industries. However, the ICI does not suffer from this issue, as the market portfolio has the lowest probability of having an index value of zero.

In Section .3.5, both the HSC and the ICI are used as independent variables. Section 3.4.2 below discusses various types of fund performance measures.

3.4.2 Fund Performance Measures

This section discusses the holding-based and factor-based approaches to measure fund performances. The holding-based approach contains three specific measures: fund hypothetical return (gross return), characteristic-based decomposition of fund return, and fund industry adjusted return. In addition, both conditional and unconditional factor-based approaches are

[8] The Herfindahl Index is Defined as $HI_t = \sum_{i=1}^{N}(W_{i,t})^2$. It is an industry concentration measure adopted by the CSMAR database.

also employed., including the Carhart four-factor unconditional model and the Ferson-Schat conditional model.

3.4.2.1 Holding-based Fund Performance Measures

The holding-based fund performance measure includes the hypothetical return (the gross return), the characteristic-based approach, and the industry-based approach. The hypothetical fund return is calculated from the weighted average portfolio return of the equity holdings on the last day of each quarter until the last day of the following quarter when the portfolio is rebalanced. Using the hypothetical return (or the gross return), rather than the net return yields a number of advantages: the mutual fund equity holdings can be directly evaluated as a "snapshot" and a better benchmark can be developed to capture a fund manager's investment style. Although the gross return sometimes overestimates the fund returns as it does not adjust for transaction costs, it provides an important insight into determining whether fund managers have superior stock picking and market timing abilities. As a comparison, fund net return is also reported.

Daniel et al. (1997) proposed a characteristic-based performance evaluation approach known as the DGTW measure, by constructing a benchmark portfolio to match the characteristics of the equity holdings held by a mutual fund. The DGTW compares the return of the equities held by a fund to the return of a portfolio of stocks with similar characteristics. Daniel and Titman (1997) suggested that this approach is to decompose the fund overall excess return into three components: Characteristic Selectivity (CS), Characteristic Timing (CT), and Average Style (AS). These components are able to detect a fund manager's stock picking and timing abilities.

The CS is calculated by taking the difference between the portfolio-weighted average return of all stocks held by a fund in a quarter and the matched benchmark portfolio in the same quarter. Specifically, the CS is calculated as the following, as in Daniel et al. (1997):

$$CS_{T=} \sum_{j=1}^{N} W_{j,t-1}(R_{j,t} - R_t^{b_{j,t-1}}) \quad (6)$$

where $W_{j,t-1}$ is the portfolio weight on stock *j* at the end of quarter *t - 1*, $R_{j,t}$ is the quarter *t* buy-and-hold return of stock *j*, and $R_t^{b_{j,t-1}}$ is the quarter *t* buy-and-hold return of the characteristic-based benchmark portfolio that stock *j* belongs to at the end of quarter *t - 1*.The characteristic-based benchmark portfolio is constructed in the same way as the HSC in Section 3.4.1.1. All listed A shares are characterised over three dimensions (size, book-to-market, and the prior-year return of that stock), to form the characteristic-based benchmark portfolio during a given quarter. This benchmark is rebalanced at the end of June on an annual basis, resulting in 125 time-varying portfolios each year. A CS score of zero indicates the fund return can be replicated by simply purchasing stocks with the same size, book-to-market, and momentum characteristics as the stocks that the fund held. Therefore, fund managers can significantly improve performance by changing portfolio weights to exploit stock style retarding size, book-to market, and momentum.

However, the CS does not capture the return premium driven by a fund manager's ability to time their equity holdings characteristics with the market. The Characteristic Timing (CT) is constructed by taking the portfolio-weighted return on benchmark portfolios that have the same characteristics as stocks currently held by the fund, in excess of time-series average returns on those control portfolios. Specifically, CT is calculated as the Following:

$$CT_t = \sum_{j=1}^{N}(W_{j,t-1}\, R_t^{b_{j,t-1}} - W_{j,t-5}\, R_t^{b_{j,t-5}}) \quad (7)$$

Equation (7) calculates the weighted average return difference between the quarter t-1 matching characteristic portfolios for stock j and the quarter t-5 of the matching characteristic portfolios for stock j. A greater CT is expected when there is an increase in weight for a particular stock before the payoff to the characteristics attribution. For example, if a fund

increases its weight in high book-to-market stocks at the beginning of a quarter, then the fund would have a positive CT component for that quarter. Therefore, this calculation provides a higher power to distinguish selectivity and timing ability for a characteristic measure compared to factor-based methods because for a factor-based approach to determine whether funds managers have timing ability, it must analyse whether there are changes in factor loadings correspond to the realization of the associated factors. With the characteristic-based measure, CT provides a direct way to examine whether the portfolio weights shift with the corresponding characteristic-based benchmark.

To evaluate if the returns earned by a fund are driven by its tendency to hold stocks with certain characteristics, a third component, the "Average Style" (AS), is introduced. This measure captures a fund's time-series average return over the benchmark portfolio that has the same characteristics (long-term style-based returns).

$$AS_t = \sum_{j=1}^{N} W_{j,t-5} \, R_t^{b_{j,t-5}} \tag{8}$$

If the fund managers systematically hold stocks with certain characteristics to produce a portfolio return premium without trying to time the market variation, these funds may exhibit a high AS. To eliminate the effect of funds "timing" the stock holding within one year, the stock weight and characteristic-based benchmark are both in lagged values. Specifically, each stock held by a fund is matched with its characteristic-based benchmark portfolio at the end of quarter *t-5*. At the end of quarter *t*, the stock return is adjusted by its matched benchmark portfolio's return at the end of quarter *t-5*. This adjusted stock return is $R_t^{b_{j,t-5}}$. Thirdly, the stock weight at end of quarter *t-5* , $W_{j,t-5}$, is multiplied by $R_t^{b_{j,t-5}}$ to capture the portion that the fund manager produces a return only because of the superior performance generated by that certain characteristic-based benchmark portfolio over the one year period. Funds that systematically invest in stocks with certain characteristics may produce high portfolio returns,

thus a high AS return. Therefore, the sum of the three components, CS, CT, and AS, is defined as the total portfolio-weighted return from the underlying stock holdings of a given fund.

Similar to the DGTW method, industry stock selectivity (IS) and industry timing (IT) measures are used to estimate whether a fund manager exhibits stock picking skills within certain industries, and whether a fund manager has the ability to select better performed industries among others.

The IS is calculated by taking the difference between the weighted average return of equity holdings for a fund in a quarter and the matched industry portfolio benchmark return in the same quarter. Specifically, the IS is calculated as the following:

$$IS_{T=} \sum_{j=1}^{N} W_{j,t-1}(R_{j,t} - R_t^{I_{j,t-1}}) \quad (9)$$

where $R_t^{I_{j,t-1}}$ is the industry portfolio return for quarter t for which stock j was allocated during period t-1. $R_{j,t}$ represents the stock j's return at quarter t and $W_{j,t-1}$ is the weight of stock j at quarter t-1. A zero IS indicates the fund returns are the duplication of the industry benchmark return and this fund manager has no ability to select stocks with superior returns among the same industry.

Industry Timing (IT) is constructed by taking the difference between the weighted average return on industry benchmark portfolios that are from the same industry as stock held by the fund in that quarter, and the time-series average return on the industry benchmark portfolios. A positive CT represents a fund manager who has the talents to choose the industries with higher returns compared to others. Specifically, the IT is calculated as the following:

$$IT_t = \sum_{j=1}^{N}(W_{j,t-1}\, R_t^{I_{j,t-1}} - W_{j,t-5}\, R_t^{I_{j,t-5}}) \quad (10)$$

where $R_t^{I_{j,t-k}}$ is the industry portfolio return for quarter t for which stock j was allocated during period t-k. $R_{j,t}$ represents the stock j's return at quarter t and $W_{j,t-k}$ is the weight of stock j at quarter t-k. Therefore, these holding-based measures of fund return together with net return are then all used as the dependent variables through the factor-based performance-evaluation approach.

3.4.2.2 Factor-based Fund Performance Measures

Researchers apply various risk and style factors (the excess return on a value-weighted aggregate market proxy, value weighted, zero-investment, factor-mimicking portfolios for size, book-to-market equity, and one-year momentum in stock returns) to analyse the performance of mutual funds. The related studies widely follow the methodology by exploring these factors' attributions to total fund return and the portion which cannot be explained which is defined as the abnormal return. Therefore, the different performance measures developed in the previous sections including fund net and gross returns, CS, CT and AS, fund IS and IT, are used as dependent variables to perform factor-based regression analysis, using the Carhart four-factor model as the unconditional approach and the Ferson-Schadt model as the conditional approach.

3.4.2.2.1 Carhart Four-Factor Model

Building upon the Fama-French three-factor model, Carhart (1997) indicated that performance persistence can be explained by including a momentum factor. Moskowitz and Grinblatt (1999) also concluded that as momentum is stronger for certain industries, it is important to adjust the momentum in cross-section stock returns (see also Bauer et al. 2005). Therefore, the Carhart four-factor model is performed as the following equation:

$$R_{j.t} - R_{F,t} = \alpha_j + b_j RMRF_t + s_j SMB_t + h_j HML_t + p_j PR1YR_t + e_{j,t} \qquad (11)$$

where, $R_{j,t} - R_{F,t}$ represents the excess net return of fund during quarter *t* (the fund net return minus T-bills yield); $RMRF_t$ denotes the excess return of a value-weighted aggregate market proxy portfolio over the risk-free rate; SMB_t, HML_t, and $PR1YR_t$ equal the quarter *t* return on value-weighted, zero-investment factor-mimicking portfolio for size, book-to-market equity, and one-year momentum in stock returns. The intercept α_j from Carhat (1997) evaluates the gross time-series performance as the mutual fund stock portfolios' abnormal return.

A robustness check is also conducted by adjusting the idiosyncratic risk on the fund performance since portfolio returns deviate from the market at the portfolio level. To take the consideration of mutual funds' exposure to market portfolio, an appraisal ratio (Treynor & Black, 1973) is applied as the modified performance measure of actively managed funds. This appraisal ratio is calculated by dividing the Carhat α_j by the standard deviation of the residual from the four-factor model. It is documented that idiosyncratic volatilities are positively correlated with the expected return when investors do not diversify their portfolio holding (Merton, 1987). The portfolio return variance can be minimised by a lower idiosyncratic risk. Therefore, the abnormal return is scaled by idiosyncratic risk as the performance measure can alleviate this bias.

3.4.2.2.2 Ferson-Schadt Measure

Ferson and Schadt (1996) concluded that the traditional unconditional measure is unreliable due to the time-varying variation in risk that can misevaluate the average fund performance. They proposed a conditional performance evaluation with public information controls for biases in the traditional market timing model and found that the predetermined variables were both statistically and economically significant. Specifically, they modified several classical performance measures conditional on public information controls. They also applied the predetermined instruments to capture the factor loading on the average performance of the

mutual fund. Consistent with this approach, following the specifications of the model employed by Kacperczyk et al. (2005) and Wermers (2003), the following model is specified to mitigate the fund flow timing effect, by incorporating the FS economic variables interaction term with the excess market return:

$$R_{j,t} - R_{F,t} = \alpha_j + b_j RMRF_t + S_j SMB_t + h_j HML_t + p_j PR1YR + \sum_{i=1}^{4} r_{j,i} \left[Z_{i,t-1} RMRT_t \right] + e_{j,t} \quad (12)$$

where $z_{i,t-1}$ is the deviation of lagged macro-economic variable *i* from its unconditional (time-series) mean at time *t-1*, and $r_{j,i}$ is the response of fund manager *j*'s loading on the market factor, $RMRF_t$, is the response to the observed realization of $z_{j,t-1}$. Specifically, the macro-economic variables incorporated into the FS model are the 1-month Treasury bill yield, the dividend yield of the CSI 300 Index (a capitalization-weighted stock market index to replicate the performance of top 300 A-share stocks listed on Shanghai and Shenzhen stock exchanges), the Treasury yield spread (Long-minus short-term bonds), and the quality spread in the corporate bond market (low- minus high-grade bonds). The intercept of the model, α_j, is the FS conditional performance measure for fund *j*.

3.5. Results

3.5.1 Investment Style Consistency and Industry Concentration of all Mutual Funds

Table 3.4 reports the holding-based mutual fund style consistency result for all funds under different categories. As mentioned earlier in literature review, the consistency of a fund's investment style can be measured either by changing in the composite characteristics of the portfolio's actual security holding or with the r-squared coefficient relative to a return-based model. It is demonstrated that the return-based style analysis is only accurate when the correlation between benchmark indices are low and if the indices have performed in a highly

correlated fashion, it is harder for the model to detect distinct style patterns in the total returns. Rekenghaler et al. (2004) documented that holding-based style analysis with a portfolio investment for more than one year produces better results than return-based analysis with "current" data. Furthermore, holding-based analysis is more stable and consistent than return-based analysis and therefore provides a better estimate of the portfolio's future style.

In addition, because return-based style analysis required 36 months of performance, indicating that this approach cannot be used for portfolios that are formulated over a short period of time. Generally, the returns-based style analysis can be applied to validate the completeness and accuracy of reported portfolio holdings. If the returns-based analysis is considerably different from the holding-based analysis, it may indicate that the portfolio manager is not disclosing all holdings. Considering those advantages of holding-based analysis, the measure of the volatility of funds' style attributes were calculated using Equation (4) based on how the funds' portfolio positions were rebalanced during the previous 36-month period.

Results in Table 3.4 indicate that Chinese equity funds exhibited a certain degree of style inconsistency, particularly for active funds with a HSC score of 1.1, compared to a HSC score of 0.74 for passive funds. The greater HSC score of active funds suggests that active equity funds are less style consistent compared to passive funds, and this is consistent with the frequent trades and high turnover from active funds which will be discussed in Section 3.5.4.

Hybrid funds exhibit similar HSC results to equity funds. Active hybrid funds generated a higher HSC at 0.89 and the passive hybrid funds have an HSC of 0.17, indicating the active hybrid fund trades their securities with changing the investment style more significantly and frequently compared to their passive counterparts. Furthermore, the average HSC of active hybrid funds is similar in scale to the average HSC of total equity funds, providing another

evidence that these active hybrid funds should be taken into consideration as "actively managed mutual funds" for the following analysis.

Consistent with the results from Table 3.3, the results in Table 3.4 suggest that more style consistent funds have lower portfolio expense ratios than low style consistent funds. In Section 3.5.4 of this chapter, these lower style consistent funds are proved to conduct more active trading among stocks with higher turnover ratios. According to Brown et al. (2009), large-cap funds demonstrate more investment style consistency, measured by both holding-based and returns-based approaches, than do small or mid-cap funds in the US market. Therefore, further analysis will be conducted in Chapter 4 to discuss the size effect on style consistency.

Table 3.4 Holding-based Mutual Fund Style Consistency Measures: HSC

This table reports style consistency statistics for the mutual fund sample over the period from June 1998 to June 2018. Fund style consistency is evaluated by two approaches: Holding-based and return-based measures. This table shows the results on HSC which are computed as the average style characteristic volatility of the fund's security holdings by $HSC_{j,t}=\sum_{c=1}^{3}\frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t}=\{\sum_{n=0}^{35}\frac{(Rank_{c,j,t-n}-MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score during the 36-month measurement period. The last two columns represent the active and passive funds HSC differences for equity funds and passive funds.

	Equity fund					Hybrid fund	Bond fund	Open-end fund	Close-end fund	All funds	HSC Difference	
Year	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity Funds	Hybrid Funds
1998	0.15	na	0.15	na	na	na	na	na	0.15	0.15	na	na
1999	0.39	0.03	0.35	na	na	na	na	na	0.35	0.35	0.36	na
2000	0.65	0.43	0.63	0.29	na	0.29	na	na	0.62	0.62	0.22	na
2001	1.12	0.8	1.1	2.07	na	2.07	na	na	1.17	1.12	0.32	na
2002	1.13	0.79	1.12	0.26	na	0.26	na	0.08	1.18	0.98	0.34	na
2003	1.22	0.58	1.16	0.54	na	0.54	0.14	0.41	1.38	0.95	0.64	na
2004	1.09	0.51	1.02	0.61	na	0.61	0.35	0.54	1.31	0.83	0.58	na
2005	1.2	0.55	1.09	0.76	na	0.76	0.48	0.75	1.26	0.91	0.65	na
2006	1.95	1.28	1.82	1.37	na	1.37	0.82	1.39	1.99	1.53	0.67	na
2007	1.73	1.14	1.62	1.03	na	1.03	0.71	1.08	1.91	1.22	0.59	na
2008	1.59	1.13	1.48	0.95	na	0.95	0.47	0.97	1.86	1.06	0.46	na
2009	0.88	0.54	0.76	0.75	na	0.75	0.28	0.67	0.87	0.68	0.34	na
2010	0.82	0.56	0.71	0.78	0.28	0.77	0.33	0.68	0.88	0.69	0.26	0.5
2011	1.41	1.03	1.22	1.26	0.18	1.19	0.41	1.06	1.57	1.08	0.38	1.08
2012	1.23	0.68	0.92	1.11	0.18	1.06	0.4	0.91	1.45	0.92	0.55	0.93

2013	1.18	0.58	0.81	1.03	0.11	0.98	0.37	0.84	1.28	0.85	0.6	0.92
2014	0.74	0.43	0.55	0.74	0.13	0.72	0.33	0.61	0.71	0.61	0.31	0.61
2015	0.79	0.5	0.61	0.72	0.14	0.7	0.36	0.62	0.68	0.62	0.29	0.58
2016	1.5	1.38	1.43	0.94	0.19	0.92	0.44	1.02	0.52	1.02	0.12	0.75
2017	1.27	1.07	1.15	0.87	0.17	0.86	0.42	0.89	0.78	0.89	0.2	0.7
Average	1.1	0.74	0.98	0.89	0.17	0.88	0.42	0.78	1.1	0.85	0.36*	0.72**

In addition to examining the fund investment style based on characteristics of fund stock holdings, this chapter extends the style consistent analysis by investigating if fund managers concentrate their equity holdings into certain industries. Table 3.5 presents results of mutual funds industry concentration and the industry-adjusted return on an annual basis. As described in Section 3.4.1.2, the Industry Concentration Index at time *t* for a mutual fund is calculated as the sum of the squared deviations of the value weight for each of the six industries held by a mutual fund relative to the industry weight of the overall stock market. A higher ICI indicates a more concentrated industry investment distribution for a fund. Results in Table 3.5 suggest that both passive equity and hybrid funds display relatively lower ICI scores. On the other hand, active funds exhibit a relatively strong industry concentration pattern, with an average score of 0.294 for active equity funds and 0.277 for active hybrid funds. The higher ICI for active funds provides indirect evidence that active fund managers hold concentrated portfolios because they may carry superior information on selected stocks in specific industries.

3.5.2 Overall Mutual Fund Returns

Table 3.6 presents the mutual fund returns by calculating funds' net asset value growth over the sample period. It includes all funds from 1998 to 2017 regardless of whether the fund survives or not, and the fund return is annualized from the quarterly return. Panel A reports the gross return and Panel B reports the net return after transaction costs. Panel A provides an insight into the stock holding returns of mutual funds as the gross return to examine whether fund managers can indeed select profitable stocks to offset the underperformance from

nonstock holdings. In Panel A, the gross return for active hybrid funds yields the highest of 19.82% and the gross return for active equity funds is 19.42%.

However, results in Panel B suggest that active equity funds yield an average annualized net return of 13.56% and active hybrid funds provide an average net return of 13.43%.

Table 3.5 Industry Concentration Index

This table presents the Mutual fund Industry Concentration Index (ICI) and fund performance after adjustment of industry return. This table reports the average quarterly fund ICI from 1998 to 2017. ICI at time *t* for a mutual fund is computed as the sum of the squared deviation of value weights for each of six distinct industries held that mutual fund from the industry weights of a share stock market portfolio, as $ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F} - W_{j,t}^{M})^2$, where $W_{j,t}^{F}$ is the weight of stock holding from the same industry relative to the total nest asset of fund *i* at quarter *t* and $W_{j,t}^{M}$ is the corresponding industry stocks weight relative to the total a share stock market. Panels B and C report the holding-based industry-adjusted fund performance. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The last two columns represent the active and passive funds ICI differences for equity funds and passive funds.

	Equity fund					Hybrid fund	Bond fund	Open-end fund	Close-end fund	All funds	ICI Difference	
Year	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity Funds	Hybrid Funds
1998	0.26	na	0.26	na	na	na	na	na	0.26	0.26	na	na
1999	0.35	0.20	0.22	na	na	na	na	na	0.22	0.22	0.15	na
2000	0.21	0.13	0.14	0.19	na	0.19	na	na	0.14	0.14	0.08	na
2001	0.29	0.24	0.25	0.23	na	0.23	na	0.39	0.24	0.25	0.05	na
2002	0.34	0.30	0.30	0.32	na	0.32	0.42	0.31	0.31	0.31	0.03	na
2003	0.33	0.28	0.28	0.24	na	0.24	0.31	0.26	0.28	0.27	0.06	na
2004	0.36	0.26	0.27	0.25	na	0.25	0.30	0.26	0.27	0.26	0.11	na
2005	0.37	0.28	0.29	0.32	na	0.32	0.33	0.33	0.26	0.30	0.09	na
2006	0.29	0.23	0.24	0.30	na	0.30	0.30	0.30	0.20	0.27	0.06	na
2007	0.20	0.22	0.22	0.17	na	0.17	0.23	0.20	0.15	0.19	-0.03	na
2008	0.22	0.15	0.17	0.15	na	0.15	0.28	0.17	0.12	0.16	0.07	na
2009	0.28	0.24	0.25	0.29	0.19	0.26	0.30	0.22	0.18	0.22	0.04	na
2010	0.39	0.30	0.34	0.34	0.30	0.33	0.26	0.32	0.15	0.31	0.09	0.5
2011	0.25	0.24	0.24	0.34	0.20	0.20	0.29	0.23	0.16	0.23	0.01	1.08
2012	0.25	0.18	0.22	0.32	0.21	0.26	0.30	0.23	0.19	0.23	0.07	0.93
2013	0.32	0.25	0.29	0.29	0.25	0.25	0.29	0.27	0.16	0.27	0.07	0.92
2014	0.34	0.21	0.29	0.30	0.23	0.24	0.26	0.26	0.16	0.26	0.13	0.61
2015	0.30	0.23	0.27	0.30	0.24	0.25	0.27	0.26	0.15	0.26	0.07	0.58
2016	0.24	0.14	0.20	0.38	0.21	0.30	0.26	0.21	0.14	0.21	0.10	0.75
2017	0.23	0.12	0.19	0.42	0.20	0.33	0.28	0.21	0.14	0.21	0.11	0.7
Average	0.294	0.221	0.249	0.277	0.229	0.249	0.292	0.263	0.197	0.24	0.071*	0.042*

For the other funds, bond funds only generate an annualized return of 6.05% because of the underperformance of fix-income assets. These non-equity asset performances also affect the

net return of equity mutual funds. The higher fund gross returns than their average realised net fund returns might be due to the underperformance of nonstock holdings. Wermers (2000) demonstrated that 0.7 % of inferior net returns of mutual funds compared to the market is generated from dismal performance of bonds, cash and other nonstock securities.

It is also informative to investigate the net returns for whether mutual fund expenses and trading costs are excessive, given the level of performance of the fund. Therefore, another reason that attributes to the lower realised net fund returns is expenses and transaction costs. Results in Table 3.4 suggest that more actively traded funds exhibit lower investment style consistency. However, they generate relatively higher realised net return compared to their passive counterparts and the expense ratio is also relatively greater for these funds. This may be due to active fund managers possessing superior stock picking abilities, and it is sufficient to offset the relative higher transaction cost. Further explanation will be conducted from the regression analysis in Section 3.5.4.2.

The difference between the gross return and the net return indicates that the gross return tends to be substantially higher than the net return, but it also varies over time. In 2010, a relative high return year for stocks, the gross return was 23.74%, versus 16.92% for total net assets weighted net return. These higher gross returns exist in most of the scenarios. In contrast, for some years, the fund net returns exhibit higher return than gross returns. The net fund returns decreased to -25.06%, which is still 2.17% greater than for the gross return in 2004. This indicates that fund holdings of cash and bonds, and other non-stock holding assets generally performed poorly over the years compared to stocks. Although cash, bonds and other nonstock securities presumably played a role as a buffer to managed investor inflows and redemptions (Wermers, 2000), these nonstock holdings contributed significantly to the reduced performance of funds on a net return basis.

Table 3.6 Mutual Fund Return

Mutual fund annualized returns are presented in this table. Panel A presents the fund hypothetical return which is calculated by the weighted stockholding's return on a quarterly basis. Panel B provides, each year, the annualized total net assets weighted net return of a mutual fund calculated from the annual net asset value growth with the dividend reinvested. Every fund existing during a given quarter (and having a complete data record) is included in the computation of that quarter's return measure regardless of whether the fund is surviving or not from the end of that quarter. These quarterly buy-and-hold returns are compounded to give the quarterly rebalanced annual returns reported below. The last two columns represent the active and passive funds returns differences for equity funds and passive funds.

Panel A: Mutual Fund Annual Gross Return%

	Equity fund			Hybrid fund			Bond fund	Open -end fund	Close - end fund	All funds	Gross Return Difference	
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity Funds	Hybrid Funds
1998	-0.11	na	-0.11	na	na	na	na	na	-0.11	-0.11	na	na
1999	12.37	-1.27	10.12	na	na	na	na	na	11.68	11.68	13.64	na
2000	28.41	14.38	26.31	22.09	na	22.09	na	na	17.9	18.7	14.03	na
2001	-10.91	-7.83	-9.28	-20.17	na	-20.17	na	-1.08	-10.84	-10.99	-3.08	na
2002	8.96	-8.17	6.75	-0.76	na	-0.76	-1.5	9.88	-11.44	8.74	17.13	na
2003	58.22	40.56	54.24	58.97	na	58.97	31.49	45.94	57.29	51.51	17.66	na
2004	-27.23	-17.52	-23.77	-14.23	na	-14.23	-17.05	-24.03	-25.34	-22.81	-9.71	na
2005	0.13	-4.62	-0.89	8.26	na	8.26	-1.62	-3.79	3.97	-2.14	4.75	na
2006	51.54	55.22	55.66	49.52	na	49.52	41.43	55.35	23.54	49.62	-3.68	na
2007	-5.49	-3.74	-4.34	25.78	na	25.78	10.98	10.25	-10.18	9.65	-1.75	na
2008	-22.81	-26.7	-21.97	-36.98	na	-36.98	-11.24	-28.43	-25.09	-28.46	3.89	na
2009	66.83	75.75	62.67	46.56	28.7	46.26	13.56	48.04	41.54	47.65	-8.92	17.86
2010	23.74	-1.78	8.15	19.19	0.56	18.91	1.69	12.8	6.83	13.42	25.52	18.63
2011	-15.09	-9.17	-12.05	-14.47	-2.02	-13.84	-14.44	-12.96	-5.34	-11.63	-5.92	-12.45
2012	39.86	68.69	45.33	37.22	0.82	35.34	5.05	45.18	20.56	43.35	-28.83	36.4
2013	36.83	6.82	9.49	27.58	-1.24	26.22	1.96	24.49	-1.07	24	30.01	28.82
2014	78.86	54.28	73.42	76.36	14.86	55.15	34.92	85.76	22.14	84.75	24.58	61.5
2015	34.08	29.42	31.06	20.22	3.62	19.8	6.98	25.9	14.46	25.03	4.66	16.6
2016	5.99	4.9	5.01	28.62	0.77	26.25	11.2	11.25	0.55	11.33	1.09	27.85
2017	24.28	19.85	20.97	23.01	5.76	20.29	6.06	22.23	6.44	21.91	4.43	17.25
Average	19.42	15.21	16.84	19.82	5.76	18.16	7.47	19.22	6.87	17.26	4.89*	13.26*

Panel B: Fund Annual Net Return (%)

	Equity fund			Hybrid fund			Bond fund	Open end fund	Close end fund	All funds	Net Return Difference	
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity Funds	Hybrid Funds
1998	na	na	na	na	na	na	na	na	na	na	na	na
1999	na	na	na	na	na	na	na	na	na	na	na	na
2000	na	na	na	na	na	na	na	na	na	na	na	na
2001	-12.62	na	-12.62	-21.13	na	-21.13	na	na	-14.42	-13.54	na	na
2002	8.07	-8.43	7.83	-1.68	na	-1.68	-2.41	8.03	-12.27	-11.11	16.50	na
2003	51.64	35.82	49.96	52.9	na	52.9	27.52	44.29	51.34	46.15	15.82	na
2004	-25.06	-16.29	-23.17	-15.58	na	-15.58	-17.74	-25.16	-26.28	-25.78	-8.77	na
2005	0.11	-5.19	-0.11	7.24	na	7.24	-2.49	-4.67	3.58	-2.93	5.30	na
2006	42.34	49.64	47.24	42.2	na	42.2	40.97	45.82	22.49	45.31	-7.30	na
2007	-6.88	-3.95	-5.01	18.48	na	18.48	9.35	9.56	-10.72	5.78	-2.93	na
2008	-27.19	-27.12	-26.79	-38.48	na	-38.48	-12.55	-29.53	-26.1	-28.66	-0.07	na
2009	47.72	60.6	57.08	33.76	24.51	33.58	11.54	44.86	31.86	36.54	-12.88	4.04
2010	16.92	-2.46	7.22	13.97	0.47	13.84	1.44	11.94	5.26	10.34	19.38	8.29
2011	-17.88	-9.46	-11.12	-14.56	-2.73	-14.2	-15.28	-13.08	-6.14	-12.01	-8.42	-17.04
2012	29.02	56.05	39.42	27.32	0.71	26.18	4.35	42.11	16.22	34.2	-27.03	21.4
2013	26.85	5.66	8.67	20.27	-2.08	19.45	1.7	22.85	-1.86	19.25	21.19	17.14
2014	56.38	45.49	48.58	55.82	12.91	40.59	30.34	80.27	17.82	68.22	10.89	37.7
2015	21.81	23.8	22.01	13.26	2.99	13.07	5.91	24.26	10.77	18.65	-1.99	5.06
2016	4.06	4.05	4.06	19.43	0.65	17.91	9.43	10.58	0.42	8.63	0.01	13.57
2017	15.18	15.27	15.21	15.03	4.68	13.14	4.72	20.38	3.75	16.1	-0.09	5.14
Average	13.56	13.34	13.44	13.43	4.68	12.21	6.05	18.28	3.87	12.66	1.23**	10.05*

3.5.3 Benchmark-Adjusted Fund Returns

3.5.3.1 Characteristics-Adjusted Performance

Mutual funds tend to hold portfolios of stocks with distinct characteristics regarded as the "style investment". It has been shown that funds display a strong preference for growth stocks with large market capitalisation (Chen et al., 2000). This was confirmed by Chan, Jegadeesh, and Lakonishok (1996) and Daniel and Titman (1997) through their illustrations on the prediction power of the following equity characteristics: size (market capitalisation), book-to-market ratio, and momentum (prior year return). The following decomposition of fund performance based on benchmark-adjusted returns allows for an in-depth examination of mutual fund

managers' stock picking talent, by taking away the portfolio return premium generated by specific stock characteristics.

Table 3.7 summarises the annual holding-based performance measure according to DGTW (1997) for different mutual fund portfolios for the period June 1998 to June 2017. This measure is a further investigation into the causes of abnormal performance by mutual funds, rather than a time-series of fund net/gross returns. The characteristic-based benchmark is introduced as way to detect fund managers' stock picking skills. Daniel, Grinblatt, Titman, and Wermers (1997) developed the DGTW characteristic-based method to quantify fund managers' stock picking talent. As discussed in Section 3.4.2.1.2, the CS (Characteristic Selectivity) provides a measure for the components that the portfolio-weighted return on stocks currently held by the fund in excess of return on matched control portfolios that is composed of the same style characteristics, as a cross-sectional comparison for stock selectivity. Panel A presents the CS for mutual funds on an annual basis, weighted by the total net assets (TNA) of each fund. To calculate the CS for a given year, the TNA-weighted CS for each quarter of that year is first computed for all funds during each quarter, and these quarterly TNA-weighted CS are then compounded into an annual measure.

The results in Panel A show that, on average, fund managers select stocks that outperform their characteristics-matched benchmark portfolios. The TNA-weighted CS for active equity funds is 4.77% during the sample period, with the majority of the years exhibiting positive returns over the characteristic-based benchmarks. Active hybrid funds exhibit a similar pattern with an average 6.96% CS returns over the sample period, after benchmark adjustment. Active traded hybrid funds also outperform the benchmarks during most of the sample periods. It is indicated that they manage to outperform their benchmarks during most years. In the unreported results, equally-weighted CS for equity mutual funds is 4.03% per year, indicating that small funds have better stock picking talent than large funds. The relatively smaller CS of passive equity

funds is likely due to the passive tracking of stock holdings with the index which shows less stock picking skills by fund managers.

Panel B reports the results of fund managers' investment timing ability, defined as CT (Characteristic Timing). CT is a performance measure examining if the fund manager is able to time the market by adjusting the portfolio weights toward stocks having certain characteristics when their returns are relatively higher. Results in Panel B suggest that funds exhibit weaker timing abilities. The average CT for equity funds is 2.14% on an annual basis. Active equity funds and hybrid funds both produce the average CT at 2.26% and 2.09% respectively. Both are higher than the CT of their passive counterparts, indicating the outperformance of active managed funds may be due to the fund managers' better timing ability. These results are consistent with He, Cao and Baker (2015), who provide some evidence on the weak timing ability of Chinese fund managers. Using the approach from Treynor and Mazuy (1966) and Henriksson and Merton (1981), they identify the market timing ability coefficient from the Cahart four-factor model. In addition, results in this section are also consistent with Yi, Liu, He, Qin, and Gan (2018) who concluded that only Chinese growth funds managers are able to time the market.

Panel C in Table 3.7 presents the third components of the characteristic-adjusted return, the Average Style (AS) over time. The AS captures a fund's time-series average return over the benchmark portfolio that has the same characteristics (long-term style-based returns). Results in Panel C indicate that the AS for equity funds is 12.59% and 9.54% for active hybrid funds. In addition, results also suggest that the AS for active equity funds is 12.81% and 10.90% for active hybrid funds. This is consistent with the results in Table 3.6 Panel A, where both active equity funds and active hybrid funds offer relatively greater returns compared to their counterparts. Results from the AS indicate that fund managers are able to experience a

relatively higher return due to the fact that they maintain their holdings with certain characteristics within a particular time period, i.e. a one-year horizon in this case.

Overall, for the entire sample, including equity funds, hybrid funds, and fixed-income bonds, the result in Panel A indicates that there is an average of 4.88% return attributed to fund mangers' stock picking talent measured by CS, and the result in Panel B suggests an average 2.04% return attributed to fund managers' time ability measured by CT. In Panel C, there is an average 10.53% return attributed to the mangers' ability to hold stocks with certain characteristics style over one year.

AS measures the superior portfolio return by maintaining their holdings with certain characteristics as the style investment within a 1-year horizon. Results in Panel C of Table 3.7 suggest that active equity funds and active hybrid funds exhibited higher AS than their counterparts over the sample period. This indicates that active funds, although significant, alter their stockholdings every quarter, and stick on a certain characteristic style stock investment to generate superior returns compared to passive funds within one year.

However, if the investment horizon extends to a 3-year period, active funds are not in line with the same stock style group with the similar characteristics portfolio. Within 36 months, active funds exhibit more style drift with a higher HSC. This indicates that active funds "tilt" their stockholding on a certain style in one year and switch their investment to other styles afterwards until the end of the third year. This inconsistent style trading measured by HSC demonstrates that it negatively affects these actively managed funds' performances. This is a consequence of the higher costs generated from frequent trading although these funds still outperform their passive counterparts when compared to their net realised return after transaction costs and other expenses. This is confirmed by Wermers (2000), who found that high-turnover funds, although incurring substantially higher transactions cost and charging higher expenses, also hold stocks

with much higher average returns than low-turnover funds. Further analysis on the relationship between fund turnover and performance will be discussed in Chapter 4.

Table 3.7 Characteristic-Adjusted Mutual Fund Returns: CS, CT and AS

This table displays the results for the DGTW (1997) as the decomposition of the overall return of a fund into a Characteristic Selectivity measure (CS), a Characteristic Timing measure (CT) and an Average Style measure (AS). DGTW (1997) requires the formation of 125 passive portfolios as the investment benchmark, by grouping all common stocks listed on the China A share market into quintiles according to size (market value), book-to-market ratio, and momentum (return of a stock in the previous year) as the sequential sorting. Panel A presents the CS, which denotes the measure of stock selection ability, and is calculated by adjusting the stockholding fund returns from the benchmark that is matched to each of the funds' stock holdings every quarter along with the three dimensions mentioned above. CS is calculated as $CS_{T=}\sum_{j=1}^{N} W_{j,t-1}(R_{j,t} - R_t^{b_{j,t-1}})$, where $W_{j,t-1}$ is the portfolio weight on stock *j* at the end of quarter *t - 1*, $R_{j,t}$ is the quarter *t* buy-and-hold return of stock *j*, and $R_t^{b_{j,t-1}}$ is the quarter *t* buy-and-hold return of the characteristic-based benchmark portfolio that is matched to stock *j* at the end of quarter *t - 1*. Panel B displays the CT, the measure of style-timing ability and is calculated as $CT_t = \sum_{j=1}^{N}(W_{j,t-1}\, R_t^{b_{j,t-1}} - W_{j,t-5}\, R_t^{b_{j,t-5}})$. The AS is designed as the measure to capture the return earned by a fund due to a fund's tilting to select stocks with certain characteristics, which is calculated as $AS_t = \sum_{j=1}^{N} W_{j,t-5}\, R_t^{b_{j,t-5}}$.The returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The last two columns represent the active and passive funds CSs differences for equity funds and passive funds.

