STOCKHOLM SCHOOL OF ECONOMICS

Bachelor Thesis in Finance

# China-focused Mutual Funds

## A Study of Performance, Selectivity and Market Timing

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**Abstract**
This study examines the performance of 36 China-focused mutual funds advertised and sold in Sweden. We use Jensen's alpha, the Treynor-Mazuy model and the Henriksson-Merton model in order to evaluate overall performance, stock selection abilities and market timing skills of the fund managers. The traditional unconditional models are also extended to condition on public information and allow for time-varying betas following Ferson and Schadt (1996). For both the unconditional and conditional versions, we find evidence suggesting that the fund managers possess good stock selection skills and overall performance. Further, the fund managers appear to have poor market timing abilities. When the conditional and unconditional models are compared, the evidence of good overall performance, good stock selection abilities and poor market timing skills is slightly weaker for the conditional versions.

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## 1. Introduction

In the beginning of the 1990s, mutual funds were virtually unexplored by Swedish investors. Today, mutual funds have become an important investment vehicle, and the vast majority of Swedish households have part of their assets invested in mutual funds. The assets of Swedish investors placed in equity mutual funds have increased from 72.2 billion SEK in 1990 to 1159.8 billion SEK in 2010.[1] More and more investors also choose to invest their money in funds that focus on emerging markets. One of the fastest growing and most popular emerging markets is China. For the period 2000-2009, the average annual real growth in China's GDP was almost 9.9% and during the past 10 years,[2] an increasing number of fund companies have added a China-focused alternative to their fund range. The performance of the Chinese stock market has been impressive during the past decade and the Chinese economy is still growing.[3] The growth potential of the Chinese market makes it attractive to foreign investors, although there are difficulties associated with direct investments in distant markets. Therefore, investing in mutual funds focusing on the Chinese market is a natural approach for investors who want to capture the investment opportunities in China.

This study aims to examine the performance of China-focused mutual funds advertised and sold in Sweden. Evaluating the performance of mutual funds is of great interest to investors as well as academicians. Investors are certainly interested in whether the performance of the funds covers the costs of active management, and if they actually gain from the expertise they pay for. If the fund performance does not cover the costs of active management, passive management and index funds would be a more efficient investment. Academicians on the other hand, are interested in whether a fund manager is able to outperform the market since this would violate the efficient market hypothesis.

Evaluation of fund performance can be accomplished by either examining overall performance or by dividing the performance measure into selectivity and market timing. The selectivity skills of the fund managers involve micro forecasting and represent the fund manager's ability to forecast price movements of individual stocks, and to identify stocks that are over- or undervalued. Market timing skills on the other hand, involve macro forecasting and denote the fund manager's ability to correctly assess the direction of the market. A fund manager that is able to time the market will load up on high beta stocks in an up-market and switch to low beta stocks in down-markets. Reversely, a fund manager that times the market poorly will decrease

[1] http://www.fondbolagen.se/sv/Statistik--index/Fondformogenhet/
[2] http://www.uschina.org/statistics/economy.html
[3] When comparing the development of share price indices of China and Sweden during the last decade, the MSCI EM China Free showed a yearly average growth of 14% compared to a yearly average growth of 7% for the OMX Stockholm index.

the portfolio beta in up-markets and increase the portfolio beta in down-markets. The most famous and widely used measure of mutual fund overall performance is Jensen's alpha developed by Jensen (1968). Jensen's alpha is derived from the capital asset pricing model (CAPM) (Sharpe 1964; Lintner 1965a), where the excess return of a certain stock or portfolio is regressed on the excess return of the market. However, Jensen's alpha does not separate selectivity skills from market timing skills and in order to do that, a more sophisticated model is required. Two of the pioneering models in the area of market timing were developed by Treynor and Mazuy (1966) and Henriksson and Merton (1981). Treynor and Mazuy added a quadratic term to the classic CAPM regression and argued that the coefficient of the quadratic term measures the market timing ability of the fund manager. In the Henriksson-Merton model, a dummy variable indicates whether there is an up-market or a down-market and a fund manager that engages in market timing will adjust the fund beta accordingly.

In 1996, Ferson and Schadt extended the traditional versions of Jensen's alpha, the Treynor-Mazuy model (TM) and the Henriksson-Merton model (HM). They argued that traditional models are biased since they do not incorporate that expected returns and risks may vary over time. In their study, they assumed semi-strong market efficiency and modified the traditional versions of Jensen's alpha, TM and HM to condition on public information. The idea is that abnormal performance should not be ascribed to an investment strategy based solely on public information, which is possible using the traditional models. Instead, only the implementation of private information to the investment strategy should potentially generate abnormal returns. To separate public information from private information of the fund manager and to capture the time-varying expectations, Ferson and Schadt added variables that represent public information to the models. Ferson and Schadt argued that this extension of the models reduces the bias present in the traditional models. The traditional models will henceforth be referred to as unconditional models while the extended models presented by Ferson and Schadt will be referred to as conditional models.

The literature on evaluation of actively managed mutual funds is extensive. However, only a limited number of studies use the conditional versions of Jensen's alpha, TM and HM to examine the performance of mutual funds that invests in foreign markets. This paper extends current literature by using both the unconditional and conditional versions of Jensen's alpha, TM and HM to examine the performance of China-focused mutual funds available to Swedish investors. Considering the volatile nature of the Chinese market, the expansion of China-focused mutual funds and the difficulties associated with foreign direct investments, examining the overall performance, the selectivity and the market timing skills of the China-focused mutual funds are of particular interest. In Sweden, Engström (2003) used the conditional models to study the performance of mutual funds available to Swedish investors that concentrate on the European or Asian markets. However, his fund sample covers the period of 1993-1998 and thus only includes a limited number of China-focused mutual funds since many of them have been initiated in the 2000s. Covering a more recent period, our study is able to deeper evaluate the growing trend to invest in China. Furthermore, our study compares the different models and the impact of conditional information.

A majority of previous studies using Jensen's alpha have concluded that overall, fund managers are unable to outperform the market (Cumby and Glen 1990; Ferson and Warther 1996). The findings of previous studies are however ambiguous since there are studies that indicate outperformance of the market to some extent (Kao, Cheng and Chan 1998). Separating fund performance into selectivity and market timing skills, both negative and positive stock selection abilities have been observed (Deb, Banerjee and Chakrabarti 2007; Chang, Fung and Lai 2010). In terms of market timing, several studies have suggested that the market timing skills of fund managers are generally perverse, implicating that funds have a higher beta than average in down-markets and a lower beta than average in up-markets (Chang and Lewellen 1984; Henriksson 1984; Cumby and Glen 1990). When using the conditional approach of the traditional fund performance models, the evidence of perverse market timing and abnormal selectivity of fund managers is often reduced (Ferson and Schadt 1996; Ferson and Warther 1996).

The data in our study consists of two subsamples, one with 14 open-ended mutual funds investing in China and one with 22 open-ended mutual funds investing in Greater China (China, Hongkong and Taiwan). Using monthly returns for the period January 2007 to December 2010, our findings indicate that overall, the funds are able to outperform the market to some extent. This is particularly true for the funds in the Greater China category. After filtering out the fund managers' market timing skills by using TM and HM, our findings indicate that in some cases, the fund managers have superior stock selection skills. However, the estimated market timing coefficients suggest that fund managers generally have poor market timing skills. Using the conditional versions of the models, there are still indications of superior stock selection abilities and poor market timing skills although they are slightly weaker. Overall, we conclude that for a Swedish investor that wishes to capture the investment opportunities on the Chinese market, the China-focused mutual funds seem to be a suitable option.

The remainder of the paper is organized as follows: section 2 presents prominent studies in the area of fund performance. Section 3 describes the methodology while section 4 presents our dataset. In section 5, we present our results and section 6 concludes our main findings. Finally, suggestions on topics for further research are provided in section 7.

## 2. Previous Research

The research on the area of mutual fund performance is extensive and the findings vary substantially between different studies. Most findings support the efficient market hypothesis since they do not indicate that fund managers are able to outperform the market in terms of overall fund performance. However, there are several exceptions including studies performed on emerging markets, where examples of fund managers that are able to outperform the market have been presented. When measuring stock selection and market timing abilities separately, the majority of previous findings indicate that fund managers do not have superior stock selection skills and that they are generally poor market timers. Nevertheless, as for overall fund performance, the results of previous studies are ambiguous and there are examples of superior stock selection abilities as well as neutral or even good market timing skills. When the models are extended to their conditional versions, the results suggest more neutral fund performance in terms of both selectivity and market timing. Additionally, incorporating conditional information into the traditional models improves the explanatory power of the models. There are several methods to measure fund performance in addition to those listed in this paper. However, we have chosen to focus on the most widely used methods and they are also the ones applied in our study.

The following section provides a more detailed presentation of prominent studies that examine the performance of mutual funds. In section 2.1 studies using the unconditional versions of Jensen's alpha, TM and HM are presented and section 2.2 presents studies using the conditional versions of the three models. Finally, section 2.3 presents previous studies performed on emerging markets since those studies are of particular interest for the topic of our study.

### 2.1 Previous studies using unconditional models

In 1968, Jensen presented a risk-adjusted measure that can be used to evaluate portfolio performance and thus assess the forecasting abilities of the portfolio manager. The measure is widely known as Jensen's alpha and it is based on the CAPM model developed by Sharpe (1964) and Lintner (1965a). Using a sample of 115 mutual funds for the period 1945-1964, Jensen concluded that the funds generally were unable to outperform the market both net and gross of fund fees. Several studies have highlighted important drawbacks of Jensen's alpha and one of the most famous is known as Roll's critique. Roll (1977) argued that the true market portfolio is unobservable since it has to include every single available asset. Hence, the chosen market proxy is likely to affect the results of the tests to some extent. In worst case, the funds that appear to outperform the market using one market proxy, might underperform the market using another market proxy. Grinblatt and Titman (1989, 1994) found evidence of this problem when they concluded that the Jensen measure differed considerably between different benchmarks. However, Jensen's alpha is still the most commonly used measure to evaluate fund performance.