Panel A: Characteristic Selectivity (CS) %

	Equity fund			Hybrid fund			Bond fund	Open end fund	Closed end fund	All funds	Net Return Difference	
Year	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity Funds	Hybrid Funds
1998	-16.14	na	-16.14	na	na	na	na	na	-16.14	-16.14	na	na
1999	-0.36	-1.5	-0.64	na	na	na	na	na	-0.5	-0.5	1.14	na
2000	15.12	13.42	14.78	19.86	na	19.86	na	na	14.96	15.76	1.7	na
2001	-9.08	-7.24	-7.99	-18.7	na	-18.7	na	-0.38	-9	-9.39	-1.84	na
2002	-4.86	-4.74	-4.79	-14.22	na	-14.22	0.12	-1.12	-4.63	-3.75	-0.12	na
2003	6.18	2.62	5.84	13.5	na	13.5	10.38	4	4.32	4.05	3.56	na
2004	-7.86	-2.9	-6.08	-1.12	na	-1.12	-12.24	-9.71	-5.29	-7	-4.96	na
2005	-18.18	-8.32	-16.71	-8.52	na	-8.52	-4.92	-10.39	-3.69	-9.08	-9.86	na
2006	7.26	8.18	7.97	23.4	na	23.4	30.5	12.48	2.88	10.36	-0.92	na
2007	9.36	7.86	8.03	15.76	na	15.76	17.62	11.07	2.62	10.69	1.5	na
2008	-3.7	-5.04	-3.98	-13.4	na	-13.4	-6.6	-7.64	-0.67	-7.3	1.34	na
2009	9.16	8.1	8.84	8.12	1.32	8.1	8.22	8.14	1.02	7.82	1.06	1.83
2010	9.42	-1.2	5.23	4.62	0.36	4.52	1.38	9.73	0.43	10.16	10.62	-0.71
2011	-11.76	-8.52	-10.8	-10.86	-2.28	-10.38	-13.98	-10.27	-0.67	-8.95	-3.24	-13.55
2012	23.46	34.2	28.42	20.82	0.36	19.64	0.36	26.8	0.17	24.97	-10.74	15.49
2013	38.1	-1.64	24.58	29.88	-0.96	28.29	2.4	28.32	0.51	27.83	39.74	25.87
2014	9.72	7.86	8.24	16.92	3.72	16.33	5.22	12.52	0.22	12.01	1.86	8.23
2015	17.98	12.14	15.32	8.7	2.52	8.52	3.48	13.48	0.08	12.56	5.84	1.21
2016	4.06	5.6	4.44	18.16	0.36	17.78	10.14	10.23	0.09	10.31	-1.54	12.83
2017	17.58	15.12	17.37	12.36	7.08	12.27	4.14	13.13	0.13	13.26	2.46	0.31
Average	4.77	3.89	4.10	6.96	1.39	6.76	3.51	6.49	-0.66	4.88	1.98*	5.72*

Panel B: Characteristic Timing (CT) %

Year	Equity fund			Hybrid fund			Bond fund	Open end fund	Closed end fund	All funds	Net Return Difference	
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity Funds	Hybrid Funds
1998	1.35	na	1.35	na	na	na	na	na	1.35	1.35	na	na
1999	2.29	0.05	2.29	na	na	na	na	na	2.29	2.29	2.24	na
2000	-0.31	-0.05	-0.3	-0.83	na	-0.83	na	na	-0.3	-0.3	-0.26	na
2001	-0.57	-0.05	-0.52	-0.57	na	-0.57	na	-0.16	-0.57	-0.52	-0.52	na
2002	-1.4	-0.73	-1.35	-1.4	na	-1.4	-0.36	-1.14	-1.4	-1.35	-0.67	na
2003	11.54	8.42	11.23	10.19	na	10.19	4.73	9.36	11.75	10.56	3.12	na
2004	-7.85	-5.98	-7.59	-4.47	na	-4.47	-2.29	-5.68	-8.53	-6.08	-1.87	na
2005	2.55	1.72	2.39	1.92	na	1.92	0.78	1.92	2.44	2.08	0.83	na
2006	18.2	12.58	17.11	16.9	na	16.9	4.37	16.17	17.84	16.48	5.62	na
2007	-8.37	-9.62	-8.63	-7.54	na	-7.54	-2.86	-7.84	-8.48	-7.7	1.25	na
2008	-4.11	-3.48	-3.95	-4.68	na	-4.68	-1.04	-4.06	-4.63	-4.06	-0.63	na
2009	9.41	16.17	12.17	9.46	6.14	9.36	1.2	11.28	9.2	11.03	-6.76	4.29
2010	-0.36	-6.34	-3.12	-0.47	-0.16	-0.47	-0.05	-1.25	-0.99	-1.25	5.98	-0.79
2011	-0.99	-0.83	-0.94	-1.09	0.08	-1.04	-0.1	-0.88	-1.61	-0.88	-0.16	-1.94
2012	3.8	7.49	5.98	3.8	0.1	3.64	1.09	4.16	4.73	4.16	-3.69	2.03
2013	-0.73	-6.4	-4.21	-1.04	-0.1	-0.99	-0.26	-2.03	-1.04	-2.03	5.67	-2.11
2014	15.5	33.38	26.36	13.36	2.5	13	6.66	16.54	16.12	16.04	-17.88	6.67
2015	2.96	-9.72	-4.68	1.98	-0.52	1.92	0.26	-0.36	2.5	-0.31	12.68	2.5
2016	-0.05	-4.84	-2.91	0.02	0.05	0.03	0.16	-0.78	-0.26	-0.78	4.79	-0.05
2017	na	na	na	na	na	na	na	na	na	na	na	na
Average	2.26	1.77	2.14	2.09	1.01	2.06	0.82	2.2	2.13	2.04	0.54	1.32*

Panel C: Average Style (%)

	Equity fund			Hybrid fund			Bond fund	Open-end fund	Closed-end fund	All funds	Net Return Difference	
Year	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Euity Funds	Hybrid Funds
1998	14.68	na	14.68	na	na	na	na	na	14.68	14.68	na	na
1999	10.44	0.18	9.89	na	na	na	na	na	9.89	9.89	10.26	na
2000	13.6	1.01	13.24	3.06	na	3.06	na	na	3.24	3.24	12.59	na
2001	-1.26	-0.54	-1.08	-0.9	na	-0.9	na	-0.54	-1.26	-1.08	-0.72	na
2002	15.22	-2.7	13.04	14.86	na	14.86	-1.26	12.14	-5.4	13.84	17.92	na
2003	40.5	29.52	39.42	35.28	na	35.28	16.38	32.58	41.22	36.9	10.98	na
2004	-11.52	-8.64	-11.16	-8.64	na	-8.64	-2.52	-8.64	-11.52	-9.72	-2.88	na
2005	15.76	1.98	14.04	14.86	na	14.86	2.52	4.68	5.22	4.86	13.78	na
2006	26.08	34.46	31.12	9.22	na	9.22	6.56	26.7	2.82	22.78	-8.38	na
2007	-6.48	-1.98	-5.4	17.56	na	17.56	-3.78	7.02	-4.32	6.66	-4.5	na
2008	-15	-18.18	-14.33	-18.9	na	-18.9	-3.6	-16.74	-19.8	-17.1	3.18	na
2009	48.26	51.48	47.62	28.98	21.24	28.8	4.14	28.62	31.32	28.8	-3.22	5.23
2010	14.68	5.76	5.22	15.04	0.36	14.86	0.36	4.32	7.38	4.5	8.92	11.04
2011	-2.34	0.18	-1.08	-2.52	0.18	-2.42	-0.36	-1.8	-3.06	-1.8	-2.52	-5.2
2012	12.6	27	15.24	12.6	0.36	12.06	3.6	14.22	15.66	14.22	-14.4	10.05
2013	-0.54	14.86	1.24	-1.26	-0.18	-1.08	-0.18	-1.8	-0.54	-1.8	-15.4	-2.07
2014	53.64	13.04	49.82	46.08	8.64	25.82	23.04	56.7	5.8	56.7	40.6	22.56
2015	13.14	27	15.42	9.54	1.62	9.36	3.24	12.78	11.88	12.78	-13.86	5.09
2016	1.98	4.14	2.24	10.44	0.36	8.44	0.9	1.8	0.72	1.8	-2.16	7.77
2017	na	na	na	na	na	na	na	na	na	na	na	na
Average	12.81	9.92	12.59	10.9	4.07	9.54	3.27	10.75	5.47	10.53	2.78*	6.81***

3.5.3.2 Industry-Adjusted Fund Performance

Table 3.8 presents the industry adjusted fund return, including the Industry Selectivity (IS) in Panel A and the Industry Timing (IT) in Panel B. Industry Selectivity (IS) estimates whether a fund manager exhibits stock picking skills within certain industries. Results in Panel A suggest that industry adjusted returns remain positive after adjusting the industry benchmark

return from the previous quarter. However, there is only a 0.97% return attributed to Industry Selectivity as reported in Panel A for all funds, compared to a gross return of 17.26% in Table 6 Panel A. Results of equity funds and hybrid funds are in line with the overall sample, indicating that fund managers do not have stock picking talent in selecting certain industries.

The Industry Timing (IT) evaluates whether a fund manager has the ability to select better-performing industries among others, i.e. industry timing ability. Results in Panel B suggest that, although fund managers have weak ability in Industry Selectivity (IS) performance, they do have the talent to time the market for certain industries, with a 5.33% industry adjusted return for the entire sample. This phenomenon is stronger for active equity funds with a 6.21% return, and 6.49% for active hybrid funds. Results of Table 3.5 suggest that these active funds also concentrate more in some industries with higher ICIs than passive funds. Since actively managed funds produce both superior gross returns and net returns (Table 6) those results illustrate that active fund managers who have higher industry selectivity tend to concentrate more holdings within certain industries and generate superior returns. Kacperczyk et al. (2005) imply this better industry selectivity with a high extent of industry concentration might be due to the fund managers' superior information.

Table 3.8 Industry-Adjusted Fund Returns

This table presents the results of fund performance after adjustment of industry return. Panel A reports the average quarterly fund Industry Selectivity (IS) from 1998 to 2017. IS measure is the variable to test fund manager's stock picking skill among the same industry and it is calculated as $IS_{T=}\sum_{j=1}^{N} W_{j,t-1}(R_{j,t} - R_{j,t-1}^{b})$. Panel B represents the industry timing return, which is defined as the variable to investigate the managers' ability to invest in superior industries. IT is computed as $IT_T = \sum_{j=1}^{N}(W_{j,t-1}\, R_{j,t-1}^{b} - W_{j,t-5}\, R_{j,t-5}^{b})$, where $W_{j,t-1}$ is portfolio weigh of the stock held by fund *j* of a certain industry at quarter *t*, and $R_{j,t-1}^{b}$ is the market portfolio industry return at quarter *t-1*. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The last two columns represent the active and passive funds ICI differences for equity funds and passive funds.

Panel A: Industry Selectivity %

	Equity fund					Hybrid fund	Bond fund	Open-end fund	Closed-end fund	All funds	Net Return Difference	
Year	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity Funds	Hybrid Funds
1998	0.13	na	0.13	na	na	na	na	na	0.13	0.13	na	na
1999	1.69	0.02	1.55	na	na	na	na	na	1.55	1.55	1.67	na
2000	1.4	2.41	1.51	6.13	na	6.13	na	na	1.68	1.68	-1.01	na
2001	2.05	1.59	2.02	3.24	na	3.24	na	na	2.07	2.05	0.46	na
2002	0.35	0.39	0.36	0.23	na	0.23	na	0.26	0.35	0.35	-0.04	na
2003	-2.26	-0.83	-2.14	-1.76	na	-1.76	-0.38	-1.49	-2.28	-2.01	-1.43	na
2004	0.02	0.26	0.04	-0.21	na	-0.21	0.01	-0.3	0.3	-0.04	-0.24	na
2005	-1.43	-0.29	-1.26	-0.58	na	-0.58	-0.41	-0.79	-1.21	-0.93	-1.14	na
2006	-4.11	-1.82	-3.7	-2.68	na	-2.68	-1.02	-2.64	-4.26	-3.06	-2.29	na
2007	2.11	3.15	2.34	2.76	na	2.76	0.58	2.55	2.31	2.51	-1.04	na
2008	5.72	4.34	5.38	4.97	na	4.97	0.75	4.59	6.36	4.78	1.38	na
2009	1.21	0.64	1.04	1.09	0	1.09	0.15	0.95	1.17	0.97	0.57	1.09
2010	2.52	0.63	1.73	2.31	0.07	2.27	0.35	1.76	3.75	1.87	1.89	2.24
2011	0.8	-0.57	0.14	0.46	0.08	0.44	0.35	0.3	1.23	0.34	1.37	0.38
2012	-2.04	-2.14	-2.1	-1.94	-0.05	-1.85	-0.23	-1.73	-2.6	-1.76	0.1	-1.89
2013	3.61	3.01	3.25	4.28	0.03	4.11	0.61	3.46	3.71	3.47	0.6	4.25
2014	3.55	0.34	1.56	3.96	0	3.82	0.61	2.72	2.32	2.72	3.21	3.96
2015	-4.79	-2.77	-3.56	-2.26	-0.92	-2.22	0.47	-2.31	-4.6	-2.32	-2.02	-1.34
2016	11.92	7.69	9.39	7.83	0.85	7.7	1.54	7.61	14.21	7.65	4.23	6.98
2017	-0.91	-0.8	-0.84	-0.62	-0.26	-0.62	-0.15	-0.63	-0.46	-0.63	-0.11	-0.36
Average	1.08	0.8	0.84	1.51	-0.02	1.49	0.21	0.89	1.29	0.97	0.79	1.7*

Panel B: Industry Timing %

	Equity fund			Hybrid fund			Bond fund	Open-end fund	Closed-end fund	All funds	Net Return Difference	
Year	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity Funds	Hybrid Funds
1998	4.8	-1.67	4.91	na	na	na	na	na	4.91	4.91	na	na
1999	5.98	3.39	5.55	12.01	na	12.01	na	na	5.62	5.62	2.59	na
2000	-3.35	-4.33	-3.48	-11.74	na	-11.74	na	na	-3.71	-3.71	0.98	na
2001	-4.42	-3.18	-4.34	-5.2	na	-5.2	na	-4.05	-4.34	-4.39	-1.24	na
2002	-3.83	-2.13	-3.71	-4.47	na	-4.47	-3.8	-4.48	-3.64	-3.89	-1.7	na
2003	-1.02	-0.57	-0.96	-1.8	na	-1.8	-0.6	-1.63	-0.7	-1.22	-0.45	na
2004	-7.43	-5.36	-7.18	-7.41	na	-7.41	-7.36	-7.08	-7.55	-7.27	-2.07	na
2005	8.05	4.55	7.39	6.5	na	6.5	6.73	6.84	7.24	6.97	3.5	na
2006	35.73	28.02	34.09	36.46	na	36.46	26.46	35.24	33.07	34.99	7.71	na
2007	-46.52	-41.68	-45.32	-47.71	na	-47.71	-28.79	-45.28	-47.02	-45.48	-4.84	na
2008	28.83	26.65	28.22	27.41	na	27.41	13.67	26.37	27.98	26.5	2.18	na
2009	3.09	-2.84	0.54	2.69	8.71	2.74	8.03	2.92	2.04	2.87	5.93	-8.41
2010	-5.56	-6.98	-5.94	-6.23	0.72	-5.98	1.44	-4.62	-8.51	-4.79	1.42	-7.02

2011	-8.88	-6.16	-7.48	-8.36	-5.53	-8.19	-5.61	-7.51	-9	-7.57	-2.72	-13.44
2012	22.05	15.78	18.27	22.57	9.57	21.99	13.52	19.83	21.86	19.89	6.27	5.21
2013	31.21	16.18	21.81	31.54	16.56	30.94	20.28	26.74	32.81	26.81	15.03	10.01
2014	25.56	18.87	21.77	31.4	16.58	30.84	14.97	25.14	33.77	25.2	6.69	11.2
2015	71.53	36.66	49.92	69.78	36.66	68.83	47.69	60.08	86.51	60.21	34.87	13.01
2016	-37.77	-53.8	-47.35	-30.56	-36.89	-30.68	-21.06	-34.36	-41.71	-34.44	16.03	4.07
2017	na	na	na	na	na	na	na	na	na	na	na	na
Average	6.21	1.13	3.51	6.49	5.8	6.36	5.7	5.88	6.82	5.33	5.01**	1.83**

3.5.4. Reclassification of Active Mutual Funds

3.5.4.1 Reclassification: "Trades" and "Turnover"

The dataset from CSMAR provides relevant information on investment objectives for Chinese equity and hybrid funds (i.e. active funds or passive funds). However, fund managers do not always keep their investment style as the funds were initially defined. It has been documented that the stated objectives and categories of more than half the funds differ from their original defined objectives, and over one third of the funds are indeed misclassified (Kim & Shukla, 1999). These misclassifications of funds categories are also reported from other studies when using different methodologies, for example, Brown and Goetzamann (1997) and Dibartolomeo (1997). Therefore, this section reclassifies the fund investment style, using the approach suggested by Chen, Jegadeesh and Wermers (2000) and Pinnuck (2003). Specifically, the actual funds '*Trade*' and '*Turnover*' are used to classify if a particular fund is an active fund or a passive fund.

'Trades' is defined as the value-weighted change of each security held by a mutual fund *j* at time *t*. A large value of *'Trades'* indicates a greater change in the market value of a fund's stock holdings, therefore, a higher level of trading activities by a fund over the quarter. The weight of security *i* held by fund *j* at time *t* is measured as:

$$W_{i,j,t} = \frac{P_{i,t}\ H_{i,j,t}}{\sum_{i=1}^{N} P_{i,t}\ H_{i,j,t}} \tag{13}$$

where $P_{i,t}$ is the price of stocks *i* at time *t*, $H_{i,j,t}$ is the number of stocks held by fund *j* in stock *i* at time *t*, and *N* is the number of stocks held by each fund. Therefore, '*Trades" is defined as* the change of the weight:

$$Trade_{i,j,t} = W_{i,j,t} - W_{i,j,t-1} \quad (14)$$

Therefore, $W_{i,j,t}$ differs from $W_{i,j,t-1}$ only because of trading from *t-1* to *t*. Intuitively, the latter value is the value of the starting portfolio if no trading took place during that quarter[9]. These *trades* are further categorised as either purchases or sales, according to the sign of *trades.* A negative *trade* represents a 'sale' and a positive sign represents a 'purchase'. This enables examination of whether the stocks held by fund managers show superior performance compared to the stocks sold. Chen et al. (2000) argue that *trades* may provide more powerful evidence of the information fund managers possess regarding future returns, as fund managers may continue to hold a stock due to the friction involved in trading rather than future abnormal returns.

"Turnover", as another way to measure a fund's trading activity, is used to analyse the extent to which fund managers rebalance their portfolio holdings. Thus, *Turnover* is defined in the same way applied by Morningstar, and for fund *k* during quarter *t*,

$$Turnover_{j,t} = min(Buys_{j,t}, Sells_{k,t}) / TNA_{j,t} \quad (15)$$

Where $Buys_{j,t}$ ($Sells_{k,t}$) is the total value of stock purchases (sales) during quarter *t* by fund *j*, and $TNA_{j,t}$ is the average total net assets of fund *j* during quarter *t*. Note that this approach is used by Chen et al. (2000), where *turnover*, as a fund's trading activity measure, is calculated by taking the lesser of purchases or sales and dividing by the corresponding net assets on a yearly basis. Since the dollar values of "buys" minus "sells" are equal to the net inflow (or

[9] Both holdings $W_{i,j,t}$ and $W_{i,j,t-1}$ are evaluated at the same price which enables the separation of the trade from the price momentum effects.

outflow) from investors (adjusting for the changes in cash holdings of funds), Chen et al. (2000) argue that this definition of turnover, by using the minimum of "buys" and "sells", captures the fund trading without the influence from investors' inflow or redemption through their trading. All mutual funds are re-classified as active or passive funds on the basis of the "*trades"* and the "*turnover"*, the updated results using this reclassification are discussed further in Section 3.5.4.2.

Table 3.9 presents the "*Trades*" and the "*Turnover*" of mutual funds stock holdings, to investigate the extent to which, and how often, fund managers change the portfolio weights on each stock they hold. Panel A reports "*Trades" statistics,* which is the difference in stock weight of a fund from the last quarter. Results are in line with the "portfolio change measure" adopted by Grinblatt and Titman (1993), to examine the extent of stock trading and calculates the change in portfolio weight of each stock for each fund. The average weight changes for stocks held in equity funds is 0.34% every quarter, indicating on average, during one quarter, the equity fund manager purchases stocks that account for 0.34% of the total assets for that fund.

During the early stages of development of Chinese mutual funds, it is more obvious that mutual fund managers purchased a great deal every quarter, and the overall purchases of stocks for funds was 2.21% on average in 1998 and this purchase behaviour became less significant after 2000. The average *trade*s of equity funds over the sample reached 0.34% per quarter, representing a large extent for their trading activities. Hybrid funds display a competitive magnitude of *trades* and they exhibit a positive average purchase of 0.33% per quarter.

By evaluating the quarterly *trades*, the result suggests that there is less trading frequency of passive hybrid funds than of active hybrid funds. The last two columns show the *trades* difference between active and passive funds that are defined by CSMAR. The *trades* of active

hybrid funds are on average 0.11% higher than the passive hybrid funds and it is statistically significantly at the 1% level. However, equity funds display a distinct pattern over the sample period. They show that the extent of trading activity measured for passive equity funds is more significant than active equity funds by 0.05% on average at the 1% level. Therefore, passive equity funds defined by CSMAR are not less traded compared to the active equity funds measured by *trades*.

Panel B presents *turnover* as another trading activity measure, and is calculated by taking the lesser of purchases or sales and dividing it by the average quarterly assets. *Turnover* of equity funds fluctuates at 10.29% on average over the sample period. The results of turnover also confirmed that passive equity funds defined by CSMAR are not "passive", but are, on average, equipped with significantly higher turnover ratios, at 1.51%, than active equity funds. This is consistent with the results for *trades* as an optional trading activity measure. However, hybrid funds exhibit supportive evidence on active hybrid funds classification for CSMAR, and these active hybrid funds trade stocks with higher turnover than their passive counterparts.

The results of both trading activity measures show that passive equity funds defined by CSMAR actually actively managed their portfolio holdings. Moreover, the active hybrid funds defined by CSMAR indeed rebalanced their equity holdings to a more significant extent than their passive counterparts. Based on the results in Table 3.2 Panel A, active hybrid funds managers allocate a significant proportion of their investment in equity trading of 65.43%, which is comparable to the equity portion of equity funds at 74.09% on average. This indicates that hybrid funds also largely invested in equity trading similar to the equity funds defined by CSMAR. Therefore, in the following sections, the active funds are re-specified by including active equity funds, passive equity funds, and active hybrid funds. However, the QDIIs and passive hybrid funds are excluded, this results a total of 2,102 (counted on 30 June 2017) re-classified 'active funds' for further analysis in this chapter.

Table 3.9 Mutual Fund Trading Activity: Trades and Turnover

This table presents the measures for trading activity captured by examining the stockholdings of all mutual funds. Panel A reports the summary statistics for the measure on whether mutual funds are being actively or passively traded by applying *Trades*. It is calculated as the portfolio weight change for each stock held by funds on a quarterly basis and reports the average value of this change at a portfolio level for each year. Accordingly, *Trades* is defined as $Trade_{i,j,t} = W_{i,j,t} - W_{i,j,t-1}$, where $W_{i,j,t}$ is the weight of security *i* in the portfolio of fund manager *j* at time *t*. Panel B summarises the measure of *Turnover*; whether funds are trading more frequently at a portfolio level. '*Turnover*' is calculated as $Turnover_{k,t} = min(Buys_{k,t}, Sells_{k,t})/ TNA_{k,t}$ by taking the proportion of the minimum total value of stocks purchased or sold for fund net assets during quarter *t* at a portfolio level.

Panel A: Trades %

	Equity fund			Hybrid fund			Bond fund	Open end fund	Closed end fund	All funds	Trades Difference	
Year	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity fund	Hybrid Funds
1998	2.21	na	2.21	na	na	na	na	na	2.19	2.21	na	na
1999	1.01	1.6	1.04	na	na	na	na	na	1.06	1.07	-0.59	na
2000	1.01	1	1	1.42	na	1.42	na	na	1.04	1.05	0.01	na
2001	0.13	-0.07	0.1	-0.02	na	-0.02	na	0.36	0.11	0.11	0.2	na
2002	0.08	-0.02	0.03	0.42	na	0.42	0.09	0.32	0.07	0.09	0.1	na
2003	0.32	0.31	0.32	0.7	na	0.7	0.6	0.73	0.25	0.41	0.01	na
2004	0.19	0.08	0.12	0.42	na	0.42	0.06	0.35	0.09	0.24	0.11	na
2005	0.1	0.36	0.18	0.37	na	0.37	0.1	0.3	0.09	0.23	-0.26	na
2006	0.2	0.09	0.16	0.53	na	0.53	0.03	0.43	0.09	0.34	0.11	na
2007	-0.13	0.28	-0.06	0.27	na	0.27	0.05	0.25	-0.35	0.15	-0.41	na
2008	0.06	0.13	0.07	0.13	na	0.13	-0.02	0.12	-0.06	0.1	-0.07	na
2009	0.2	0.36	0.21	0.27	0.53	0.27	0.36	0.28	0.09	0.27	-0.16	-0.25
2010	0.25	0.28	0.26	0.18	0.06	0.17	0.03	0.18	0.09	0.17	-0.03	0.12
2011	0.17	0.24	0.18	0.16	0.03	0.15	-0.04	0.14	0.02	0.13	-0.07	0.13
2012	0.17	0.16	0.17	0.17	0.01	0.16	0.01	0.15	0.01	0.14	0.01	0.18
2013	0.1	0.09	0.09	0.17	0.01	0.17	-0.05	0.12	-0.12	0.12	0.01	0.16
2014	0.18	0.12	0.15	0.2	0.06	0.2	0.31	0.21	-0.64	0.19	0.06	0.14
2015	0.34	0.37	0.36	0.17	0.01	0.16	0.07	0.22	0.17	0.22	-0.03	0.16
2016	0.08	0.03	0.05	0.12	0	0.12	-0.02	0.08	0.59	0.08	0.05	0.12
2017	0.17	0.1	0.13	0.24	-0.01	0.23	0.2	0.2	0.7	0.2	0.07	0.24
Average	0.34	0.29	0.34	0.33	0.08	0.33	0.11	0.26	0.27	0.38	-0.05*	0.11***

Panel B: Turnover %

Year	Equity fund			Hybrid fund			Bond fund	Open-end fund	Closed-end fund	All funds	Turnover Difference	
	Active	Passive	Total Equity Fund	Active	Passive	Total Hybrid Fund					Equity Funds	Hybrid Funds
1998	3.06	na	3.06	na	na	na	na	na	3.06	3.06	na	na
1999	4.51	4.31	4.50	na	na	na	na	na	4.50	4.50	0.2	na
2000	6.71	2.12	6.27	0.36	na	0.36	na	na	6.08	6.08	4.59	na

2001	14.18	2.55	13.25	5.99	na	5.99	na	0.00	13.22	13.07	11.63	na
2002	19.75	7.51	19.07	2.51	na	2.51	0.00	1.07	19.46	17.90	12.24	na
2003	16.27	2.71	15.18	3.74	na	3.74	5.55	3.50	17.06	12.55	13.56	na
2004	13.68	5.51	12.74	9.04	na	9.04	8.45	8.55	14.91	11.25	8.17	na
2005	19.64	6.66	17.64	12.42	na	12.42	9.80	13.13	18.95	15.01	12.98	na
2006	11.94	8.01	11.17	10.75	na	10.75	6.32	10.81	10.21	10.72	3.93	na
2007	0.99	1.59	0.91	3.33	na	3.33	5.45	3.40	0.60	1.24	-0.60	na
2008	4.76	2.54	4.21	3.52	na	3.52	1.18	3.32	5.27	3.50	2.22	na
2009	2.58	2.89	2.49	5.37	0.01	5.36	2.40	4.66	2.94	3.68	-0.31	5.37
2010	5.99	7.73	6.74	6.84	0.32	6.71	4.96	6.61	3.20	6.44	-1.73	6.52
2011	10.34	12.79	10.28	11.11	0.49	10.58	2.67	10.22	3.54	8.00	-2.45	10.62
2012	13.37	21.61	15.00	14.61	0.61	13.92	2.41	12.49	4.43	10.19	-8.24	14.00
2013	8.01	46.40	14.48	14.78	0.36	14.07	2.96	18.29	1.04	8.14	-38.39	14.42
2014	9.05	25.45	11.19	9.07	2.10	8.74	2.30	10.46	1.59	5.18	-16.40	6.97
2015	7.93	24.14	11.86	4.62	0.99	4.48	1.30	3.62	4.61	3.61	-16.21	3.63
2016	18.78	27.37	19.16	5.93	3.16	5.31	1.48	4.39	6.68	4.37	-8.59	2.78
2017	14.16	19.40	13.55	3.10	1.48	3.05	1.29	2.63	6.12	2.61	-5.24	1.62
Average	10.29	12.17	10.64	7.06	1.06	6.88	3.66	6.89	7.37	7.56	-1.51*	7.32***

3.5.4.2 Investment Style and Active Mutual Fund Performance

Based on the reclassified 'active funds' in the previous section, this section presents some summary statistics for these active funds, followed by a regression analysis. Table 3.10 presents the summary statistics for the ICI, HSC, characteristics-adjusted and industry adjusted fund performances with other fund characteristics. The results of Panel A show that the average natural logarithm of total net assets for these active mutual funds was 2.05, ranging from 0.12 to 2.5. The average fund flow of these datasets increased to 5.15% compared to the overall mutual fund average flow of 3.88%.

Furthermore, the HSC of the sample varies from 0 to 7.6, representing distinct style consistency scores. Style-consistent funds may differ significantly from style-inconsistent funds regarding fund size, fund flow, expense ratio and trades and turnover. Concentrated funds can also differ substantially from diversified funds in terms of these fund level characteristics. Panel A also shows that the average actively managed mutual fund has an ICI of 0.26 ranging from 0.07 to

2.41. This demonstrates a significant, cross-sectional variation for mutual funds with respect to their concentration levels. The average *trades* of re-classified active mutual funds increased from 0.38% to 0.53% per quarter from the original dataset and the *turnover* remained competitive at 7.26% for these active mutual funds on a quarterly basis. These actively managed funds produced a better annualized gross return and net return compared to the overall fund market. Accordingly, the characteristic-based performance measures improve as well. These active mutual funds display a weaker CS of 2.94% compared to the overall mutual fund sample. However, the CT and AS enhance to 4.84% and 11.24%, respectively, due to the frequent and large extent of equity trading. Both the industry-based performance measures strengthen for active mutual funds and the average IS and IT is 1.11% and 6.23% per quarter, respectively.

Panel B of Table 3.10 presents the correlation matrix between the ICI, HSC and fund characteristics. The result provided indirect evidence for the positive relationship between fund style consistency and their performance regardless the performance measures. The correlation between fund gross and HSC is -0.062 at 5% significant level, demonstrating the more volatile the fund investment characteristics style is, the worse the fund performance is. This negative relationship between fund performance and HSC become more significant when CT is applied for measuring the market timing ability. Although the significant level of the coefficient between ICI and fund performance, the relationship between these two is generally positive. The funds' IS significant positively correlated with ICI at 0.062, illustrating that more concentrate the fund equity holding is, the better fund industry selectivity is. The correlation also suggests that style-consistent funds have lower turnover and lower expense ratios. Industry concentrated funds exhibit higher turnover and higher expenses. This provides further evidence to show that Chinese mutual fund managers concentrate their holdings in certain industries. In

addition, style-inconsistent and industry-concentrated funds are associated with lower fund age and have lower levels of assets under management.

Table 3.10 Summary Statistics of Active Managed Funds

Panel A presents the summary statistics of the actively managed mutual funds including all the equity funds and actively-managed hybrid funds in this research. Panel B presents the Pearson correlation coefficients between the main variables used in the regression analysis. "Fund flow" is calculated as the percentage growth of the fund in excess of the growth that would have occurred had no new funds flowed, with all dividends being reinvested. HSC is the holding-based style consistency measure that is calculated as the average style characteristic volatility of a fund's security holdings for the most recent 36 months. CS, CT and AS are components of fund performance achieved by adjusting the characteristic benchmark to capture a fund manager's stock selection ability, short term style timing ability and long term investment style tendencies. ICI is the Industry Concentration Index that measures the extent of stocks held by mutual funds that are concentrated in a certain industry. It is calculated by the sum of stock industry weights difference between the fund and market portfolio. IS and IT are the industry adjusted fund returns that measure the industry stock selectivity measure and the industry timing measure respectively. '***', '**' and '*' represent significance at the 1%, 5% and 10% levels for the two-tailed test.

Panel A

Variable	Mean	Median	Std Dev	Minimum	Maximum
Log_TNA	2.05	1.63	0.163	0.12	2.5
Fund Flow (%)	5.15	7.22	12.98	-69.73	44.32
HSC (%)	1.086	1.67	0.747	0	7.6
ICI (%)	0.26	1.04	1.65	0.07	2.41
Trades (%)	0.15	0.85	0.77	-0.6	9.53
Turnover(%)R	7.26	13.48	15.378	0	25.34
Expense (%)	2.61	1.92	0.8	0	6.18
Log_Age	1.74	1.25	0.74	0	2.89
Fund Return (%)	13.33	12.97	34.29	-63.3	133.66
Fund Gross Return	18.21	26.58	59.38	-46.98	119.8
AS (%)	11.24	12.44	27.88	-33.29	74.21
CT (%)	4.84	6.08	25.41	-27.89	48.78
CS (%)	2.94	1.9	17.88	-18.27	36.74
IS (%)	1.11	0.75	15.97	-10.27	28.58
IT (%)	6.23	10.03	58.06	-61.92	77.67

Table 3.11 presents the results of the unconditional and conditional four-factor models, as in Equations (11) and (12). The factor-adjusted returns are investigated both before and after subtracting expenses. Both the quarterly calculated net returns and the gross returns for funds from the stock holdings are also examined. Other holding-based fund returns, including the characteristic-based returns (CS, CT and AS) and the industry-based returns (IS, IT), are analysed as a comparison to fund gross returns.

Panel B: Correlation Structure

	Log_tna	Fund Flow	HSC	ICI	Trades	Turnover	Expense ratio	Log_age	Fund Net Return	Fund Gross Return	AS	CT	CS	IS	IT
Log_tna	1														
Fund flow	-0.013***	1													
HSC	-0.022***	-0.049***	1												
ICI	-0.059**	-0.068*	0.061***	1											
Trades	-0.050***	0.086***	0.121***	-0.008**	1										
Turnover	-0.031***	0.006*	0.096***	0.017	0.004*	1									
Expense ratio	0.088***	-0.006**	0.023***	0.048**	-0.090	0.130**	1								
Log_age	0.033**	0.094***	-0.185***	-0.059***	0.111**	0.044**	-0.165**	1							
Fund net return	-0.038***	0.067***	-0.001***	0.005**	0.122***	0.003***	-0.016***	0.062***	1						
Fund gross return	-0.005**	0.045***	-0.062**	0.004**	0.136***	0.007***	-0.094***	0.065***	0.636***	1					
AS	-0.031**	0.072***	-0.031*	-0.001*	0.007*	0.070***	-0.110***	0.077***	0.122***	0.113***	1				
CT	-0.032***	0.063***	-0.118***	0.014	0.019***	0.040***	-0.019***	0.061***	0.100***	0.093***	0.077***	1			
CS	-0.011**	0.044***	-0.011**	0.025	0.038***	-0.007*	-0.009**	0.018***	0.060***	0.062***	0.147***	0.129***	1		
IS	-0.017***	0.021***	-0.053***	0.062*	0.112***	0.014**	-0.004*	0.019***	0.028***	0.030***	0.047***	0.035***	0.037***	1	
IT	-0.029***	0.107***	-0.068***	0.015*	0.036***	-0.002	-0.019***	0.171***	0.190***	0.155***	0.132***	0.128***	0.126***	0.235***	1

Results in Panel A indicate that mutual funds generate statistically significant returns when using the Carhart (1997) unconditional model. The coefficients on the return remain significantly positive after adjusting for characteristics and industry benchmarks. The coefficient is 3.35% for the gross return, and 2.14% for the net return. The Carhart-adjusted CS measure for actively managed funds is 0.25%. This positive CS suggests that mutual fund managers are able to better the benchmarks. Therefore, using the Carhart factors as a benchmark, fund managers still exhibit considerable selectivity abilities. The results are stronger for fund average style and industry timing that have returns of 2.89% and 1.15%, respectively, and both are statistically significant at the 1% level. This indicates that maintaining the stock investment in a certain style within one year or timing the holdings in some certain industries can produce positive abnormal returns. Panel B presents the results of the FS conditional model and the results represent a statistically significant positive relationship between the macro-economic variables and fund performance. The coefficient of these macro-economic variables is statistically significant at the 5% level when fund performance is measured with fund gross returns and also other holding-based performance measures such like CS, As and IS. Other coefficient results remain consistent with findings from the Carhart unconditional Model.