Treynor and Mazuy (1966) added a quadratic term to CAPM to separately test for market timing abilities. Using annual returns for the period 1953-1962 for 57 U.S.-based mutual funds, they concluded that for 56 of the funds, the timing measure was not significantly different from zero. Their study was one of the first in the area of market timing and the model has been widely used in research on the area of market timing and selectivity of mutual funds. Another study that used the unconditional versions of TM and Jensen's alpha was performed by Cumby and Glen (1990). Using monthly returns for 15 U.S.-based and internationally diversified mutual funds from the period 1982-1988, they found no evidence of superior performance of the fund managers. When testing the market timing abilities, they found evidence of perverse market timing implying that fund managers increase the fund beta in down-markets and vice versa.

Another approach of how to separately measure market timing and selectivity skills of fund managers was introduced by Henriksson and Merton (1981). They suggested that for the fund manager to be able to time the market, it requires a forecast whether it is going to be an up- or a down-market. Henriksson (1984) was the first to test the model empirically and he estimated the separate contributions of selectivity and market timing on 116 U.S.-based funds. Using monthly returns from the period 1968-1980, the results indicated that 11 funds had positive stock selection abilities and that 8 funds had negative stock selection abilities on a 5% significance level. Furthermore, three funds had positive market timing skills and 9 funds had negative market timing skills on the same significance level.

Chang and Lewellen (1984) obtained results similar to Henriksson (1984) for both market timing and selectivity using a slightly different model also developed by Henriksson and Merton (1981). Their sample consisted of monthly returns for 67 U.S.-based funds from the period 1971-1979. On a 5% significance level, 4 funds had positive market timing abilities and 5 funds had significant stock selection estimates although three were negative. Indications of positive market timing abilities among mutual fund managers were also found by Lee and Rahman (1990). The findings of Chang and Lewellen and Lee and Rahman were to some extent contradicted by Kao et al. (1998). They used HM and Jensen's alpha to examine the performance of 97 U.S.-based funds during the period 1989-1993. Their findings suggested that generally, the fund managers had good stock selection skills and overall performance whereas they were poor market timers. Indications of poor market timing were also presented by Romacho and Cortez (2006). They used HM to test the selectivity and market timing abilities of 21 Portuguese mutual funds for the period 1996-2001.

### 2.2 Previous studies using conditional models

In 1996, Ferson and Schadt studied monthly returns for 67 U.S.-based mutual funds from the period 1968-1990, and argued that since the traditional models do not incorporate the time variation in portfolio betas, a statistical bias arises. By including instruments representing publicly available information, their model allows for time variation in the fund betas and the bias is reduced. They constructed conditional versions of Jensen's alpha, TM and HM and concluded that the conditional approach made the average performance of mutual funds look better when compared to the unconditional approach. Most importantly, the evidence of perverse market timing suggested by the unconditional models was almost completely removed using the conditional versions. Moreover, they concluded that the conditional information was both statistically and economically significant and that it increased the explanatory power of the models. Becker, Ferson, Myers and Schill (1999) confirmed the findings of Ferson and Schadt of a more neutral fund performance when including conditional variables. Using the unconditional TM and HM for a sample of more than 400 U.S.-based mutual funds for the period 1976-1994, they found evidence suggesting positive stock selection abilities and negative market timing skills. When the conditional versions were used, the results suggested neutral fund performance in terms of both selectivity and market timing skills.

Ferson and Warther (1996) studied monthly returns for 63 U.S.-based mutual funds from the period 1968-1990, and they found strong evidence that the funds' market risk exposure change in response to the market indicators. This emphasizes the importance of incorporating conditional information. Using the unconditional version of Jensen's alpha, they found that the alphas were predominantly negative while the alphas were centered near zero using the conditional version. As Ferson and Schadt (1996), they found perverse market timing using the unconditional version of the TM model and that using the conditional version removed these findings.

Using the conditional versions of Jensen's alpha and TM, Sawicki and Ong (2000) measured the performance of 97 Australian mutual funds for the period 1983-1995. They found evidence suggesting that the use of conditional information was statistically significant and that the performance of the funds was improved in terms of both selectivity and market timing when incorporating the conditional variables. However, their findings were contradicted by Otten and Bams (2004). Using data covering all U.S. funds during the period 1962-2000 they found evidence suggesting that the fund overall performance appeared to be worse when incorporating the conditional information. Both Jensen's alpha and Carhart's four-factor model were used to test the overall fund performance, and the authors concluded that the incorporation of conditional information did improve the explanatory power of the models.

Dahlquist, Engström and Söderlind (2000) investigated the performance and characteristics of Swedish mutual funds using the unconditional and conditional versions of Jensen's alpha. They also used TM and HM in order to analyze the robustness of their results but they did not comment on the market timing coefficients. Their sample included 170 mutual funds and the sample period ranged from the end of 1992 to the end of 1997. Generally, their findings suggested mixed results including indications of both negative and positive fund performance. A more recent study that used the unconditional and conditional versions of Jensen's alpha is Leite and Cortez (2009). They used a sample consisting of monthly returns for 24 Portuguese equity funds from the period June 2000-June 2004, and their findings indicated that the fund performance was neutral and in some cases poor. Further, consistent with several previous studies, they found that incorporating the conditional variables increased the explanatory power of the model. However, unlike most previous studies, when the unconditional and conditional versions were compared, the fund performance appeared to be slightly worse using the conditional model.

### 2.3 Previous studies on emerging markets

Engström (2003) used a sample of 299 Europe-based mutual funds that invest in Europe and Asia and that are available to Swedish investors. Using monthly returns from the period 1993-1998, his findings suggested that both the Europe- and the Asia-focused funds underperformed. The evidence of underperformance was consistent when using both the conditional Jensen's alpha and the conditional versions of TM and HM. The findings regarding the Asia-focused funds indicated that they performed even worse than the Europe-focused funds in terms of stock selection abilities. Further, Engström found that about 10% of the Asian fund managers possessed a positive market timing ability but that almost as many possessed a negative market timing ability.

Deb et al. (2007) used both the unconditional and conditional versions of TM and HM to investigate the performance of 96 Indian mutual funds. Using the unconditional models with both monthly and weekly frequency data from the period 2000-2005, the results indicated poor market timing skills and good stock selection abilities. Hence, the authors concluded that fund managers were more inclined towards stock selection than market timing. Using the conditional models, the evidence of good stock selection skills was not as strong and in terms of market timing, there was a considerable reduction in the evidence of negative market timing skills.

One of few studies that examines the performance of China-focused mutual funds was performed by Chang et al. (2010). They used monthly returns from the period 2004-2008 for 10 U.S.-based mutual funds that invests mainly in Chinese equity. Using the unconditional HM, the results showed that 8 funds had a positive and statistically significant alpha, indicating that the fund managers did have good stock selection abilities. Further, their results suggested that the fund managers possessed poor market timing abilities.

## 3. Methodology

In order to evaluate fund performance, three models are used. When evaluating the overall performance of the funds, we use the traditional and widely known Jensen's alpha developed by Jensen in 1968. To separately measure the selectivity and market timing abilities of the fund managers, the models developed by Treynor and Mazuy (1966) and Henriksson and Merton (1981) are applied. All three models are estimated using both the unconditional and the conditional versions presented by Ferson and Schadt (1996). The conditional versions of the models assume semi-strong market efficiency and include variables that represent publicly available information. Firstly, we estimate all models on an individual fund level and secondly we perform pooled regressions including data for all funds in each subsample to provide a better overall view of the fund performance.

The following section presents our three models in more detail. Section 3.1 describes the unconditional versions of Jensen's alpha, TM and HM respectively, and section 3.2 presents their extended versions including conditional information. A description of the variables used is presented in appendix.

### 3.1 Unconditional models

#### *3.1.1 Jensen's alpha*

The traditional approach to measure fund performance is to perform the CAPM equation by regressing the excess return of the fund on the excess return of a market proxy as proposed by Jensen (1968):

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + u_{p,t} \quad (1)$$

where $r_{p,t}$ is the return of fund p in excess of the risk-free rate and $r_{m,t}$ is the return of the market in excess of the risk-free rate at time t. $\beta_p$ represents the systematic risk of fund p and $u_{p,t}$ is a random error term of fund p at time t. $\alpha_p$ represents Jensen's alpha and has an expected value of zero in order for the efficient market hypothesis to hold. If $\alpha_p$ has a significantly positive value, it indicates that the fund has positive abnormal returns and that can be interpreted as the fund manager having superior investment skills. Reversely, if $\alpha_p$ has a significantly negative value, it can be interpreted as the fund manager having inferior investment skills. However, Jensen's alpha does not distinguish between the stock selection skills and the market timing skills of the fund manager and therefore, it reflects both. Models that separately measure the stock selection ability and the market timing skills of fund managers are presented below.

### *3.1.2 Treynor-Mazuy model (TM)*

The model developed by Treynor and Mazuy was introduced in 1966 and adds a quadratic term to the original version of CAPM:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p r_{m,t}^2 + u_{p,t} \quad (2)$$

According to Treynor and Mazuy, the coefficient $\gamma_p$ measures the market timing skills of the fund manager. A positive and significant value of $\gamma_p$ indicates that the fund manager is successful in timing the market. Since the market timing skills of the fund manager is now measured separately, the intercept $\alpha_p$ exclusively represents the stock selection ability of the fund manager. The other variables are defined as in equation (1).

Treynor and Mazuy argued that when the fund manager does not engage in market timing and concentrate only on stock selection, the average beta of the portfolio should not change considerably over time. Further, the relationship between the fund's excess return and the excess return of the benchmark will be linear. If the fund manager successfully engages in market timing by changing the beta in response to the market, the beta will be higher than average during up-markets conditions and lower than average during down-market conditions. The fund's excess return will then be higher than the benchmark excess return in both up- and down-market conditions. By increasing the portfolio risk in up-markets and decreasing it in down-markets, the relation becomes a nonlinear function, which is captured by the quadratic term.

### *3.1.3 Henriksson-Merton model (HM)*

In 1981, Henriksson and Merton introduced an alternative version to TM. Treynor and Mazuy argued that fund managers who successfully engage in market timing continuously change the beta of a portfolio depending on the market conditions. However, Henriksson and Merton assumed that for the fund manager to be able to time the market, it requires forecasts whether there will be an up-market, defined as the market return exceeding the risk-free rate ($r_{m,t} \geq$

$r_{f,t}$), or a down-market ($r_{m,t} \leq r_{f,t}$). A fund manager who is a successful market timer will select a high portfolio beta in up-markets and a low portfolio beta in down-markets. HM is specified as follows:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p D r_{m,t} + u_{p,t} \quad (3)$$

where $D$ is a dummy variable that equals 1 in up-markets ($r_{m,t} \geq r_{f,t}$), and 0 in down-markets ($r_{m,t} \leq r_{f,t}$), and $\gamma_p$ represents the market timing abilities of the fund manager. The other variables are defined as in equation (1). The beta of the portfolio equals $\beta_p$ in down-market conditions and $\beta_p$+$\gamma_p$ in up-market conditions. Consequently, the parameter $\gamma_p$ represents the difference between the beta in up-markets and the beta in down-markets. Further, as suggested by Henriksson and Merton, the term $Dr_{m,t}$ can be interpreted as the payoff of an option with an exercise price equal to the risk free rate. As for TM, a positive and significant value of $\gamma_p$ indicates good market timing abilities of the fund manager while a positive and significant value of the intercept, $\alpha_p$, indicates good stock selection abilities.

### 3.2 Conditional models

Fund managers base their forecasts of the market condition on the information available. This information includes all public information available as well as any private information that the fund manager might possess. A fund manager that engages in market timing will increase the portfolio beta when he predicts an up-market, and decrease the portfolio beta when he predicts a down-market. The aim of a conditional approach is to distinguish investment strategies based on public information from investment strategies based on private information, and to ascribe superior performance only to managers that possess investment information or skills superior to that of the investing public. According to this approach, fund managers are not given any credit for responding to public information since this information is also available to the investing public. Therefore, a fund manager should only be given credit for responding to private information (Ferson and Schadt 1996).

Furthermore, the unconditional models do not take into consideration that the funds' betas may vary over time. When using a market timing model that does not allow for time-varying betas, the results may indicate perverse market timing of the fund managers when none in fact exists. Three separate explanations to why time variations in the funds' betas occur were identified by Ferson and Schadt (1996). Firstly, the betas of the underlying assets of the portfolio might not be constant over time. Secondly, as the relative values of the underlying assets change, the portfolio weights of a passive buy-and-hold strategy will vary and thus affect the portfolio beta. Thirdly, the fund manager can actively change the portfolio weights. A fourth explanation is provided by Ferson and Warther (1996) regarding the net cash inflows or outflows to the fund which the fund manager does not control. The cash flows affect the cash holdings of the fund which in turn affect the portfolio beta. As shown by Ippolito (1992), the net cash flows of mutual funds correlate with market conditions. When the market is bullish, increased net inflows will result in lower betas than expected and reversely, a bearish market will imply net cash outflows and thus a higher beta than expected. The changes in the fund betas are then caused by fluctuations in the cash holdings of the fund that the fund manager does not control. When including conditional variables and thus allowing for time-varying betas, the bias present in the unconditional models can be avoided to a greater extent.

### *3.2.1 Jensen's alpha*

Ferson and Schadt (1996) developed conditional versions of the three models presented that allow for time-varying betas by incorporating publicly available information. As instruments for the publicly available information, we use the dividend yield, a measure representing the term structure and the short-term interest rate. Several studies have shown their relevance in predicting stock returns (Fama and French 1989; Pesaran and Timmermann 1995). Furthermore, in previous studies that use conditional models to examine fund performance, these variables have proven to be the most relevant ones as well as the most commonly used, even though the range of variables vary (Ferson and Schadt 1996; Sawicki and Ong 2000; Ferson and Qian 2004; Leite and Cortez 2009). Following Ferson and Schadt (1996), the conditional version of Jensen's alpha can be expressed as:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + u_{p,t} (4)$$

where $r_{p,t}$ and $r_{m,t}$ are defined as in equation (1), $TS_{t-1}$ is the term structure, $TB_{t-1}$ is the short-term Treasury bill yield and $DY_{t-1}$ is the dividend yield of a market index. All conditional variables are lagged and demeaned. $\alpha_p$ represents the conditional Jensen's alpha and measures the overall performance of the fund manager.

### *3.2.2 Treynor-Mazuy model (TM)*

The conditional version of TM with the added quadratic term is expressed as:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + \gamma_p * r_{m,t}^2 + u_{p,t} (5)$$

The added instruments now capture the part of the quadratic term that is attributed to the public information variables. With the conditional approach the potential bias in the original TM is reduced and $\gamma_p$ now measures how private market timing signals affect the fund manager's portfolio beta. The other variables are defined as in equation (1) and (4).

### *3.2.3 Henriksson-Merton model (HM)*

The conditional version of HM is specified as follows by Ferson and Schadt (1996):

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1(r_{m,t} * TS_{t-1}) + b_2(r_{m,t} * TB_{t-1}) + b_3(r_{m,t} * DY_{t-1}) + \gamma_p * r^*_{m,t} + b^*_1(r^*_{m,t} * TS_{t-1}) + b^*_2(r^*_{m,t} * TB_{t-1}) + b^*_3(r^*_{m,t} * DY_{t-1}) + u_{p,t} \quad (6)$$

where $r^*_{m,t}$ is the product of the excess return of the market index used and an indicator dummy for positive values of the difference between the excess return of the market index and the conditional mean of the excess return. The conditional mean has been estimated by regressing the excess return of the market index on the lagged instruments ($TS_{t-1}, TB_{t-1}$, and $DY_{t-1}$). $b_0$ represents the conditional down-market beta and $\gamma_p$ is the market timing coefficient which measures the difference between the up- and down-market conditional beta. The other variables are defined as in equation (1) and (4). As for the conditional version of TM, the use of publicly available information will reduce the bias present in the original HM.

## 4. Data

This section describes the data that have been used in our tests. The section is structured as follows: section 4.1 describes the data used in the tests and how it has been obtained and section 4.2 discusses the potential survivorship bias of the sample.

### 4.1 Fund sample and additional variables

Our fund sample covers four years of monthly data and ranges from January 2007 to December 2010. The length of the period was chosen due to the limited number of funds that have existed for a longer time period. The sample consists of data collected for 36 open-ended mutual funds that are advertised and sold in Sweden and that invest mainly in China but also to some extent in Taiwan and Hongkong. In some cases the fund is available in more than one class, and then the class A fund has primarily been chosen (Chang et al. 2010). For funds with no class A available, the class most common and similar to class A is used. In cases where one fund is available with different dividend strategies, the fund class with accumulated dividends has been chosen.

The funds have been chosen based on the categories China Equity and Greater China Equity provided by Morningstar. Our sample is therefore divided into two subsamples named China funds and Greater China funds. The China subsample consists of 14 funds and the Greater China subsample consists of 22 funds. The funds have to fulfill the following criteria to be included in the sample: [4]

[4] Criteria 1, 3 and 4 are the same criteria as Morningstar uses while criteria 2 is added by us.

1. The fund invests at least 75% of total assets in equities.
2. The fund's primary objective is not to track a specific benchmark, hence no index funds are included.
3. For the China Equity category, the fund has to invest at least 75% of equity assets in Chinese companies or companies that have considerable business ties with or derives a significant part of their revenues from the Chinese market. Further, the fund should typically invest less than 10% of equity assets in Taiwanese equities.
4. For the Greater China category, the fund has to invest in companies based in China, Hongkong and Taiwan. To some extent, the fund can also invest in companies related to these three markets as described above. At least 50% of equity assets have to be invested in Chinese equities and at least 10% of equity assets in Taiwanese equities.

Monthly returns for all funds are provided by Morningstar. The returns include dividends and are calculated based on the net asset values of the funds as follows:

$$R_{p,t} = \frac{NAV_{p,t} - NAV_{p,t-1}}{NAV_{p,t-1}}$$

where $R_{p,t}$ is the return of fund p and $NAV_{p,t}$ is the net asset value of fund p at time t. All returns are net of management fees but gross of any purchase or redemption fees. Descriptive statistics for all funds are presented in Table 1. The table includes the name of the fund along with summary statistics of the funds' excess return for the 2007-2010 period, as well as the inception date, the management fee and the size of the fund. The excess return is calculated from the fund returns in excess of the Swedish one-month Treasury bill yield. Fund sizes, inception dates and management fees are provided by Morningstar and represent a snapshot picture as of April 2011. As can be noted, the mean excess return of all funds, as well as for the benchmarks in Table 2, is negative and this could possibly be explained by the recent financial turbulence.