It is not necessary that style consistency produce a positive effect on fund performance. However, there are several potential reasons why portfolios with a greater degree of style consistency can produce superior returns. First, style-consistent funds exhibit less portfolio turnover and thus lower transaction costs than funds that allow their style to drift. It is demonstrated that mutual funds have the stock-picking talent but failed to outperform the market due to nonstock holdings and transaction costs (Wermers, 2000). Although fund managers can drift their styles to pursue superior returns, the overall net realized return after expenses cannot beat the market. Second, fund managers who attempt to time their investment

styles are more likely to make asset allocations and equity selection failures regardless of relative turnover (Barberis & Shleifer, 2003). Third, it was also found that fund managers who frequently drift their investments result in alteration of their portfolio risk that might produce inferior performance (Huang, Sialm, & Zhang, 2008). In addition, style-consistent managers are less disturbing for the other market participants for the evaluation. Consequently, sticking to the style for investments can be a signal of their expertise to other potential investors.

Table 3.11 Factor-Based Performance Regression

This table reports the abnormal returns and the factor loading from the Carhart (1997) four-factor model of actively managed mutual funds for the period 1998 to 2017. The first column shows the dependent variables as different fund performance measures. The fund net return is calculated from the quarterly change of fund total net assets. Fund gross return is calculated from the TNA-weighted average return of stocks held by this fund. Fund gross returns are decomposed as Characteristic Selectivity (CS), Characteristic Timing (CT) and Average Style (AS) by adjusting to characteristic benchmarks to capture a fund manager's stock selection ability, style-timing ability and long term investment style tendencies. The CS is calculated as the difference between the time *t* return of the portfolio held at *t-1* and the quarter *t* return of the quarter *t-1* matching the control portfolio. The CT is calculated as the deduction for the quarter *t* return of the quarter *t-5* matching the characteristic portfolio for each stock from the quarter *t* return of the quarter *t-1* matching the characteristic portfolio for each stock. AS is calculated as the sum of each stock held by a fund at the end of quarter *t-5*, matching with the characteristic-based benchmark portfolio, and multiplied by the end of the quarter t-5 portfolio weight of that stock. IS and IT are the industry adjusted fund returns that measure the industry stock selectivity measure and the industry timing measure respectively. Panel A shows the unconditional abnormal returns and other factor coefficients before and after expenses. Panel B summarises the conditional abnormal returns according to Ferson and Schadt (1996), adding the macro-economic variable to the original four-factor model, including the lagged 1-month treasury bill yield, the lagged dividend yield of the aggregate A share market, the lagged measure of the slope of the term structure, and the lagged quality spread in the bond market. The returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. All coefficients are presented followed by time-series *t* statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Unconditional Regression: Carhart Four-Factor Model Results

	Abnormal Return		Market		Size		Value		Momentum	
Dependent Variable	Before Expense	After Expense	Before Expense	After Expense	Before Expense	After Expense	Before Expense	After Expense	Before Expense	After Expense
Fund Net Return	0.0214***	0.0204***	0.7015***	0.6865***	0.1251**	0.1240**	-0.2560***	-0.2471***	0.0357***	0.0287**
	(4.67)	(4.45)	(7.32)	(7.16)	(2.14)	(2.12)	(-7.37)	(-7.11)	(2.62)	(2.11)
Fund Gross Return	0.0335***	0.03273***	0.4755***	0.4598***	0.0562**	0.0464*	-0.2353***	-0.2250***	0.0713***	0.0629***
	(3.26)	(3.19)	(4.33)	(4.19)	(2.09)	(1.73)	(-6.05)	(-5.79)	(4.84)	(4.27)
CS	0.0025**	0.0021*	0.1553**	0.1452**	0.0512***	0.0439***	-0.0441***	-0.0393***	0.0052**	0.0049*
	(2.07)	(1.74)	(2.38)	(2.23)	(4.21)	(3.61)	(-3.94)	(-3.51)	(1.98)	(1.87)
CT	0.0018*	0.0015	0.1015***	0.1008***	0.0075**	0.0053*	-0.0224*	-0.0023***	0.0011	0.0010
	(1.93)	(1.61)	(3.23)	(3.21)	(2.65)	(1.87)	(-1.67)	(-1.68)	(0.88)	(0.8)

Table 3.11 Panel A-*Continued*

AS	0.0289***	0.0277***	0.2048***	0.1988**	0.0017***	0.0012**	-0.1624***	-0.1712***	0.0628**	0.0618**
	(3.16)	(3.03)	(2.67)	(2.59)	(2.21)	(1.56)	(-3.29)	(-3.47)	(2.04)	(2.01)
IS	0.0098*	0.0078*	0.3414***	0.3333***	0.0132*	0.0123	-0.0756***	-0.0842***	0.0231**	0.0203**
	(2.66)	(2.12)	(4.43)	(4.32)	(1.66)	(1.55)	(-2.75)	(-3.06)	(1.70)	(1.49)
IT	0.0115***	0.0105**	0.1209***	0.1137***	0.0275***	0.0230***	-0.1489**	-0.1283*	0.0337*	0.0285
	(3.78)	(3.47)	(6.79)	(6.38)	(4.31)	(3.60)	(-1.96)	(-1.69)	(1.78)	(1.51)

Panel B: Conditional Regression: Ferson-Schadt Model Results

	Abnormal Return		Market		Size		Value		Momentum		Macro-Economic Variables	
Dependent Variable	Before Expense	After Expense	Before Expense	After Expense	Before Expense	After Expense	Before Expense	After Expense	Before Expense	After Expense	Before Expense	After Expense
Fund Net Return	0.0212***	0.0201***	0.7023***	0.6879***	0.1267**	0.1134*	-0.2558***	-0.2687***	0.0479***	0.0455***	0.0017	0.0023*
	(4.63)	(4.38)	(7.32)	(7.18)	(2.17)	(1.94)	(-7.36)	(-7.73)	(3.51)	(6.91)	(1.5)	(1.81)
Fund Gross Return	0.0325***	0.0317***	0.4796***	0.4645***	0.0643**	0.0553**	-0.2343***	-0.2240***	0.0954***	0.1082***	0.0088**	0.0093***
	(3.16)	(3.08)	(4.37)	(4.23)	(2.39)	(2.06)	(-6.02)	(-5.76)	(6.48)	(14.88)	(2.62)	(2.77)
CS	0.0022*	0.0019	0.1565**	0.1464**	0.0504***	0.0500***	-0.0438***	-0.0395***	0.0051*	0.0140***	0.0027**	0.0025**
	(1.82)	(1.57)	(2.40)	(2.24) f	(4.14)	(4.11)	(-3.91)	(-3.52)	(1.94)	(5.40)	(2.55)	(2.43)
CT	0.0017*	0.0015	0.1022***	0.1001***	0.0073***	0.0068**	-0.0213	-0.0235*	0.0011	0.0010***	0.0010	-0.0030*
	(1.82)	(1.61)	(3.25)	(2.58)	(2.58)	(2.40)	(-1.59)	(-1.75)	(0.88)	(4.73)	(0.69)	(0.61)

AS	0.0275***	0.0259***	0.1989***	0.1877**	0.0015*	0.0014***	-0.1633***	-0.1597***	0.0613***	0.0036**	0.0050***	0.0034***
	(3.01)	(2.83)	(2.59)	(2.45)	(1.95)	(1.82)	(-3.31)	(-3.24)	(1.99)	(2.50)	(4.58)	(3.11)
IS	0.0091**	0.0090***	0.3269***	0.3212***	0.0128	0.0112	-0.0745***	-0.0766***	0.0228*	0.2988***	0.0016***	0.0012
	(2.47)	(2.44)	(4.12)	(4.05)	(1.61)	(1.41)	(-2.71)	(-2.79)	(1.68)	(5.37)	(1.24)	(0.93)
IT	0.0112***	0.0109**	0.1167***	0.1086***	0.0366***	0.0324***	-0.1455*	-0.1202*	0.0429*	0.0705***	0.0031*	0.0021
	(3.73)	(3.63)	(6.55)	(6.10)	(4.21)	(3.72)	(-1.92)	(-1.58)	(1.75)	(2.87)	(1.67)	(1.13)

Table 3.12 Investment Style and Fund Performance: Regression Evidence

This table summarises the coefficients of the quarterly panel regression of fund performance with fund investment style consistency, the industry concentration index and other fund characteristics as control variables from 1997 to 2017. The general form of the panel regression is $PERF_{I,T}=b_0+ b_1 * HSC_{i.t-1} + b_2 * ICI_{i.t-1} + b_3 * EXP_{i.t-1} + b_4 * Trades_{i.t-1} + b_5 * \log\_age_{i.t-1} + b_6 * \log\_tna_{i.t-1} + b_7 * fund\_flow_{i.t-1}$. The dependent variable, PERF, measures the quarterly performance that is calculated as the abnormal return from the Carhart four factor model for 36 months of lagged data. By adding the macroeconomic variable, the Ferson-Schadt model (1996) is employed for conditional regression to calculate conditional abnormal returns. The holding-based adjustment of fund performance for CS, CT and AS for the characteristic benchmark and IS, and IT for industry benchmarks, use the same calculation as the previous part. The independent variable of Industry Concentration Index (ICI) is calculated as $ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F} - W_{j,t}^{M})^2$ and the holding-based style consistency score is computed as $HSC_{j,t}=\sum_{c=1}^{3}\frac{\sigma_{c,j,t}}{3}$. The appraisal ratio is calculated as dividing the abnormal return by the standard deviation of the residuals from the four-factor model. All regressions include year dummies and the Newy-west test for the autocorrelation. All coefficients are presented followed by t statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable									
	Four-Factor Abnormal Return			Characteristic-adjusted Fund Return				Industry-adjusted Fund Return		
	Fund Net Return	CH	FS	Fund Gross Return	CS	CT	AS	IS	IT	Appraisal Ratio
HSC	-0.0852***	-0.0811***	-0.0873***	-0.0831***	-0.0120*	-0.051*	-0.0161**	-0.0399*	-0.0148*	-0.0067***
	(-4.05)	(-4.22)	(-3.84)	(-3.38)	(-1.69)	(-1.65)	(-2.53)	(-1.69)	(-1.68)	(-2.91)

ICI	0.0281*	0.0023**	0.0019**	0.0212*	0.0011*	0.0013	0.0017**	0.0077*	0.0070	0.0069***
	(1.68)	(2.19)	(1.67)	(1.73)	(1.80)	(1.12)	(1.87)	(1.80)	(1.02)	(2.85)
Turnover	0.0482**	0.0302**	0.0032*	0.0501**	0.0012	0.0021**	0.0018***	0.0039*	0.0015	0.0264**
	(2.01)	(2.16)	(1.83)	(2.47)	(1.07)	(2.19)	(3.12)	(1.66)	(1.53)	(2.32)
TNA	-0.6436***	-0.4259*	-0.4756	-0.5279**	-0.1015*	-0.0914	-0.2250*	-0.0258	-0.3647	0.0067
	(-2.91)	(-1.95)	(-1.56)	(-2.30)	(-1.77)	(-1.12)	(-1.74)	(-1.64)	(-1.40)	(1.49)
Fund Flow	0.2527	0.1646*	0.1698	0.1381	0.0471*	0.0043	0.0359**	0.0527**	0.0692***	0.0018
	(1.36)	(1.74)	(1.27)	(1.22)	(1.73)	(1.06)	(2.01)	(2.21)	(1.54)	(1.19)
Expense	-0.6560**	-0.5323*	-0.6234*	-0.3163*	0.0014***	-0.0335***	-0.2261*	-0.0034*	-0.3835***	-0.3412**
	(-2.88)	(-2.26)	(-1.92)	(-1.78)	(1.25)	(-1.71)	(-1.84)	(-1.10)	(-2.49)	(-2.11)
Log_age	-0.5650***	-0.5324***	-0.5766***	-0.4972***	-0.1032**	0.1027	-0.3026***	0.0037	-0.2775*	-0.0146**
	(-2.33)	(-3.84)	(-3.11)	(-2.81)	(-2.39)	(1.62)	(2.96)	(1.06)	(1.77)	(-2.03)
No. of obs	45572	43332	43322	43322	43310	43220	43220	43318	43220	43322
R^2	0.253	0.312	0.312	0.213	0.308	0.185	0.247	0.152	0.158	0.250

Table 3.12 reports the panel regression results on fund performance with different measures. The dependent variables used are fund net returns, fund abnormal returns obtained from estimating conditional and unconditional four-factor models, fund gross returns on stock holdings, characteristic-adjusted fund returns as represented by CS, CT and AS, and the industry-adjusted performances measured by IS and IT. This study follows two steps in the regression analysis. In step 1, three years' worth of past monthly returns are regressed on market, size, value and momentum factors, to estimate the loadings in both the conditional and unconditional models. In step 2, the abnormal returns from step 1, for each mutual fund in each quarter, are regressed cross-sectionally on industry concentration index, holding-based style consistency, and other fund characteristics. All explanatory variables in step 2 are lagged by one quarter, which mitigates potential endogeneity problems. This regression uses the natural logarithms of fund age and size due to the data skewness. It also takes into consideration fund flow to address its impact on asset prices (Wermers, 2003).

The second and third columns show the estimated coefficients from the panel regression, using fund abnormal returns as a dependent variable. They indicate that funds with a higher past HSC (the less style-consistent funds) tend to have lower future returns. The estimated coefficient of unconditional abnormal returns is -0.0811 and is statistically significant at the 1% level.

However, the ICI has a significant and positive impact on fund abnormal returns. The positive relationship between ICI and fund abnormal returns illustrates that funds with higher portfolio concentration perform better in the subsequent quarter. A positive IT of actively managed funds suggests that stock picking talent is reflected in the selection of industries. The positive coefficient on IS of equity funds implies that managers who concentrate their holdings on certain industries exhibit stronger stock selectivity.

Turnover has a positive effect on a fund's future returns. The coefficient of turnover from a multivariate regression on unconditional abnormal returns is 0.0302, which is statistically significant at the 5% level. Evidence is provided to show that greater net and gross returns are generated by active funds regardless of whether they are equity or hybrid funds. Panel B of Table 3.6 shows that active equity funds have an average annualised net return of 13.56%, and that passive equity funds generate less return of 13.34%. Similar results are found for hybrid funds over the same sample period. In particular, active hybrid funds have net returns triple that of their corresponding passive funds. Fund flow contributes to future returns in a statistically significant and positive way. The coefficient of 0.1646 suggests that money growth of funds is a signal for better performance in the future. This is consistent with the results from the empirical work of Kacperczyk et al. (2005). In addition, the age of Chinese domestic funds is negatively correlated with fund returns, indicating that younger funds tend to invest more aggressively. All the results mentioned above remain significant after adjusting for characteristics and industries, thereby providing robust evidence for a positive relationship between style consistency and fund future performance, as well as between industry concentration and fund future performance.

When a portfolio deviates from the market portfolio, a fund is exposed to idiosyncratic risk. By applying the same portfolio measure as the study conducted by Treynor and Black (1973), this study further modifies the fund performance measure as the appraisal ratio. This is calculated by dividing the abnormal return by the standard deviation of the residuals from the four-factor model. Brown, Goetzmann and Ross (1995) found that applying the alpha, which is scaled by idiosyncratic risk, to the fund performance measure, mitigates the survivorship problem. The results remain economically significant for the HSC and other characteristics. Fund future performance exhibits a positive relationship with portfolio industry concentration. These results,

along with the analysis of investment style, show that fund managers produce superior performance with concentrated-industry holdings and with consistent style regarding stock size, value and past returns.

3.6 Conclusion

Mutual fund performance has long been a major concern in both the fund industry and academia. A variety of evaluation techniques have been proposed and implemented, but to date there is no consensus about the ability of professional portfolio managers to earn abnormal returns. The previous empirical work on developed countries provides mixed evidence on evaluating mutual funds. Otten and Bams (2002) found positive after cost alphas of the European mutual fund industry while US studies present that mutual funds underperform in the market due to the expenses they charge (Fortin & Michelson, 2002). However, few studies have been conducted for developing mutual fund markets. As China's capital market rises to become the third largest in the world and the great trading scale of equities of Chinese domestic funds, this study examines whether these fund managers are capable of producing abnormal returns in this immature market based on both factor-based and holding-based performance measures. Compared to the well-documented developed market, this is the first study providing comprehensive and complete evaluation of Chinese domestic funds.

A descriptive analysis of different fund categories presents the remarkable growth of the Chinese domestic mutual fund industry after 2010. Equity funds and hybrid funds averagely contribute to the total market by 45.31% and 34.21%, respectively, over the sample years from 1998 to 2017. Hybrid funds exhibit comparable stock holding weight, gross and net fund returns with equity funds in China. Hybrid funds are then taken into account as the mutual fund sample in this study. Since the sophisticated investor that actively manages their portfolio holdings can produce a

superior return with information advantages, this study further investigates whether these funds are actively or passively managing their stock holdings quarterly by applying '*Trades*' and '*Turnover*'. These two measures of trading activities examine the extent of portfolio stockholding alerts and it is found that passive equity funds defined by CSMAR exhibit a statistically significantly greater magnitude of changes in quarterly stockholdings. Therefore, this study re-defines the active mutual fund sample by including all equity funds and active hybrid funds.

Chinese actively managed mutual funds are explored by examining their factor-based and holding-based performance measures. The positive statistically significant abnormal return is found from the Carhart four-factor model and the results were still robust after adjusting the time-varying macroeconomic factors through applying Ferson Fachat model. There are two holding-based performance measures applied: "Characteristic-based performance measure" and the "Industry-based performance measure". By further decomposing the characteristic-based performance, it is found that Chinese mutual fund managers are capable of picking stock outperforming the market but have weak ability to "tilt" their portfolio stock holding with market variation. The results of industry-based performance show that fund managers have the ability to select superior industries to invest in, but weak ability when it comes to picking stocks within an industry.

Fund managers appear to stick to certain groups of stocks with similar characteristics (i.e., size, value, and past return), which is defined as "Style Investment" in previous studies. This research proposes "industry concentration" as another dimension of this investment style. By investigating the two measures of investment style, Holding-based Consistency (HSC) and Industry Concentration Index (ICI), it is demonstrated that funds maintaining their selection on a particular set of style characteristics or concentrating their holdings in certain industries generate a greater further return. The results remain robust after adjusting the common risk factors from four-factor

models and this positive relation of style-performance is not affected by various fund performance measures. With the controlling of other fund characteristics (size, fund flow, turnover, expense and fund age), it is illustrated that greater style consistency and industry concentration are positively associated, on average, with fund factor-based and holding-based returns.

This positive style-performance relation induces several implications and extensions. It appears that the ability of superior portfolio managers to sustain a preferred degree of consistency to their designated investment style can signal their skills to investors. Also, the results do not refute the possibility that managers who apply an explicit tactical style timing strategy can generate a returns premium, they suggest that the unintentional style drift can result in inferior relative performance. Thus, portfolio managers can benefit from remaining style consistent and industry concentrated to avoid chronically poor performance. Further research is warranted in examining how distinct the performance between industry diversified and concentrated funds is by sorting the industry concentration index in a panel regression. Similarly, to the extent that style consistency positively affects fund performance, and what the magnitude is for the difference between the most style consistent portfolio and most style drift portfolio. Discussion on how fund performance varies in response to changes in investment style can be further analysed by controlling for risk and size. More discussions can be conducted on the role of style consistent and industry concentrated investments on portfolio-level return predictability. These issues are discussed in detail in the following chapter.

Chapter 4: An Examination of Investment Style and Industry Concentration of Institutional Investors: Further Evidence from China

4.1. Introduction

A longstanding debate in finance is whether institutional fund managers are skilled investors or not. Lewellen (2011) investigated the aggregate holdings of institutional investors from 1980 to 2017 and found little evidence in support of their stock-picking skills. Despite the well-documented evidence that, on average, actively managed funds underperform passive benchmarks, mutual fund managers might still differ in stock picking ability (Carhart, Carpenter, Lynch, & Musto, 2002).

Over the past few decades, the importance of 'style tilt' in equity portfolios has resulted in institutional managers increasingly marketing themselves as specialising in certain categories of investment style. This raises the question: Do institutional portfolio managers, who remain focused on a certain category of equity style, outperform other managers who allow their portfolios to 'drift' from one style category to another?

This study evaluates the performance of both domestic and foreign institutional investors based upon style consistency and industry concentration. The rationale for 'chasing' one type of stock, with style investment as the conditioning variable, is that skilled fund managers, or QFIIs, may exhibit superior performance by consistently holding a certain group of stocks with similar characteristics, and by demonstrating a strong ability to identify a certain group of underpriced stocks. Moreover, QFIIs may exploit their informational advantages by holding more concentrated portfolios in certain industries, which is another dimension of style investment of institutional investors. To date, there has been no research on whether a portfolio's characteristic style, along with industry concentration, is related to the performance of institutional investors.

In Chapter 3, I study the overall performance of Chinese domestic funds. By decomposing the performance evaluation of Chinese mutual fund managers' overall gross returns, I show that they exhibit stock picking talents over time but exhibit weaker ability when it comes to timing with market variations. Chapter 3 illustrates that both unconditional and conditional regressions imply that fund managers generate significantly positive abnormal returns by factor-based performance, and that their characteristic-based and industry-based performances are also robust.

Importantly, Chapter 3 demonstrates that fund managers who consistently concentrate their holdings in a certain group of stocks, either with similar characteristics (size, value and momentum) or stocks within the same industry, outperform those funds with more frequent modifications to their portfolio style. This chapter will extend upon the study in Chapter 3 by further ranking the Holding-Based Style Consistency Score and Industry Concentration Index when forming decile portfolios.

Although Chapter 3 demonstrates a positive style-performance relation, the magnitude of the difference in fund performance generated by portfolio managers' investment styles has not been discussed. Therefore, Chapter 4 will carry out an examination on the extent of the effect on fund performance from investment style. Furthermore, this chapter will analyse the style-performance relation for QFIIs: the counterparts of Chinese domestic funds. A comparison will be made between these two groups to investigate whether their performance is influenced in different ways by portfolio investment style. Additionally, it is still not clear whether the style-performance relation varies with other fund characteristics including fund size, category, state-owned holdings and trading activities. Therefore, this chapter will continue to explore fund performance factor-based and characteristic-based measures, as applied in Chapter 3, and carry out further investigation into the variations in fund performance from portfolios with different characteristics.

While still examining both factor-based and holding-based performance measures, I also carry out a more formal analysis by using multivariate regressions to generate more solid evidence for the style-performance relation.

Recent studies have reported that size is a factor which affects a fund's ability to outperform the benchmark. A study by Chen, Hong, Huang, and Kubik (2004) explained how and why the size of a mutual fund affects its performance. The authors found that smaller funds tend to outperform larger funds due to diseconomies of scale. Using a detailed stockholding for a comprehensive sample of Chinese open-end equity mutual funds from 2004 to 2010, Tang, Wang and Xu (2012) investigated the effects of economy of scale and liquidity on the relationship between fund size and performance. They found that an inverted U-shaped relationship exists between fund size and performance, as measured by various performance benchmarks. They also document that economy-of-scale and liquidity constraints do indeed exist simultaneously in mutual funds. The impact of economy of scale (liquidity) on fund performance decreases with increasing fund size. Therefore, economy of scale plays a more important role than liquidity does for small funds, however, the role of liquidity is significantly important for large funds. While the size of a fund negatively affects its performance, it is possible that a wide dispersion of holdings across many stock characteristic-based and industry-based investment styles may also erode its performance. This chapter investigates whether such diseconomies of scale have important implications for asset management. I do so by controlling the size factor in the style-performance analysis; an approach which is not considered in Chapter 3.

While recent researchers have investigated the style-performance relation, no studies have explored this relationship for QFIIs. Therefore, Chapter 2 undertakes analysis on the preference for stocks with certain characteristics, industry allocations and corporate governance in foreign

institutional holdings. Media stories which report success stories for QFIIs have aroused great interest amongst China's institutional investors, academics, practitioners and regulators. However, the performance of QFIIs has not been investigated at a portfolio level. This suggests that solid, detailed and in-depth studies are called for. This chapter will apply both factor-based and holding-based performance measures to QFIIs from 2003 (the year in which the QFII scheme was introduced in China) and will provide a comprehensive study on whether they have the same style-performance relation as Chinese domestic funds.

However, the limitation on this comparison between Chinese domestic funds and QFIIs exists. Since Chinese domestic funds can be considered as complete portfolios Chinese QFIIs may just be one of the many component portfolios comprising the complete portfolio for foreign institutions. Although a QFII, unlike a domestic fund, also invests in other countries' assets, under the QFII scheme QFIIs need only to disclose their equity portfolios of foreign institutional investors in China. This enables me to analyse each QFII equity investment as a portfolio in China, and to calculate the portfolio returns. Therefore, all performance measures of QFIIs are related to their holdings in China only, not to the realised returns on their overall global investment portfolios.

To facilitate comparisons between the performance of domestic mutual funds and foreign institutional investors, I use the same characteristic decomposition methods applied to the former in Chapter 3. Specifically, I place the performance of the latter into three categories: Characteristic Selectivity, Characteristic Timing, and Average Style.

Each QFII's performance characteristic decompositions are based on fund returns calculated from their stock holdings. As another holding-based performance measure, QFIIs are further explored using the industry adjusted performance measure to examine whether they are able to select stocks from industries with superior performance, and whether they can pick stocks with returns

premiums within the same industry. Regarding the style-performance relation of QFIIs, a Holding-Based Style Consistency score is calculated as frequently as portfolio holdings are reported, measuring the changes in market capitalisation of equity (size) of portfolio holdings, the changes in the ratio of book-equity to market-equity (value-growth), and the changes in the price momentum of equity holdings. In doing so, I follow recent research on the cross-sectional influence of industry concentration on equity returns (Daniel & Titman, 1997; Fama & French, 1992, 1993, 1996; Jegadeesh & Titman, 1993) as well as research on the influence of style consistency on fund performance (Brown et al., 2009).

Using Chinese mutual fund data from 1998 to 2017, this study constructs portfolios of funds with different levels of investment style. Investment style is examined using two dimensions. First, regarding characteristic style, a Holding-Based Style Consistency (HSC) Score is used to examine whether the fund or QFII's 'tilting' of equity holdings, of certain types of stocks with similar characteristics and HSC quantifies the extent of portfolio consistency of investing in a certain characteristic-based equity style category. Second, regarding industry style, the Industry Concentration Index (ICI) investigates whether institutional investors allocate their cross-sectional holdings in certain industries and quantifies the extent of portfolio concentration in six broadly defined industries. This combination of 'characteristics-style' and 'industry-style' provides this study with a comprehensive framework for analysis.

I find that Chinese mutual funds differ in their investment style consistency and in different categories of stock characteristics. Results from the decile portfolio, sorted by the HSC, provide evidence that mutual funds with more style consistency generate higher further returns. My analysis indicates, after adjusting for risks, that fund managers who 'tilt' their holdings towards certain equities perform better. This is demonstrated by the unconditional four-factor model of

Carhart (1997) and the conditional four-factor model of Ferson and Schadt (1996). Mutual funds with below-median HSC (style consistent funds) yield a higher abnormal return than those with above-median HSC (style inconsistent funds) by 1.32% per year before expenses, and 0.76% per year after expenses. From the results of the decile portfolios sorted by ICI, it can be seen that mutual funds with above-median industry concentration yield a higher abnormal return than those with below-median industry concentration by 2.04% per year before expenses and 1.8% per year after expenses. Both characteristics-style and industry-style are examined using panel regressions on fund performance, controlling for other fund characteristics. Using the conditional measures of abnormal returns put forward by Ferson and Schadt (1996), this study establishes that the superior performance of style-consistent and industry-concentrated funds is not due to their greater responsiveness to macroeconomic conditions.

This chapter also finds that growth funds tend to generate higher future returns by further sorting all funds into distinct fund style categories. Furthermore, this chapter examines whether funds concentrate their holdings in stocks with high state ownership and whether, as suggested by the results of this study, fund performance is negatively correlated with the state ownership of fund equity holdings. Moreover, this chapter also examines the trading of mutual funds and finds that stocks purchased tend to significantly outperform stocks sold. In addition, I find that the return difference between buys and sells of mutual funds both increase significantly with style consistency and industry concentration. This finding indicates that the managers of style-consistent and industry-concentrated funds are more successful at selecting securities than those of style-inconsistent or industry-diversified funds.

On the basis of the stock level analysis for QFIIs in Chapter 1, this chapter further explores the stock picking abilities of QFIIs and their style-performance relation on a portfolio level. Each

QFII is analysed as an equity portfolio in China, and each portfolio return is computed by stock holdings and further adjusted by characteristic-based and industry-based benchmarks. I continue to apply DGTW's (1997) characteristic-based measure in Chapter 3 to investigate holding-based performance. The QFII results provide evidence to show that institutional investors can generate superior future performance by style investing and by concentrating their holdings in certain industries where they might have information advantages.

4.2. Data and Methodology

Since this chapter contains a continued examination of domestic mutual funds, all fund-related data are the same as those employed in Chapter 3. I have collected quarterly data on equity holdings for all funds from CSMAR from June 1998 to June 2017. The equity holding data for each fund is cross-checked with Morningstar, Wind and Bloomberg for accuracy. The four databases are then merged to give a complete record of equity holdings for any given fund. This sample also contains data concerning other fund characteristics, such as daily and monthly net asset value growth, sales charges and fund management fees. Individual stock data and macroeconomic indicators, including monthly returns, market capitalisation, book-to-market ratio, treasury-bill yield, and corporate bond yield, are also collected from CSMAR for the same period.

The investigation of trading activity in Chapter 3 shows that the investment objective of each fund, pre-defined by CSMAR, does not accurately capture the extent of stock trading activities by those fund managers. Therefore, Section 3.5.4 of Chapter 3 employs another two trading activity measures, '*trades*' and '*turnover*', and the classification of active/passive funds are redefined accordingly. Chapter 3 continues the same redefinition of 'actively managed equity funds' in China as in Chapter 4 and consequently there are 2102 funds represented in the remaining database until June 30, 2017.The summary statistics are presented in Section 3.5.4 of Chapter 3.

The quarterly stock holdings of QFIIs are manually collected from the 'Stock Star' official website and cross-checked with other sources, including the Shanghai and Shenzhen Stock Exchanges and the CSRC. While the sample used in Chapter 1 spans from the 4th quarter of 2003 to the 4th quarter of 2014 due to data availability at that time, the present chapter is now able to extend the sample of quarterly stock holdings to the end of June 2017, covering 55 quarters in total. Since Chapter 3 examines the performance of QFIIs at the portfolio level, a summary of QFIIs' portfolio characteristic statistics can now be presented (which is absent in Chapter 1).

For the style-performance analysis, the study in this chapter follows the same measures applied in Chapter 3. There are two investment style measures, both based on institutional investors' equity holdings. The first is the Holding-Based Style Consistency (HSC) measure, which is used to examine whether quarterly equity holdings are consistently concentrated on a group of stocks with similar characteristics. The second measure is the Industry Concentration Index (ICI), which is used to examine whether institutional investors concentrate their equity holdings in certain industries.

This chapter employs the same performance measures as Chapter 3 for both mutual funds and QFIIs; holding-based and factor-based measures. The holding-based performance measure includes the hypothetical return (gross return), the characteristic-based measure (DGTW, 1997), and the industry-based measure. The factor-based performance measure includes the Carhart four-factor measure (1997) and the Ferson-Schadt measure (1996). The details of these measures are discussed in Section 3.4.2, Chapter 3.

4.3. Empirical Evidence

This section reports several empirical results. The first concerns the style-performance relation for actively managed equity funds, obtained using both a portfolio and a regression approach. The second result pertains to how fund size and investment style interact with the observed relationship. The third result stems from further exploring the trading of actively managed equity funds to see the relationship between investment style and fund performance. The fourth result is obtained by analysing QFIIs, as the counterparts of domestic funds, for both factor-based performance and holding-based performance measures. Finally, I present the results of the panel regressions used to examine QFII performance, adjusted by the characteristics-benchmark and industry-benchmark.

4.3.1 Portfolio Evidence of Actively Managed Mutual Funds: Do Style-Consistent and Industry-Concentrated Funds Generate Better Returns?

To further study the relative performance of funds with different investment style consistencies and industry concentrations, I sort all actively managed mutual funds into 10 portfolios according to their Holding-Based Style Consistency and Industry Concentration Index at the beginning of each quarter. The equally weighted average return for each quarter is computed for each decile portfolio. The performance information comes from all funds regardless of their status (i.e., dead or inactive). By including funds with short return histories, the extensive sample is free from survivorship and mitigates a potential selection bias.

4.3.1.1 Factor-Based Performance Measures: Carhart Four-Factor and Ferson-Schadt Four-Factor Models

Table 4.1 summarises the results of the Carhart four-factor model (unconditional) and the Ferson-Schadt model (conditional) (see equations (11) and (12) in Sections 3.4.2.2 of Chapter 3). The table examines the factor-adjusted returns and factor loadings before and after deducting expenses.

By deriving a number of empirical predictions of a rational model from active portfolio management, Berk and Green (2004) found that a high level of skill among active managers may charge higher expenses to extract rents. A recent study by Kacperczyk, Nieuwerburgh and Veldkamp (2014) confirms that fund managers with better skills generate higher expenses via higher portfolio turnover per year, even in recessions. Thus, to better evaluate the investment ability of mutual fund managers, returns before expenses need to be considered. However, active fund managers are more likely to have superior performance, even after expenses, and better skilled managers are able to attract new money flows as they are able to select undervalued stocks (Wermers, 2012). Meanwhile, a fund's risk-adjusted net returns of expenses are also significant concerns for fund investors in practice.

In this study, all funds are ranked by their HSC for each quarter into decile portfolios. Panel A of Table 1 reports the unconditional regression results for the abnormal returns and the factor loading per quarter from the Carhart four-factor model. The first column presents unconditional abnormal returns before expenses. The average abnormal return for all funds is estimated to be 2.14% per quarter. It can be seen that the decile portfolio with the highest characteristic style consistency and the lowest HSC generates the highest abnormal return of 2.73% per quarter, while the most style inconsistent fund with the highest HSC generates an abnormal return of 1.8% per quarter. The average abnormal return of the five most style-consistent decile portfolios is 0.33%

higher than the abnormal return of the five most style-inconsistent decile portfolios per quarter, which is statistically significant at the 5% level. The performance variation becomes more significant as the magnitude of the return difference increases; the return difference being between the top and bottom quintiles or deciles. The 'after expenses' abnormal return in the second column presents similar results for the relationship between fund style consistency and performance.

Panel B of Table 4.1 shows the risk-adjusted abnormal returns from the Ferson-Schadt model, which favours conditional performance evaluation with public information controls for bias in traditional market timing models. There are four lagged macroeconomic variables in the conditional model to capture the time-varying factor loadings: the 1-month treasury bill yield (long- minus short-term bonds), the dividend yield of the CSI300 Index, the measure of the slope of the term structure, and the quality spread in the bond market (low- minus high-grade bonds). The results of the Ferson-Schadt model are consistent with those of the Carhart four-factor model. The decile portfolio with the highest style drift (high HSC) exhibits low abnormal returns for both before- and after-expenses performance measures. The magnitude of the performance difference still exists after controlling for common variations in risk levels to mitigate the influence from average performance on risk premia. The top style-inconsistent decile portfolio with a higher HSC appears to have a lower abnormal return of 1.86% per quarter. The bottom style-consistent decile portfolio with a lower HSC appears to have a higher abnormal return of 2.67%. In general, the results of the conditional model are statistically significant. On the other hand, the results from the Ferson-Schadt model provide evidence that the performance difference between style-consistent funds and style-drift funds is not driven by their response to macroeconomic conditions. This is confirmed by the results from the statistically insignificant coefficient of macroeconomic variables, which is 0.0023 in the conditional model.

Table 4. 1 Decile Portfolios: Mutual Fund Factor-Based Performance Measures Sorted by HSC

This table presents the estimated abnormal returns and factor loadings applying the Carhart (1997) four-factor model for different portfolios of actively managed mutual funds for the sample period of 1998 to 2017. Panel A shows the unconditional abnormal returns and four factor loadings before and after expenses. Panel B reports the conditional abnormal returns, according to the Ferson and Schadt (1996) model, using the lagged level of the 1-month treasury bill yield, the lagged dividend yield of the CSI300 Index, the lagged measure of the slope of the term structure, and the lagged quality spread in the bond market. The sample is divided into deciles based on the lagged Holding-based Style Consistency (HSC) Score. The HSC, as the average style characteristic of volatility of a fund's security holdings, is computed by $HSC_{j,t}=\sum_{c=1}^{3}\frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t}=\{\sum_{n=0}^{35}\frac{(Rank_{c,j,t-n}-MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score over the 36-month measurement period. The returns are of quarterly frequency and the portfolios are rebalanced quarterly. The *t*-statistics, based on Newey West robust standard errors, are reported in parentheses. '***', '**' and '*' denote significance at the 1%, 5%, and 10% levels respectively.

Panel A: Unconditional Regression: Carhart Four-Factor Model Results

	Abnormal Return		Market		Size		Value		Momentum	
	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expense	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses
All funds	0.0214***	0.0204***	0.7015***	0.6865***	0.1251**	0.124**	-0.256***	-0.2471***	0.03182***	0.0287**
	(4.67)	(4.45)	(7.32)	(7.16)	(2.14)	(2.12)	(7.37)	(7.11)	(2.62)	(2.11)
Decile 1 (Most style Consistent)	0.0273***	0.0235***	0.7747***	0.7611***	0.1831***	0.1511***	-0.3050***	-0.2873***	0.0460*	0.0154
	(5.36)	(4.61)	(8.08)	(7.94)	(3.13)	(2.58)	(8.78)	(8.27)	(1.89)	(0.63)
Decile 2	0.0235***	0.0229***	0.7617***	0.7502***	0.1202**	0.1255**	-0.3592***	-0.4628***	0.0691***	0.0406*
	(4.20)	(3.75)	(7.95)	(7.82)	(2.06)	(2.15)	(10.34)	(13.32)	(2.84)	(1.67)
Decile 3	0.0223***	0.0208***	0.7569***	0.7430***	0.1150**	0.1244**	-0.3917***	-0.3871***	0.1097***	0.0628***
	(3.98)	(3.40)	(7.90)	(7.75)	(1.97)	(2.13)	(11.28)	(11.14)	(4.52)	(2.58)
Decile 4	0.0210**	0.0193**	0.7549***	0.7456***	0.1186	0.1106	-0.3429	-0.2380	0.0090	0.1055***
	(2.43)	(2.23)	(3.94)	(3.89)	(1.35)	(1.26)	(0.67)	(0.46)	(0.25)	(2.89)
Decile 5	0.0211**	0.0203**	0.6855***	0.6765***	0.1096	0.1104	-0.1952	-0.1987	0.0365	0.0348
	(2.44)	(2.34)	(3.58)	(3.53)	(1.25)	(1.26)	(0.67)	(0.68)	(1.50)	(1.43)
Decile 6	0.0208**	0.0204**	0.4880**	0.4731**	0.2246**	0.2296***	-0.1841	-0.1725	0.0115	0.0123
	(2.27)	(2.11)	(2.55)	(2.47)	(2.56)	(2.62)	(0.67)	(0.62)	(0.32)	(0.34)
Decile 7	0.0204**	0.0198*	0.6838***	0.6675***	0.0897	0.0904	-0.1660**	-0.1630**	0.0087	0.0069
	(2.36)	(1.94)	(3.57)	(3.48)	(1.02)	(1.03)	(2.39)	(2.35)	(0.24)	(0.19)
Decile 8	0.0201**	0.0198**	0.6334***	0.6167***	0.1293	0.1390	-0.0450	-0.0424	0.0081	-0.0015
	(2.22)	(2.43)	(3.30)	(3.43)	(1.47)	(1.59)	(0.86)	(0.81)	(0.33)	(-0.06)

Table 4.1 Panel A-*Continued*

Decile 9	0.0195**	0.0199**	0.7455***	0.7350***	0.0946	0.1001	-0.2960***	-0.2818***	0.0090	0.0054
	(2.12)	(2.21)	(3.89)	(3.74)	(1.08)	(1.14)	(5.68)	(5.41)	(0.25)	(0.15)
Decile 10 *(Most Style Inconsistent)*	0.018	0.0173	0.7302*	0.6965*	0.0663	0.0590	-0.2749***	-0.2375***	0.0106	0.0052
	(1.22)	(1.13)	(1.90)	(1.82)	(1.42)	(1.26)	(3.17)	(2.73)	(0.22)	(0.11)
1^{st} half-2^{nd} half	0.0033**	0.0019	0.0906***	0.0975***	0.0084**	0.0008	-0.1256***	-0.1353***	0.0445***	0.0462***
	(2.19)	(1.28)	(3.23)	(3.48)	(2.02)	(0.19)	(-3.84)	(-4.13)	(3.42)	(3.55)
1^{st} quintile-5^{th} quintile	0.0067**	0.0046	0.0304	0.0399	0.0712***	0.0588**	-0.0467	-0.1154***	0.0478**	0.0227
	(2.22)	(0.92)	(0.92)	(1.21)	(2.84)	(2.35)	(-1.09)	(-2.69)	(2.17)	(1.03)
1^{st} decile-10^{th} decile	0.0093*	0.0062	0.0445	0.0646	0.1168	0.0921	-0.0301	-0.0498	0.0354	0.0102
	(1.68)	(1.03)	(1.06)	(1.54)	(1.42)	(1.12)	(-0.55)	(-0.92)	(1.11)	(0.39)

Panel B: Conditional Regression: Ferson-Schadt Model Results

	Abnormal Return		Market		Size		Value		Momentum		Macro-Economic	
	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses
All funds	0.0212***	0.0201***	0.7023***	0.6879***	0.1267**	0.1134*	-0.2558***	-0.2687***	0.0479***	0.0455***	0.0017	0.0023**
	(4.63)	(4.63)	(7.32)	(7.17)	(2.17)	(1.94)	(-7.36)	(-7.73)	(3.51)	(3.33)	(1.50)	(2.03)
Decile 1	0.0267***	0.0238***	0.7757***	0.7570***	0.1453**	0.1140*	-0.3373***	-0.3535***	0.0258	0.0242	0.0047**	0.0045**
(Most style Consistent)	(5.25)	(4.68)	(8.09)	(7.89)	(2.49)	(1.95)	(-9.70)	(-10.17)	(0.95)	(0.89)	(2.07)	(1.99)
Decile 2	0.0240***	0.0225***	0.7635***	0.7507***	0.1239**	0.1199**	-0.3410***	-0.3583***	0.0192	0.0095	0.0030	0.0028
	(3.93)	(3.69)	(7.96)	(7.82)	(2.12)	(2.05)	(-9.81)	(-10.31)	(0.70)	(0.35)	(1.32)	(1.24)
Decile 3	0.0224***	0.0211***	0.7301***	0.7496***	0.1214**	0.1209**	-0.3759***	-0.3872***	0.0036	0.0002	-0.0028	-0.0018
	(3.67)	(3.46)	(7.61)	(7.81)	(2.08)	(2.07)	(-10.82)	(-11.14)	(0.13)	(0.001)	(-1.24)	(-0.79)
Decile 4	0.0217**	0.0201**	0.7559***	0.7354***	0.1208	0.1189	-0.3277***	-0.3379***	0.0159	0.0109	0.0048	0.0068**
	(2.51)	(2.32)	(3.94)	(3.83)	(1.38)	(1.36)	(-6.29)	(-6.48)	(0.39)	(0.27)	(1.41)	(2.00)
Decile 5	0.0203**	0.0200**	0.4940**	0.4815**	0.2354***	0.2763***	-0.1772***	-0.1783***	0.0702**	0.0583**	0.0025	0.0044*
	(2.10)	(2.07)	(2.57)	(2.51)	(2.69)	(3.15)	(-3.40)	(-3.42)	(2.57)	(2.14)	(1.10)	(1.94)
Decile 6	0.0199**	0.0181*	0.7476***	0.7206***	0.0987	-0.0256	-0.2805***	-0.2935***	0.0230	0.0220	-0.0051	-0.0029
	(2.06)	(1.87)	(3.90)	(3.76)	(1.13)	(-0.29)	(-5.38)	(-5.63)	(0.56)	(0.54)	(-1.50)	(-0.85)
Decile 7	0.0198*	0.0195*	0.6895***	0.6787***	0.1008	-0.0211	-0.1495**	-0.1623**	0.0859**	0.0819**	0.0024	0.0022
	(1.96)	(1.78)	(3.59)	(3.54)	(0.86)	(-0.18)	(-2.15)	(-2.33)	(2.10)	(2.00)	(0.71)	(0.65)
Decile 8	0.0197**	0.0192**	0.6947**	0.6675***	0.1279	0.2450***	-0.1780***	-0.1832***	0.0708***	0.0673**	-0.0002	-0.0001
	(2.42)	(2.36)	(3.62)	(3.48)	(1.46)	(2.80)	(-3.41)	(-3.51)	(2.59)	(2.47)	(-0.09)	(-0.04)
Decile 9	0.0189*	0.0179*	0.7305***	0.7161***	0.0672	0.0671	-0.2598***	-0.2785***	0.0141	0.0082	0.0067**	0.0065*
	(1.86)	(1.76)	(3.81)	(3.73)	(0.58)	(0.57)	(-4.98)	(-5.34)	(0.34)	(0.20)	(1.97)	(1.91)
Decile 10	0.0186	0.0186	0.6418*	0.6216	0.1253	0.1184	-0.1311	-0.1542*	0.1504***	0.1728***	0.0007	0.0006
(Most Style Inconsistent)	(1.22)	(1.22)	(1.67)	(1.62)	(0.86)	(0.81)	(-1.51)	(-1.77)	(2.76)	(3.17)	(0.15)	(0.13)
1^{st} half-2^{nd} half	0.0036	0.0028	0.0030	0.0139	0.04538**	0.0732***	-0.1120**	-0.1087**	-0.0419***	-0.0498***	0.0015	0.0021
	(1.17)	(0.91)	(0.06)	(0.27)	(2.21)	(3.57)	(-2.15)	(-2.09)	(-3.81)	(-4.53)	(0.68)	(0.92)
1^{st} quintile-5^{th} quintile	0.0066*	0.0049	0.0834	0.0850	0.0384*	0.0242	-0.1437**	-0.1396**	-0.0598***	-0.0737***	0.0002	0.0001
	(1.69)	(1.25)	(1.01)	(1.03)	(1.73)	(1.09)	(-2.07)	(-2.01)	(-2.85)	(-3.51)	(0.04)	(0.03)
1^{st} decile-10^{th} decile	0.0081*	0.0052	0.1339	0.1354	0.0200	-0.0044	-0.2062*	-0.1993*	-0.1246***	-0.1486***	0.0040	0.0039
	(1.81)	(1.16)	(1.41)	(1.43)	(-0.71)	(-0.16)	(-1.98)	(-1.91)	(-3.78)	(-4.50)	(0.71)	(0.69)

In comparison with the before-expenses results, the after-expenses abnormal returns present a similar ranking for the style consistent decile. For both the conditional and unconditional models, the most style-consistent fund portfolios tend to have higher positive net abnormal returns, while the most style-drift portfolios tend to have lower net abnormal returns. The difference in the performance between style-consistent and style-inconsistent funds declines slightly after deduction of the expense ratio. This is because style-inconsistent fund managers require higher expenses from investors than style-consistent funds. In particular, the after-expenses abnormal returns of the five most style-consistent deciles exceed those of the five least style-consistent by 0.19% per quarter for the unconditional model. In general, examination of after-expenses abnormal returns indicates that the trading strategies of 'going long' in the most style-consistent portfolios, and 'going short' in the most style-inconsistent portfolios, generate these risk-adjusted returns. By taking the fund expense ratios into consideration, style-consistent funds still outperform style-drift funds.

Previous studies have established a significant negative relationship between fund expense ratios and returns (e.g., Carhart, 1997; Bogle, 1998). Brown et al. (2009) argue that style consistency is attributed to superior risk-adjusted returns because more active management with higher portfolio turnover could increase fund expenses to a turning point, after which relative performance starts to decline. Another potential reason for this positive relationship between style consistency and fund performance is that active fund managers, with higher portfolio turnover, 'drift' their investments more often to appear to under invest in sectors that persistently generate superior returns and they lose profits because of the frequent style switching with more frequent tactical portfolio adjustments. As stated in Chapter 3, Chinese mutual funds which actively trade with high levels of style drift, exhibit higher turnovers resulting in lower realised fund returns. It can now be

seen that Chapter 3's results for differences in style decile portfolios confirm Chapter 3's conclusion and provide evidence in support of Brown et al. (2002).

Regarding the loading on market factors, the difference between style-consistent and style-inconsistent decile portfolios does not vary significantly across the conditional and unconditional models. The Carhart four-factor model shows that the portfolios with higher style-consistency and lower HSC, than the average level, generate greater loading on the size factor and smaller loading on the value factor than the lower style-consistent portfolios. This suggests that style-consistent funds tend to hold small and growth companies whereas style-drift funds tend to hold large and value companies.

The momentum factor explains the superior performance of style-consistent funds compared to style-drift funds. As shown in Panel A Table 4.1, the coefficient of momentums factor is 0.046 which is statistically significant at the 5% level for the most style consistent portfolio. This explanatory power of momentum factor becomes insignificant with the increase of the degree of fund style drifting. In general, the overall fund quarterly abnormal return from the Carhart four-factor model is 2.12% while the overall fund quarterly return is 3.43%. Although the factor models provide the risk-related variables, they can only explain 38.19% of the superior returns generated by actively managed funds. Therefore, the portion unexplained by the factor models may indicate the superior stock picking talents of these mutual fund managers. This supposition will be substantiated by the DGTW model in the analysis of holding-based performance.

The relationship between industry concentration and fund performance is explored in a similar way to that of style consistency and fund performance. The Quarterly Industry Concentration Index of all funds is first ranked from smallest to largest as decile portfolios, and the corresponding average abnormal returns of each decile portfolio is computed. These results are shown in columns

2 and 3 of Table 4.2. The Industry Concentration Index (ICI) helps quantify the extent of portfolio concentration in 6 broadly-defined industries. This measure is laid out in detail in Section 3.4.1.2 of Chapter 3.

Table 4.2 summaries the results of the unconditional and conditional four-factor models before and after expenses. Panel A indicates that the most diversified fund generates an abnormal return of 1.87% per quarter before expenses, while the most concentrated fund portfolio generates an abnormal return of 2.84% per quarter. The abnormal returns of the five most concentrated portfolios are all significantly positive at the 5% level. In contrast, the abnormal returns of the five most diversified portfolios are not all significantly different from zero. Compared with the results of decile portfolios sorted by HSC, the performance differences of the decile portfolios ranked by ICI are relatively more significant. The five most concentrated deciles outperform the five most diversified deciles by 0.51%, before expenses, at the 5% level. The results of Panel B from the Ferson-Schadt model are consistent with those of the Carhart model. The magnitude of the performance difference increases further after the macroeconomic conditions are allowed for. In general, the conditional model's results indicate that concentrated funds perform better than diversified funds before deducting expenses.

In line with the results reported by Kacperczyk, Sialm and Zheng (2005), the abnormal returns before and after expenses present similar ranks of concentrating deciles. However, in the unconditional model, the slightly smaller coefficients on the difference in the after-expenses abnormal returns still indicate that highly concentrated funds charge higher expenses than diversified funds. Furthermore, the results for the factor loading of the four-factor models illustrate that diversified funds tend to hold large and high-valued stocks, whereas concentrated funds tend

to select lower-valued firms. Past returns are more able to explain the superior returns for concentrated funds than for diversified funds.

Table 4. 2 Decile Portfolios: Factor-Based Performance Measures Sorted by ICI

This table reports the estimated abnormal returns and the factor loading applying the Carhart (1997) four-factor model for different portfolios of actively managed mutual funds over the sample period of 1998 to 2017. Panel A shows the unconditional abnormal returns and the four factor loadings coefficient before and after expenses. Panel B reports the conditional abnormal returns, according to the Ferson and Schadt (1996) model, using the lagged level of the 1-month treasury bill yield, the lagged dividend yield of the CSI300 Index, the lagged measure of the slope of the term structure, and the lagged quality spread in the bond market.The sample is further divided into deciles based on the lagged Industry Concentration Index (ICI), which is calculated as $ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F} - W_{j,t}^{M})^2$, where $W_{j,t}^{F}$ is the weight of stock holdings from the same industry relative to the total net assets of fund *i* at quarter *t* and $W_{i,t}^{M}$ is the corresponding industry stock weight relative to the total A share stock market. The returns are of quarterly frequency and the portfolios are rebalanced quarterly. The *t*-statistics, based on Newey West robust standard errors, are reported in parentheses. All coefficients are presented followed by *t* statistics. '***', '**' and '*' represent significance at the 1%, 5%, and 10% levels respectively.

Panel A: Unconditional Regression: Carhart Four-Factor Model Results

	Abnormal Return		Market		Size		Value		Momentum	
	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses
All Funds	0.0214***	0.0204***	0.7015***	0.6865***	0.1251**	0.124**	-0.2560***	-0.2471***	0.0357***	0.0287**
	(4.67)	(4.45)	(7.32)	(7.16)	(2.14')	(2.12)	(-7.37)	(-7.11)	(2.62)	(2.11)
Decile 1	0.0187	0.0175	0.6067***	0.5540	0.0796	0.0801	-0.3732***	-0.3659***	0.0101	0.0026
(Diversified)	(1.26)	(1.14)	(3.17)	(1.44)	(0.54)	(0.55)	(-5.37)	(-5.26)	(0.20)	(0.05)
Decile 2	0.0174*	0.0172*	0.6247***	0.6930***	0.0823	0.0814	-0.3626***	-0.3526	0.0166	0.0084
	(1.90)	(1.69)	(3.26)	(3.61)	(0.70)	(0.70)	(-6.96)	(-6.77)	(0.46)	(0.23)
Decile 3	0.0185**	0.0178**	0.6477***	0.7197***	0.1180	0.1137	-0.3631***	-0.3609***	0.0142	0.0071
	(2.27)	(2.18)	(3.38)	(3.75)	(1.35)	(1.30)	(-6.97)	(-6.93)	(0.58)	(0.29)
Decile 4	0.0196**	0.0185*	0.6885***	0.6912***	0.0993	0.0961	-0.3104***	-0.2955***	0.0284	0.0255
	(2.27)	(1.82)	(3.59)	(3.60)	(0.85)	(0.82)	(-5.96)	(-5.67)	(0.78)	(0.70)
Decile 5	0.0200**	0.0195**	0.7276***	0.7154***	0.1093	0.1087	-0.2806***	-0.2705***	0.0346	0.0301
	(2.19)	(2.01)	(3.80)	(-3.73)	(1.25)	(1.24)	(-3.23)	(-3.11)	(0.95)	(0.83)
Decile 6	0.0213**	0.0195**	0.7250***	0.6935***	0.1033	0.1021	-0.2658***	-0.2588***	0.0337	0.0263
	(2.46)	(2.25)	(3.78)	(3.62)	(1.18)	(1.16)	(-5.10)	(-4.97)	(1.39)	(1.08)
Decile 7	0.0230***	0.0223***	0.7394***	0.7101***	0.1258	0.1259	-0.2243***	-0.2094***	0.0561	0.0545
	(2.66)	(2.58)	(3.86)	(3.70)	(1.43)	(1.44)	(-6.46)	(-6.03)	(1.54)	(1.50)
Decile 8	0.0224***	0.0220***	0.7582***	0.7182***	0.1584***	0.1578***	-0.2186***	-0.2052***	0.0064	0.0010
	(4.00)	(3.59)	(7.91)	(7.49)	(2.71)	(2.70)	(-4.20)	(-3.94)	(0.26)	(0.04)
Decile 9	0.0246***	0.0240***	0.7465***	0.7091***	0.1875***	0.1859***	-0.0659*	-0.0704**	0.0687***	0.0418*
	(4.40)	(3.92)	(7.79)	(7.40)	(3.21)	(3.18)	(-1.90)	(-2.03)	(2.83)	(1.72)

Table 4.2 Panel A-*Continued*

Decile 10	0.0284***	0.0254***	0.7509***	0.6609***	0.1874***	0.1862***	-0.0955***	-0.0818**	0.0882***	0.0899***
(Concentrated)	(5.58)	(4.99)	(7.84)	(6.89)	(3.20)	(3.18)	(-2.75)	(-2.35)	(3.63)	(3.70)
2^{nd} half-	0.0051*	0.0045	0.0850	0.0237	0.0548	0.0556	0.1639***	0.1640***	0.0299**	0.0280**
1^{st} half	(1.70)	(1.51)	(1.13)	(0.32)	(1.44)	(1.46)	(3.15)	(3.15)	(2.49)	(2.33)
5^{th} quintile-	0.0085**	0.0074*	0.1330	0.0615	0.1065**	0.1053**	0.2872***	0.2832***	0.0651***	0.0604**
1^{st} quintile-	(2.12)	(1.84)	(1.64)	(0.76)	(2.13)	2.10	(2.11)	(4.08)	(2.71)	(2.51)
10^{th} decile-1^{st}	0.0097*	0.0080	0.1442	0.1069	0.1078*	0.1061*	0.2777***	0.2841***	0.0781**	0.0874**
decile-	(1.95)	(1.59)	(1.50)	(1.11)	(1.86)	(1.83)	(2.66)	(2.73)	(2.23)	(2.50)

Panel B: Conditional Regression: Ferson-Schadt Model Results

	Abnormal Return		Market		Size		Value		Momentum		Macro-Economic Variables	
	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses	Before Expenses	After Expenses
All Funds	0.0212***	0.0201***	0.7023***	0.6879***	0.1267**	0.1134*	-0.2558***	-0.2687***	0.0479***	0.0455***	0.0017	0.0023
	(4.63)	(4.63)	(7.32)	(7.17)	(2.17)	(1.94)	(-7.36)	(-7.73)	(3.51)	(3.33)	(1.50)	(0.87)
Decile 1 (Diversified)	0.0177***	0.0167***	0.5873***	0.5575***	0.0798	0.0784	-0.0650*	-0.0821**	0.0139	0.0126	0.0002	0.0010
	(3.47)	(3.27)	(6.31)	(5.99)	(1.37)	(1.34)	(-1.87)	(-2.36)	(0.51)	(0.46)	(0.09)	(0.44)
Decile 2	0.0179***	0.0169***	0.6763***	0.6598***	0.0822	0.0819	-0.0957***	-0.1036***	0.0149	0.0134	0.0003	0.0011
	(2.93)	(2.76)	(7.27)	(7.09)	(1.41)	(1.40)	(-2.75)	(-2.98)	(0.55)	(0.49)	(0.12)	(0.47)
Decile 3	0.0189***	0.0181***	0.7057***	0.6928***	0.1018*	0.1009*	-0.2176***	-0.2257***	0.0183	0.0169	0.0008	0.0017
	(3.09)	(2.97)	(7.66)	(7.52)	(1.74)	(1.73)	(-6.26)	(-6.49)	(0.67)	(0.62)	(0.36)	(0.76)
Decile 4	0.0199**	0.0189**	0.7011***	0.6933***	0.1115	0.1094	-0.2235***	-0.2302***	0.1131***	0.1012**	0.0021	0.0022
	(2.31)	(2.18)	(7.53)	(7.45)	(1.27)	(1.25)	(-4.29)	(-4.42)	(2.76)	(2.47)	(0.63)	(0.64)
Decile 5	0.0205**	0.0190**	0.7348***	0.7150***	0.1096	0.1087	-0.3106***	-0.3207***	0.0329	0.0399	0.0016	0.0027
	(2.12)	(1.97)	(7.90)	(7.68)	(1.25)	(1.24)	(-5.96)	(-6.15)	(1.21)	(1.46)	(0.71)	(1.18)
Decile 6	0.0203**	0.0194**	0.7110***	0.6967***	0.1178	0.1160	-0.2810***	-0.2924***	0.0277	0.0364	0.0013	0.0021
	(2.10)	(2.01)	(7.64)	(7.49)	(1.34)	(1.32)	(-5.39)	(-5.61)	(0.68)	(0.89)	(0.38)	(0.63)
Decile 7	0.0232**	0.0206**	0.7232***	0.7126***	0.1465	0.1399	-0.2661***	-0.3076***	0.0324	0.0316	0.0029	0.0018
	(2.29)	(2.03)	(7.85)	(7.74)	(1.25)	(1.20)	(-3.83)	(-4.42)	(0.79)	(0.77)	(0.85)	(0.54)
Decile 8	0.0217***	0.0203**	0.7234***	0.7094***	0.1583*	0.1572*	-0.3727***	-0.3745***	0.0535**	0.0521*	0.0019	0.0027
	(2.66)	(2.50)	(7.77)	(7.62)	(1.81)	(1.80)	(-7.15)	(-7.18)	(-1.96)	(1.91)	(0.84)	(1.20)
Decile 9	0.0242	0.0236	0.7291	0.7181	0.1757	0.1728	-0.3628	-0.3726	0.0867	0.0797	0.0032	0.0032
	(2.38)	(2.32)	(7.68)	(7.56)	(1.50)	(1.48)	(-6.96)	(-7.15)	(2.11)	(1.95)	(0.94)	(0.95)
Decile 10 (Concentrated)	0.02778*	0.0269*	0.7311***	0.7238***	0.1837	0.1821	-0.3631***	-0.3770***	0.0859	0.0710	0.0032	0.0045
	(1.82)	(1.76)	(8.19)	(8.11)	(1.26)	(1.25)	(-4.18)	(-4.34)	(1.57)	(1.30)	(0.70)	(0.98)
2^{nd} half- 1^{st} half	0.0076	0.0073	0.1560	0.1591	0.0756	0.0737	-0.1770***	-0.1844***	0.0251	0.0235	0.0016	0.0014
	(1.07)	(1.02)	(0.81)	(0.83)	(0.86)	(0.84)	(-3.40)	(-3.54)	(0.92)	(0.86)	(0.73)	(0.63)
5^{th} quintile- 1^{st} quintile-	0.0082***	0.0085	0.0983	0.1123	0.0987	0.0973	-0.2826***	-0.2819***	0.0719*	0.0624	0.0030	0.0028
	(9.00)	(0.84)	(0.34)	(0.39)	(0.85)	(0.83)	(-4.06)	(-4.60)	(1.76)	(1.52)	(0.87)	(0.83)
10^{th} decile-1^{st} decile-	0.0101	0.0103	0.1438	0.1663	0.1039	0.1037	-0.2980***	-0.2948***	0.0720	0.0584	0.0030	0.0035
	(0.62)	(0.63)	(0.37)	(0.43)	(0.59)	(0.59)	(-2.86)	(-2.83)	(1.06)	(0.86)	(0.53)	(0.61)

4.3.1.2 Holding-Based Performance Measure: Characteristic-Based and Industry-Based Fund Returns

In this section, I further rank the holding-based performance measure, as a complementary fund performance measure, by the style consistency score and the industry concentration score. For the holding-based performance measure, both characteristic-adjusted and industry-adjusted holding returns are employed.

Daniel et al. (1997) put forward a characteristic-based performance evaluation approach known as the 'DGTW Measure'. The approach constructs a benchmark portfolio to match the characteristics of the equity holdings held by a mutual fund. Specifically, the DGTW measure decomposes mutual fund performance into three components to identify the causes of the performance of mutual funds. These components are Characteristic Selectivity (CS), Characteristic Timing (CT), and Average Style (AS). CS is constructed to gauge a fund manager's stock picking ability by adjusting the portfolio-weighed return on stocks currently held by the fund, in excess of returns on matched control portfolios which have the same style characteristics. CT is constructed to measure a fund manager's market timing ability. It is computed as the portfolio-weighted returns on control portfolios which have the same characteristics as stocks currently held by the fund, in excess of time-series average returns on those control portfolios. AS is the time-series average return on control portfolios having the same characteristics as stocks currently held (long-term style-based returns). Similarly, industry-adjusted benchmarks are constructed to examine whether fund managers can generate additional performance by selecting superior stocks within industries. This stock picking ability is denoted by the industry stock selectivity measure (IS). The industry timing measure (IT) evaluates a fund manager's ability to select superior industries by exploiting time-

varying expected returns of market industry portfolios. The calculation method is discussed in Section 3.4.2 Chapter 3.

Table 4.3 summarises the results of abnormal returns for both the characteristic-adjusted and industry-adjusted fund performance measures for the style consistency decile portfolios. The first three columns set out the before-expenses abnormal returns estimated using the Carhart four-factor model on a quarterly basis. In the model, CT, CS and AS are used as the dependent variables to gauge characteristic-adjusted holding-based performances. The last two columns report the results associated with IS and IT as industry-adjusted performance.

From Table 4.3, it can be seen that style-consistent mutual funds tend to have a higher selectivity CS measure, a higher timing CT measure and also a higher long-term style-based return AS measure, than style-drift mutual funds. The difference in the characteristic-based measure between the five most, and the five least, style consistent deciles equals 0.08% for CS, 0.1% for CT, and 0.1% for AS, per quarter. The magnitude of this difference increases monotonically when comparing the top and the bottom quintiles or deciles. The difference between the first decile and last decile portfolios, for the characteristic-based measure, is 0.26% for CS, 0.47% for CT, and 0.53% for AS, per quarter. All the differences for the top and bottom decile portfolios are significant at the 1% level. This estimation indicates that, by applying the characteristic holding-based fund measure, all three components of fund returns show results which are in line with the factor-based performance measures; that is, style-consistent funds exhibit a future higher return. The reasons for superior returns provided by the decomposition of fund performance suggest that style-consistent fund managers have better stock picking skills and market timing ability, over the sample period, than style-inconsistent fund managers.

Table 4. 3 Decile Portfolios: Holding-Based Performance Measure sorted by HSC

This table summarises the results of the holding-based performance measure according to DGTW (1997) for different portfolios of actively managed mutual funds sorted by Holding-Based Style Consistency (HSC) over the sample period of 1998 to 2017. The sample is divided into deciles based on the lagged Holding-Based Style Consistency (HSC), which is computed as the average style characteristic volatility of a fund's security holdings by $HSC_{j,t}=\sum_{c=1}^{3}\frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t}=\{\sum_{n=0}^{35}\frac{(Rank_{c,j,t-n}-MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score during the 36-month measurement period. The characteristic-based performance measures are calculated as CS, CT, and AS. Mutual fund stock selectivity ability is defined as $CS_{T=}\sum_{j=1}^{N}W_{j,t-1}(R_{j,t}-R_t^{b_{j,t-1}})$, where $R_t^{b_{j,t-1}}$ denotes the return of a benchmark portfolio during period *t-1* according to its size, value, and momentum characteristics. CT, the measure of style-timing ability, is computed as $CT_t=\sum_{j=1}^{N}(W_{j,t-1}\,R_t^{b_{j,t-1}}-W_{j,t-5}\,R_t^{b_{j,t-5}})$. AS captures the return earned by the fund due to a fund's tendency to hold stocks with certain characteristics, which is computed as $AS_t=\sum_{j=1}^{N}W_{j,t-5}\,R_{j,t-5}^{b}$. For industry-adjusted fund performance, this table displays the result of IS, the industry stock selectivity measure, which is the variable to test a fund manager's stock picking skills from within an industry and is calculated as $IS_{T=}\sum_{j=1}^{N}W_{j,t-1}(R_{j,t}-R_t^{I_{j,t-1}})$. IT is defined as the industry timing measure and investigates a manager's ability to invest in superior industries, computed as $IT_t=\sum_{j=1}^{N}(W_{j,t-1}\,R_t^{I_{j,t-1}}-W_{j,t-5}\,R_t^{I_{j,t-5}})$, where $W_{j,t-1}$ is portfolio weight of the stock held by fund *j* of a certain industry at quarter *t*, and $R_{j,t-1}^{I}$ is the market portfolio industry return at quarter *t-1*. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The *t*-values of the regressions are presented in parentheses. This table reports the differences in the abnormal returns between the top and bottom deciles, the top and bottom quintiles, and the top and the bottom halves of the mutual funds. All abnormal returns are presented followed by *t* statistics. '***', '**' and '*' represent significance at the 1%, 5%, and 10% levels respectively.

	Characteristics-Adjusted Performance			Industry-Adjusted Performance	
	CS	CT	AS	IS	IT
All Funds	0.0022*	0.0017*	0.0275***	0.0091**	0.0112***
	(1.82)	(1.82)	(3.01)	(2.47)	(3.73)
Decile 1	0.0037***	0.0056***	0.0303***	0.0159***	0.0147***
(Most Style	(3.28)	(4.53)	(3.61)	(4.68)	(3.67)
Consistent)					
Decile 2	0.0026**	0.0019*	0.0277***	0.0121***	0.0137***
	(2.57)	(1.74)	(3.27)	(3.88)	(3.92)
Decile 3	0.0025**	0.0012	0.0276***	0.0119***	0.0133***
	(2.47)	(1.28)	(3.17)	(3.82)	(4.44)
Decile 4	0.0024**	0.0015	0.0275***	0.0091***	0.0139***
	(2.18)	(1.61)	(3.12)	(2.67)	(4.64)
Decile 5	0.0023**	0.0014	0.0273***	0.0086**	0.0131***
	(2.09)	(1.50)	(3.07)	(2.52)	(3.27)
Decile 6	0.0021*	0.0013	0.0276***	0.0081**	0.0129***
	(1.76)	(1.39)	(3.02)	(2.20)	(4.29)
Decile 7	0.0025	0.0012	0.0274***	0.0072	0.0118***
	(1.60)	(1.28)	(2.95)	(1.49)	(3.94)
Decile 8	0.0019	0.0013	0.0273***	0.0061	0.0082**
	(1.04)	(1.04)	(2.84)	(1.08)	(2.04)
Decile 9	0.0013	0.0010	0.0272***	0.0068***	0.0072
	(0.58)	(0.71)	(2.78)	(7.75)	(1.60)
Decile 10	0.0010	0.0009	0.0250**	0.0053	0.0031
(Most Style	(0.33)	(0.58)	(2.41)	(0.57)	(0.62)
Inconsistent)					
1^{st} half-2^{nd} half	0.0008	0.0010	0.0010	0.0040	0.0043*
	(0.97)	(1.27)	(0.13)	(1.34)	(1.70)
1^{st} quintile-	0.0013	0.0019	0.0019*	0.0053	0.0060
5^{th} quintile	(1.20)	(1.51)	(1.93)	(1.32)	(1.51)
1^{st} decile-	0.0026***	0.0047***	0.0053***	0.0106**	0.0116**
10^{th} decile	(2.63)	(2.77)	(2.65)	(2.12)	(2.10)

Together with the evidence from the factor-based models, this study presents strong evidence that style consistency contributes to the superior performances of mutual fund managers. Over the past few decades, the importance of the 'style tilt' of an equity portfolio has resulted in an increased emphasis by institutional managers on marketing themselves as specializing in a certain style category. Brown et al. (2009) found that style-consistent funds outperform other funds in terms of their stock picking performance. Using two different statistical measures of consistency linked to fund returns, they found that a negative relationship exists between portfolio style consistency and portfolio turnover, and that a positive relationship exists between a fund's style consistency and a fund's return, and between a fund's style consistency and a fund's performance persistence. However, Wermers (2012) found that the relationship between style consistency and stock picking talents is, at best, tenuous. He illustrated that managers with the best stock picking talents often tend to implement strategies that involve a significant amount of equity style drift. These findings provide an interesting contrast to Brown, Harlow and Zhang's study. By using the unique dataset for Chinese actively managed mutual funds, I provide supportive evidence for the former; that is, that style consistency is positively correlated with fund future returns.