As proxies for the market return we use the equity indices MSCI EM China Free for the China funds and MSCI AC Golden Dragon for the Greater China funds. These are the benchmarks also used by Morningstar. Further, as a proxy for the risk-free rate we use the Swedish one-month Treasury bill yield since the study is performed from the perspective of Swedish investors. For our conditional variables, the short-term interest rate is represented by the one-month China Treasury bill bid yield and the dividend yield of the market index is represented by the dividend yield of the AMEX China Index. The term structure is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield. All data for the indices, the Treasury bills and the bond are monthly and have been retrieved from

Thomson Reuter's Datastream except for the dividend yield of the AMEX China index, which has been retrieved from the FactSet database. The returns of the market indices are calculated as follows:

$$R_{j,t} = \frac{I_{j,t} - I_{j,t-1}}{I_{j,t-1}}$$

where $R_{j,t}$ is the return of index j and $I_{j,t}$ is the size of the index j at time t. Descriptive statistics for the benchmark returns and the conditional variables are presented in Table 2.

**Table 1: Descriptive statistics of the funds**

The statistics for the excess return of the mutual funds are calculated as monthly fund returns in excess of the Swedish one-month Treasury bill yield. The monthly fund return is calculated as follows:

$$R_{p,t} = \frac{NAV_{p,t} - NAV_{p,t-1}}{NAV_{p,t-1}}$$

where $R_{p,t}$ is the return of fund p and $NAV_{p,t}$ is the net asset value of fund p at time t. The data covers four years from January 2007 to December 2010. Fund names and classifications are taken from Morningstar. Similarly, the source for the inception date, fund sizes and management fees is Morningstar. Fund sizes and management fees represent a snapshot picture as of April 2011.

| Fund | Inception date | Size (bnSEK) | Management fees | Excess return Mean | Min | Max | Std.Dev. |
|---|---|---|---|---|---|---|---|
| *A. China funds* | | | | | | | |
| Baring Hong Kong China A | 1982-12-03 | 28938.8 | 0.0125 | -0.0116 | -0.2815 | 0.0949 | 0.0844 |
| Callander Fund China Universe C1 | 2004-06-08 | 241.0 | 0.02 | -0.0148 | -0.2736 | 0.1220 | 0.0858 |
| Danske Invest China K | 2005-03-22 | 1246.6 | 0.028 | -0.0140 | -0.2510 | 0.1169 | 0.0860 |
| Dexia Eqs B Red Chips C Acc | 1998-01-05 | 734.1 | 0.016 | -0.0117 | -0.2254 | 0.1407 | 0.0906 |
| FF - China Focus A | 2003-08-18 | 32711.4 | 0.015 | -0.0104 | -0.2348 | 0.1155 | 0.0807 |
| HSBC GIF Chinese Equity A Acc | 1992-06-25 | 17838.0 | 0.015 | -0.0150 | -0.2715 | 0.1055 | 0.0875 |
| Invesco PRC Equity A | 1992-03-31 | 3058.0 | 0.02 | -0.0110 | -0.2567 | 0.0971 | 0.0856 |
| JF China A Acc | 2005-03-31 | 22118.9 | 0.015 | -0.0116 | -0.2560 | 0.1139 | 0.0869 |
| Parvest Equity China C | 1995-03-27 | 3024.7 | 0.0175 | -0.0167 | -0.2790 | 0.1286 | 0.0925 |
| Saint-Honoré Chine A | 1998-04-08 | 8016.7 | 0.02 | -0.0104 | -0.2691 | 0.1420 | 0.0849 |
| Schroder ISF China Opportunities A | 2006-02-17 | 6058.5 | 0.015 | -0.00867 | -0.2571 | 0.1103 | 0.0849 |
| SGAM Fund Eqs China A | 1996-06-18 | 1121.3 | 0.02 | -0.0143 | -0.2683 | 0.1010 | 0.0878 |
| Standard Life SICAV China Eqs A | 2005-02-28 | 660.7 | 0.018 | -0.0070 | -0.2766 | 0.1389 | 0.0907 |
| Ålandsbanken China Growth | 1997-10-30 | 1037.0 | 0.02 | -0.0134 | -0.2335 | 0.1383 | 0.0862 |
| *B. Greater China funds* | | | | | | | |
| AB Greater China A | 1997-11-10 | 838.3 | 0.02 | -0.0164 | -0.2156 | 0.0967 | 0.0719 |
| Amundi Funds Greater China AU C | 2003-04-07 | 4183.5 | 0.017 | -0.0108 | -0.2512 | 0.1255 | 0.0841 |
| BNPP L1 Equity China C Acc | 1997-07-01 | 3479.9 | 0.0175 | -0.0168 | -0.2673 | 0.0908 | 0.0823 |
| Carnegie Kinafond | 2004-04-06 | 581.6 | 0.019 | -0.0163 | -0.2445 | 0.0943 | 0.0820 |
| Comgest Growth Greater China | 2000-03-23 | 764.7 | 0.015 | -0.0120 | -0.1718 | 0.0985 | 0.0622 |
| Danske Invest Greater China A | 2003-11-24 | 320.3 | 0.016 | -0.0118 | -0.2136 | 0.1094 | 0.0732 |
| FF - Greater China A | 1990-10-01 | 3365.0 | 0.015 | -0.0101 | -0.1969 | 0.1237 | 0.0693 |
| FIM China | 2002-05-08 | 323.5 | 0.03 | -0.0185 | -0.2628 | 0.1136 | 0.0760 |
| First State Greater China Growth A | 2003-12-01 | 668.6 | 0.0175 | -0.0088 | -0.1904 | 0.1041 | 0.0656 |
| Ignis Intl Greater China Opp A Acc | 2006-12-19 | 415.4 | 0.015 | -0.0156 | -0.2180 | 0.0977 | 0.0759 |
| ING (L) Invest Greater China P Acc | 1999-10-01 | 1681.8 | 0.015 | -0.0120 | -0.1925 | 0.1028 | 0.0690 |
| Invesco Greater China Equity A | 1992-07-15 | 3811.6 | 0.015 | -0.0102 | -0.2382 | 0.1099 | 0.0778 |
| JF Greater China A Acc | 2005-03-31 | 5257.3 | 0.015 | -0.0109 | -0.2205 | 0.1296 | 0.0741 |
| Martin Currie GF Greater China | 2003-09-19 | 262.7 | 0.015 | -0.0124 | -0.2535 | 0.1437 | 0.0829 |
| Nordea Kiina Kasvu | 2005-09-26 | 1840.7 | 0.0185 | -0.0154 | -0.2014 | 0.1217 | 0.0692 |
| Pictet-Greater China P | 2006-06-14 | 2731.9 | 0.016 | -0.0123 | -0.2049 | 0.1088 | 0.0719 |
| PineBridge Greater China Equity A | 2002-12-18 | 4309.3 | 0.013 | -0.0159 | -0.1985 | 0.0915 | 0.0719 |
| Schroder ISF Greater China A Acc | 2002-03-28 | 10765.3 | 0.015 | -0.0115 | -0.2199 | 0.1052 | 0.0733 |
| Skandia Greater China Equity A1 | 1998-05-05 | 2881.3 | 0.015 | -0.0097 | -0.1931 | 0.1000 | 0.0653 |
| Swedbank Robur Kinafond | 2006-06-07 | 3021.5 | 0.018 | -0.0143 | -0.1900 | 0.1125 | 0.0690 |
| Templeton China A Acc | 1994-09-01 | 9733.6 | 0.021 | -0.0097 | -0.2058 | 0.1101 | 0.0734 |
| UBS (Lux) EF Greater China P | 1997-01-15 | 9022.3 | 0.0234 | -0.0089 | -0.2446 | 0.1093 | 0.0857 |

**Table 2: Descriptive statistics of benchmark returns and conditional variables**

Statistics for benchmark returns and conditional variables are based on monthly observations. MSCI EM China Free is the benchmark index used for China funds and MSCI AC Golden Dragon is the benchmark index used for Greater China funds. The returns of the market indices are calculated as follows:

$$R_{j,t} = \frac{I_{j,t} - I_{j,t-1}}{I_{j,t-1}}$$

where $R_{j,t}$ is the return of index j and $I_{j,t}$ is the size of the index j at time t. For our conditional variables, the short-term interest rate is represented by the one-month China Treasury bill bid yield and the dividend yield of the market index is represented by the dividend yield of the AMEX China Index. The term structure is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield. The data are monthly from January 2007 to December 2010.

| Series | Mean | Min | Max | Std.Dev. |
|---|---|---|---|---|
| MSCI EM China Free | 0.00814 | -0.224 | 0.168 | 0.0826 |
| MSCI AC Golden Dragon | 0.00512 | -0.166 | 0.111 | 0.0633 |
| One-year government bond | 0.0219 | 0.0098 | 0.037 | 0.00853 |
| Termstructure | 0.0143 | 0.00158 | 0.0232 | 0.00620 |
| Dividend yield, AMEX China Index | 0.0247 | 0.0114 | 0.0998 | 0.0210 |

## 4.2 Survivorship bias

As our sample contains only surviving funds, the potential existence of survivorship bias needs to be addressed. Due to limited data we have not been able to examine the potential existence of survivorship bias in our sample. If our sample does suffer from survivorship bias, it will bias the performance measures upwards since the terminated funds are likely to be the worst performing ones (Brown, Goetzmann and Ibbotson 1992; Brown and Goetzmann 1995; Malkiel 1995). Accordingly, our estimates of the funds' performances might be too optimistic and that has to be taken into consideration when analyzing our results.

# 5. Empirical results

This section presents the results of the performed regressions. Section 5.1 presents the results for the unconditional and conditional versions of Jensen's alpha and section 5.2 presents the findings for the unconditional versions of TM and HM. Finally, section 5.3 presents the findings for the conditional versions of TM and HM.