The results for the relationship between mutual funds' industry concentration and performance are presented in Table 4.4 and are based on the holding-based measure. Both the characteristic-based and industry-based performance measures are regressed on the Carhart risk factors, which yield the abnormal returns presented. Concentrated mutual funds with a higher ICI tend to have a higher selectivity measure CS and a higher market timing measure CT, than diversified mutual funds with a lower ICI. The difference in the CS measure between the most and the least concentrated deciles is 0.34%, indicating that fund managers who concentrate their portfolio equity holdings in certain

Table 4. 4 Decile Portfolios: Holding-Based Performance Measure sorted by ICI

This table reports the holding-based performance measure according to DGTW (1997) for different portfolios of actively managed mutual funds sorted by the Industry Concentration Index over the sample period of 1998 to 2017. The sample is divided into deciles based on the lagged Industry Concentration Index (ICI), which is calculated as the $ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F} - W_{j,t}^{M})^2$, where $W_{j,t}^{F}$ is the weight of stock holdings from the same industry relative to the total net assets of fund *i* at quarter *t* and $W_{j,t}^{M}$ is the weight of the corresponding industry stocks relative to the total A share stock market. The characteristic-based performance measures are calculated as CS, CT, and AS. Mutual fund stock selectivity ability is defined as $CS_{T=}\sum_{j=1}^{N} W_{j,t-1}(R_{j,t} - R_t^{b_{j,t-1}})$, where $R_t^{b_{j,t-1}}$ denotes the return of a benchmark portfolio during period *t-1* according to its size, value, and momentum characteristics. CT, the measure of style-timing ability, is computed as $CT_t = \sum_{j=1}^{N}(W_{j,t-1}\, R_t^{b_{j,t-1}} - W_{j,t-5}\, R_t^{b_{j,t-5}})$. AS captures the return earned by the fund due to a fund's tendency to hold stocks with certain characteristics, which is computed as $AS_t = \sum_{j=1}^{N} W_{j,t-5}\, R_{j,t-5}^{b}$. For industry-adjusted fund performance, this table displays the result of IS, the industry stock selectivity measure, which is the variable to test a fund manager's stock picking skills from within an industry and is calculated as $IS_{T=}\sum_{j=1}^{N} W_{j,t-1}(R_{j,t} - R_t^{I_{j,t-1}})$. IT is defined as the industry timing measure and investigates a manager's ability to invest in superior industries, computed as $IT_t = \sum_{j=1}^{N}(W_{j,t-1}\, R_t^{I_{j,t-1}} - W_{j,t-5}\, R_t^{I_{j,t-5}})$, where $W_{j,t-1}$ is the portfolio weight of a stock held by fund *j* of a certain industry at quarter *t*, and $R_{j,t-1}^{I}$ is the market portfolio industry return at quarter *t-1*. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The *t*-values of the regressions are presented in parentheses. This table reports the differences in the abnormal returns between the top and bottom deciles, the top and bottom quintiles, and the top and the bottom halves of the mutual funds. All abnormal returns are presented followed by *t* statistics. '***', '**' and '*' represent significance at the 1%, 5%, and 10% levels respectively.

	Characteristics-Adjusted Performance			Industry-Adjusted Performance	
	CS	CT	AS	IS	IT
All Funds	0.0022*	0.0017*	0.0275***	0.0091**	0.0112***
	(1.82)	(1.82)	(3.01)	(2.47)	(3.73)
Decile 1	0.0010	0.0008	0.0157*	0.0031	0.0012
(Diversified)	(0.89)	(0.65)	(1.86)	(0.91)	(0.29)
Decile 2	0.0012	0.0011	0.0169	0.0042	0.0020
	(1.14)	(1.05)	(1.99)	(1.34)	(0.58)
Decile 3	0.0015	0.0013	0.0188**	0.0051*	0.0021
	(1.42)	(1.39)	(2.16)	(1.65)	(0.70)
Decile 4	0.0014	0.0017*	0.0199**	0.0074**	0.0033
	(1.28)	(1.80)	(2.26)	(2.18)	(1.10)
Decile 5	0.0017	0.0018*	0.0251***	0.0062**	0.0028
	(1.51)	(1.95)	(2.83)	(1.83)	(0.92)
Decile 6	0.0013	0.0019**	0.0263***	0.0081**	0.0115***
	(1.04)	(2.05)	(2.88)	(2.21)	(3.83)
Decile 7	0.0027*	0.0021**	0.0332***	0.0095**	0.0130***
	(1.70)	(2.22)	(3.58)	(1.98)	(4.34)
Decile 8	0.0034*	0.0022*	0.0357***	0.0128**	0.0147***
	(1.83)	(1.76)	(3.70)	(2.26)	(3.67)
Decile 9	0.0036	0.0020	0.0383***	0.0162**	0.0265***
	(1.59)	(1.44)	(3.92)	(2.38)	(5.88)
Decile 10	0.0044	0.0023	0.0450***	0.0180*	0.0396***
(Concentrated)	(1.43)	(1.51)	(4.34)	(1.92)	(7.91)
	0.0012	0.0004	0.0105**	0.0056*	0.0153***
2^{nd} half-1^{st} half	(1.20)	(0.33)	(2.09)	(1.85)	(6.11)
	0.0029	0.0012	0.0296***	0.0138***	0.0305***
5^{th} quintile- 1^{st} quintile-	(1.46)	(0.58)	(3.49)	(3.46)	(7.61)
	0.0034	0.0015	0.0293***	0.0149***	0.0384***
10^{th} decile-1^{st} decile-	(1.13)	(0.51)	(3.36)	(2.98)	(6.98)

industries have stronger stock picking abilities. A return premium can also be found for the portfolio with the highest industry concentration, when fund performance is measured by CT. The most concentrated decile portfolio generates 0.15% more return premiums than the most diversified decile portfolio, demonstrating the stronger ability of concentrated fund managers to time stock holding with market variation. When the industry-adjusted measures of IS and IT are used, the differences in fund performance between concentrated and diversified portfolios are all statistically significant and positive at the 10% level or higher. The most concentrated decile portfolio generates 1.49% and 3.84% differences, when compared with the diversified funds, for IS and IT respectively, and the differences are significant at the 1% level. Consistent with earlier results in this study, concentrated funds exhibit better stock-picking and style-timing abilities than diversified funds over the sample period.

4.3.2 Multivariate Regression Evidence of Mutual Funds: Does a Style-Performance Relation Still Exist When Other Fund Characteristic Controls are Apparent?

In this section, I recall the results of style-performance analysis by applying multivariate regressions for each individual fund in Table 3.12 of Chapter 3. In comparison with the portfolio approach discussed earlier, the multivariate regression approach allows for more considerations from different perspectives. The style decile portfolio analysis evaluates fund performance without controlling for other mutual fund characteristics that are associated with fund performance. Conducting such an analysis of a detailed stockholding for a comprehensive sample of Chinese open-end equity mutual funds, Tang, Wang and Xu (2012) showed that an inverted U-shaped relationship exists between fund size and fund performance. Furthermore, the authors found that the size of style-drift and industry-diversified mutual funds tends to be larger than style-consistent and industry-concentrated funds. Their results suggest that style decile portfolio analysis cannot

precisely detect the causes for the superior returns of style-consistent and industry-concentrated funds. This raises the question: Are the superior returns generated by better management skills or are they simply due to the size effect? Since active mutual funds generate a significant amount of style drift by active trading and more active management than passive funds (Wermers, 2012), this study considers fund turnover as another control variable in the multivariate regression.

Moreover, it is the fund flow into, or out of, a mutual fund that is strongly related to the lagged measure of excess return (Chevalier and Ellison, 1997; Berk and Green, 2004). Therefore, it is essential to control the flow effect on fund style-performance in analysis. The multivariate regression approach allows for simultaneous control of these different factors. Unlike the portfolio approach that explores fund performance by aggregating mutual funds of similar style consistency or industry concentration, multivariate regressions examine the style effect for each individual mutual fund. Furthermore, the style decile portfolio method assumes that the factor loading is not time-varying. Multivariate regressions relax this assumption and use historical data to estimate the four-factor model and determine the abnormal return for the current period. In the multivariate regression analysis, I consider both the unconditional and conditional four-factor models to obtain abnormal returns, as well as the holding-based performance measures.

The results of these multivariate regressions suggest funds with a higher style investment consistency can generate superior performance in the future. The industry concentration statistically significantly affects the fund performance return in a positive way regardless of the fund performance measure applied. Furthermore, turnover positively impacts these actively managed funds' returns and it displays a positive relationship between fund flow and their holding-based and factor-based returns. Furthermore, funds that are established in a shorter time achieve better in the future and size produces a significant negative effect on their next quarter returns.

These fund characteristic analyses give rise to the investigation on whether these characteristics have an impact on the extent of the style-performance relation.

4.3.3 Portfolio Size: Does the Style Effect Vary With Size?

A number of papers illustrate a negative relationship between size and performance. Berk and Green (2004) provided a theoretical argument that performance cannot persist because new money flows into well-performing mutual funds and there are diseconomies of scale. Chen, Hong, Huang and Kubik (2004) found a negative relationship between lagged fund size and fund returns. They found that this association is most pronounced among funds that have to invest in small and illiquid stocks, indicating that adverse scale effects are related to liquidity. However, a positive relationship between fund family size and fund performance is detected with the same dataset. Yan (2008) reported supportive results employing superior proxies for liquidity. It has also been found that trading costs and transaction expenses are the primary sources of diseconomies of scale for funds (Edelen, Evans & Kadlec, 2007). Wang and Nanda (2008) argue that some funds are too large relative to the investment opportunities and abilities of their managers. The agency costs for the poorer performance from these large funds are a potential explanation. Cross-country evidence is provided by Ferreira, Keswani, Miguel and Ramos (2013). They found diseconomies of scale for US funds but no evidence of diseconomies for non-US funds. They also found that adverse scale effects in the US are related to liquidity constraints faced by funds that have to invest in small and domestic stocks. Countries with liquid stock markets and strong legal institutions enable fund managers to generate superior performance.

In contrast, other researchers demonstrate a positive relationship between fund size and fund performance. By using a sample of US mutual funds in univariate sorts, Elton, Gruber and Blake (2012) found a positive (although insignificant) relationship between size and performance.

Moreover, Bhojraj, Cho, and Yehuda (2012) attributed the positive size-performance relation to private information. They found that when large fund managers who have access to managerial, non-public information from investment banks, this enables them to gain unfair advantage over smaller funds.

Previous studies have found mixed evidence that fund size is negatively related to performance. It has been demonstrated that this lack of consensus may be due to the size-performance relation being endogenous (Phillip, Pukthuanthong & Rau, 2018) That is, fund size might be only indirectly related to performance via other fund characteristics. Using the instrument variable specification, Phillip et al. (2018) found little evidence that fund size affects fund performance and they failed to report any significant diseconomies of scale in mutual fund performance.

Therefore, funds of different sizes may present different style-performance relation. To further explore whether style consistency and industry concentration depend on the size of mutual funds, this study sorts all funds into quintile portfolios by fund size and compares the performance between style-consistent funds and style-inconsistent funds, and between concentrated and diversified funds within the same size quintile portfolios. The funds are firstly sorted into size quintile portfolios according to the total net assets at the end of the prior quarter. Subsequently, within each size quintile, mutual funds are further ranked by high and low HSC or high and low ICI based on the comparison of mean values.

Table 4.5 reports the results of both the factor-based and holding-based fund performance measures for size quintile portfolios. Panel A shows the quintile size portfolios further sorted by the style consistency score (HSC). It can be seen that small funds, on average, outperform large funds. For the unconditional four-factor model, the average abnormal return of the smallest quintile portfolio is 2.6% per quarter before expenses, and the largest quintile portfolio only

generates 1.2% abnormal returns per quarter. This result favours the finding of there being a negative size effect on fund performance (Chen, Hong, Huang & Kubik, 2004). The style consistency effect on performance of small funds is more significant. The magnitude of the performance difference between style-consistency and style-drift funds decreases from 0.65% per quarter for the smallest quintile funds, to 0.29% per quarter for the largest quintile funds for conditional abnormal returns. The holding–based performance measure provides supportive results to the factor-based discussion with greater statistical significance, especially for small funds.

Panel B presents the results for the size portfolio further sorted by the Industry Concentration Index. From Panel B, the abnormal returns difference between the smallest and largest sized portfolios does not vary significantly for these factor-based performance measures. For the smallest portfolios, the funds with a higher ICI generate a return premium at 0.29% higher per quarter over the funds with lower ICI for unconditional abnormal return. The difference between industry concentrated funds and diversified funds is even slightly greater at 0.51% per quarter for conditional abnormal returns at the 10% level. However, the holding-based measures of funds present similar results as Panel A, and the small sized funds exhibit a more conspicuous industry concentration effect on their performance. For the CS measure of the funds, the concentrated funds for the smallest quintile portfolios outperform the diversified funds from the same size quintile portfolio by 0.09% per quarter and is statistically significantly different from zero at the 5% level. This difference becomes less significant for funds from the largest quintile portfolio. The CT measure provides results consistent with the CS. Therefore, regardless of whether investment styles are measured by style consistency or industry concentration, in general, Table 4.5 demonstrates that small funds outperform large funds. The style-performance relation exists for all funds, regardless of size, but small funds exhibit a stronger style effect.

Table 4. 5 Size Portfolios

All actively managed mutual funds are sorted into five equally sized portfolios according to the lagged total net assets of mutual funds. Panel A presents the results of funds that are further divided these quintile portfolios into two groups according to lagged Holding-Based Style Consistency (HSC). The HSC, as the average style characteristic volatility of a fund's security holdings, is computed by $HSC_{j,t}=\sum_{c=1}^{3}\frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t}=\{\sum_{n=0}^{35}\frac{(Rank_{c,j,t-n}-MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score over the 36-month measurement period. The abnormal returns before expenses from the Carhart (1997) four-factor model are summarised for different portfolios of mutual funds over the sample period of 1998 to 2017. The appraisal ratio is calculated by dividing the abnormal returns by the standard deviation of the residual from a four-factor model. The characteristic-adjusted performance measures are denoted by CS, CT and AS. IS is the mutual fund managers' industry stock selectivity measure, examining a fund manager's stock picking skills from within an industry and is calculated as $IS_{T=}\sum_{j=1}^{N}W_{j,t-1}(R_{j,t}-R_t^{I_{j,t-1}})$. IT is defined as the industry timing measure, and investigates a manager's ability to invest in superior industries, which is computed as $IT_t=\sum_{j=1}^{N}(W_{j,t-1}\,R_t^{I_{j,t-1}}-W_{j,t-5}\,R_t^{I_{j,t-5}})$, where $W_{j,t-1}$ is the portfolio weight of the stock held by fund *j* of a certain industry at quarter *t*, and $R_{j,t-1}^{I}$ is the market portfolio industry return at quarter *t-1*. Panel B divides these quintile portfolios into two groups based on the lagged Industry Concentration Index, which is calculated as the $ICI_t=\sum_{j=1}^{6}(W_{j,t}^{F}-W_{j,t}^{M})^2$, where $W_{j,t}^{F}$ is the weight of stock holdings from the same industry relative to the total net assets of fund *i* at quarter *t* and $W_{j,t}^{M}$ is the weight of the corresponding industry stocks relative to the total A share stock market. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The *t*-values of the regressions are presented in parentheses. All coefficients are presented followed by *t* statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Size Portfolios Further Sorted By HSC

		Four-Factor Abnormal Return			Holding-Based Performance Measure				
					Characteristic-Based Performance Measure			Industry-Based Performance Measure	
Size Quintiles	HSC	Unconditional	Conditional	Appraisal Ratio Four-Factor	CS	CT	AS	IS	IT
Quintile 1	Low	0.0290***	0.0288***	0.0450***	0.0034***	0.0054***	0.0348**	0.0148**	0.0179***
		(3.79)	(3.77)	(5.27)	(3.32)	(4.94)	(2.29)	(2.41)	(5.12)
	High	0.0241***	0.0223**	0.0279***	0.0026	0.0017	0.0306*	0.0094	0.0142***
		(2.96)	(2.19)	(3.06)	(1.40)	(1.10)	(1.89)	(1.43)	(2.84)
	Low-High	0.0048	0.0065*	0.0171	0.0008	0.0037***	0.0042*	0.0054*	0.0037
		(0.48)	(1.65)	(1.50)	(0.57)	(2.95)	(1.76)	(1.66)	(0.92)
Quintile 2	Low	0.0272***	0.0274***	0.0236***	0.0033***	0.0035***	0.0347**	0.0112*	0.0167***
		(3.34)	(3.17)	(2.59)	(3.21)	(3.25)	(2.14)	(1.71)	(4.77)
	High	0.0251***	0.0245***	0.0111	0.0024	0.0011	0.0304**	0.0081	0.0100**
		(3.29)	(3.21)	(1.30)	(1.51)	(0.88)	(2.00)	(1.33)	(2.50)

Table 4.5 Panel A-*Continued*

	Low-High	0.0021*	0.0029	0.0125	0.0009	0.0024***	0.0043	0.0031*	0.0067**
		(1.72)	(0.38)	(1.47)	(1.64)	(2.61)	(0.28)	(1.75)	(2.23)
Quintile 3	Low	0.0258***	0.0259***	0.0131	0.0029***	0.0016*	0.0318**	0.0114**	0.0129***
		(3.61)	(3.64)	(1.64)	(2.83)	(1.69)	(2.24)	(1.99)	(4.29)
	High	0.0181*	0.0238*	0.0101	0.0024	0.0011	0.0298	0.0092	0.0107***
		(1.87)	(2.34)	(0.93)	(1.13)	(1.17)	(1.55)	(1.19)	(3.56)
	Low-High	0.0076	0.0021	0.0030	0.0005	0.0005	0.0020	0.0022	0.0022*
		(0.79)	(0.13)	(0.27)	(0.26)	(0.62)	(0.02)	(0.28)	(1.87)
Quintile 4	Low	0.0230***	0.0248***	0.0127	0.0024**	0.0012	0.029**	0.0103*	0.0103**
		(3.23)	(4.87)	(1.59)	(2.36)	(0.96)	(2.02)	(1.81)	(2.57)
	High	0.0161*	0.0166	0.0087	0.0021	0.0007	0.0274	0.0087	0.0091***
		(1.58)	(1.56)	(0.76)	(1.14)	(0.67)	(1.35)	(1.06)	(2.61)
	Low-High	0.0069*	0.0082*	0.0040*	0.0003	0.0005	0.0013	0.0016	0.0012
		(1.80)	(1.89)	(1.72)	(0.18)	(0.50)	(0.15)	(0.23)	(0.38)
Quintile 5	Low	0.0253***	0.0212***	0.0084	0.0020*	0.0013	0.0276***	0.0090**	0.0102***
		(4.97)	(4.17)	(1.47)	(1.76)	(1.19)	(2.72)	(2.21)	(2.91)
	High	0.022**	0.0183*	0.0037	0.0013	0.0010	0.0252	0.0075	0.0117***
		(2.40)	(1.90)	(0.36)	(0.66)	(0.94)	(1.38)	(1.02)	(3.35)
	Low-High	0.0033	0.0029	0.0047*	0.0007	0.0003	0.0024	0.0015	-0.0015
		(0.43)	(0.38)	(1.75)	(0.45)	(0.29)	(0.16)	(0.25)	(-0.51)

Panel B: Size Portfolios Further Sorted By ICI

Size Quintiles	ICI	Four-Factor Abnormal Return: Unconditional	Four-Factor Abnormal Return: Conditional	Appraisal Ratio Four-Factor	Holding-Based Performance Measure: Characteristic-Based Performance Measure: CS	CT	AS	Industry-Based Performance Measure: IS	IT
Quintile 1	High	0.0194***	0.0200***	0.0204***	0.0034***	0.0024***	0.0276***	0.0072**	0.0222***
		(5.49)	(5.66)	(5.16)	(7.18)	(4.76)	(3.91)	(2.55)	(2.85)
	Low	0.0165***	0.0154***	0.0157***	0.0025***	0.0010	0.0260***	0.0060*	0.0041
		(3.99)	(2.98)	(3.38)	(2.65)	(1.26)	(3.15)	(1.81)	(1.60)
	High-Low	0.0029	0.0046*	0.0048	0.0009*	0.0014*	0.0016	0.0012	0.0182***
		(0.46)	(1.87)	(0.67)	(1.73)	(1.80)	(1.05)	(0.60)	(3.47)
Quintile 2	High	0.0225***	0.0233***	0.0180**	0.0025***	0.0012	0.0322**	0.0092	0.0081***
		(3.32)	(3.23)	(2.37)	(2.93)	(1.33)	(2.38)	(1.52)	(2.76)
	Low	0.018**	0.0184***	0.0142*	0.0028*	0.0011	0.0276**	0.0040	0.0101***
		(2.54)	(2.60)	(1.79)	(1.91)	(1.06)	(2.17)	(0.70)	(2.72)
	High-Low	0.0045***	0.0049*	0.0038	-0.0003	0.0001	0.0047	0.0052***	-0.0020
		(3.45)	(1.67)	(0.41)	(-0.52)	(0.11)	(0.29)	(2.80)	(-0.64)
Quintile 3	High	0.0237***	0.0244***	0.0164*	0.0020*	0.0037***	0.0286*	0.0114*	0.0059*
		(2.98)	(3.08)	(1.85)	(1.76)	(3.56)	(1.81)	(1.79)	(1.77)
	Low	0.0225*	0.0206***	0.0108	0.0024	0.0027**	0.0250	0.0078	0.0114***
		(1.81)	(2.60)	(1.05)	(1.01)	(2.25)	(1.16)	(0.78)	(2.94)
	High-Low	0.0012	0.0038	0.0057*	-0.0004	0.0010*	0.0036	0.0036	-0.0054
		(0.24)	(0.74)	(1.83)	(-0.17)	(1.93)	(0.35)	(0.34)	(-0.06)
Quintile 4	High	0.0246**	0.0254***	0.0162	0.0017	0.0012	0.0270	0.0127	0.0117*
		(2.49)	(3.13)	(1.28)	(1.04)	(0.60)	(1.19)	(1.39)	(1.84)
	Low	0.0192	0.0214	0.0128	0.0019	0.0010	0.0239	0.0084	0.0120
		(1.18)	(1.44)	(0.81)	(0.73)	(0.66)	(0.85)	(0.74)	(2.45)
	High-Low	0.0053*	0.0040	0.0035	-0.0002	0.0002	0.0031	0.0043*	-0.0002
		(1.82)	(0.85)	(1.35)	(-0.12)	(0.20)	(0.34)	(1.75)	(-0.07)
Quintile 5	High	0.0288***	0.0278***	0.0152*	0.0019	0.0019	0.0322	0.0142**	0.0225***
		(3.64)	(3.52)	(1.72)	(1.10)	(1.12)	(1.60)	(2.23)	(4.14)
	Low	0.024*	0.0227	0.0103	0.0016	0.0011	0.0250*	0.0100	0.0040
		(1.83)	(1.44)	(0.61)	(0.50)	(0.82)	(1.84)	(0.83)	(0.70)
	High-Low	0.0048	0.0051*	0.0050*	0.0003	0.0008	0.0073*	0.0042	0.0185***
		(0.44)	(1.81)	(1.92)	(0.14)	(1.63)	(1.73)	(0.47)	(4.30)

4.3.4 Style Category Portfolios: Do Small or Growth Funds Outperform?

When funds are classified into different categories according to their size and value, they may generate different returns. Brown et al. (2009) illustrated that US value-oriented funds produce average annual returns as much as 4.9% higher than those for growth-oriented portfolios. Moreover, they also demonstrate that small-cap funds outperform large-cap funds by an average of between 4.77% and 8.66% by controlling for value-growth characteristics. Inspired by these findings, in this section Chinese domestic equity fund performance will be further explored to examine whether fund returns vary according to different fund style categories. I will discuss further the extent to which style consistency and industry concentration results are related to fund performance under different fund categories. The sample of actively managed equity mutual funds are sorted by four style categories based on the multi-steps procedure used by Brown et al. (2009) as follows.

First, all fund returns for the previous 36 months are regressed on the Carhart four-factor model at the beginning of each calendar year to estimate the factor loadings. Second, each fund is ranked by its coefficient on size from most negative (i.e., large-cap orientation) to most positive (i.e., small-cap orientation). Funds are classified into large and small-cap categories by comparing them with the average size coefficient. Secondly, within each size group, funds are further divided into value and growth categories by ranking the value coefficient from the most positive (i.e., value orientation) to the most negative (i.e., growth orientation). This annual fund category classification procedure results in four fund style categories: small growth, small value, large growth and large value. Within each fund category portfolio, funds are then subdivided into high or low groups by the Holding-Based Style Consistency (HSC) score and the Industry Concentration Index (ICI) respectively.

Table 4.6 summarises the performance results of these portfolios of mutual funds. Panel A presents results for the style category portfolios further sorted by HSC. The first two columns report the abnormal returns from the conditional and unconditional four-factor models before subtracting expenses. The third column presents the risk-adjusted abnormal return as an appraisal ratio. The remaining columns report the holding-based performance. The results show that growth funds, on average, perform better than value growth funds. The abnormal returns from the unconditional model for growth funds before expenses is 0.57% higher than value funds per quarter. This is consistent with the empirical work of Asness, Friedman, Krail, and Liew (2000), who illustrated that portfolios formed on growth characteristics outperform those with value-oriented strategies by 30% during the sample period and presented a new model on value-growth and earnings spreads. Regarding the style consistency effect on fund performance, both the factor-based and holding-based performance measures show that small growth funds exhibit the most significant difference between style-consistent and style-inconsistent portfolios. The unconditional abnormal returns for small growth funds, which have a higher style-consistency score, outperform the fund lower style-consistency score by 0.44% per quarter. The magnitude of this difference becomes 0.32% for large value funds. This indicates that small growth fund managers can make the most profits by continuously investing in stocks with similar, particular characteristics.

Table 4. 6 Style Category Portfolios

All actively managed mutual funds are sorted into four portfolios according to their ranking for the coefficient of lagged market value (small vs. large cap) and the lagged book-to-market ratios (growth vs. value) from the four-factor model. In Panel A, mutual funds with these four style categories are further divided into two groups according to the lagged Holding-Based Style Consistency. The HSC, as the average style characteristic volatility of a fund's security holdings, is computed by $HSC_{j,t}=\sum_{c=1}^{3}\frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t}=\{\sum_{n=0}^{35}\frac{(Rank_{c,j,t-n}-MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score over the 36-month measurement period. The abnormal returns before expenses using the Carhart (1997) four-factor model are summarised for different portfolios of mutual funds over the sample period from 1998 to 2017. The appraisal ratio is calculated by dividing the abnormal return by the standard deviation of the residual from a four-factor model to adjust idiosyncratic risk. The characteristic-adjusted performance measures are denoted by CS, CT and AS. IS is the mutual fund managers' industry stock selectivity measure, testing a fund manager's stock picking skills from within an industry and is calculated as $IS_{T=}\sum_{j=1}^{N}W_{j,t-1}(R_{j,t}-R_t^{I_{j,t-1}})$. IT is defined as the industry timing measure, investigating managers' abilities to invest in superior industries, which is computed as $IT_t=\sum_{j=1}^{N}(W_{j,t-1}\,R_t^{I_{j,t-1}}-W_{j,t-5}\,R_t^{I_{j,t-5}})$, where $W_{j,t-1}$ is the portfolio weight of the stock held by fund *j* of a certain industry at quarter *t*, and $R_{j,t-1}^{I}$ is the market portfolio industry return at quarter *t-1*. In Panel B, mutual funds with these four style categories are further divided into two groups based on the lagged Industry Concentration Index, which is calculated as $ICI_t=\sum_{j=1}^{6}(W_{j,t}^{F}-W_{j,t}^{M})^2$, where $W_{j,t}^{F}$ is the weight of stock holdings from the same industry relative to the total net assets of fund *i* at quarter *t* and $W_{j,t}^{M}$ is the corresponding industry stock weight relative to the total A share stock market. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The *t*-values of the regressions are presented in parentheses. All coefficients are presented followed by *t* statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels respectively.

Panel A: Category Portfolios Further Sorted By HSC

		Four-Factor Abnormal Return			Holding-Based Performance Measure				
					Characteristic-Based Performance Measure			Industry-Based Performance Measure	
Style Quintiles	HSC	Unconditional	Conditional	Appraisal Ratio Four-Factor	CS	CT	AS	IS	IT
Small Growth	Low	0.0233**	0.0253**	0.1791***	0.0032**	0.0029**	0.0641*	0.0303***	0.0173***
		(2.18)	(2.49)	(14.97)	(2.15)	(2.33)	(1.88)	(6.68)	(4.32)
	High	0.0189	0.0192	0.0997***	0.0018	0.0017	0.0388	0.0089	0.0102
		(1.33)	(1.30)	(6.25)	(0.52)	(0.78)	(0.49)	(0.85)	(1.45)
	Low-High	0.0044	0.0061	0.0794***	0.0014*	0.0012*	0.0253	0.0213***	0.0071
		(1.26)	(0.39)	(4.22)	(1.67)	(1.70)	(0.42)	(2.69)	(1.29)
Small Value	Low	0.0191*	0.0188*	0.1810***	0.0021*	0.0019***	0.0433	0.0103***	0.0183*
		(1.88)	(1.68)	(15.89)	(1.74)	(6.10)	(1.56)	(2.80)	(1.82)

Table 4.6 Panel A-*Continued*

	High	0.0151	0.0154	0.1586***	0.0016	-0.0005	0.0201	0.0024	0.0110***
		(1.48)	(1.44)	(13.92)	(1.01)	(-0.64)	(0.55)	(0.50)	(4.41)
	Low-High	0.0040	0.0034*	0.0224***	0.0005	0.0024***	0.0232**	0.0079**	0.0073***
		(0.52)	(1.65)	(2.62)	(0.49)	(3.85)	(1.99)	(2.54)	(3.63)
Large Growth	Low	0.0339***	0.0252***	0.1703***	0.0029**	0.0023	0.0247	0.0099*	0.0124***
		(4.76)	(3.81)	(21.35)	(2.40)	(1.64)	(0.89)	(2.69)	(2.75)
	High	0.0206**	0.0214**	0.1387***	0.0040*	0.0016	0.0134	-0.0309***	0.0081
		(2.02)	(2.10)	(12.17)	(1.79)	(1.03)	(0.26)	(-4.54)	(1.61)
	Low-High	0.0133*	0.0038	0.0316***	-0.0011	0.0007	0.0113	0.0408*	0.0043
		(1.74)	(0.37)	(2.64)	(-0.59)	(0.75)	(0.27)	(1.72)	(1.44)
Large Value	Low	0.0214**	0.0233**	0.1411***	0.0013	0.0019	0.0108	0.0246***	0.0109**
		(2.47)	(2.55)	(14.57)	(1.08)	(1.36)	(0.39)	(2.64)	(2.42)
	High	0.0182*	0.0216**	0.1254***	0.0010	0.0017	0.0069	0.0176***	0.0072
		(1.79)	(2.02)	(11.01)	(0.67)	(1.21)	(0.20)	(3.89)	(1.59)
	Low-High	0.0032	0.0017	0.0157**	0.0003	0.0002	0.0039	0.0070***	0.0037*
		(0.52)	(-0.23)	(2.30)	(0.36)	(0.26)	(0.20)	(2.74)	(1.94)

Panel B: Category Portfolios Further Sorted By ICI

State ownership Quintiles	ICI	Four-Factor Abnormal Return		Appraisal Ratio	Holding-Based Performance Measure				
					Characteristic-Based Performance Measure			Industry-Based Performance Measure	
		Unconditional	Conditional	Four-Factor	CS	CT	AS	IS	IT
Small Value	High	0.0337***	0.0318***	0.0199***	0.0074***	0.0056***	0.0033	0.0504**	0.0397**
		(6.81)	(6.75)	(3.59)	(10.76)	(3.54)	(1.56)	(2.02)	(2.14)
	Low	0.0275***	0.0248***	0.0136*	0.0041**	0.0039***	0.0024*'	0.0180***	0.0109***
		(3.80)	(3.31)	(1.67)	(2.35)	(3.52)	(1.73)	(3.38)	(3.07)
	High-Low	0.0062***	0.0070***	0.0063*	0.0033***	0.0017	0.0009*	0.0324***	0.0288***
		(2.84)	(2.78)	(1.75)	(6.32)	(1.55)	(1.72)	(6.54)	(4.34)
Small Value	High	0.0239***	0.0218**	0.0153	0.0022**	0.0046*	0.0069	0.0266***	0.0258***
		(2.82)	(2.34)	(1.61)	(2.17)	(1.73)	(1.29)	(4.66)	(3.09)
	Low	0.0174*	0.0156	0.0105	0.0015	0.0024***	0.0088	0.0148***	0.0068***
		(1.84)	(1.57)	(0.99)	(1.02)	(3.31)	(1.26)	(3.31)	(2.92)
	High-Low	0.0065*	0.0062***	0.0048*	0.0007	0.0022***	-0.0019	0.0118***	0.0190***
		(1.80)	(2.82)	(1.65)	(1.63)	(3.32)	(0.17)	(3.54)	(4.89)
Large Growth	High	0.0279***	0.0260***	0.0179**	0.0028**	0.0037**	0.0034	0.0214***	0.0160***
		(3.51)	(3.53)	(2.02)	(2.08)	(2.37)	(1.11)	(5.21)	(3.18)
	Low	0.0221*	0.0208	0.0161	0.0047	0.0012	0.0025	0.0133	-0.0065
		(1.69)	(1.59)	(1.10)	(1.64)	(0.60)	(1.03)	(1.52)	(-1.00)
	High-Low	0.0058	0.0052	0.0018	-0.0019	0.0025*	0.0009	0.0081	0.0224
		(0.55)	(0.37)	(0.11)	(-0.74)	(1.93)	(1.15)	(1.03)	(1.54)
Large Value	High	0.0222	0.0225	0.0191	-0.0010	0.0026	0.0067	-0.0404***	0.0564***
		(1.61)	(1.54)	(1.23)	(-0.52)	(1.16)	(1.15)	(-6.88)	(7.85)
	Low	0.0180	0.0181	0.0202	-0.0019	-0.0086***	0.0079	-0.0221***	0.0475***
		(1.27)	(1.22)	(1.27)	(-0.92)	(-4.41)	(1.16)	(-3.50)	(4.16)
	High-Low	0.0042	0.0044	-0.0011	0.0009***	0.0110*	-0.0113	-0.0182**	0.0089
		(1.39)	(1.09)	(-1.27)	(3.19)	(1.78)	(-0.70)	(2.52)	(1.24)

Panel B reports the results for the style category portfolios further sorted by industry concentration. The results show that small growth funds outperform other mutual funds in the light of most performance measures. Small growth funds outperform large value funds by 0.105% per quarter, according to abnormal returns compared before expenses from the unconditional model. Furthermore, small growth funds generate the most significant difference between concentrated portfolios and diversified portfolios, especially for the holding-based performance measure. The concentrated portfolio of small growth funds outperforms the diversified portfolio by 0.62% per quarter. However, the magnitude of difference is 0.42% per quarter for large value funds. Therefore, the effect of industry concentration on abnormal returns is more significant for small growth funds. The holding-based fund performance measure provides evidence that the concentrated small growth funds outperform more than the least concentrated funds in the same category. The difference between high and low concentration portfolios for large value funds becomes less significant.

4.3.5 State Ownership Portfolios: How Do Funds that Invest More in Stocks with High State Ownership Perform?

While the relationship between state ownership and firm performance has been widely researched, the empirical evidence is mixed. Qi, Wu and Zhang (2000) found that state equity ownership is negatively related to operating performance. Sun and Tong (2003) also showed that state ownership has a negative impact on firm performance and that legal person ownership has a positive impact on performance after privatization. Lin, Ma and Su (2009) demonstrated that state ownership is negatively related to firm efficiency. Moreover, it has been found that government ownership has a U-shaped relationship with corporate value (Tian & Estrin, 2008; Wei & Varela, 2003; Wei, Xie & Zhang, 2005). On the other hand, Jiang, Laurenceson and Tang (2008) argued

that the government-owned share proportion has exerted a linear and positive impact on firm performance. Therefore, no consensus has been reached on the relationship between state ownership and Chinese firm performance.

As suggested by prior studies, fund performance is affected by whether or not fund managers invest more in equities with higher state ownership. In this section, I examine the extent to which the style-performance relation is associated with a fund's holdings being state owned.

In this study, stocks listed in the China A share market are grouped into respective quintiles according to their state ownership which is the ratio calculated by dividing the number of shares owned by the government by the total number of shares on issue. Subsequently, the value-weighted state ownership score ($Rank\_Stato_{i,t}$) is computed for each mutual fund in each period. For example, a mutual fund that invested only in stocks in the smallest state ownership quintile would have a $Rank\_Stato_{i,t}$ of one, while a mutual fund that invested only in the largest state ownership quintile would have a $Rank_Stato_{i,t}$of five. Consequently, each stock held by a mutual fund is assigned a $Rank\_Stato_{i,t}$. To measure whether a stock held by mutual funds is highly state-owned or not, STATO is computed as a weighted average of each stock's $Rank\_Stato_{i,t}$ at quarter *t*. All funds are sorted by the STATO each quarter into state ownership portfolios. Finally, each quintile portfolio is further sorted according to its HSC and ICI.

Table 4.7 summarises the results of state ownership portfolios. Panels A and B present the fund performances further sorted by HSC and ICI respectively. It is found that the style-effect exists for all state ownership quintiles. In Panel A, the result for the unconditional abnormal returns illustrates that the quintile portfolios which have stockholdings with the lowest state ownership

Table 4. 7 State Ownership Portfolios

Mutual funds are sorted into fine equally ownership portfolios according to the lagged STATO (state ownership), which is calculated as $\text{STATO}_{j,t}=\sum_{i=1}^{N} Rank\_Stato_{i,t} * W_{i,t}$, where $Rank\_Stato_{i,t}$ is the score of state ownership, $W_{i,t}$ is the portfolio weight of each stock in fund *j* at the end of quarter *t*. All stocks in the A share market are firstly ranked by their state ownership annually and a score of 5 is assigned to the stock with the highest quintile rank during that quarter. The mutual funds in each of these five portfolios are further divided into two groups according to the lagged Holding-based Consistency (HSC) in Panel A, and the Industry Concentration Index (ICI) in Panel B. The abnormal returns before expenses using the Carhart (1997) four-factor model are summarised for different portfolios of mutual funds over the sample period of 1998 to 2017. The appraisal ratio is calculated by dividing the abnormal return by the standard deviation of the residual from the four-factor model. The characteristic-adjusted performance measures are denoted by CS, CT and AS. IS is the mutual fund managers' industry stock selectivity measure, testing a fund manager's stock picking skills from within an industry and it is calculated as $IS_{T=}\sum_{j=1}^{N} W_{j,t-1}(R_{j,t}-R_t^{I_{j,t-1}})$. IT is defined as the industry timing measure, investigating a manager's ability to invest in superior industries, which is computed as $IT_t=\sum_{j=1}^{N}(W_{j,t-1}\,R_t^{I_{j,t-1}}-W_{j,t-5}\,R_t^{I_{j,t-5}})$, where $W_{j,t-1}$ is the portfolio weight of the stock held by fund *j* of a certain industry at quarter *t*, and $R_{j,t-1}^{b}$ is the market portfolio industry return at quarter *t-1*. Panel B further divides these quintile portfolios into two groups based on the lagged Industry Concentration Index, which is calculated as the $ICI_t=\sum_{j=1}^{6}(W_{j,t}^{F}-W_{j,t}^{M})^2$, where $W_{j,t}^{F}$ is the weight of the stock holdings from the same industry relative to the total net assets of fund *i* at quarter *t* and $W_{j,t}^{M}$ is the corresponding industry stock weight relative to the total A share stock market. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The *t*-values of the regressions are presented in parentheses. All coefficients are presented followed by *t* statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels respectively.

Panel A: State Ownership Portfolios Further Sorted By HSC

		Four-Factor Abnormal Return			Holding-Based Performance Measure				
					Characteristic-Based Performance Measure			Industry-Based Performance Measure	
Size Quintiles	HSC	Unconditional	Conditional	Appraisal Ratio Four-Factor	CS	CT	AS	IS	IT
Quintile 1	Low	0.0253***	0.0241***	0.0126	0.0016	0.0015	0.0169	0.0045	0.0073
		(3.20)	(3.06)	(1.42)	(0.94)	(0.91)	(1.07)	(0.71)	(1.34)
	High	0.0232	0.0222	0.0042	0.0013	0.0010	0.0012	0.0029	0.0015
		(1.55)	(1.41)	(0.25)	(0.39)	(0.58)	(0.04)	(0.24)	(0.26)
	Low-High	0.0021	0.0019	0.0083**	0.0004	0.0005	0.0157	0.0016	0.0058
		(0.19)	(0.18)	(2.16)	(0.18)	(0.37)	(0.72)	(0.18)	(1.36)
Quintile 2	Low	0.02431**	0.0232***	0.0139	0.0028*	0.0020	0.0279	0.0073	0.0071
		(2.14)	(2.86)	(1.09)	(1.73)	(1.00)	(1.23)	(0.80)	(1.12)
	High	0.0218	0.0193	0.0060	0.0014	0.0014	0.0158	0.0028	0.0054
		(1.53)	(1.30)	(0.38)	(0.54)	(0.94)	(0.56)	(0.24)	(1.10)
	Low-High	0.0026	0.0039	0.0079***	0.0014	0.0006	0.0121	0.0045	0.0017

Table 4.7 Panel A-*Continued*

Quintile 3	Low	0.0284***	0.0273***	0.0321***	0.0018***	0.0026***	0.0458***	0.0203***	0.0187***
		(8.03)	(7.72)	(8.13)	(3.87)	(5.21)	(6.50)	(7.14)	(11.55)
	High	0.0140***	0.0160***	0.0139***	0.0026***	0.0014*	0.0241***	0.0058*	0.0065**
		(3.38)	(3.09)	(2.99)	(2.73)	(1.80)	(2.92)	(1.74)	(2.54)
	Low-High	0.0144**	0.0113***	0.0183**	-0.0008	0.0012	0.0217***	0.0145***	0.0123***
		(2.26)	(4.58)	(2.57)	(-0.86)	(1.54)	(14.55)	(7.12)	(4.90)
Quintile 4	Low	0.0213***	0.0266***	0.0154*	0.0027**	0.0021**	0.0374**	0.0137**	0.0117***
		(2.68)	(3.36)	(1.73)	(2.37)	(2.00)	(2.36)	(2.15)	(3.51)
	High	0.0200	0.0172	0.0083	0.0013	0.0001	0.0152	0.0072	0.0267***
		(1.60)	(1.31)	(0.59)	(0.48)	(0.10)	(0.61)	(0.72)	(6.91)
	Low-High	0.0013	0.0094	0.0071	0.0014	0.0020*	0.0222	0.0065	-0.0150***
Quintile 5	Low	0.0216***	0.0201***	0.0269***	0.0033***	0.0024***	0.0483***	0.0167***	0.0153***
		(3.19)	(2.79)	(3.54)	(3.86)	(2.65)	(3.57)	(3.06)	(5.25)
	High	0.0142**	0.0142**	0.0164**	0.0015	0.0015	0.0392***	0.0123**	0.0075**
		(2.00)	(2.00)	(2.06)	(1.04)	(1.31)	(2.77)	(2.16)	(2.02)
	Low-High	0.0075***	0.0060	0.0105	0.0018***	0.0009	0.0091	0.0044**	0.0078**

Panel B: State Ownership Portfolios Further Sorted By ICI

Size Quintiles	ICI	Four-Factor Abnormal Return: Unconditional	Four-Factor Abnormal Return: Conditional	Appraisal Ratio Four-Factor	Holding-Based Performance Measure: Characteristic-Based Performance Measure: CS	CT	AS	Industry-Based Performance Measure: IS	IT
Quintile 1	High	0.0425***	0.0418***	0.0224***	0.0083***	0.0055***	0.0604	0.0691***	0.0353***
		(6.35)	(5.23)	(4.10)	(4.14)	(3.78)	(1.56)	(4.38)	(4.09)
	Low	0.0245***	0.0233***	0.0136**	0.0023***	0.0023***	0.0314*	0.0123***	0.0089*
		(5.27)	(4.33)	(2.11)	(3.46)	(4.14)	(1.73)	(2.68)	(1.72)
	High-Low	0.0180***	0.0185***	0.0088*	0.0060***	0.0032***	0.0290*	0.0568**	0.0264***
		(3.23)	(2.78)	(1.75)	(3.13)	(4.70)	(1.72)	(1.99)	(4.33)
Quintile 2	High	0.0327***	0.0318***	0.0185**	0.0062***	0.0029*	0.0455	0.0307***	0.0248***
		(5.26)	(4.75)	(2.22)	(7.93)	(1.73)	(1.29)	(4.66)	(3.09)
	Low	0.0165**	0.0157**	0.0115	0.0025*	0.0019**	0.0284	0.0109*	0.0059**
		(2.52)	(2.08)	(1.45)	(1.84)	(1.98)	(1.26)	(1.91)	(1.97)
	High-Low	0.0162*'	0.0161***	0.0070*	0.0037	0.0010	0.0171	0.0198*	0.0189***
		(1.80)	(4.92)	(1.65)	(1.63)	(1.05)	(0.17)	(1.83)	(4.89)
Quintile 3	High	0.0279***	0.0268***	0.0168**	0.0038***	0.0028***	0.0310	0.0129**	0.0143*
		(3.52)	(2.62)	(2.11)	(3.34)	(2.69)_	(1.11)	(2.25)	(1.65)
	Low	0.0122	0.0112	0.0101	0.0017	0.0010	0.0202	0.0033	-0.0082
		(0.94	(1.02)	(0.89)	(0.69)	(0.80)	(1.03)	(0.41)	(1.26)
	High-Low	0.0157**	0.0156*	0.0068	0.0021	0.0018**	0.0109	0.0096	0.0225
		(2.20)	(1.91)	(0.43)	(0.61)	(2.41)	(1.15)	(0.86)	(1.54)
Quintile 4	High	0.0232	0.0225**	0.0191	-0.0016	-0.0027	0.0194	-0.03724***	0.0168
		(1.55)	(1.99)	(1.58)	(-0.63)	(-0.90)	(1.15)	(-4.28)	(1.26)
	Low	0.0126	0.0115	0.0223*	-0.0029	0.0016	0.0113	-0.0202**	0.0057***
		(0.70)	(0.71)	(1.77)	(-1.01)	(0.95)	(1.16)	(-2.23)	(4.16)
	High-Low	0.0107**	0.0110	-0.0414	0.0045	-0.0043*	0.0082	0.0574**	-0.0225
		(2.26)	(-1.09)	(-1.27)	(1.63)	(1.78)	(0.56)	(2.52)	(-1.24)
Quintile 5	High	0.0182	0.0175	0.0153	-0.0016	0.0016	-0.0067	0.0040	-0.0921
		(1.40)	(1.36)	(1.63)	(-0.57)	(0.57)	(1.15)	(0.60)	(-1.03)
	Low	0.0100	0.0101	0.0202	0.0017	0.0056**	-0.0079	-0.0221*	-0.0872***
		(0.42)	(0.45)	(1.09)	(0.30)	(2.39)	(1.16)	(-1.66)	(4.16)
	High-Low	0.0082	0.0074	-0.03551	-0.000115	-0.004*	0.0012	0.0261**	-0.00486
		(0.53)	(-1.09)	(-1.27)	(-0.04)	(1.78)	(0.20)	(2.52)	(-1.24)

generate the highest average at 2.43% per quarter. The higher style-consistent funds from the quintile portfolio, with highest STATO, generate 2.53% per quarter, outperforming the style-inconsistent funds by 0.21% per quarter. Mutual funds from the largest STATO quintile portfolio only achieve the average unconditional abnormal return at 1.79%, and the magnitude of the difference between style-consistent and style-inconsistent portfolios increases to 0.75%. This provides indirect evidence that stock performance is negatively correlated with state ownership and funds that invest less in stocks with high state ownership generate higher return premium over others. It can also be concluded that style consistent funds still generate superior performance after controlling state ownership of portfolio stockholdings. Moreover, fund managers who invest in more stocks with higher state ownership are more significantly affected by fund style consistency in terms of their performance.

In Panel B, the funds with higher ICI for the quintile portfolio having the lowest state ownership produce a 4.25% as the unconditional abnormal return and it outperform the funds with lower ICI for the same quintile portfolio 1.8% at the 1% level. This outperform of industry concentrated funds over industry diversified funds becomes weaker with the increasing of the state-owned equity holdings. The other fund performance measures display the similar pattern through the state ownership portfolio sorting approach. Therefore, it is concluded that with the controlling of state ownership of stock holdings for each fund, the positive relationship between industry concentration and fund performance still exists. More importantly, funds with lower government-owned stockholding exhibit a more significant style-performance relation.

4.3.6 Trade Portfolios: Do Style-Consistent and Industry-Concentrated Funds have Informational Advantages?

Chapter 3 has reported that mutual fund managers do possess strong stock picking abilities but are not as strong when it comes to timing of market variations. To further examine whether style-consistent and industry-concentrated funds have informational advantages, this section analyses the performance of mutual funds regarding their '*trades*', which measures the changes in market value of the stock holdings of a mutual fund (specification in Section 3.5.4 of Chapter 3). For each mutual fund, the average quarterly returns of the stocks purchased and sold are examined. Each fund performance is sorted by the fund's style consistency and industry concentration into decile portfolios. The results are summarised in Table 4.8.

Table 4. 8 Trade Portfolios

This table reports the returns of the stocks purchased and sold by different trade portfolios of mutual funds for the period 1998 to 2016. The sample is divided into deciles based on the lagged HSC (Holding-Based Style Consistency) in Panel A and the lagged ICI (Industry Concentration Index) in Panel B. The HSC, as the average style characteristic volatility of a fund's security holdings, is computed by $\mathrm{HSC}_{j,t} = \sum_{c=1}^{3} \frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t} = \{\sum_{n=0}^{35} \frac{(Rank_{c,j,t-n} - MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score over the 36-month measurement period. The ICI is defined as $ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F} - W_{j,t}^{M})^2$, where $W_{j,t}^{F}$ is the weight of stock holdings from the same industry relative to the total net assets of fund *i* at quarter *t* and $W_{j,t}^{M}$ is the corresponding industry stock weight relative to the total A share stock market. The returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. For each mutual fund, the net return is calculated as well as the style-adjusted returns of their stock purchases and sells. The net return is calculated from the value of the growth of a fund's quarterly net assets. The style adjusted return is a measure of stock selection ability and is defined as $CS_{T=} \sum_{j=1}^{N} W_{j,t-1}(R_{j,t} - R_t^{b_{j,t-1}})$, where $W_{j,t-1}$ is the portfolio weight on stock *j* at the end of quarter *t - 1*, $R_{j,t}$ is the quarter *t* buy-and-hold return of stock *j*. The table includes the differences in the returns, along with their t values, between the top and bottom deciles, the top and bottom quintiles, and the top and bottom halves of the mutual funds. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The *t*-values of the regressions are presented in parentheses. All coefficients are presented followed by *t* statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels respectively.

Panel A: Trade Portfolios Further Sorted By HSC

	Fund net return			CS		
	Buy	Sell	Buys-Sells	Buys	Sells	Buy-Sells
All funds	9.21***	6.72***	2.47**	0.52***	-0.46*	0.98***
	(3.46)	(3.14)	(1.98)	(2.58)	(-1.72)	(3.16)
Decile1	12.01***	9.16***	2.85***	0.82**	0.12**	0.7**
	(3.22)	(3.17)	(2.72)	(2.24)	(2.19)	(2.05)
Decile2	10.85***	8.11***	2.74***	0.71**	-0.15**	0.86**

	(3.94)	(2.89)	(3.07)	(2.47)	(-1.98)	(2.18)
Decile3	9.04***	7.21***	1.83***	0.70*	-0.23**	0.93**
	(4.29)	(3.06)	(2.89)	(1.78)	(-2.07)	(1.97)
Decile4	9.23**	5.13*	4.1**	0.62***	-0.45***	1.07**
	(2.11)	(1.86)	(2.45)	(3.21)	(-2.66)	(2.31)
Decile5	11.26***	9.25***	2.01**	0.64	-0.32	0.96
	(3.05)	(4.37)	(2.15)	(1.45)	(-1.23)	(1.07)
Decile6	8.44***	7.02***	1.42***	0.50*	-0.47	0.97
	(3.73)	(2.99)	(2.59)	(1.72)	(-1.15)	(1.39)
Decile7	9.09**	7.39**	1.70*	0.47**	-0.52*	0.99
	(2.46)	(1.97)	(1.73)	(2.13)	(-1.64)	(1.05)
Decile8	8.57**	6.55*	2.02*	0.41*	-0.63	1.04
	(2.81)	(1.87)	(1.65)	(1.78)	(-1.18)	(0.98)
Decile9	7.26	5.27**	1.99**	0.31*	-0.82	1.13
	(1.49)	(2.04)	(2.00)	(1.93)	(-1.62)	(1.57)
Decile10	6.23*	4.04**	2.19*	0.17*	-0.88*	1.05
	(1.83)	(2.10)	(1.80)	(1.87)	(-1.78)	(1.52)
1^{st} half-2^{nd} half	2.56	1.72**	0.84*	0.33**	0.46*	-0.13
	(1.44)	(2.09)	(1.73)	(2.01)	(1.82)	(-0.85)
1^{st} quintile-5^{th} quintile	4.69*	3.98	0.70*	0.53*	0.84	-0.31
	(1.68)	(1.61)	(1.67)	(1.87)	(1.64)	(-0.94)
1^{st} decile-10^{th} decile	5.78*	5.12	0.66*	0.65	1.00	-0.35
	(1.65)	(1.63)	(1.68)	(1.06)	(0.88)	(-1.48)

Panel B: Trade Portfolios Further Sorted By ICI

	Fund net return			CS		
	Buy	Sell	Buys-Sells	Buys	Sells	Buy-Sells
All funds	9.21***	6.72***	2.47**	0.52**	-0.46*	0.98***
	(3.46)	(3.14)	(1.98)	(2.58)	(-1.72)	(3.16)
Decile1	9.12***	6.01***	3.11***	0.30**	-0.25	0.56**
	(4.01)	(3.14)	(4.32)	(2.05)	(-1.08)	(2.35)
Decile2	9.17***	6.01***	3.17**	0.41***	-0.24	0.65*
	(3.83)	(3.14)	(2.18)	(2.80)	(-0.60)	(1.73)
Decile3	8.84***	6.39***	2.45	0.36**	-0.82***	1.17**
	(3.66)	(3.14)	(1.51)	(2.43)	(-3.32)	(2.11)
Decile4	9.06***	6.56***	2.50*	0.46***	-0.72***	1.18
	(3.60)	(3.14)	(1.90)	(2.77)	(-2.73)	(1.60)
Decile5	8.81***	6.61***	2.19*	0.38**	-0.82***	1.19*
	(3.44)	(3.14)	(1.83)	(2.15)	(-2.89)	(1.74)
Decile6	8.93***	6.83***	2.10*	0.41**	-0.67**	1.09*
	(3.38)	(3.14)	(1.78)	(2.24)	(-2.32)	(1.92)
Decile7	9.03***	6.89***	2.14	0.50*	-0.97***	1.47**
	(3.32)	(3.14)	(1.30)	(2.34)	(-3.24)	(2.43)
Decile8	9.19***	7.27***	1.92	0.56*	-1.13***	1.69***
	(3.10)	(3.14)	(1.35)	(1.79)	(-3.27)	(3.44)
Decile9	9.56***	7.3***	2.23*	0.70**	-0.94***	1.64***
	(3.07)	(3.14)	(1.74)	(2.05)	(-2.65)	(4.01)
Decile10	3.12***	8.10***	2.36	1.18	-0.86	2.04
	(3.07)	(3.14)	(1.40)	(1.03)	(-1.27)	(1.57)
2^{nd} half -1^{st} half	0.43	0.97*	-0.54	0.21***	-0.27	0.47 *
	(1.17)	(1.84)	(-1.62)	(2.58)	(-0.82)	(1.67)
5^{th} quintile -1^{st} quintile	0.86	2.87*	-2.00	0.52*	-0.29	0.81***
	(1.35)	(1.68)	(-0.83)	(1.82)	(-0.97)	(2.88)
10^{th} decile− 1^{st} decile	1.34*	2.09*	-0.75	0.87*	-0.42	1.30 *
	(1.66)	(1.87)	(-0.37)	(1.82)	(-0.97)	(1.88)

Panel A sorts the two performance measures for portfolios based on stock trades by mutual funds in different style consistency deciles. Two performance measures are applied: the first measure is a fund's net return which is calculated from the growth of a fund's net asset value; and the second measure is the stock selection ability measure CS from DGTW (1997). Regardless of the different fund performance measures applied, stocks purchased tend to perform significantly better than stocks sold. For fund net returns, the purchased stocks generate a 2.47% return premium per quarter higher than the sold stocks. This return difference is significant at the 5% level. The return difference between bought and sold portfolios tends to decrease with the HSC deciles, but the superior returns still exist for the stocks fund managers purchase and are all statistically and economically significant. The difference is 2.85% for the most style-consistent portfolios and 2.19% for the most style-drift portfolios. This superior performance of the trades of the style-consistent funds provides evidence that these managers may have information advantages regarding stocks with certain characteristics. Panel B displays fund net returns and the characteristics-adjusted returns based on stock trades by mutual funds in different industry concentration deciles. The results confirm that the stocks purchased outperform stocks sold in the different concentration deciles. Particularly, this return premium, generated by stocks purchased for CS measures, becomes more statistically significant for different ICI decile portfolios.

Table 4. 9 State Ownership of Stocks and Fund Size in Fund Style-performance Relation: Regression Evidence

This table summarises the coefficients of the quarterly panel regression of fund performance with fund investment style consistency, the industry concentration index and other fund characteristics as control variables from 1997 to 2017. The general form of the panel regression is $PERF_{I,T}=b_0+ b_1 * HSC_{i.t-1}(orICI_{i.t-1}) + b_2 * STATO_{i.t-1} + b_3 * STATO_{i.t-1} * HSC_{i.t-1}(orICI_{i.t-1}) + b_4 * STATO_{i.t-1} * \log\_tna_{i.t-1} + b_5 EXP_{i.t-1} + b_6 * Trades_{i.t-1} + b_7 * \log\_age_{i.t-1} + b_8 * \log\_tna_{i.t-1} + b_9 * fund\_flow_{i.t-1}$. The dependent variable, PERF, measures the quarterly performance that is calculated as the abnormal return from the Carhart four factor model for 36 months of lagged data. By adding the macroeconomic variable, the Ferson-Schadt model (1996) is employed for conditional regression to calculate conditional abnormal returns. The holding-based adjustment of fund performance for CS, CT and AS for the characteristic benchmark and IS, and IT for industry benchmarks, use the same calculation as the previous part. The independent variable of Industry Concentration Index (ICI) is calculated as $ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F} - W_{j,t}^{M})^2$ and the holding-based style consistency score is computed as $HSC_{j,t}=\sum_{c=1}^{3}\frac{\sigma_{c,j,t}}{3}$. The appraisal ratio is calculated as dividing the abnormal return by the standard deviation of the residuals from the four-factor model. All regressions include year dummies and the Newy-west test for the autocorrelation. All coefficients are presented followed by t statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels, respectively.

Panel A: State Ownership of Stocks and Fund Size in Fund Style-performance measured by HSC

	Dependent Variable							
	Four-Factor Abnormal Return			Characteristics-adjusted Fund Return			Industry-adjusted Fund Return	
	CH	FS	Appraisal Ratio	CS	CT	AS	IS	IT
HSC	-0.0541***	-0.0507**	-0.0041**	-0.0100**	-0.039	-0.0123	-0.0297	-0.0105
	(-3.24)	(-2.41)	(-2.03)	(-1.97)	(-1.55)	(-1.85)	(-1.44)	(-1.46)
STATO	-0.0358*	-0.0279*	-0.0097	-0.0269*	0.0143	-0.0587*	0.0296*	-0.1641**
	(-2.09)	(-1.98)	(-0.73)	(-1.92)	(0.63)	(-1.78)	(1.92)	(-2.30)
STATO*HSC	0.0674**	0.0767*	0.0312	-0.0547	0.0796	0.0554	0.0755	0.0469
	(1.99)	(1.70)	(1.63)	(-0.77)	(1.04)	(0.49)	(1.21)	(1.39)
STATO*TNA	0.3422**	0.2798**	0.1974*	0.0577	0.0786	0.1928	0.1144	0.1848*
	(2.07)	(2.00)	(1.90)	(0.47)	(0.84)	(1.45)	(0.97)	(1.75)
Turnover	0.0222**	0.0188	0.0400**	0.0019	0.0010**	0.0015**	0.0029	0.0015
	(2.01)	(1.08)	(2.37)	(1.09)	(2.06)	(2.19)	(1.55)	(1.03)

TNA	-0.3124**	-0.2277	-0.4129*	-0.1824*	-0.0833	-0.4920**	-0.0348	-0.6523*
	(-1.98)	(-1.06)	(-2.13)	(-1.92)	(-1.42)	(-1.96)	(-1.54)	(-1.80)
Fund Flow	0.3371*	0.1547*	0.1631	0.0522	0.0037	0.0425**	0.0495**	0.0734
	(1.67)	(1.72)	(1.52)	(1.60)	(1.23)	(2.00)	(2.11)	(1.04)
Expense	-0.7329**	-0.5433*	-0.2918*	0.0010	-0.02938	-0.2589*	-0.0088	-0.5823**
	(-1.99)	(-1.72)	(-1.68)	(1.51)	(-1.16)	(-1.64)	(-1.23)	(-2.09)
Log_age	-0.4944**	-0.1749*	-0.3923*	-0.0834	0.1197	-0.7954**	0.0054	-0.1795*
	(-2.04)	(-1.91)	(-1.89)	(-1.29)	(1.56)	(1.99)	(1.85)	(1.66)
No. of obs	43332	43322	43322	43310	43220	43220	43318	43220
R^2	0.206	0.196	0.199	0.173	0.158	0.204	0.196	0.137

Panel B: State Ownership of Stocks and Fund Size in Fund Style-performance measured by ICI

	Dependent Variable							
	Four-Factor Abnormal Return			Characteristics-adjusted Fund Return			Industry-adjusted Fund Return	
	CH	FS	Appraisal Ratio	CS	CT	AS	IS	IT
ICI	0.0269**	0.0197**	0.0098**	0.0338	0.0948*	0.0255	0.0749*	0.0217*
	(2.41)	(2.03)	(2.00)	(1.06)	(1.89)	(1.08)	(1.90)	(1.89)
STATO	-0.02769*	-0.0190*	-0.0079	-0.0586*	0.0241	-0.0185	-0.0886	-0.2931*
	(-1.88)	(-1.84)	(-1.03)	(-1.94)	(0.79)	(-0.28)	(1.02)	(-1.73)
STATO*ICI	-0.05811*	-0.0499	-0.0549	0.0664	-0.0851*	0.0666	0.0564*	0.0621
	(-1.96)	(-1.51)	(-1.06)	(0.24)	(-1.66)	(0.99)	(-1.79)	(1.29)
STATO*TNA	0.3329**	0.2232*	0.1799	0.03824	0.0534	0.1924	0.2315**	0.1189*
	(2.10)	(1.91)	(1.91)	(0.77)	(1.48)	(1.05)	(1.96)	(1.75)

Turnover	0.0182* (1.91)	0.0232 (1.60)	0.0552* (1.87)	0.0021 (1.01)	0.0029 (1.06)	0.0029* (1.96)	0.0013* (1.90)	0.0010 (0.89)
TNA	-0.5311* (-1.69)	-0.2277 (-1.04)	-0.5249** (-2.33)	-0.1669* (-1.80)	-0.0743 (-1.04)	-0.5324 (-1.09)	-0.0431 (-1.00)	-0.5766* (-1.96)
Fund Flow	0.5738* (1.90)	0.1924 (1.55)	0.1755 (1.02)	0.0434 (1.58)	0.0058* (1.97)	0.0348 (1.09)	0.05713** (2.01)	0.0621 (1.01)
Expense	-0.9366** (-2.13)	-0.6433* (-1.94)	-0.3458 (-0.86)	0.0010* (1.95)	-0.0456 (-1.26)	-0.3566** (-2.31)	-0.0075 (-1.29)	-0.6912* (-1.90)
Log_age	-0.7931*** (-3.24)	-0.2917** (-2.32)	-0.2399* (-1.97)	-0.0522* (-1.90)	0.1948 (1.05)	-0.2785 (1.27)	0.0089 (1.05)	-0.2680** (1.97)
No. of obs	43332	43322	43322	43310	43220	43220	43318	43220
R^2	0.189	0.274	0.166	0.210	0.162	0.138	0.197	0.159

4.3.7 QFII Portfolios: Do QFIIs' Portfolios Exhibit Style Effect?

The QFII scheme, which was introduced in 2003, allows institutional investors to trade in A share stocks. The first chapter discussed QFIIs' investment preferences in stock picking and analysed the characteristics of their stock holdings at the stock level. This section further explores QFIIs' investment styles and performances at the portfolio level, and the preliminary results on the style-performance relation are presented.

I examine the performance of QFIIs using both the factor-based and holding-based performance measures. I also discuss the multivariate regression evidence by controlling for other QFII characteristics.

4.3.7.1 QFII Factor-Based Performance Measures

Table 4.9 reports the summary statistics of QFIIs at a portfolio level with the sample period December 31, 2003 to June 30, 2017. The quarterly gross return of QFIIs is calculated from the domestic counterparts by 0.9% per quarter. QFIIs also exhibit lower style consistency and industry concentration than domestic funds.

Table 4. 10 QFII Summary Statistics

Panel A documents the summary statistics for the QFIIs included in this study from December 31, 2003 to June 30, 2017. Quarterly gross return is calculated as the weighted average stock return, and quarterly net return is calculated from the change of a QFII's total net assets. Panel B reports the contemporaneous correlations between the main variables used in this study. The HSC, as the average style characteristic volatility of a fund's security holdings, is computed by $HSC_{j,t} = \sum_{c=1}^{3} \frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t} = \{\sum_{n=0}^{35} \frac{(Rank_{c,j,t-n} - MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score over the 36-month measurement period. The Industry Concentration Index is defined as $ICI_t = \sum_{j=1}^{6} (W_{j,t}^F - W_{j,t}^M)^2$, where $W_{j,t}^F$ is the weight of a stock holding from the same industry relative to the total net assets of fund i at quarter t and $W_{j,t}^M$ is the corresponding industry stocks' weight relative to the total A share stock market. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The *t*-values of the regressions are presented in parentheses. All coefficients are presented followed by *t* statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels respectively.

Panel A: QFII Characteristics

	Mean	Median	Minimum	Maximum
Total number of QFIIs	307			
Number of stocks held by QFIIs	16	11	5	43
Total net assets (in millions)	162.33	174.23	40.26	220.49
Age (years)	7.22	9.49	1	14
Quarterly gross return (%)	3.27	4.15	-10.53	12.62
Quarterly net return	2.43	3.01	-14.22	15.91
Holding-Based Style Consistency	1.57	2.13	0	8.26
Industry Concentration Index	0.18	0.33	0.08	3.15

Panel B: Correlation Structure

Variables	Holding-Based Style Consistency	Concentration Index	Turnover	log_age	log_TNA
Holding-Based Style Consistency	1				
Concentration Index	-0.052**	1			
Turnover	0.071**	0.074***	1		
log_age	-0.047***	0.097*	0.039**	1	
log_TNA	-0.032*	0.066***	0.114*	-0.026*	1

Table 4.11 presents abnormal returns and factor loadings using the unconditional and conditional four-factor models. Panel A estimates the factor-based performance measure by further sorting QFIIs into quantile portfolios according to their Holding-Based Consistency. It shows that QFIIs from the lowest HSC quintile portfolio generate the highest abnormal return of 1.92% per quarter, which outperforms the QFIIs from the highest HSC quintile portfolio by 0.89% per quarter.

This indicates that style consistent QFIIs perform better than style-drift QFIIs. Panel B illustrates the results for QFIIs' abnormal returns and demonstrates that the positive effect from industry concentration on the performance still exists for these foreign institutional investors. It also shows that the difference between the most concentrated and diversified quantile portfolios is 1.23% per quarter, which is significant at the 10% level.

Table 4. 11 Quintile Portfolios: QFII Factor-Based Performance Measures

This table summarises the abnormal returns and the factor loadings using the Carhart (1997) four-factor model for different portfolio of QFIIs over the period of 2003 to 2017. The first and third columns present the unconditional abnormal returns before and after expenses. The second and fourth columns present the conditional abnormal returns according to Ferson and Schadt (1996). Panel A shows the results for the abnormal return of QFIIs further sorted into quantile portfolios based on the lagged Holding-Based Style Consistency. The HSC, as the average style characteristic volatility of a fund's security holdings, is computed by $HSC_{j,t}=\sum_{c=1}^{3}\frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t}=\{\sum_{n=0}^{35}\frac{(Rank_{c,j,t-n}-MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score over the 36-month measurement period. Panel B shows the results for the abnormal return of QFIIs sorted into quantile portfolios based on the lagged Industry Concentration Index. The Industry Concentration Index is defined as $ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F}-W_{j,t}^{M})^2$, where $W_{j,t}^{F}$ is the weight of a stock holding from the same industry relative to the total net assets of fund *i* at quarter *t* and $W_{j,t}^{M}$ is the corresponding industry stocks' weight relative to the total A share stock market. All the returns are expressed at a quarterly frequency and the portfolios are rebalanced quarterly. The *t*-values of the regressions are presented in parentheses. All coefficients are presented followed by *t* statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels respectively.

Panel A: Abnormal Returns Sorted By HSC

	Abnormal Returns				Factor Loadings Before Expenses Unconditional Models			
	Before Expenses		After Expenses					
	Unconditional	Conditional	Unconditional	Conditional	Market	Size	Value	Momentum
All QFIIs	0.0158***	0.0143***	0.0124***	0.0106**	0.7241**	0.1357*	-0.3089*	0.0949*
	(3.27)	(2.97)	(2.58)	(2.20)	(2.09)	(1.66)	(-1.71)	(1.69)
Quintile 1	0.0192***	0.0183***	0.0154***	0.0133**	0.8425	0.1364**	-0.3473*	0.0742
(Most style consistent)	(4.2)	(3.08)	(3.37)	(2.24)	(1.16)	(2.31)	(-1.54)	(1.43)
Quintile 2	0.0210**	0.0198**	0.017*	0.0152	0.7758***	0.1827	-0.4128	0.1012*
	(2.18)	(1.98)	(1.76)	(1.52)	(2.73)	(1.59)	(-1.47)	(1.77)
Quintile 3	0.0152	0.0131	0.0116	0.0107	0.7812**	0.1126	-0.3024**	0.1129
	(1.62)	(1.54)	(1.23)	(1.26)	(2.11)	(1.05)	(-2.01)	(0.89)
Quintile 4	0.0130	0.0103	0.0102	0.0084	0.6433	0.1428	-0.2745	0.1043
	(1.57)	(1.21)	(1.24)	(0.99)	(1.26)	(1.98)	(-1.39)	(1.33)
Quintile 5	0.0103**	0.01*	0.0079	0.0053	0.5778	0.1041**	-0.2075*	0.0822*
(Most style inconsistent)	(2.04)	(1.87)	(1.56)	(0.99)	(1.60)	(2.05)	(-1.70)	(1.65)
$Top\ 40\% - Bottom\ 40\%$	0.0085**	0.0089*	0.0071*	0.0074	0.1986*	0.0361*	-0.1391	-0.0056
	(1.76)	(1.66)	(1.94)	(1.38)	(1.87)	(1.69)	-1.63	(-1.25)
$Top\ 20\% - Bottom\ 20\%$	0.0089*	0.0083	0.0075	0.0080	0.2647*	0.0323	-0.1398	-0.0080
	(1.12)	(1.08)	(0.95)	(1.05)	(1.67)	(1.61)	-1.02	(-1.51)

Panel B: Abnormal Returns Sorted By ICI

	Abnormal Returns				Factor Loadings Before Expenses Unconditional Models			
	Before Expenses		After Expenses					
	Unconditional	Conditional	Unconditional	Conditional	Market	Size	Value	Momentum
All QFIIs	0.0158***	0.0143***	0.0124***	0.0106**	0.7241**	0.1357*	-0.3089*	0.0949*
	(3.27)	(2.97)	(2.58)	(2.20)	(2.09)	(1.66)	(-1.71)	(1.69)
Quintile 1	0.01*	0.0082*	0.0074	0.0058	0.5022*	0.1007	-0.1288	0.0497*
(Most style consistent)	(1.92)	(1.8)	(1.43)	(1.26)	(1.89)	(1.55)	(-1.85)	(1.77)
Quintile 2	0.012*	0.0101*	0.0081	0.0070	0.5991*	0.1144	-0.2715	0.0644
	(1.88)	(1.72)	(1.27)	(1.19)	(1.68)	(1.01)	-1.09	(0.98)
Quintile 3	0.0164*	0.0152*	0.0123	0.0108	0.7044	0.1322**	-0.2401	0.0979
	(1.74)	(1.68)	(1.31)	(1.19)	(1.5)	(2.31)	(-1.57)	(1.04)
Quintile 4	0.0181	0.0162	0.0152	0.0119	0.8556**	0.1557	-0.4022*	0.1225*
	(1.63)	(1.49)	(1.37)	(1.09)	(2.15)	(1.49)	(-1.76)	(1.79)
Quintile 5	0.0223**	0.0212**	0.0193*	0.0174*	0.9606*	0.1755*	-0.5014*	0.1404**
(Most style inconsistent)	(2.26)	(2.07)	(1.95)	(1.69)	(1.84)	(1.75)	(-1.88)	(2.04)
Bottom 40% − Top 40%	0.0092*	0.0095*	0.0095**	0.0083	0.35745*	0.05805*	-0.2517	0.0744*
	(1.95)	(1.84)	(2.01)	(1.59)	(1.7)	(1.67)	(-1.43)	(1.65)
$Bottom$ 20 % − Top 20%	0.0123*	0.0130*	0.0119*	0.0106	0.4584	0.0748	-0.3726	0.0907
	(1.77)	(1.67)	(1.71)	(1.36)	(1.62)	(1.09)	(-1.66)	(1.58)

4.3.7.2 QFII Holding-Based Performance Measures

Both characteristic-adjusted performance and the industry-adjusted performance are examined in this section. To adjust for idiosyncratic risk, the appraisal ratio is applied. Table 4.12 reports the results of the holding-based performance measures. In Panel A, QFIIs with higher style consistency show better stock selection abilities. Furthermore, the most style-consistent quantile portfolio exhibits a superior return of 0.28% per quarter and outperforms the style-drift quintile portfolio by 0.18% per quarter. These results are statistically significant at the 10% level. The industry-adjusted performance provides evidence that frequent style drift affects returns negatively as per 'Industry Selectivity' and 'Industry Timing'. The appraisal ratio indicates a more significant difference in performance between the most style consistent and inconsistent quintiles at 1.06% per quarter, which is statistically significant at the 10% level. Panel B estimates the holding-based performance measure further sorted by ICI, and the results illustrate that industry concentrated portfolios generate a return premiums regardless of whether the performance is adjusted for characteristics or industries.