The models are estimated with regressions on the individual fund level as well as with pooled regressions for the China funds and Greater China funds respectively. The regressions are performed using the OLS method and the Newey-West procedure is used to correct for any potential heteroscedasticity or serial correlation in the residuals (Newey and West, 1987). If heteroscedasticity is not taken into account, it is possible that negative estimates of the market timing coefficient become more significant than they in fact are (Breen, Jagannathan and Ofer 1986). To further improve our results, 1% of the most extreme values of the funds' excess return in the data used for the pooled regressions are removed. For all regressions, the null hypothesis is that there is no abnormal performance and consequently, the alternative hypothesis is that there is.

For the Jensen model, the sign, size and significance of the alphas will be presented and interpreted. For the unconditional and conditional versions of TM and HM, the sign, size and significance of the alphas will be presented and compared to the alphas generated by the Jensen model. Thus, we are able to examine how the alphas are affected when the market timing is filtered out. We will also analyze the sign and significance level of the market timing coefficients in order to assess the market timing skills of the fund managers. The size of the market timing coefficients will not be part of the analysis which is in line with most previous studies. A deeper interpretation of the size of the market timing coefficient is left to future research. When the coefficients are referred to as significant on the individual fund level, they are significant on a 5% level or higher.

### 5.1 Performance measured by Jensen's alpha

Jensen's alpha is estimated based on the unconditional model in equation (1) and the conditional model in equation (4). The estimated alphas represents the overall performance of the fund managers without distinguishing between selectivity and market timing skills. A positive (negative) and significant alpha suggests that the fund manager outperforms (underperforms) the market. The results are compiled in Table 3 and 4. More detailed results for the regressions of the individual funds are presented in appendix, Table 9.

#### *5.1.1 Results for the unconditional Jensen's alpha*

When using the unconditional version of Jensen's alpha, 26 out of 36 funds have positive estimated alphas. 8 of the positive estimates and none of the negative estimates are significant. The values of the significant and positive alphas range from 0.43% to 0.96%. Since all estimations are net of management fees, our findings suggest that even when management fees are taken into account, the fund managers are able to outperform the market with up to almost 1%. Hence, gross of management fees, the outperformance would be even larger. When performing pooled regressions for all funds, the alpha is positive but insignificant for the China funds. For the Greater China funds, the estimated alpha has a value of 0.32% and is significant on a 1% level. Overall, our findings using the unconditional Jensen's alpha indicate that the managers are able to outperform the market to some extent. However, these findings apply only to the Greater China funds since neither the regressions on the individual fund level nor the pooled regression for the China funds generates positive and significant alphas.

#### *5.1.2 Results for the conditional Jensen's alpha*

The alphas estimated using the conditional Jensen's alpha do not deviate considerably from the ones generated by the unconditional version. On the individual fund level, 23 out of 36 estimates of alpha are positive and 5 of the positive estimates and one of the negative estimates are significant. The significant and negative alpha has a value of -0.30% and the significant and positive alphas range from 0.58% to 1.11%. The pooled regressions generate a weakly negative and insignificant alpha for the China funds and a positive alpha of 0.34% that is significant on a 1% level for the Greater China funds. Compared to the findings using the unconditional model, the conditional version provides slightly weaker indications of outperformance due to a lower number of significant alphas. On the other hand, the values for the five positive and significant alphas are all higher when compared to the corresponding values generated by the unconditional Jensen's alpha. The same applies for the alphas estimated by the pooled regression for the Greater China funds. Hence, the economic significance seems to increase slightly while the statistical significance decreases when the conditional version is used. The differences between the two subsamples are consistent with the differences obtained for the unconditional version.

### *5.1.3 General findings for Jensen's alpha*

Both the conditional and unconditional versions of Jensen's alpha indicate that the fund managers are able to outperform the market to some extent. When comparing the outcomes of the two versions of Jensen's alpha for the individual funds, the number of positive and significant alphas is lower when including the conditional variables. However, the values of the significant and positive alphas for the Greater China funds are higher for the conditional version both on the individual fund level and for the pooled regression, which implies a slightly higher economic significance. For the unconditional and conditional Jensen's alpha altogether, the size of the significant alphas on the individual fund level range from 0.43% to 1.11%, which is quite substantial considering that the estimations are net of management fees. The management fees for the fund sample range from 1.25% to 3.00% and consequently, some of the differences in fund performance could possibly be explained by differences in management fees.

It can also be noted that all the positive and significant alphas are obtained for the Greater China funds. Hence, we find no evidence that the China funds are able to outperform the market. As suggested by Roll (1977) and Grinblatt and Titman (1989, 1994) the results obtained from Jensen's alpha are sensitive to the choice of market proxy. Consequently, the discrepancies between our two subsamples might be due to the fact that different market proxies are used for the two categories. Another explanation could be that the larger investment universe of the Greater China funds is beneficial. When extending the significance level to 10%, a few more coefficients are significant but they do not change the overall findings. The indications of superior performance differ from the findings of most previous studies including Ferson and Schadt (1996), Cumby and Glen (1990) and Engström (2003), who all found indications of inferior performance. Furthermore, our findings also contradict the efficient market hypothesis since the estimated alphas should not be significantly different from zero in order for it to hold.

However, our results are in line with the findings of Kao et al. (1998). In addition, when comparing our findings to previous studies on emerging markets, both Deb et al. (2007) and Chang et al. (2010) found indications of superior fund performance.

Compared to the regressions using the unconditional version of Jensen's alpha, the regressions based on the conditional version generate slightly higher values of adjusted R-squares indicating better explanatory power of the conditional model. This is consistent with the majority of the findings of previous studies ( Ferson and Schadt 1996; Leite and Cortez 2009).

### Table 3: Compilation of fund performance for the individual fund regressions for the Jensen model

Table 3 summarizes the number of positive and negative estimated coefficients of Jensen's alpha and the number of significant coefficients on a 5% level. The data are monthly from January 2007 to December 2010. For the unconditional Jensen's alpha, the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield and $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield at time t. $\beta_p$ represents the systematic risk of fund p and $u_{p,t}$ is the random error term of fund p at time t. $\alpha_p$ represents Jensen's alpha. For the conditional model, the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + u_{p,t}$$

where $\alpha_p$, $r_{p,t}$, $r_{m,t}$ and $u_{p,t}$ are defined as above. $TS_{t-1}$ is the lagged and demeaned value of the term structure, which is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield. $TB_{t-1}$ is the lagged and demeaned value of the one-month China Treasury bill bid yield and $DY_{t-1}$ is the lagged and demeaned value of the dividend yield of the China AMEX index. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

| | **Unconditional Jensen's alpha** | | **Conditional Jensen's alpha** | |
|---|---|---|---|---|
| | **Positive** | **Negative** | **Positive** | **Negative** |
| *A. China funds* | | | | |
| Total | 8 | 6 | 5 | 9 |
| On a 5% significance level | **0** | **0** | **0** | **1** |
| *B. Greater China funds* | | | | |
| Total | 18 | 4 | 18 | 4 |
| On a 5% significance level | **8** | **0** | **5** | **0** |
| *C. All funds* | | | | |
| Total | 26 | 10 | 23 | 13 |
| On a 5% significance level | **8** | **0** | **5** | **1** |

### Table 4: Results of pooled regressions for the Jensen model

Table 4 presents the alphas, their t-ratios and the adjusted R-square values for the pooled regressions using the Jensen model. The pooled data consists of combined time-series observations across the 36 mutual funds. The data are monthly from January 2007 to December 2010. For the unconditional Jensen's alpha, the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield and $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield at time t. $\beta_p$ represents the systematic risk of fund p and $u_{p,t}$ is the random error term of fund p at time t. $\alpha_p$ represents Jensen's alpha. For the conditional model, the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + u_{p,t},$$

where $\alpha_p$, $r_{p,t}$, $r_{m,t}$ and $u_{p,t}$ are the defined as above. $TS_{t-1}$ is the lagged and demeaned value of the term structure, which is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield. $TB_{t-1}$ is the lagged and demeaned value of the one-month China Treasury bill bid yield and $DY_{t-1}$ is the lagged and demeaned value of the dividend yield of the China AMEX index. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

| | **Unconditional Jensen's alpha** | | | **Conditional Jensen's alpha** | | |
|---|---|---|---|---|---|---|
| | **$\alpha$** | **t($\alpha$)** | **adj. $R^2$** | **$\alpha$** | **t($\alpha$)** | **adj. $R^2$** |
| *A. China funds* | | | | | | |
| All funds | 0.000114 | (0.16) | 0.952 | -0.00105 | (-1.48) | 0.955 |
| *B. Greater China funds* | | | | | | |
| All funds | 0.00317*** | (5.04) | 0.930 | 0.00342*** | (5.11) | 0.933 |

* p<0.10, ** p<0.05, *** p<0.01

### 5.2 Unconditional selectivity and market timing

TM and HM offer the possibility to separately measure the stock selection and market timing abilities among mutual fund managers. This section presents the findings using the unconditional versions of the two models presented in equation (2) and (5). For both models, the estimated alpha indicates the stock selection ability and the market timing coefficient measures the market timing skills of the fund manager. A positive (negative) and significant alpha suggests that the fund manager outperforms (underperforms) the market in terms of stock selection, and a positive (negative) and significant market timing coefficient suggests that the fund manager has good (poor) market timing skills. The results are compiled in Table 5 and 6. More detailed results for the regressions of the individual funds are presented in appendix, Table 10.