Table 4. 12 Quantile Portfolios: QFII Holding-Based Performance Measures

This table reports holding-based performance measures according to DGTW (1997) for different portfolios of QFIIs for the period of 2003 to 2017. The QFII sample is further divided into quantiles based on the lagged Holding-Based Style Consistency (HSC) and the lagged Industry Concentration Index (ICI). All these holding-based measures are firstly regressed on the Carhart four-factor model and the abnormal return for each measure for each quantile is reported. Panel A reports the abnormal returns of quarterly holding-based performance measures that are sorted by HSC, and Panel B reports the quantile results sorted by ICI. The HSC, as the average style characteristic volatility of a fund's security holdings, is computed by $HSC_{j,t} = \sum_{c=1}^{3} \frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t} = \{\sum_{n=0}^{35} \frac{(Rank_{c,j,t-n} - MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score over the 36-month measurement period. ICI is defined as $ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F} - W_{j,t}^{M})^2$, where $W_{j,t}^{F}$ is the weight of stock holdings from the same industry relative to the total net assets of fund i at quarter t and $W_{j,t}^{M}$ is the corresponding industry stocks' weight relative to the total A share stock market. All regressions include year dummies. The t-statistics based on Newey West robust standard errors are reported in parentheses. All coefficients are presented followed by t statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels respectively.

Panel A: Holding-Based Performance Measures Sorted By HSC

	Quarterly Holding-Based Performance Measures					
	Characteristic-Adjusted Performance			Industry-Adjusted Performance		Appraisal Ratio
	CS	CT	AS	IS	IT	
All funds	0.0018*	0.0017*	0.0223**	0.0115*	0.0124**	0.0134**
	(1.94)	(1.8)	(2.04)	(1.89)	(2.05)	(2.11)
Quintile 1	0.0028	0.0034**	0.0410	0.0188	0.0207	0.0208
	(1.47)	(2.11)	(1.64)	(1.52)	(0.87)	(1.15)
Quintile 2	0.0023*	0.002*	0.0299**	0.0121	0.0122*	0.0146**
	(1.69)	(1.75)	(1.99)	(1.48)	(1.79)	(2.45)
Quintile 3	0.0015*	0.0010	0.0152**	0.0083*	0.0102***	0.0121
	(1.77)	(1.04)	(2.31)	(1.89)	(3.21)	(1.09)
Quintile 4	0.0013**	0.0018	0.0187	0.0087*	0.0103	0.0100
	(2.03)	(0.54)	(1.17)	(1.66)	(0.59)	(1.44)
Quintile 5	0.0010	0.0007*	0.0132	0.0107	0.0081***	0.0102
	(0.93)	(1.67)	(1.44)	(1.21)	(4.02)	(0.81)
$Top\ 40\% - Bottom\ 40\%$	0.0014	0.0015*	0.0195*	0.00575*	0.00727**	0.0076
	(1.04)	(1.81)	(1.65)	(1.71)	(2.07)	(0.66)
$Top\ 20\% - Bottom\ 20\%$	0.0018*	0.0027	0.0278*	0.0081	0.0126	0.0106*
	(1.69)	(1.39)	(1.78)	(1.61)	(0.94)	(1.85)

Panel B: Holding-Based Performance Measures Sorted By ICI

	Quarterly Holding-based Performance Measures					
	Characteristic-Adjusted Performance			Industry-Adjusted Performance		Appraisal Ratio
	CS	CT	AS	IS	IT	
All funds	0.0018*	0.0017*	0.0223**	0.0115*	0.0124**	0.0134**
	(1.94)	(1.8)	(2.04)	(1.89)	(2.05)	(2.11)
Quintile 1	0.0015	0.0018**	0.0196	0.0079*	0.0097**	0.0145***
	(1.60)	(2.53)	(1.49)	(1.85)	(1.96)	(3.08)
Quintile 2	0.0019*	0.0016*	0.0177***	0.0086*	0.0051	0.0105***
	(1.84)	(1.73)	(3.19)	(1.76)	(0.57)	(2.44)
Quintile 3	0.0015*	0.0017	0.0288*	0.0112	0.0172	0.0184*
	(1.91)	(1.51)	(1.77)	(1.54)	(1.49)	(1.68)
Quintile 4	0.0026	0.0021	0.0221	0.0134	0.0194***	0.0112
	(1.57)	(1.09)	(1.60)	(0.93)	(3.16)	(1.51)
Quintile 5	0.0031	0.0027*	0.0455*	0.0286	0.0229**	0.0259*
	(0.73)	(1.86)	(1.70)	(0.67)	(2.22)	(1.70)
Bottom 40% − Top 40%	0.0014	0.0007*	0.01515*	0.0128	0.0137*	0.0061
	(0.97)	(1.93)	(1.80)	(1.34)	(1.67)	(1.59)
$Bottom\ 20\ -\ Top\ 20\%$	0.0016*	0.0009	0.0259*	0.0207	0.0132*	0.0114**
	(1.67)	(1.59)	(1.66)	(1.60)	(1.65)	(1.77)

4.3.7.3 Multivariate Regression Evidence on the Style-Performance Relation of QFIIs

Controlling for QFII characteristics, including turnover, total net asset, new money growth, and age, this section investigates the style-performance relation by regressing the factor-based and holding-based performance measures on the style consistency score and the industry concentration score.

As shown in Table 4.13, HSC is negatively correlated with the abnormal returns from the four-factor model. The HSC loading from the unconditional four-factor model is -0.1255 which is statistically significant at the 1% level. The holding-based measure also shows that the QFII performance is negatively affected by an inconsistent style of trading. With the alternative risk adjustment for the appraisal ratio, the abnormal return is still significantly reduced by style drift, at -0.064 per quarter.

Industry concentration is positively correlated with the QFII returns. Considering macroeconomic variation over time, the abnormal return from the conditional model is estimated to be 0.0194 coefficient with ICI. This indicates that QFIIs with stockholdings that have high industry concentration outperform QFIIs with diversified stockholdings. Regarding other QFII characteristics, a QFIIs' fund performance is positively affected by fund age and total net assets, which is different from domestic fund multivariate regression results.

Table 4. 13 Regression Evidence for QFIIs

This table summarises the coefficients of the quarterly panel regression of the general form. The general form of the panel regression is $PERF_{I,T} = b_0 + b_1 * HSC_{i.t-1} + b_2 * ICI_{i.t-1} + + b_3 * Trades_{i.t-1} + b_4 * \log\_age_{i.t-1} + b_5 * \log\_tna_{i.t-1} + b_7 * NME_{i.t-1}$. The dependent variable, PERF, measures the quarterly performance that is calculated as the abnormal return from the Carhart four factor model for 36 months of lagged data. By adding the macroeconomic variables, the Ferson-Schadt model (1996) is employed for conditional regressions to calculate conditional abnormal returns. The holding-based adjustment of fund performance for CS, CT and AS for the characteristic benchmark, and IS, and IT for industry benchmarks, use the same calculation as the previous part. The independent variable of the Industry Concentration Index (ICI) is calculated as $ICI_t = \sum_{j=1}^{6}(W_{j,t}^F - W_{j,t}^M)^2$ and the Style Consistency score is computed as Holding-Based Style Consistency (HSC). The HSC, as the average style characteristic volatility of a fund's security holdings, is computed by $HSC_{j,t} = \sum_{c=1}^{3} \frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t} = \{\sum_{n=0}^{35} \frac{(Rank_{c,j,t-n} - MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score over the 36-month measurement period. The appraisal ratio is calculated by dividing the abnormal return by the standard deviation of the residuals from the four-factor model. QFII turnover is computed as the same as a fund's turnover, which is defined as $Turnover_{j,t} = min(Buys_{j,t}, Sells_{k,t}) / TNA_{j,t}$, where $Buys_{j,t}$ ($Sells_{k,t}$) is the total value of stock purchases (sales) during quarter *t* by QFII *j*, and $TNA_{j,t}$ is the average total net assets of QFII *j* during quarter *t*. NMG denotes new money growth, which is calculated as $NMG_{j,t} = \frac{TNA_{j,t} - TNA_{j,t-1} * (1+R_{i,t})}{TNA_{j,t-1}}$, where $TNA_{j,t}$ is QFII *j*'s total net assets or the dollar value of all shares outstanding at quarter *t*, and $R_{j,t}$ is a QFII's return over the prior year. All regressions include year dummies and the Newy-West test for the autocorrelation. All coefficients are presented followed by *t* statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels respectively.

	Dependent Variable (Quarterly Performance)							
	Four-Factor Abnormal Return		Characteristic-Adjusted QFII Return			Industry-Adjusted QFII Return		Appraisal Ratio
	Unconditional	Conditional	CS	CT	AS	IS	IT	
HSC	-0.1255***	-0.1532***	-0.1161	-0.1561***	-0.2037	-0.0462	-0.0514***	-0.064*
	(-7.29)	(-5.09)	(-1.54)	(-1.88)	(-1.05)	(-1.85)	(2.05)	(-1.91)
ICI	0.0176*	0.0194*	0.0204**	0.0137*	0.0457*	0.0521*	0.03721	0.0303*
	(1.94)	(1.81)	(2.07)	(1.78)	(1.70)	(1.81)	(0.49)	(1.92)
Turnover	0.0358*	0.0379	0.0012*	0.0028*	0.0209*	0.0329***	-0.0025	0.0149***
	(1.65)	(1.44)	(1.83)	(1.93)	(1.76)	(4.71)	(1.45)	(3.24)
TNA	0.0341*	0.0522	0.0512***	0.0731**	0.1301***	0.0897*	0.1537	0.1829***
	(1.75)	(1.62)	(6.15)	(2.47)	(3.02)	(1.67)	(3.78)	(4.13)
NMG	0.0264	0.0358	-0.0674	0.0355*	0.0316***	0.0562*	0.1924**	0.2755***
	(1.33)	(1.09)	(-0.69)	(1.79)	(2.57)	(1.85)	(1.97)	(2.11)
Log_age	0.2745***	0.3166**	0.1327**	0.1025*	0.1497	0.3214**	0.2975	0.0145
	(2.94)	(1.98)	(2.84)	(1.67)	(1.27)	(1.96)	(1.61)	(1.54)
No. of obs	10323	10323	9377	9377	9377	10125	10125	10300
R^2	0.084	0.0503	0.0164	0.0178	0.046	0.071	0.085	0.192

Table 4. 14 Further Regression Evidence: State Ownership of Stocks Held by QFII and QFII Size in Style-performance Relation

This table summarises the coefficients of the quarterly panel regression of the general form. The general form of the panel regression is $PERF_{I,T} = b_0 + b_1 * HSC_{i.t-1}(orICI_{i.t-1}) + b_2 * STATO_{i.t-1} + b_3 * STATO_{i.t-1} * HSC_{i.t-1}(orICI_{i.t-1}) + b_4 * STATO_{i.t-1} * \log\_tna_{i.t-1} + b_5 * Trades_{i.t-1} + b_6 * \log\_age_{i.t-1} + b_7 * \log\_tna_{i.t-1} + b_9 * NGW_{i.t-1}$ .The dependent variable, PERF, measures the quarterly performance that is calculated as the abnormal return from the Carhart four factor model for 36 months of lagged data. By adding the macroeconomic variables, the Ferson-Schadt model (1996) is employed for conditional regressions to calculate conditional abnormal returns. The holding-based adjustment of fund performance for CS, CT and AS for the characteristic benchmark, and IS, and IT for industry benchmarks, use the same calculation as the previous part. The independent variable of the Industry Concentration Index (ICI) is calculated as $ICI_t = \sum_{j=1}^{6}(W_{j,t}^{F} - W_{j,t}^{M})^2$ and the Holding-Based Style Consistency score is computed as Holding-Based Style Consistency (HSC). The HSC, as the average style characteristic volatility of a fund's security holdings, is computed by $HSC_{j,t}=\sum_{c=1}^{3}\frac{\sigma_{c,j,t}}{3}$, and $\sigma_{c,j,t}= \{\sum_{n=0}^{35}\frac{(Rank_{c,j,t-n}-MRank_{c,j})^2}{(36-1)}\}^{1/2}$, where $Rank_{c,j,t-n}$ is the weighted average characteristic ranking in month *t-n* and $MRank_{c,j}$ is the mean of the monthly ranking score over the 36-month measurement period. The appraisal ratio is calculated by dividing the abnormal return by the standard deviation of the residuals from the four-factor model. QFII turnover is computed as the same as a fund's turnover, which is defined as $Turnover_{j,t} = min(Buys_{j,t}, Sells_{k,t})/ TNA_{j,t}$, where $Buys_{j,t}$ ($Sells_{k,t}$) is the total value of stock purchases (sales) during quarter *t* by QFII *j*, and $TNA_{j,t}$ is the average total net assets of QFII *j* during quarter *t*. NMG denotes new money growth, which is calculated as $NMG_{j,t} = \frac{TNA_{j,t}-TNA_{j,t-1}*(1+R_{i,t})}{TNA_{j,t-1}}$, where $TNA_{j,t}$ is QFII *j*'s total net assets or the dollar value of all shares outstanding at quarter *t*, and $R_{j,t}$ is a QFII's return over the prior year. All regressions include year dummies and the Newy-West test for the autocorrelation. All coefficients are presented followed by *t* statistics. '***', '**' and '*'represent significance at the 1%, 5%, and 10% levels respectively.

Panel A: State Ownership of Stocks Held by QFII and QFII Size in Style-performance Relation:

Style measured by HSC

	Dependent Variable (Quarterly Performance)							
	Four-Factor Abnormal Return		Characteristics-Adjusted QFII Return			Industry-Adjusted QFII Return		Appraisal Ratio
	Unconditional	Conditional	CS	CT	AS	IS	IT	
HSC	-0.1579***	-0.1344***	-0.0897*	-0.1430	-0.1549	-0.0397	-0.0942**	-0.044
	(-5.23)	(-4.19)	(-1.65)	(-1.09)	(-1.17)	(-1.08)	(1.97)	(-1.26)
STATO	-0.0229*	-0.0202*	-0.0189***	-0.0285**	-0.0564*	0.0225	0.0394	-0.032*
	(-1.90)	(-1.71)	(-2.66)	(-1.97)	(-1.67)	(1.58)	(1.48)	(1.91)
STATO*HSC	0.0174*	0.0165*	0.0299	-0.0374*	0.0895*	0.0543	0.5711*	-0.0029
	(1.97)	(1.66)	(1.21)	(-1.64)	(1.99)	(0.92)	(2.13)	(0.46)
STATO*TNA	-0.0597*	-0.0499*	-0.0138	-0.0796**	-0.0555***	-0.0344	-0.0596	-0.0019
	(-2.09)	(-1.98)	(-1.45)	(-2.00)	(-2.61)	(-1.06)	(-1.11)	(0.99)
Turnover	0.0594*	0.0329	0.0010	0.0019	0.0289**	0.0925***	0.0844***	0.0291
	(1.66)	(1.54)	(1.31)	(1.09)	(2.37)	(5.01)	(2.64)	(1.42)
TNA	0.0522**	0.0419**	0.0833	0.0924**	0.1827**	0.0928	0.1625**	0.0212*
	(2.09)	(1.96)	(1.15)	(2.04)	(1.99)	(1.01)	(2.41)	(1.68)
NMG	0.0355*	0.0291	-0.0211	0.0964*	0.0521***	0.0416	0.2692*	0.2615**
	(1.71)	(1.00)	(-0.99)	(1.89)	(3.01)	(1.07)	(1.67)	(2.04)
Log_age	0.5724***	0.4444**	0.2515**	0.1547	0.333*	0.534	0.3015	0.0211**
	(5.23)	(2.09)	(2.83)	(1.00)	(1.99)	(0.58)	(1.51)	(2.04)

No. of obs	10323	10323	9377	9377	9377	10125	10125	10300
R^2	0.072	0.083	0.079	0.065	0.024	0.048	0.067	0.051

Panel B: State Ownership of Stocks Held by QFII and QFII Size in Style-performance Relation:

Style measured by ICI

	Dependent Variable (Quarterly Performance)							
	Four-Factor Abnormal Return		Characteristics-Adjusted QFII Return			Industry-Adjusted QFII Return		Appraisal Ratio
	Unconditional	Conditional	CS	CT	AS	IS	IT	
ICI	0.1525***	0.1352***	0.1544	0.1368*	0.5324	0.0753	0.0490***	0.058*
	(5.12)	(3.19)	(1.09)	(1.79)	(1.35)	(1.89)	(1.27)	(1.68)
STATO	-0.0277*	-0.0277	-0.0301**	0.0195*	0.0457*	-0.0422*	0.0211	0.0296
	(-1.91)	(1.65)	(-2.07)	(1.87)	(1.70)	(-1.79)	(1.09)	(1.60)
STATO*ICI	-0.0695*	-0.0651*	-0.0433	-0.1231	-0.5964	0.0122	-0.0792	-0.0443
	(1.69)	(1.66)	(1.59)	(-0.73)	(-1.23)	(1.58)	(-1.44)	(-0.91)
STATO*TNA	-0.0335*	-0.0227*	-0.0022*	-0.8313	0.0129	-0.0755*	-0.0522	-0.0317
	(-2.07)	(-1.90)	(-1.67)	(-1.22)	(0.29)	(-1.70)	(-1.28)	(-1.55)
Turnover	0.0584*	0.0477	0.0010*	0.0085*	0.0593	0.0419***	-0.0038	0.0241*
	(1.69)	(1.60)	(1.73)	(1.66)	(0.97)	(2.73)	(-1.54)	(1.65)
TNA	0.0432*	0.0378	0.044**	0.0552*	0.103	0.0997*	0.1335***	0.1642*
	(1.77)	(1.06)	(2.00)	(1.78)	(1.12)	(1.70)	(2.92)	(1.91)
NMG	0.0422	0.0344	-0.0687	0.0454	0.0826***	0.0223	0.2997	0.3552***
	(1.01)	(1.24)	(-0.99)	(1.71)	(3.07)	(1.05)	(1.09)	(2.88)
Log_age	0.2011***	0.1151	0.1522	0.1201*	0.1887	0.5528	0.3112*	0.0244
	(2.84)	(1.08)	(1.24)	(1.77)	(2.27)	(1.25)	(1.67)	(1.64)
No. of obs	10323	10323	9377	9377	9377	10125	10125	10300
R^2	0.094	0.0609	0.0295	0.0669	0.037	0.065	0.049	0.187

Panel A investigates this further regression for style relation of QFII of which style measurement is HSC. The general results appeal that the positive style-relation remains statistically significant after taking the state ownership of stock holding for QFII and its interaction term with QFII size as the additional explanatory variables. HSC have an average negative coefficient on fund further performance, which is measured by the fund unconditional abnormal return, is -0.1579 at 1% significant level. The state ownership of stock holding for QFII generates the negative impact on factor-based performance and the coefficient of the conditional abnormal return is -0.0202 at 10% significant level. This negative relation between

portfolio performance and the degree of state owned ownership of their stock holing become weaker when the holdings-based return measures are applied. This negative coefficient of STATO on QFII further performance can be caused by the adverse effect on firm performance which is demonstrated in table 2.8 Chapter 2. This inferior performance of stocks held by governments consequently contribute to the lower QFII return at an aggregate level. The coefficient of interaction term for STATO and HSC is generally positive and the partial effect from state ownership of QFII stockholding is 0.0165 at 10 % significant level. This result also provides an indirect evidence that QFII with higher investment style consistency and of which the stockholding is less stated-owned produce a higher portfolio return.

Panel B examines he QFII's investment style measured by ICI and the result shows that the ICI remains significantly positive affect the QFII performance when the extent of their state-owned stock holding is tested as an additional explanatory variable. Regardless whether QFII abnormal return is conditional or not, it is shown that QFII with higher industry concentration perform better in the next quarter. Similarly, as the STATO effect on domestic funds' performance, QFII that are holding less state-owned stocks produce superior further return and this negative coefficient is -0.0301 at 5% significant level for CS performance measure. The interaction term of STATO and ICI displays a negative impact on QFII performance and the partial effect from state ownership of QFII stockholding is -0.0695 at 10% significant level. Therefore, this negative coefficient illustrates that the higher the state ownership of QFII stockholding is, the stronger QFII's style-performance relation is. The size and state ownership stockholding interaction present the negative coefficient at -0.0335, demonstrating the size positive effect on QFII performance is diminishing with their state-owned stockholding.

4.4. Conclusion

There has been a long-standing debate among researchers and practitioners as to whether active fund managers possess stock picking talents. In Chapter 3 of this research, the empirical work indicates that Chinese domestic mutual fund managers have stock selection abilities but weaker abilities when it comes to market timing. This chapter investigated whether these fund managers utilise their skills to consistently invest in stocks with certain characteristics, such as size, value and past returns, to generate superior returns. As another dimension of style, this research also examined whether these actively managed funds concentrate their equity holdings in specific industries and deviate from having passive market portfolios when they have information advantages.

By re-defining the active trading of Chinese mutual funds from 1998 to 2017, this study finds that mutual fund performance differs in regard to style consistency and industry concentration. From the analysis of the factor-based and holding-based fund performance measures, this study finds that style-consistent funds and industry concentrated funds outperform others. This style-performance relation is still statistically significant after controlling for other fund characteristics.

By further sorting funds into different portfolios according to size, style category, state ownership and trades of stock holdings, this chapter finds that the higher performance by style consistent funds still remains. Furthermore, the results suggest that the style effect is more significant for small funds and the growth funds perform better than other fund style categories. Funds that invest more in stocks with higher state ownership, generate lower future returns. Additionally, the results suggest that stocks that are purchased by funds, outperform the stocks that funds have sold.

I also investigate the QFIIs regarding the style-performance relation and the results provide evidence that foreign institutional investors are able to generate superior future returns by style

investment and by concentrating their stock holdings in industries where they might have information advantages.

Chapter 5 Concluding Remarks

5.1 Summary and Conclusions

A longstanding debate in finance concerns whether institutional investors perform well and whether they are skilled or not. Previous literature provides mixed evidence regarding institutional investors' performance and their stock picking abilities for developed markets.

Although the trading strategies of mutual funds have been widely explored in developed markets, there is little literature on emerging economies. As the largest emerging economy, and now the second largest economy in the world, China has achieved great economic success which has attracted growing international attention over recent years.

Although foreign direct investment has had a dramatic impact on economic development in China, foreign institutional investors have only been permitted to directly invest in the Chinese domestic securities market since 2003. The Qualified Foreign Institutional Investor (QFII) scheme was one of numerous measures implemented to liberalise the Chinese economy and to improve the investment environment. In spite of the Chinese economy's exceptional growth, there is limited research on how QFIIs allocate their assets across different listed stocks, and the trading strategies they adopt through their investments. The recent availability of more proprietary data has afforded researchers the opportunity to empirically examine these foreign institutional investors in the Chinese financial market. As the domestic institutional investors, Chinese mutual funds have become increasingly crucial, especially since the non-tradable share reform of 2005. This reform has allowed the Chinese equity market to become more efficient and has meant that investors are less able to take advantage of serial correlation to make abnormal returns. Moreover, the Chinese equity market is characterised by high volatility and liquidity, which makes it more difficult for professional institutional investors to make profits. In addition, compared to less regulated markets like the US, the impact of government policy on the equity market in China has been more significant. Given the challenge and advantage

of trading in these immature markets, this thesis has endeavoured to explore how institutional investors trade and whether they are capable of reaping abnormal returns in China. This work is intended as a step towards the development of a comprehensive investigation of both domestic and foreign institutional investors' trading behaviours in the Chinese economy. The results of the work support the underlying hypothesis that domestic and foreign institutional investors perform differently when it comes to stock selection and industry allocation. However, the two groups exhibit similarities regarding some stock characteristics, and they both display style investing over time which enables them to exploit superior stock returns. Below are summaries of the main findings of this research.

First, having provided an introduction to the QFII scheme in China, this study conducted a fundamental analysis of the firm-level characteristics of the stocks institutions invest in. The study also investigated whether stock preferences vary across foreign and domestic fund managers. The work lays a foundation for the trading behaviour and style investing analysis in the subsequent chapters. Using a unique dataset of QFII quarterly holdings in China from 2003 to 2014, I found that both domestic funds and QFIIs exhibit similar preferences regarding certain stock characteristics. They both invest in big firms, firms with lower systematic risk, relatively higher stock price, turnover and better accounting performance, and firms which are under-valued relative to the overall A-shares market. However, the results do not show strong evidence that domestic funds and QFIIs hold stocks that outperform the overall markets, although the stocks held by domestic funds have superior returns compared to the stocks held by QFIIs. More significant differences between domestic and foreign institutional investors were found in relation to industry preference. The industries which are heavily invested in by QFIIs are under-invested in by domestic funds. Regarding the corporate governance characteristics of firms held by institutions, there is no evidence showing a significant difference in firms' ownership and management structures. Even though stock characteristics

are similar between institutional investors, this study demonstrates that differences in stock picking patterns still exist among them. It also suggests that firms with institutional holdings in the previous period perform better in the following period, and this phenomena is more significant for domestic fund managers. This implies that domestic institutional investors have an edge in stock selection over their counterparts. In addition, the performance of stocks held by institutions are significantly impressive, correlated with their ownership concentration, tangibility and adjusted annual returns. This stock characteristic preference analysis leads to an important question worth further exploring: what if these institutional investors consistently invest in these preferred stocks with similar characteristics or industry classifications as the style investing?

Second, based on the stock fundamental characteristics analysis on a firm-level, this study extends the exploration on institutional investors' performance on a portfolio-level. Both the factor-based and holding-based performance evaluation measures are applied for Chinese actively traded funds and QFIIs. By decomposing performance with the characteristic-based benchmark, this study illustrates that mutual fund managers have stock picking talents over time, but weak abilities when it comes to timing their holdings with market variations. By adjusting the industry market portfolio, this study also found that Chinese mutual fund managers have the ability to select superior industries to invest in but are less proficient at selecting stocks from within an industry. This superior performance of mutual funds remains statistically significantly positive after adjusting for common risk factors, regardless of whether transaction costs are included or not. On the basis of the factor-based model, this abnormal return is robust after the adjustments for macro-economic conditions. On the other hand, QFIIs exhibit both positive characteristic-based and industry-based returns, but they are relatively lower compared to actively managed funds. QFIIs' average positive quarterly abnormal returns provide evidence of that their investment skills in stock selection to exploit profits.

Thirdly, analysis of the investment style and performance of institutions extends the fundamental study on the stock characteristics and industry preferences on a portfolio level. Style investing can produce return premiums for both domestic funds and QFIIs. By computing the standard deviation of score variation on stock characteristics, and the extent of industry concentration of stockholdings, this study further illustrated that funds which maintain stock selection based on a particular set of styles, produce greater further returns compared to mutual funds which exhibit significant "style drift" within 36 months. The results of the multivariate regression also suggest that funds that have greater turnover, larger fund low, less expenses and are younger, can outperform others. QFIIs show a positive style-performance relation over time, and the magnitude of the style effect is relatively smaller compared to domestic funds.

Fourthly, further examination of the extent of style effect on domestic funds indicated the magnitude of benefits which can be obtained from consistently investing in stocks with similar characteristics and industry allocations. This research also illustrates that the style effect varies with fund size, and that small funds exhibit more return premiums by maintaining their styles and by concentrating their holdings. Growth funds outperform the other categories of funds and their style-performance is more statistically significant. Fund style-performance is also negatively associated with state ownership of stocks held by funds. The relatively higher returns of stocks purchased by funds compared with those they sell, suggest that fund managers do have abilities when it comes to investing in undervalued stocks.

This thesis is a more comprehensive study exploring the trading behaviours of institutional investors in China. The fundamental analysis of stock characteristic preferences employs both accounting-based and market-based variables as the measure. It also contributes to the existing literature by applying more appropriate methodologies than the logit model and panel regression, or by investigating the relationship between the ownership of institutional investors and their performance. By going beyond the short-term horizons of previous studies on Chinese

mutual fund markets, this thesis is also the first study to investigate the relationship between style investment and institution performance. By considering industry concentration as another dimension of 'investment style' along with other stock characteristics, this thesis provides a more rigorous and integrated demonstration of the style effect. In particular, it shows that QFIIs exhibit superior performance when they take advantage of style investment.

5.2 Tasks for the Future

The detected positive style-performance relation has several implications and provides areas for further investigation. Portfolio managers that exhibit superior performance appear to maintain a preferred style which, in turn, maintains consistency in order to generate future return premiums. This, in practice, can signal their stock picking skills to other investors. Therefore, portfolio managers can benefit from remaining style consistent and by concentrating funds in certain industries in order to avoid poor performance. This leads to further discussion on herding behaviour among different investor groups regarding style investment. This is especially the case for foreign investors as they make up a disproportionately small share of investors' equity holdings when one considers their relative stock market capitalisation. This is discussed as the 'home bias puzzle' as the result of information asymmetry (French & Poterba, 1991; Cooper & Kaplnis, 1994; Tesar & Wermer,1995). However, QFIIs are found to generate significant, positive quarterly abnormal returns which are relatively lower than those of domestic funds. Both of these groups of investors present positive style-performance relation. This poses the following questions: Are QFIIs' positive abnormal returns the result of their stock picking skills, or are they just mimicking the trading styles of domestic institutional investors? Would this herding persist if domestic institutional investors change their stock holdings into another distinct style? Further research is warranted to examine the herding effect on investment style among institutional investors.

Another area to be investigated is the relationship between investment style and investor sentiment, since investor sentiment has a significant effect on asset prices. Through their investment style model, Barberis and Shleifer (2003) demonstrated that some investors can be irrational as they make investment decisions based solely on past style performance. Therefore, styles that have outperformed others attract more investment and the fund inflows positively affect stock prices. However, it remains unclear as to whether past style returns can predict future stock returns. An understanding of the predictivity of investment style, therefore, may help further exploring the drivers of momentum. Further study will also provide a greater understanding of stock price variations by investigating how investment style drives asset prices away from fundamental values, and whether style investing drives momentum through co-movement of stocks with their style. This is important for both market participants and policy makers.

References

Abdel-Kader, M. & Qing, K.Y. (2007). Risk-Adjusted performance, selectivity, timing ability, and performance persistence of Hong Kong mutual funds. *Journal of Asia-Pacific Business, 8*(2), 25-57.

Aggarwal, R., Klapper, L., & Wysocki, P. D. (2005). Portfolio preferences of foreign institutional investors. *Journal of Banking and Finance,* 29(12), 919-2946.

Asness, C., Friedman, J., Krail, R., & Liew, J. (2000). Style timing: Value versus growth. *Journal of Portfolio Management, 26*(2), 6-50.

Azriel, L., & Miles, L. (1995). The gains from diversification reconsidered: transaction costs and superior information. *Financial Market, Institutions, and Instruments*, *4*(3), 1-60.

Banz, R. W. (1981). The Relationship between return and market value of common stocks. *Journal of Financial Economics, 9*(1), 3-18.

Barberis, N., & Shleifer, A. (2003). Style Investing. *Journal of Financial Economics*, *68*(2), 161-199.

Bardhan, P. K. (2000). Understanding underdevelopment: Challenges for institutional economics from the point of view of poor countries. *Journal of Institutional and Theoretical Economics*, *156*(1), 216-235.

Basu, S. (1977). Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *Journal of Finance, 32*(3), 663-682.

Bauer, R., Keodijk, K., & Otten, R. (2005). International evidence on ethical mutual fund performance and investment style. *Journal of Banking & Finance, 29*(7), 1751-1767.

Bennett, J. A., Sias, R. W., & Starks, L. T. (2003). Greener pastures and the impact of dynamic institutional preferences. *The Review of Financial Studies, 16*(4), 1203-1238.

Berk., J. B., & Green. R. C., (2004). Mutual fund flows and performance in rational markets. *Journal of Plotical Economy, 112*(6), 1269-1295.

Bhojraj, S., Cho, Y. J., & Yehuda, N. (2012). Mutual fund family size and mutual fund performance: The role of regulatory changes. *Journal of Accounting Research, 50*(3), 647-684

Bird, G., & Rajan, R. S. (2001). Banks, financial liberalisation and financial crises in emerging markets. *World Economy*, *24*(7), 889-910.

Bodson, L., Cavenaile, L., & Sougné, D. (2013). A global approach to mutual funds market timing ability. *Journal of Empirical Finance, 20*, 96-101.

Bogle, J. C. (1998). The implications of style analysis for mutual fund performance evaluation. *Journal of Portfolio Management*, *24*(4), 34-42.

Brands, S., Brown, S., & Gallagher, D. (2005). Portfolio concentration and investment manager performance. *Inernational Review of Finance, 5*(3), 149-174.

Brown, S. J., & Goetzmann, W. N. (1997). Mutual fund styles. *Journal of Financial Economics, **43***(3), 373-399.

Brown, K. C., Harlow, W. V., & Zhang, H. (2009). *Staying the course: The role of investment style consistency in the performance of mutual funds* (SSRN Working Paper No.1364737). Retrieved from SSRN website: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1364737.

Brown, S. J., Goetzmann, W. N., & Ross, S. A. (1995). Survival. *The Journal of Finance, 50*(3), 853-873.

Carhart, M. M., Carpenter, J. N., Lynch, A. W., & Musto, D. K. (2002). Mutual fund survivorship. *The Review of Financial Studies, 15*(5), 1439-1463.

Carhart, M. M. (1997). On Persistence in mutual fund performance. *The Journal of Finance, 52*(1), 57-82.

Chang, E. C., Luo, Y., & Ren, J. (2013). Pricing deviation, misvaluation comovement, and macroeconomic conditions. *Journal of Banking & Finance, 37*(12), 5285-5299.

Chay, J. B., & Trzcinka, C. A. (1999). Managerial performance and cross-sectional pricing of closed-end funds. *Journal of Financial Economics, 52*(3), 379-408.

Chan, L. K., Jegadeesh, N., & Lakonishok, J. (1996). Momentum strategies. *The Journal of Finance*, 51(5), 1681-1713.

Chan, L. K. C., Chen, H., & Lakonishok, J. (2002). On mutual fund investment styles. *Review of Financial Studies, 15(*5), 1407-1437.

Chen, H. H., & Chen, L. H. (2017). An analysis of the investment concentration of equity mutual funds in China. *Emerging Markets Finance and Trade, 53*(3), 511-520.

Chen, J., Hong, H., Huang, M., & Kubik, J. D. (2004). Does fund size erode mutual fund performance? The role of liquidity and organization. *American Economic Review, 94*(5), 1276-1302.

Chen, X., Harford, J., & Li, K. (2007). Monitoring: Which institutions matter?. *Journal of financial Economics, 86*(2), 279-305.

Chen, X., Kim, K. A., Yao, T., & Yu, T. (2010). On the predictability of Chinese stock returns. *Pacific-Basin Finance Journal, 18*(4), 403-425.

Chen, H. L., Jegadeesh, N., & Wermers, R. (2000). The value of active mutual fund management: An examination of the stockholdings and trades of fund managers. *Journal of Financial and quantitative Analysis, 35*(3), 343-368.

Chevalier, J., & Ellison, G. (1997). Risk taking by mutual funds as a response to incentives. *Journal of Political Economy, 105*(6), 1167-1200.

Choe, H., Kho, B. C., & Stulz, R. M. (2005). Do domestic investors have an edge? The trading experience of foreign investors in Korea. *The Review of Financial Studies, 18*(3), 795-829.

Choe, H., Kho, B. C., & Stulz, R. M. (1999). Do foreign investors destabilize stock markets? The Korean experience in 1997. *Journal of Financial Economics, 54*(2), 227-264.

Chong, T. T. L., Lam, T. H., & Yan, I. K. M. (2012). Is the Chinese stock market really inefficient?. *China Economic Review*, *23*(1), 122-137.

Chu, X., Liu, Q., & Tian, G. G. (2015). Does control‐ownership divergence impair market liquidity in an emerging market? Evidence from China. *Accounting & Finance*, *55*(3), 881-910.

Covrig, V., Lau, S. T., & Ng, L. (2006). Do domestic and foreign fund managers have similar preferences for stock characteristics? A cross-country analysis. *Journal of International Business Studies*, *37*(3), 407-429.

Cremers, K. M., & Petajisto, A. (2009). How active is your fund manager? A new measure that predicts performance. The Review of Financial Studies, 22(9), 3329-3365.

Cuthbertson, K., Nitzsche, D., & O'Sullivan, N. (2008). UK mutual fund performance: Skill or luck?. *Journal of Empirical Finance*, *15*(4), 613-634.

Dahlquist, M., & Robertsson, G. (2001). Direct foreign ownership, institutional investors, and firm characteristics. *Journal of Financial Economics*, *59*(3), 413-440.

Daniel, K., Grinblatt, M., Titman, S., & Wermers, R. (1997). Measuring mutual fund performance with characteristic-based benchmarks. *The Journal of Finance*, *52*(3), 1035-1058.