#### *5.2.1 Results for the unconditional TM*

When performing the regressions using the unconditional version of TM, 30 out of 36 estimated alphas are positive and among them, 10 are significant. The significant alphas range from 0.54% to 1.40% which is higher than the corresponding values generated by the two versions of Jensen's alpha. Further, the estimated market timing coefficient is negative in 27 out of 36 cases and two of the positive and 12 of the negative estimates are significant. The pooled regression for the China funds generates a positive alpha of 0.20%, although only significant on a 10% level and a negative market timing coefficient significant on a 5% level. For the Greater China funds, the pooled regression generates a positive alpha of 0.49% and a negative market timing coefficient, both significant on a 1% level. Differences between the two subsamples still exist, although the regressions of the China funds now indicate some outperformance of the market as well.

#### *5.2.1 Results for the unconditional HM*

For the unconditional version of HM, 30 out of 36 estimated alphas are positive and among them, 12 are significant. The values of the significant alphas range from 0.60% to 1.90%. Thus, HM indicates even better stock selection abilities of the fund managers than TM both in terms of number of significant alphas and the magnitude of the estimates. As for previous models, the estimated alphas of the Greater China funds are typically higher and more significant when compared to those of the China funds. The estimated market timing coefficient is negative for 28 funds and 11 among them as well as one positive estimate are significant. For the China funds, the pooled regression generates a positive alpha of 0.38% that is significant on a 5% level and a negative market timing coefficient significant on a 1% level. The pooled regression for the Greater China funds generates a positive alpha of 0.68% and a negative market timing coefficient, both significant on a 1% level.

### *5.2.3 General findings for the unconditional versions of TM and HM*

For both TM and HM, there are indications of significantly positive stock selection abilities and significantly negative market timing abilities of the fund managers. When the two models are compared, the estimated alphas are higher for the HM model implying higher economic significance. When comparing the two subsamples, there are stronger indications of positive stock selection abilities for the Greater China funds, whereas fund managers in both categories appear to be poor market timers. The findings on the individual fund level are also confirmed by the pooled regressions. When the estimated alphas are compared to those obtained by the Jensen model, both TM and HM generate slightly higher alphas than the Jensen model. One plausible explanation is that Jensen's performance measure is downward biased when market timing is ignored (Grant 1977). Since our estimated alphas are higher when market timing is filtered out, our findings are consistent with previous studies including Grant (1977), Chang and Lewellen (1984) and Henriksson (1984). Further, it should be noted that the values of the significant alphas are higher than 1% in several cases, which implies that the fund managers are able to select stocks that are clearly undervalued. Thus, the positive stock selection abilities violate the efficient market hypothesis. As for Jensen's alpha, part of the differences in the estimated alphas between the individual funds can possibly be explained by the variation in their management fees.

The indications of inferior market timing using the unconditional versions of TM and HM are consistent with the findings of most previous studies (Ferson and Schadt 1996; Ferson and Warther 1996; Cumby and Glen 1990; Kao et al. 1998 and Romacho and Cortez 2006). Our findings of superior stock selection skills of fund managers contradicts the findings of many previous studies (Cumby and Glen 1990; Ferson and Schadt 1996) but are consistent with the findings of previous studies performed on emerging markets such as Deb et al. (2007) and Chang et al. (2010).

## Table 5: Compilation of selectivity and market timing for individual funds for unconditional TM and HM

Table 5 summarizes the number of positive and negative coefficients of selectivity and market timing when using unconditional versions of TM and HM. Further, the number of coefficients that are significant on a 5% significance level are stated. The data are monthly from January 2007 to December 2010. For the unconditional TM the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p r_{m,t}^2 + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield and $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield at time t. $\beta_p$ represents the systematic risk of fund p and $u_{p,t}$ is a random error term of fund p at time t. The coefficient $\gamma_p$ measures the market timing and $\alpha_p$ measures the selectivity of the fund manager. For the unconditional HM the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p D r_{m,t} + u_{p,t}$$

where $\alpha_p$, $r_{p,t}$, $r_{m,t}$ and $u_{p,t}$ are defined as above and $D$ is a dummy variable that equals 1 in up-markets ($r_{m,t} \geq r_{f,t}$), and 0 in down-markets ($r_{m,t} \leq r_{f,t}$). The coefficient $\gamma_p$ measures the market timing of the fund manager and $\alpha_p$ measures the selectivity of the fund manager. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

| | **Treynor-Mazuy model** | | | | **Henriksson-Merton model** | | | |
|---|---|---|---|---|---|---|---|---|
| | **α** | | **γ** | | **α** | | **γ** | |
| | **Positive** | **Negative** | **Positive** | **Negative** | **Positive** | **Negative** | **Positive** | **Negative** |
| *A. China funds* | | | | | | | | |
| Total | 9 | 5 | 4 | 10 | 10 | 4 | 3 | 11 |
| On a 5% significance level | **2** | **0** | **1** | **5** | **2** | **0** | **0** | **6** |
| *B. Greater China funds* | | | | | | | | |
| Total | 21 | 1 | 5 | 17 | 20 | 2 | 5 | 17 |
| On a 5% significance level | **8** | **0** | **1** | **7** | **10** | **0** | **1** | **5** |
| *C. All funds* | | | | | | | | |
| Total | 30 | 6 | 9 | 27 | 30 | 6 | 8 | 28 |
| On a 5% significance level | **10** | **0** | **2** | **12** | **12** | **0** | **1** | **11** |

## Table 6: Results of pooled regressions for unconditional TM and HM

Table 6 presents the alphas, their t-ratios and the adjusted R-square values for the pooled regressions using the unconditional versions of TM and HM. The pooled data consists of combined time-series observations across the 36 mutual funds. The data are monthly from January 2007 to December 2010. For the unconditional TM the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p r_{m,t}^2 + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield and $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield at time t. $\beta_p$ represents the systematic risk of fund p and $u_{p,t}$ is a random error term of fund p at time t. The coefficient $\gamma_p$ measures the market timing and $\alpha_p$ measures the selectivity of the fund manager. For the unconditional HM the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p D r_{m,t} + u_{p,t}$$

where $\alpha_p$, $r_{p,t}$, $r_{m,t}$ and $u_{p,t}$ are defined as above and $D$ is a dummy variable that equals 1 in up-markets ($r_{m,t} \geq r_{f,t}$), and 0 in down-markets ($r_{m,t} \leq r_{f,t}$). The coefficient $\gamma_p$ measures the market timing of the fund manager and $\alpha_p$ measures the selectivity of the fund manager. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

| | **Treynor-Mazuy model** | | | | | **Henriksson-Merton model** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** |
| *A. China funds* | | | | | | | | | | |
| All funds | 0.00112 | (1.30) | -0.159* | (-1.95) | 0.952 | 0.00312*** | (2.73) | -0.0975*** | (-3.15) | 0.952 |
| *B. Greater China funds* | | | | | | | | | | |
| All funds | 0.00479*** | (6.98) | -0.444*** | (-4.44) | 0.931 | 0.00675*** | (7.39) | -0.158*** | (-4.93) | 0.931 |

* p<0.10, ** p<0.05, *** p<0.01

### 5.3 Conditional selectivity and market timing

To incorporate the effect of time-varying betas and to identify managers that possess investment information or skills superior to that of the investing public, the conditional versions of TM and HM presented in equations (3) and (6) are applied. The estimated alpha indicates the stock selection ability and the market timing coefficient measures the market timing skills of the fund manager. A positive (negative) and significant alpha suggests that the fund manager outperforms (underperforms) the market in terms of stock selection, and a positive (negative) and significant market timing coefficient suggests that the fund manager has good (poor) market timing skills. The results are compiled in Table 7 and 8. More detailed results for the regressions of the individual funds are presented in appendix, Table 11.

#### *5.3.1 Results for the conditional TM*

The regressions using the conditional version of TM generate 28 positive alphas and among them, 9 are significant. The values of the significant alphas range from 0.40% to 1.30%. Compared to the unconditional version of TM, the values of the alphas are generally slightly lower for the conditional version. As for the unconditional versions of TM and HM, the indications of positive stock selection abilities are stronger for the Greater China funds. The estimated market timing coefficient is negative for 27 funds and among them, 8 are significant. When performing the pooled regression for the China funds, the alpha is positive but insignificant and the market timing coefficient is negative and significant on a 5% level. For the Greater China funds, the pooled regression generates a positive alpha of 0.42% and a negative market timing coefficient, both significant on a 1% level. Hence, the findings on the individual fund level are supported by the pooled regressions.

#### *5.3.2 Results for the conditional HM*

Using the conditional version of HM, 30 out of 36 of the estimated alphas are positive and among them, 9 are significant. The values of the significant alphas range from 0.50% to 1.80%, which is higher than the corresponding values generated by the conditional TM. When the alphas are compared to the ones generated by the unconditional HM, they are slightly lower for the conditional version. As for the unconditional versions of TM and HM as well as the conditional version of TM, the indications of positive stock selection abilities are stronger for the Greater China funds. The estimated market timing coefficient is negative for 25 funds and 8 of them are significant. The pooled regression for the China funds generates an alpha of 0.21% although only significant on a 10% level, and a negative market timing coefficient significant on a 5% level. For the Greater China funds, the pooled regression generates a positive alpha of 0.64% and a negative market timing coefficient, both significant on a 1% level. As for previous models, the pooled regressions support the findings on the individual fund level.

### *5.3.3 General findings for the conditional versions of TM and HM*

The results for the conditional versions of TM and HM indicate that the fund managers possess good stock selection abilities and poor market timing abilities. As for the unconditional versions of TM and HM, the estimated alphas are generally higher and thus more economically significant for the HM model. When comparing the results for the conditional versions to the results for the unconditional versions of TM and HM, they only differ slightly. In line with previous studies we find a decrease in the number of significant alphas and market timing coefficients for the conditional models. There is also a slight decrease in the magnitude of the estimated alphas. However, there is still evidence of superior stock selection abilities as well as inferior market timing skills. These findings indicate that even though some of the abnormal performance is ascribed to publicly available information, the fund managers do seem to possess private information or skills superior to that of the investing public. Since several previous studies report neutral performance in terms of both stock selection and market timing when incorporating conditional information (Ferson and Schadt 1996; Ferson and Warther 1996; Deb et al. 2007), our findings differ in this aspect.

The negative market timing might reflect that the fund managers base their strategy on options or similar instruments. In case of such a strategy, there should be evidence of significantly positive alphas (Ferson and Schadt 1996). Since our findings indicate that the funds that have significantly negative market timing do have significantly positive stock selection abilities, it is possible that the fund managers apply the investment strategies suggested by Ferson and Schadt. Further, as for Jensen's alpha, the explanatory power of the models increases slightly when incorporating the conditional variables, which is consistent with most previous studies (Ferson and Schadt 1996; Leite and Cortez 2009).

## Table 7: Compilation of selectivity and market timing for individual funds for conditional TM and HM

Table 7 summarizes the number of positive and negative coefficients of selectivity and market timing when using the conditional versions of TM and HM. Further, the number of coefficients that are significant on a 5% significance level are stated. The data are monthly from January 2007 to December 2010. For the conditional TM the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + \gamma_p * r_{m,t}^2 + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield, $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield and $u_{p,t}$ is a random error term of fund p at time t. $TS_{t-1}$ is the lagged and demeaned value of the term structure, which is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield, $TB_{t-1}$ is the lagged and demeaned value of the one-month China Treasury bill bid yield and $DY_{t-1}$ is the lagged and demeaned value of the dividend yield of the China AMEX index. The coefficient $\gamma_p$ measures the market timing and $\alpha_p$ measures the selectivity of the fund manager. For the conditional HM the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1(r_{m,t} * TS_{t-1}) + b_2(r_{m,t} * TB_{t-1}) + b_3(r_{m,t} * DY_{t-1}) + \gamma_p * r_{m,t}^* + b_1^*(r_{m,t}^* * TS_{t-1}) + b_2^*(r_{m,t}^* * TB_{t-1}) + b_3^*(r_{m,t}^* * DY_{t-1}) + u_{p,t}$$

where $r_{p,t}$, $r_{m,t}$, $TS_{t-1}$, $TB_{t-1}$, $DY_{t-1}$ and $u_{p,t}$ are specified as for the conditional version of TM. Further, $r_{m,t}^*$ is the product of the excess return of the market index used and an indicator dummy for positive values of the difference between the excess return on the index and the conditional mean of the excess return. $\gamma_p$ is the market timing coefficient which measures the difference between the up- and down-market conditional beta and $\alpha_p$ measures the selectivity of the fund manager. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

| | **Treynor-Mazuy model** | | | | **Henriksson-Merton model** | | | |
|---|---|---|---|---|---|---|---|---|
| | **α** | | **γ** | | **α** | | **γ** | |
| | **Positive** | **Negative** | **Positive** | **Negative** | **Positive** | **Negative** | **Positive** | **Negative** |
| *A. China funds* | | | | | | | | |
| Total | 8 | 6 | 3 | 11 | 10 | 4 | 3 | 11 |
| On a 5% significance level | **2** | **0** | **0** | **5** | **2** | **0** | **0** | **3** |
| *B. Greater China funds* | | | | | | | | |
| Total | 20 | 2 | 6 | 16 | 20 | 2 | 8 | 14 |
| On a 5% significance level | **7** | **0** | **0** | **3** | **7** | **0** | **0** | **5** |
| *C. All funds* | | | | | | | | |
| Total | 28 | 8 | 9 | 27 | 30 | 6 | 11 | 25 |
| On a 5% significance level | **9** | **0** | **0** | **8** | **9** | **0** | **0** | **8** |

## Table 8: Results of pooled regression for conditional TM and HM

Table 8 presents the alphas, their t-ratios and the adjusted R-square values for the pooled regressions using the conditional versions of TM and HM. The pooled data consists of combined time-series observations across the 36 mutual funds. The data are monthly from January 2007 to December 2010. For the conditional TM the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + \gamma_p * r_{m,t}^2 + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield, $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield and $u_{p,t}$ is a random error term of fund p at time t. $TS_{t-1}$ is the lagged and demeaned value of the term structure, which is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield, $TB_{t-1}$ is the lagged and demeaned value of the one-month China Treasury bill bid yield and $DY_{t-1}$ is the lagged and demeaned value of the dividend yield of the China AMEX index. The coefficient $\gamma_p$ measures the market timing of the fund manager and $\alpha_p$ measures the selectivity of the fund manager. For the conditional HM the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1(r_{m,t} * TS_{t-1}) + b_2(r_{m,t} * TB_{t-1}) + b_3(r_{m,t} * DY_{t-1}) + \gamma_p * r_{m,t}^* + b_1(r_{m,t}^* * TS_{t-1}) + b_2(r_{m,t}^* * TB_{t-1}) + b_3(r_{m,t}^* * DY_{t-1}) + u_{p,t}$$

where $r_{p,t}$, $r_{m,t}$, $TS_{t-1}$, $TB_{t-1}$, $DY_{t-1}$ and $u_{p,t}$ are specified as for the conditional version of TM. Further, $r_{m,t}^*$ is the product of the excess return of the market index used and an indicator dummy for positive values of the difference between the excess return on the index and the conditional mean of the excess return. $\gamma_p$ is the market timing coefficient which measures the difference between the up- and down-market conditional beta and $\alpha_p$ measures the selectivity of the fund manager. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

| | **Treynor-Mazuy model** | | | | | **Henriksson-Merton model** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** |
| *A. China funds* | | | | | | | | | | |
| All funds | 0.000177 | (0.21) | -0.227*** | (-2.82) | 0.956 | 0.000988 | (0.93) | -0.0500 | (-1.52) | 0.957 |
| *B. Greater China funds* | | | | | | | | | | |
| All funds | 0.00409*** | (5.95) | -0.334*** | (-2.58) | 0.934 | 0.00619*** | (6.76) | -0.155*** | (-3.94) | 0.935 |

* p<0.10, ** p<0.05, *** p<0.01

### 5.4 Robustness of results

We use the unconditional and conditional versions of three different models to test the performance of China-focused mutual funds available to Swedish investors. Both the unconditional and the conditional versions of all three models indicate that the fund managers are able to outperform the market to some extent in terms of both overall performance and selectivity, which increases the robustness of our findings. As mentioned earlier, the findings of outperformance are particularly true for the Greater China funds. The same reasoning applies for the market timing skills since the findings indicating poor market timing skills are robust across models as well as when incorporating the conditional information. To further examine the robustness of our findings, we have created subsamples for each year of our sample period. Performing pooled regression for both the unconditional and conditional versions of our three models, the fund performance is worse during 2008. However, considering the great economic turbulence during that year, the findings are not surprising. In terms of market timing, the majority of the estimated market timing coefficients are negative and typically significant. Conversely, the conditional versions of both TM and HM indicate significantly positive market timing for the Greater China funds during 2007. Generally though, our findings are robust also when looking at different time periods. All results of the pooled regressions for the sub periods are presented in appendix, Table 12-14.

Further, we have also calculated the Sharpe ratio for each fund and for our two benchmark indices. The Sharpe ratio is a risk-adjusted measure that indicates how well the investor is compensated for the risk he has taken. When comparing assets, the asset with the higher Sharpe ratio is preferred. For the China funds, 8 out of 14 funds had higher Sharpe ratios than the MSCI EM China Free index and for the Greater China funds, 20 out of 22 of the ratios were higher than the ratio of the MSCI AC Golden Dragon index. Since these indications matches our overall findings well, our results are robust also in this aspect. The Sharpe ratios for all funds and the two benchmark indices are presented in appendix, Table 15.

Although our results appear to be robust in several aspects, it is important to emphasize that our estimates might be too optimistic due to the potential existence of survivorship bias. One should also take into account that the data used in our analysis is limited and that changes in the fund sample as well as changes in the length of the studied time period could potentially affect our findings. The fact that our time period mainly covers years that are characterized by large economic turbulence due to the financial crisis that started in 2008, might also have an impact on our results.

## 6. Conclusion

This study examines the performance of China-focused mutual funds advertised and sold in Sweden. Firstly, we estimate Jensen's alpha to measure the overall performance of the funds. Secondly we use both TM and HM to generate separate estimates of the selectivity and market timing abilities of the fund managers. Thirdly, we incorporate lagged instruments representing publicly available information to all models following Ferson and Schadt (1996).

The dataset includes monthly returns for 36 China-focused mutual funds and covers four years ranging from January 2007 to December 2010. The sample is divided into two subsamples representing the two categories China and Greater China. Our estimates for overall performance using both the unconditional and conditional Jensen's alpha indicate neutral performance of the China funds and superior performance for some of the Greater China funds. Even though several previous studies present results in line with ours, our findings still contradicts a majority of the studies in the area. The unconditional and conditional versions of TM and HM generate similar estimates in terms of both market timing and selectivity. There are indications of positive stock selection abilities especially for the fund managers in the Greater China category, and the estimates of the market timing coefficient indicate poor market timing abilities for both categories. Even though the evidence of poor market timing and positive stock selection abilities is slightly weaker using the conditional versions of the models, we cannot confirm the findings of several previous studies where the conditional approach has almost completely neutralized the coefficients. However, it should also be emphasized that our positive estimates of fund performance might be too optimistic due to the potential existence of survivorship bias in our fund sample. Overall, the conditional models have better explanatory power than the unconditional versions, which is in line with previous studies. When examining the robustness of our results, they are robust across models as well as when the conditional variables are incorporated. Our findings are also supported by the Sharpe ratios that have been calculated for all funds. When examining different time periods, there are small variations in the results, but our findings are generally robust also in this aspect.