Daniel, K., & Titman, S. (1997). Evidence on the characteristics of cross sectional variation in stock returns. *The Journal of Finance*, *52*(1), 1-33.

DiBartolomeo, D., & Witkowski, E. (1997). Mutual fund misclassification: Evidence based on style analysis. *Financial Analysts Journal*, *53*(5), 32-43.

Edelen, R., Evans, R., & Kadlec, G. (2007). *Scale effects in mutual fund performance: The role of trading costs* (SSRN Working Paper No. 951367). Retrieved from SSRN website: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=951367

Edelen, R. M. (1999). Investor flows and the assessed performance of open-end mutual funds. *Journal of Financial Economics*, *53*(3), 439-466.

Elton, E. J., Gruber, M. J., & Blake, C. R. (2012). Does mutual fund size matter? The relationship between size and performance. *The Review of Asset Pricing Studies*, *2*(1), 31-55.

Falkenstein, E. G. (1996). Preferences for stock characteristics as revealed by mutual fund portfolio holdings. *The Journal of Finance*, *51*(1), 111-135.

Fama, E. F., & French, K. R. (1992). The cross‐section of expected stock returns. *The Journal of Finance*, *47*(2), 427-465.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*(1), 3-56.

Fama, E. F., & French, K. R. (1996). Multifactor explanations of asset pricing anomalies. *The Journal of Finance*, *51*(1), 55-84.

Feng, X., Zhou, M., & Chan, K. C. (2014). Smart money or dumb money? A study on the selection ability of mutual fund investors in China. *The North American Journal of Economics and Finance*, *30*, 154-170.

Ferreira, M. A., Keswani, A., Miguel, A. F., & Ramos, S. B. (2013). The determinants of mutual fund performance: A cross-country study. *Review of Finance*, *17*(2), 483-525.

Ferreira, M. A., & Matos, P. (2008). The colors of investors' money: The role of institutional investors around the world. *Journal of Financial Economics*, *88*(3), 499-533.

Ferson, W. E., & Schadt, R. W. (1996). Measuring fund strategy and performance in changing economic conditions. *The Journal of Finance*, *51*(2), 425-461.

Frenkel, M., & Menkhoff, L. (2004). Are foreign institutional investors good for emerging markets?. *World Economy*, *27*(8), 1275-1293.

Fortin, R., & Michelson, S. (2002). Indexing versus active mutual fund management. *Journal of Financial Planning*, *15*(9), 82-94.

Froot, K., & Teo, M. (2008). Style investing and institutional investors. *Journal of Financial and Quantitative Analysis*, *43*(4), 883-906.

Gabriele, A., Baratav, K., & Parikh, A. (2000). Instability and volatility of capital flows to developing countries. *World Economy*, *23*(8), 1031-1056.

Gillan, S. L., & Starks, L. T. (2000). Corporate governance proposals and shareholder activism: The role of institutional investors. *Journal of Financial Economics*, *57*(2), 275-305.

Gompers, P. A., & Metrick, A. (2001). Institutional investors and equity prices. *The Quarterly Journal of Economics*, *116*(1), 229-259.

Grinblatt, M., & Keloharju, M. (2000). The investment behaviour and performance of various investor types: a study of Finland's unique data set. *Journal of Financial Economics*, *55*(1), 43-67.

Grinblatt, M., & Titman, S. (1993). Performance measurement without benchmarks: An examination of mutual fund returns. *Journal of Business*, 47-68.

Grinblatt, M., & Titman, S. (1989). Mutual fund performance: An analysis of quarterly portfolio holdings. *Journal of Business*, 393-416.

Gruber, M. J. (1996). Another puzzle: The growth in actively managed mutual funds. *The Journal of Finance*, *51*(3), 783-810.

Goetzmann, W. N., & Kumar, A. (2008). Equity portfolio diversification. *Review of Finance*, *12*(3), 433-463.

Henriksson, R. D., & Merton, R. C. (1981). On market timing and investment performance. II. Statistical procedures for evaluating forecasting skills. *Journal of business*, *54*(4), 513-533.

He, W., Cao, B., & Baker, H. K. (2015). The performance and market timing ability of Chinese mutual funds. *Financial Services Review*, *24*(3), 289-311.

Holmes, K. A., & Faff, R. W. (2007). Style drift, fund flow and fund performance: New cross-sectional evidence. *Financial Services Review*, *16*(1), 55-71.

Huang, J., Sialm, C., & Zhang, H. (2011). Risk shifting and mutual fund performance. *The Review of Financial Studies*, *24*(8), 2575-2616.

Huang, R. D., & Shiu, C. Y. (2009). Local effects of foreign ownership in an emerging financial market: Evidence from qualified foreign institutional investors in Taiwan. *Financial Management, 38*(3), 567-602.

Idzorek, T. M. & Bertsch, F. (2004). The Style drift Score. *The Journal of Portfolio Management, 31*(1), 76-83.

Ippolito, R. A. (1989). Efficiency with costly information: A study of mutual fund performance, 1965-1984. *The Quarterly Journal of Economics*, *104*(1), 1-23.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance, 48*(1), 65-91.

Jensen, M. C. (1968). The performance of mutual funds in the period 1945–1964. *The Journal of Finance, 23*(2), 389-416.

Jiang, B. B., Laurenceson, J., & Tang, K. K. (2008). Share reform and the performance of China's listed companies. *China Economic Review, 19*(3), 489-501.

Kacperczyk, M., Nieuwerburgh, S. V., & Veldkamp, L. (2014). Time‐varying fund manager skill. *The Journal of Finance*, *69*(4), 1455-1484.

Kacperczyk, M., Sialm, C., & Zheng, L. (2005). On the industry concentration of actively managed equity mutual funds. *The Journal of Finance, 60*(4), 1983-2011.

Kang, Stulz, R. M. (1997). Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan. *Journal of Financial Economics*, *46*(1), 3-28.

Karpoff, J. M., Malatesta, P. H., & Walkling, R. A. (1996). Corporate governance and shareholder initiatives: Empirical evidence. *Journal of Financial Economics, 42*(3), 365-395.

Keim, D. B., & Madhavan, A. (1997). Transactions costs and investment style: an inter-exchange analysis of institutional equity trades. *Journal of Financial Economics, 46*(3), 265-292.

Khorana, A., Servaes, H., & Tufano, P. (2005). Explaining the size of the mutual fund industry around the world. *Journal of Financial Economics*, *78*(1), 145-185.

Kim, M., Shukla, R., & Tomas, M. (2000). Mutual fund objective misclassification. *Journal of Economics and Business, 52*(4), 309-323.

Lai, C. J., Lou, K. R., & Shiu, C. Y. (2008). Does foreign investors trade predict stock return? Evidence from Taiwan. *Information and Management Sciences*, *19*(3), 477-494.

Lee, B. S., Li, W., & Wang, S. S. (2010). The dynamics of individual and institutional trading on the Shanghai Stock Exchange. *Pacific-Basin Finance Journal*, *18*(1), 116-137.Malkiel, B. G. (1995). Returns from investing in equity mutual funds 1971 to 1991. *The Journal of Finance, 50*(2), 549-572.

Leuz, C., Lins, K. V., & Warnock, F. E. (2009). Do foreigners invest less in poorly governed firms?. *The Review of Financial Studies*, *23*(3), 3245-3285.

Levy, A., & Livingston, M. (1995). Financial Markets, Institutions & Instruments: The Gains from Diversification Reconsidered: Transaction Costs and Superior Information. Blackwell Publishers.

Lewellen, J. (2011). Institutional investors and the limits of arbitrage. *Journal of Financial Economics*, *102*(1), 62-80.

Liao, L., Zhang, X., & Zhang, Y. (2017). Mutual fund managers' timing abilities. *Pacific-Basin Finance Journal*, *44*, 80-96.

Lin, A., & Chen, C. Y. (2006). The impact of qualified foreign institutional investors on Taiwan's stock market. *Journal of Chinese Management Review*, *9*(2), 1-27.

Lin, A. Y., & Swanson, P. E. (2003). The behaviour and performance of foreign investors in emerging equity markets: Evidence from Taiwan. *International Review of Finance*, *4*(3-4), 189-210.

Lin, C., Ma, Y., & Su, D. (2009). Corporate governance and firm efficiency: evidence from China's publicly listed firms. *Managerial and Decision Economics*, *30*(3), 193-209.

Lin, C. H., & Shiu, C. Y. (2003). Foreign ownership in the Taiwan stock market—an empirical analysis. *Journal of Multinational Financial Management*, *13*(1), 19-41.

Liu, N., Bredin, D., Wang, L., & Yi, Z. (2014). Domestic and foreign institutional investors' behaviour in China. *The European Journal of Finance*, *20*(7-9), 728-751.

Liu, J. G., & Zhang, L. J. (2010). Chinese open-end fund style drift and stock-picking. *Shanghai Economic Research*, *11*(3), 45-63.

Malkiel, B. G. (1995). Returns from investing in equity mutual funds 1971 to 1991. *The Journal of finance*, *50*(2), 549-572.

Ma, L., Tang, Y., & Gómez, J. P. (2017). *Portfolio manager compensation in the US mutual fund industry* (SSRN Working Paper No. 2024027). Retrieved from SSRN website: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2024027

Meier, I. & Rombouts, J. K. (2009). *Style Rotation and Performance Persistence of Mutual Funds* (SSRN working paper No. 1313242). Retrieved from SSRN website: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1313242

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *The Journal of Finance*, *42*(3), 483-510.

Moskowitz, T. J., & Grinblatt, M. (1999). Do industries explain momentum?. *The Journal of Finance*, *54*(4), 1249-1290.

Naughton, B. J. (2006). *The Chinese economy: Transitions and growth*. Cambridge, Massachusetts: MIT press.

Otten, R., & Bams, D. (2002). European mutual fund performance. *European Financial Management*, *8*(1), 75-101.

Pinnuck, M. (2003). An examination of the performance of the trades and stock holdings of fund managers: Further evidence. *Journal of Finance and Quantitative Analysis*, *38*(4), 811-828.

Phillips, B., Pukthuanthong, K., & Rau, P. R. (2018). Size does not matter: Diseconomies of scale in the mutual fund industry revisited. *Journal of Banking & Finance*, *88*, 357-365.

Qi, D., Wu, W., & Zhang, H. (2000). Shareholding structure and corporate performance of partially privatized firms: Evidence from listed Chinese companies. *Pacific-Basin Finance Journal*, *8*(5), 587-610.

Rakowski, D. (2010). Fund flow volatility and performance. *Journal of Financial and Quantitative Analysis*, *45*(1), 223-237.

Roll, R. (2003). Style return differentials: Illusions, risk premiums, or investment opportunities. In T. D. Coggin & F. J. Fabozzi (Eds.), *The handbook of equity style management* (pp. 229-258). New Jersey, USA: John Wiley & Sons.

Seasholes, M. (2000). Smart foreign traders in emerging markets. *unpublished Harvard Business School working paper*.

Sapp, T., & Yan, X. (2008). Security concentration and active fund management: do focused funds offer superior performance?. *Financial Review*, *43*(1), 27-49.

Sharpe, W. F. (1992). Asset allocation: Management style and performance measurement. *Journal of Portfolio Management*, *18*(2), 7-19.

Sirri, E., & Tufano, P. (1998). Costly search and mutual fund flows. *The Journal of Fiannce*, *53*(5), 1589-1622.

Stiglitz, J. E. (1989). Financial markets and development. *Oxford Review of Economic Policy*, *5*(4), 55-68.

Sun, Q., & Tong, W. H. (2003). China share issue privatization: the extent of its success. *Journal of Financial Economics*, *70*(2), 183-222.

Swinkels, L., & Tjong-A-Tjoe, L. (2007). Can mutual funds time investment styles?. *Journal of Asset Management*, *8*(2), 123-132.

Tam, O. K., Li, S. G., Zhang, Z., & Yu, C. P. (2010). Foreign investment in China and qualified foreign institutional investor (QFII). *Asian Business & Management*, *9*(3), 425-448.

Tang, K., Wang, W., & Xu, Rong. (2012). Size and performance of Chinese mutual funds: The role of economy of scale and liquidity. *Pacific-Basin Finance Journal*, *20*(2), 228-246.

Tian, L., & Estrin, S. (2008). Retained state shareholding in Chinese PLCs: Does government ownership always reduce corporate value?. *Journal of Comparative Economics*, *36*(1), 74-89.

Treynor, J. L., & Mazuy, K. K. (1966). Can mutual funds outguess the market? *Harvard Business Review*, *44*(4),131-136.

Treynor, J. L, & Black. F. (1973). How to use security analysis to improve portfolio selection. *Journal of Business*, *46*(3), 66-86.

Wang, Z. J., & Nanda, V. (2008). *Why Do Aggressive Payout Policies Reduce Fund Discounts-Is It Signaling, Agency Costs, or Dividend Preferences?*. Working Paper, University of Illinois.

Wei, Z., & Varela, O. (2003). State equity ownership and firm market performance: Evidence from China's newly privatized firms. *Global Finance Journal*, *14*(1), 65-82.

Wei, Z., Xie, F., & Zhang, S. (2005). Ownership structure and firm value in China's privatized firms: 1991–2001. *Journal of Financial and Quantitative Analysis, 40*(1), 87-108.

Wermers, R. (2012). *A matter of Style: The Causes and Consequences of Style Drift in Institutional Portfolios* (SSRN Working Paper No. 2024259). Retrieved from SSRN website: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2024259

Wermers, R. (2003). *Is money really "Smart"? New evidence on the relation between mutual fund flows, manager behaviour, and performance persistence* (SSRN Working Paper No. 414420). Retrieved from SSRN website: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=414420

Wermers, R. (2002). *A matter of style: The causes and consequences of style drift in institutional portfolios* (SSRN Working Paper No. 2024259). Retrieved from SSRN website: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2024259

Wermers, R. (2000). Mutual fund performance: An empirical decomposition into stock-picking talent, style, transactions costs, and expenses. *The Journal of Finance, 55*(4), 1655-1695.

Xu, X., & Wang, Y. (1999). Ownership structure and corporate governance in Chinese stock companies. *China Economic Review, 10*(1), 75-98.

Yan, X. S. (2008). Liquidity, investment style, and the relation between fund size and fund performance. *Journal of Financial and Quantitative Analysis, 43*(3), 741-767.

Yang, L., & Liu, W. (2017). Luck versus skill: Can Chinese funds beat the market?. *Emerging Markets Finance and Trade, 53*(3), 629-643.

Yi, L., Liu, Z., He, L.,Qin, Z.& Gan,S. (2018). Do Chinese Mutual Funds Time the Market?. *Pacific-basin Finance Journal, 47*(1), 1-19.

Yu, L., & Du, Y. (2008). Stock Selectivity and Timing Ability of Chinese Open-end Funds. *Security Markets,* 342, 93-96. (In Chinese).

Yuan, R., Xiao, J. Z., & Zou, H. (2008). Mutual funds' ownership and firm performance: Evidence from China. *Journal of Banking & Finance, 32*(8), 1552-1565.

Appendix

A1. Corporate Governance: the ownership structure and the management structure

Panel A: Ownership Structure

	Percentage of State-owned shares			Percentage of tradable shares		
Year	QFIIs	DFs	A share	QFIIs	DFs	A share
2003	38.72	40.05	35.75	42.86	39.92	39.62
2004	36.36	37.16	34.49	40.65	39.36	39.50
2005	35.61	35.40	32.33	42.98	42.77	41.52
2006	32.57	30.55	27.91	49.29	47.70	47.91
2007	27.56	27.11	24.31	53.45	50.82	53.39
2008	25.70	22.93	20.89	57.55	56.69	59.08
2009	12.18	13.13	12.58	71.28	69.66	68.63
2010	9.57	9.46	8.90	75.78	67.67	67.39
2011	6.87	6.33	6.25	78.31	69.13	68.85
2012	4.66	5.26	5.22	78.69	70.51	70.85
2013	2.86	3.89	3.96	81.03	76.65	75.81
2014	4.31	3.57	3.80	85.88	78.60	77.08

Panel B: Management Structure

This table presents the descriptive statistics for the ownership structure in Panel A, and the management structure in Panel B, for the QFII holdings, the domestic fund holdings, and the overall A-shares market, respectively. The test for equality of means between QFIIs and A-Shares, DFs and A-Shares, and QFIIs and DFs are performed, no statistically significant results are found.

	Number of directors			Number of supervisors			Number of Executive			Percentage of independent directors		
Year	QFIIs	DFs	A share	QFIIs	DFs	A share	QFIIs	DFs	A share	QFIIs	DFs	A share
2003	11	10	10	5	5	4	7	6	6	34	33	33
2004	10	10	10	5	4	4	7	6	6	35	34	34
2005	10	10	10	4	4	4	7	7	6	35	35	35
2006	10	10	9	4	4	4	7	6	6	35	35	35
2007	10	10	9	4	4	4	7	7	6	36	36	36
2008	10	10	9	4	4	4	7	7	6	36	36	36
2009	10	9	9	4	4	4	7	7	6	36	36	36
2010	9	9	9	4	4	4	7	7	6	37	37	37
2011	10	9	9	4	4	4	7	7	6	37	37	37
2012	10	9	9	4	4	4	7	7	6	37	37	37
2013	9	9	9	4	4	4	7	7	7	38	37	37
2014	NA	9	8	NA	3	3	NA	6	6	NA	37	38

A2. Industry Classification

Six Industry Classifications	Weight	Twenty Industry Sub Classifications	Weight
1. Finance	16.67%	Currency Financial Service	12.02
		Capital Market Service	2.18%
		Insurance	2.25%
		Other Financial Industries	0.22%
2. Industrials	59.75%	Mining Industry	12.66%
		Manufacturing	41.68%
		Electricity, Heat, Gas and Water Production and Supply	5.41%
3.Public Utilities	10.97%	Transportation, Warehousing and Postal Services	6.07%
		Leasing and Business Services	0.95%
		Scientific Research and Technology Services	0.13%
		Water, Environment and Public Facilities Management	0.72%
		Education, Culture, Sports, and Entertainment	1.17%
		Information Transmission, Software and Information Technology Services	1.67%
4. Conglomerates	2.35%	Agriculture, Forestry, Animal Husbandry and Fishery	1.02%
		Building Decoration	0.36%
		Other Conglomerates	0.97%
5. Commerce	3.88%	Accommodation and Catering Industry	0.26%
		Wholesale and Retail Trade	3.62%
6. Properties	6.38%	Civil Engineering Construction	2.35%
		Properties	4.03%

A3. Qualified Foreign Institutional Investors List in 2018

No.	QFII Name	Approval Date
1	UBS AG	23/05/2003
2	Nomura Securities Co.,Ltd.	23/05/2003
3	Morgan Stanley & Co. International PLC.	05/06/2003
4	Citigroup Global Markets Limited	05/06/2003
5	Goldman Sachs&Co. LLC	04/07/2003
6	Deutsche Bank Aktiengesellschaft	30/07/2003
7	The Hongkong and Shanghai Banking Corporation Limited	04/08/2003
8	ING Bank N.V.	10/09/2003
9	JPMorgan Chase Bank, National Association	30/09/2003
10	Credit Suisse (Hong Kong) Limited	24/10/2003
11	Standard Chartered Bank (Hong Kong) Limited	11/12/2003
12	Nikko Asset Management Co.,Ltd.	11/12/2003
13	Merrill Lynch International	30/04/2004
14	Hang Seng Bank Limited	10/05/2004
15	Daiwa Securities Co. Ltd.	10/05/2004
16	Bill & Melinda Gates Foundation Trust	19/07/2004
17	INVESCO Asset Management Limited	04/08/2004
18	Société Générale	02/09/2004
19	Barclays Bank PLC	15/09/2004
20	Commerzbank AG	27/09/2004
21	BNP Paribas	29/09/2004
22	Power Corporation of Canada	15/10/2004
23	Credit Agrigole Corporate and Investment Bank	15/10/2004
24	Goldman Sachs Asset Management International	09/05/2005
25	Martin Currie Investment Management Ltd	25/10/2005
26	GIC Private Limited	25/10/2005
27	PineBridge Investment LLC	14/11/2005
28	Temasek Fullerton Alpha Pte Ltd	15/11/2005
29	JF Asset Management Limited	28/12/2005
30	The Dai-ichi Life Insurance Company，Limited	28/12/2005
31	DBS Bank Ltd	13/02/2006
32	AMP Capital Investors Limited	10/04/2006
33	The Bank of Nova Scotia	10/04/2006
34	KBC Financial Products UK Limited	10/04/2006
35	Edmond de Rothschild（France）	10/04/2006
36	Yale University	14/04/2006
37	Morgan Stanley Investment Management Inc.	07/07/2006
38	Eastspring Investment(Hong Kong) Limited	07/07/2006
39	Stanford University	05/08/2006

40	United Overseas Bank Limited	05/08/2006
41	Schroder Investment Mangement Limited	29/08/2006
42	HSBC Global Asset Management (Hong Kong) Limited	05/09/2006
43	Mizuho Securities Co.,Ltd	05/09/2006
44	UBS Asset Management (Singapore) Ltd	25/09/2006
45	Sumitomo Mitsui Asset Management Company, Limited	25/09/2006
46	Norges Bank	24/10/2006
47	Pictet Asset Management Limited	25/10/2006
48	The Trustees of Columbia University in the City of New York	12/03/2008
49	Robeco Institutional Asset management B.V.	05/05/2008
50	State Street Global Advisors Asia Limited	16/05/2008
51	Platinum Investment Company Limited	02/06/2008
52	KBC Asset Management N.V.	02/06/2008
53	Mirae Asset Global Investments Co., Ltd.	25/07/2008
54	Chubb INA International Holdings Ltd.	05/08/2008
55	Caisse de dépôt et placement du Québec	22/08/2008
56	President and Fellows of Harvard College	22/08/2008
57	Samsung Investment Trust Management Co., Ltd.	25/08/2008
58	AllianceBernstein Limited	28/08/2008
59	Oversea-Chinese Banking Corporation Limited	28/08/2008
60	First State Investment Management (UK) Limited	11/09/2008
61	DAIWA Asset Management Co.	11/09/2008
62	Shell Asset Management Company B.V.	12/09/2008
63	T. Rowe Price Associates, Inc.	12/09/2008
64	Credit Suisse AG	14/10/2008
65	UOB Asset Management Ltd	28/11/2008
66	ABU Dhabi Investment Authority	03/12/2008
67	Allianz Global Investors GmbH	16/12/2008
68	Capital International, Inc.	18/12/2008
69	Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.	29/12/2008
70	Hanwha Investment Trust Management Co., Ltd.	05/02/2009
71	Ashmore Equities Investment Management(US) LLC	10/02/2009
72	The Korea Development Bank	23/04/2009
73	Woori Bank Co., Ltd	04/05/2009
74	Bank Negara Malaysia	19/05/2009
75	Lloyd George Management (Hong Kong) Limited	27/05/2009
76	Templeton Investment Counsel, LLC	05/06/2009
77	BEA Union Investment Management Limited	18/06/2009
78	The Sumitomo Trust & Banking Co., Ltd.	26/06/2009
79	Korea Investment Trust Management Co., Ltd	21/07/2009
80	Baring Asset Management Limited	06/08/2009
81	Ashmore Investment Management Limited	14/09/2009

82	BNY Mellon Asset Management International Limited	06/11/2009
83	Manulife Asset Management (Hong Kong) Limited	20/11/2009
84	Nomura Asset Management CO., LTD	23/11/2009
85	Tongyang Asset Management Corp.	11/12/2009
86	Royal Bank of Canada	23/12/2009
87	Aviva Investors Global Services Limited	28/12/2009
88	Ivy Investment Management Company	08/02/2010
89	Asset Management One Co., Ltd.	20/04/2010
90	OFI Asset Management	21/05/2010
91	Aberdeen Asset Management Asia Limited	06/07/2010
92	KB Asset Management Co., Ltd.	09/08/2010
93	Fidelity Investments Management (Hong Kong) Limited	01/09/2010
94	Legg Mason Investements (Europe) Limited	08/10/2010
95	Hong Kong Monetary Authority	27/10/2010
96	Fubon Asset Management Co., Ltd.	29/10/2010
97	Capital Securities Investment Trust Corporation	29/10/2010
98	BMO Investments Inc.	06/12/2010
99	Bank Julius Bear & Co.,Ltd	14/12/2010
100	KTB Asset Management Co.,Ltd	28/12/2010
101	Lyxor Asset Management	16/02/2011
102	Yuanta Securities Investment Trust Co.,Ltd.	04/03/2011
103	Assicurazioni Generali S.p.A.	18/03/2011
104	Banco Bilbao Vizcaya Argentaria, S.A.	06/05/2011
105	Cathay Securities Investment Trust Co., Ltd.	09/06/2011
106	Fuh Hwa Securities Investment Trust Co. Ltd.	09/06/2011
107	Comgest S.A.	24/06/2011
108	Amundi Hong Kong Limited	14/07/2011
109	BlackRock Institutional Trust Company, N.A.	14/07/2011
110	Grantham, Mayo, Van Otterloo & Co.LLC	09/08/2011
111	Monetary Authority of Singapore	08/10/2011
112	China Life Insurance Co., Ltd.（Taiwan）	26/10/2011
113	Shin Kong Life Insurance Co., Ltd.	26/10/2011
114	Princeton University	25/11/2011
115	Canada Pension Plan Investment Board	09/12/2011
116	Van Eck Associates Corporation	09/12/2011
117	Hansberger Global Investors, Inc.	13/12/2011
118	EARNEST Partners LLC	13/12/2011
119	Bank of Thailand	16/12/2011
120	Kuwait Investment Authority	21/12/2011
121	Northern Trust Global Investments Limited	21/12/2011
122	Taiwan Life Insurance Co., Ltd.	21/12/2011
123	The Bank of Korea	21/12/2011

124	Ontario Teachers' Pension Plan Board	22/12/2011
125	Korea Investment Corporation	28/12/2011
126	Russell Investments Ireland Limited	28/12/2011
127	Metzler Asset Management GmbH	31/12/2011
128	HI Asset Management Co., Linmited.	31/12/2011
129	Shinhan BNP Paribas Asset Management Co., Ltd.	05/01/2012
130	Stichting Pensioenfonds voor Huisartsen	05/01/2012
131	National Pension Service	05/01/2012
132	Mercuries Life Insurance Co,Ltd	30/01/2012
133	Prudential Financial Securities Investment Trust Enterprise	31/01/2012
134	Principal Global Investors LLC	31/01/2012
135	Hospital Authority Provident Fund Scheme	31/01/2012
136	TransGlobe Life Insurance Inc.	03/02/2012
137	Public Mutual Berhad	03/02/2012
138	Meiji Yasuda Asset Management Company Ltd.	27/02/2012
139	Cathay Life Insurance Co., LTD.	28/02/2012
140	Sumitomo Mitsui Banking Corporation	28/02/2012
141	Fubon Life Insurance Co. Ltd	01/03/2012
142	AIA Company Limited	05/03/2012
143	Neuberger Berman Europe Limited	05/03/2012
144	KHAZANAH NASIONAL BERHAD	07/03/2012
145	Capital Research and Management Company	09/03/2012
146	Tokio Marine Asset Management Co.,Ltd	14/03/2012
147	Hana Financial Investment Co.,Ltd	29/03/2012
148	Genesis Asset Managers,LLP	30/03/2012
149	City of London Investment Managementi Company Limited	30/03/2012
150	JPMorgan Asset Management (UK) Limited	30/03/2012
151	Okasan Asset Management Co.,Ltd	30/03/2012
152	Prescient Investment Management PTY LTD	18/04/2012
153	Dongbu Asset Management Co.,Ltd.	20/04/2012
154	Janus Capital Management LLC	20/04/2012
155	Henderson Global Investors Limited	28/04/2012
156	Eurizon Capital S.A.	02/05/2012
157	BOCI-Prudential Asset Management Limited	03/05/2012
158	Fullerton Fund Management Company Ltd	04/05/2012
159	Lion Global Investors Limited	07/05/2012
160	BG FUND MANAGEMENT LUXEMBOURG S.A.	23/05/2012
161	William Blair & Company,L.L.C.	24/05/2012
162	Investec Asset Management Limited	28/05/2012
163	ING Investment Management Aisa Pacific (Hong Kong) Limited	04/06/2012
164	Mitsubishi UFJ Kokusai Asset Management Co., Ltd.	04/06/2012
165	BOC Group Life Assurance Company Limited	12/07/2012

166	Hall Capital Partners LLC	06/08/2012
167	Board of Regents of The University of Texas System	06/08/2012
168	Nan Shan Life Insurance Company,Ltd.	06/08/2012
169	Suva	13/08/2012
170	British Columbia Investment Management Corporation	17/08/2012
171	Value Partners Hong Kong Limited	21/08/2012
172	Ontario Pension Board	29/08/2012
173	The Church Pension Fund	31/08/2012
174	Macquarie Bank Limited	04/09/2012
175	Andra AP-fonden	20/09/2012
176	Haitong International Asset Management (HK) Limited	20/09/2012
177	IDG CAPITAL MANAGEMENT (HK) LIMITED	20/09/2012
178	Duke University	24/09/2012
179	Qatar Holding LLC	25/09/2012
180	EFG Bank AG	26/09/2012
181	Cutwater Investor Services Corporation	26/10/2012
182	OrbiMed Advisors LLC	26/10/2012
183	New Silk Road Investment Pte. Ltd.	26/10/2012
184	BlackRock Asset Management North Asia Limited	26/10/2012
185	JPMorgan Asset Management Taiwan	05/11/2012
186	AEGON USA Investment Management, LLC	05/11/2012
187	CDH Investment Advisory Private Limited	07/11/2012
188	Skandinaviska Enskilda Banken AB(publ)	12/11/2012
189	Harvest Global Investments Limited	12/11/2012
190	Greystone Managed Investments Inc.	21/11/2012
191	Uni-President Assets Management Corporation	21/11/2012
192	Daiwa SB Investments Ltd.	19/11/2012
193	APS Asset Management Pte Ltd	27/11/2012
194	CITIC Securities International Investment Management (HK) Limited	11/12/2012
195	Pacific Alliance Investment Management (HK) Limited	11/12/2012
196	E Fund Management (Hongkong) Co.,Limited	11/12/2012
197	Hillhouse Capital Management Pte. Ltd.	11/12/2012
198	SinoPac Securities Investment Trust Co.,Ltd	13/12/2012
199	China Asset Management (Hong Kong) Limited	25/12/2012
200	East Capital AB	07/01/2013
201	First Securities Investment Trust Co., Ltd.	24/01/2013
202	PIMCO Asia Pte Ltd	24/01/2013
203	UBS Asset Management (Hong Kong) Ltd	24/01/2013
204	CSOP Asset Management Limited	31/01/2013
205	EJS Investment Management S.A.	31/01/2013
206	Guotai Junan Assets (Asia) Limited	21/02/2013
207	Taikang Asset Management (HK) Company Limited	22/02/2013

208	CMS Asset Management (HK) Co., Limited	22/02/2013
209	KB Securities co., Ltd.	22/03/2013
210	ICBC (Asia) Investment Management Company Limited	25/03/2013
211	Asia Capital Reinsurance Group Pte. Ltd.	11/04/2013
212	AZ Fund Management S.A.	11/04/2013
213	Taishin Securities Investment Trust Co., Ltd.	27/04/2013
214	HFT Investment Management (HK) Limited	07/05/2013
215	HSBC Global Asset Management (Taiwan) Limited	10/05/2013
216	Taiping Assets Management (HK) Company Limited	15/05/2013
217	China International Capital Corporation Hong Kong Asset Management Limited	16/05/2013
218	China Everbright Assets Management Limited	30/05/2013
219	Bosera Asset Management (International) Co., Ltd.	04/06/2013
220	Mega International Investment Trust Co., Ltd.	04/06/2013
221	BNP Paribas Investment Partners Asia Limited	19/06/2013
222	University of Notre Dame du Lac	19/06/2013
223	Newport Asia LLC	15/07/2013
224	HUA NAN INVESTMENT TRUST CORPORATION	15/07/2013
225	Greenwoods Asset Management Hong Kong Limited	15/07/2013
226	CTBC Life Insurance Co., Ltd.	20/08/2013
227	Keywise Capital Management (HK) Limited	20/08/2013
228	FUBON INSURANCE COMPANY LIMITED	26/08/2013
229	Alta Advisers Limited	26/08/2013
230	Flowering Tree Investment Manangement Pte. Ltd.	26/08/2013
231	GF International Investment Management Limited	26/09/2013
232	Mayo Clinic	29/09/2013
233	Guosen Securities (HK) Asset Management Company Limited	29/09/2013
234	ST Asset Management Ltd	18/10/2013
235	Government Pension Fund	24/10/2013
236	SeaTown Holdings International Pte. Ltd.	30/10/2013
237	CSAM Asset Management Pte Ltd	30/10/2013
238	China Life Franklin Asset Management Co., Limited	30/10/2013
239	UBS Hana Asset Management Co., Ltd.	31/10/2013
240	Cathay United Bank Co., Ltd.	07/11/2013
241	Bank of Lithuania	23/11/2013
242	Franklin Templeton SinoAM SIM Inc.	23/11/2013
243	CTBC Bank Co., Ltd.	23/11/2013
244	The Washington University	23/01/2014
245	Monetary Authority of Macao	27/01/2014
246	Stifel Nicolaus & Company, Inc.	27/01/2014
247	NTUC Income Insurance Co-operative Limited	27/01/2014
248	Invesco PowerShares Capital Management LLC	27/01/2014
249	Swiss Re Asia AG	27/01/2014

250	Nordea Investment Management AB	27/01/2014
251	Paradigm Asset Management Co., Ltd.	11/03/2014
252	Cascade Investment, L.L.C.	11/03/2014
253	Matthews International Capital Management, LLC	12/03/2014
254	Oppenheimer Funds, Inc.	19/03/2014
255	Overlook Investments Limited	08/04/2014
256	Taishin International Bank	03/06/2014
257	Citigroup First Investment Management Limited	16/06/2014
258	ASSETPLUS Investment Management Co., Ltd.	24/07/2014
259	The Bloomberg Family Foundation Inc.	25/07/2014
260	The Rock Creek Group, LP.	28/07/2014
261	Massachusetts Institute of Technology	19/09/2014
262	Viking Global Hong Kong Limited	22/09/2014
263	Goldman Sachs International	22/09/2014
264	AXA Fund Management S.A.	08/10/2014
265	UBS SDIC Asset Management (Hong Kong) Company Limited	01/12/2014
266	ICBC Credit Suisse Asset Management (International) Company Limited	04/12/2014
267	Shenwan Hongyuan Asset Management (Asia) Limited	30/12/2014
268	Trustees of the University of Pennsylvania	05/01/2015
269	GF Asset Management (Hong Kong) Limited	07/01/2015
270	Munsun Asset Management (Asia) Limited	22/01/2015
271	E.SUN COMMERCIAL BANK, LTD.	27/02/2015
272	China Universal Asset Management (Hong Kong) Company Limited	27/02/2015
273	The Regents of the University of California	25/03/2015
274	Fullgoal Asset Management (HK) Limited	08/04/2015
275	Brunei Investment Agency	07/05/2015
276	Bank of Taiwan	20/05/2015
277	Springs Capital (Hong Kong) Limited	20/05/2015
278	Allianz Global Investors Taiwan Limited	21/05/2015
279	Essence Asset Management (Hong Kong) Limited	02/06/2015
280	Jih Sun Securities Investment Trust Co., Ltd	02/06/2015
281	General Oriental Investments SA	29/06/2015
282	CCB International Asset Management Limited	28/07/2015
283	Fidelidade-Companhia de Seguros, S.A.	31/08/2015
284	TBP Investment Advisory (HK) Limited	12/10/2015
285	Eastspring Securities Investment Trust Co. Ltd.	02/11/2015
286	PineBridge Investments Management Taiwan Limited	24/11/2015
287	ABCI Asset Management Limited	24/11/2015
288	Rongtong Global Investment Limited	15/01/2016
289	Guotai Global Investments Limited	17/03/2016
290	First Commercial Bank, Ltd.	03/05/2016
291	Yuanta Securities Co., Ltd.	19/07/2016

292	ICBC International Asset Management Limited Company	19/07/2016
293	China Everbright Securities Asset Management Limited	12/08/2016
294	The Vanguard Group, Inc.	01/09/2016
295	China Post & Capital Global Asset Management Limited	09/09/2016
296	Caitong International Asset Management Co. Limited	09/09/2016
297	J.P. Morgan Securities plc	28/09/2016
298	Da Cheng International Asset Management Company Limited	06/12/2016
299	CMB International Asset Management Limited	05/01/2017
300	BOB Scotia International Asset Management Company Limited	10/01/2017
301	FSS Trustee Corporation	18/01/2017
302	Haitong Bank, S.A.	13/02/2017
303	BOCHK Asset Management Limited	24/05/2017
304	China Industrial Securities International Asset Management Limited	19/06/2017
305	SSIF Asset Management Limited	14/08/2017
306	China International Fund Management (Hong Kong) Limited	27/10/2017
307	APG Asset Management N.V.	28/11/2017