In conclusion, our study indicates that the fund managers of China-focused mutual funds have been able to outperform the market to some extent during the past four years. Hence, for a Swedish investor that wishes to capture the investment opportunities on the Chinese market, the China-focused mutual funds seem to be a suitable option.

## 7. Further research

In our study, we use the conditional versions of fund performance models that allow time variation in fund betas following Ferson and Schadt (1996). However, the models can also be extended to allow for time variation in fund alphas following Christopherson, Ferson and Glassman (1998) and this could be one interesting extension of this study. Considering the potential bias caused by our market proxies, it could also be interesting to test the robustness of our results by using several different benchmarks. Since our positive estimations of fund performance might be due to the potential existence of survivorship bias in our fund sample, another possibility is to try to solve this problem by including all funds that existed during the sample period. A different approach is to perform a cross-sectional analysis in order to determine which fund characteristics that affect fund performance.

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# 9. Appendix

## Variable definitions

| | |
|---|---|
| **Fund excess return, $r_{p,t}$** | The monthly fund excess return is calculated as the difference between the fund return and the return of the Swedish one-month Treasury bill. |
| **Market excess return, $r_{m,t}$** | The monthly market excess return is calculated as the difference between the return on a market index and the return of the Swedish one-month Treasury bill. We calculate the excess return for two market indices: The MSCI EM China Free and the MSCI AC Golden Dragon. |
| **Risk free rate, $R_f$** | The risk-free rate is represented by monthly data for the Swedish one-month Treasury bill. |
| **Quadratic term in TM, $r_{m,t}^2$** | The quadratic term in TM is the squared monthly market excess return. |
| **Dummy in HM, $D$** | The dummy variable in HM is constructed to equal 1 in up-markets ($r_{m,t} \geq r_{f,t}$), and 0 in down-markets ($r_{m,t} \leq r_{f,t}$). |
| **$r_{m,t}^*$** | $r_{m,t}^*$ is the product of the excess return of the market index used and an indicator dummy for positive values of the difference between the excess return on the index and the conditional mean of the excess return. The conditional mean has been estimated by regressing the excess return of our two indices on the lagged instruments ($TS_{t-1}$, $TB_{t-1}$, and $DY_{t-1}$). |
| *Conditional variables* | |
| **Treasury bill, $TB_{t-1}$** | TB represents the lagged and demeaned value of the one-month China Treasury bill bid yield. A one period lag is applied. |
| **Term structure, $TS_{t-1}$** | TS represents the term structure which is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield. The variable is demeaned and a one period lag is applied. |
| **Dividend yield, $DY_{t-1}$** | DY represents the lagged and demeaned dividend yield of the AMEX China Index. A one period lag is applied. |

## Table 9: Performance using Jensen's alpha

Table 9 presents the alphas, their t-ratios and the adjusted R-square values for the regressions on the individual fund level using the unconditional and conditional versions of Jensen's alpha. The data covers four years ranging from January 2007 to December 2010. For the unconditional Jensen model, the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + u_{p,t}$$

where $\alpha_p$represents Jensen's alpha, $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield and $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield at time t. $\beta_p$ represents the systematic risk of fund p and $u_{p,t}$ is a random error term of fund p at time t. For the conditional models, the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + u_{p,t},$$

where $\alpha_p$, $r_{p,t}$, $r_{m,t}$ and $u_{p,t}$ are defined as above. $TS_{t-1}$ is the lagged and demeaned value of the term structure, which is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield, $TB_{t-1}$ is the lagged and demeaned value of the one-month China Treasury bill bid yield and $DY_{t-1}$ is the lagged and demeaned value of the dividend yield of the China AMEX index. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

**Panel A: Performance of China funds using Jensen's alpha**

| | Unconditional model | | | Conditional model | | |
|---|---|---|---|---|---|---|
| **Fund** | **α** | **t(α)** | **adj. $R^2$** | **α** | **t(α)** | **adj. $R^2$** |
| *A. China funds* | | | | | | |
| Baring Hong Kong China A | 0.000293 | (0.10) | 0.946 | -0.00218 | (-0.75) | 0.954 |
| Callander Fund China Universe C1 | -0.00256 | (-0.99) | 0.960 | -0.00357 | (-1.23) | 0.961 |
| Danske Invest China K | -0.00210 | (-0.57) | 0.900 | -0.00468 | (-1.23) | 0.911 |
| Dexia Eqs B Red Chips C Acc | 0.000932 | (0.26) | 0.915 | -0.000871 | (-0.25) | 0.912 |
| FF - China Focus A | 0.00115 | (0.57) | 0.968 | 0.000528 | (0.25) | 0.967 |
| HSBC GIF Chinese Equity A Acc | -0.00240* | (-1.78) | 0.988 | -0.00297** | (-2.31) | 0.989 |
| Invesco PRC Equity A | 0.00123 | (0.49) | 0.958 | 0.000136 | (0.05) | 0.958 |
| JF China A Acc | 0.000929 | (0.54) | 0.981 | 0.000259 | (0.15) | 0.981 |
| Parvest Equity China C | -0.00334* | (-1.93) | 0.982 | -0.00287* | (-1.72) | 0.985 |
| Saint-Honoré Chine A | 0.00130 | (0.30) | 0.896 | -0.00128 | (-0.30) | 0.913 |
| Schroder ISF China Opportunities A | 0.00348 | (1.66) | 0.971 | 0.00307* | (1.79) | 0.982 |
| SGAM Fund Eqs China A | -0.00178 | (-0.78) | 0.957 | -0.00367 | (-1.51) | 0.958 |
| Standard Life SICAV China Eqs A | 0.00589* | (1.98) | 0.955 | 0.00544* | (1.88) | 0.957 |
| Ålandsbanken China Growth | -0.00101 | (-0.61) | 0.973 | -0.0000406 | (-0.02) | 0.978 |
| Pooled regression of China funds | 0.000144 | (0.21) | 0.952 | -0.000907 | (-1.22) | 0.956 |

* p<0.10, ** p<0.05, *** p<0.01

**Panel B: Performance of Greater China funds using Jensen's alpha**

| | Unconditional model | | | Conditional model | | |
|---|---|---|---|---|---|---|
| **Fund** | **α** | **t(α)** | **adj. $R^2$** | **α** | **t(α)** | **adj. $R^2$** |
| *B. Greater China funds* | | | | | | |
| AB Greater China A | -0.000822 | (-0.32) | 0.943 | -0.000409 | (-0.15) | 0.949 |
| Amundi Funds Greater China AU C | 0.00740** | (2.18) | 0.937 | 0.00776** | (2.02) | 0.936 |
| BNPP L1 Equity China C Acc | 0.000627 | (0.17) | 0.900 | 0.00144 | (0.36) | 0.907 |
| Carnegie Kinafond | 0.000761 | (0.14) | 0.863 | 0.00470 | (0.94) | 0.896 |
| Comgest Growth Greater China | 0.00111 | (0.35) | 0.891 | 0.00177 | (0.50) | 0.903 |
| Danske Invest Greater China A | 0.00426** | (2.26) | 0.968 | 0.00182 | (1.08) | 0.979 |
| FF - Greater China A | 0.00499** | (2.50) | 0.953 | 0.00156 | (0.67) | 0.964 |
| FIM China | -0.00249 | (-0.66) | 0.884 | -0.000530 | (-0.16) | 0.884 |
| First State Greater China Growth A | 0.00519* | (1.80) | 0.908 | 0.00408 | (1.15) | 0.910 |
| Ignis Intl Greater China Opp A Acc | 0.000497 | (0.14) | 0.898 | 0.00396 | (1.17) | 0.907 |
| ING (L) Invest Greater China P Acc | 0.00314 | (1.40) | 0.957 | 0.00359 | (1.31) | 0.956 |
| Invesco Greater China Equity A | 0.00674** | (2.63) | 0.950 | 0.00759** | (2.56) | 0.950 |
| JF Greater China A Acc | 0.00539** | (2.64) | 0.969 | 0.00582*** | (2.73) | 0.967 |
| Martin Currie GF Greater China | 0.00550 | (1.66) | 0.936 | 0.00307 | (0.85) | 0.941 |
| Nordea Kiina Kasvu | -0.000200 | (-0.12) | 0.970 | -0.000724 | (-0.42) | 0.969 |
| Pictet-Greater China P | 0.00349 | (1.61) | 0.958 | 0.00177 | (0.67) | 0.962 |
| PineBridge Greater China Equity A | -0.0000681 | (-0.04) | 0.975 | -0.000554 | (-0.29) | 0.976 |
| Schroder ISF Greater China A Acc | 0.00463** | (2.50) | 0.972 | 0.00305* | (1.90) | 0.982 |
| Skandia Greater China Equity A1 | 0.00424 | (1.49) | 0.909 | 0.00379 | (1.19) | 0.920 |
| Swedbank Robur Kinafond | 0.000970 | (0.83) | 0.982 | 0.000882 | (0.64) | 0.983 |
| Templeton China A Acc | 0.00621** | (2.58) | 0.943 | 0.00916*** | (3.34) | 0.948 |
| UBS (Lux) EF Greater China P | 0.00959*** | (2.79) | 0.926 | 0.01111*** | (2.72) | 0.928 |
| Pooled regression of Greater China funds | 0.00323*** | (4.89) | 0.928 | 0.00340*** | (4.89) | 0.932 |

* p<0.10, ** p<0.05, *** p<0.01

## Table 10: Selectivity and market timing using unconditional TM and HM

Table 10 presents the alphas, their t-ratios and the adjusted R-square values for the regressions on the individual fund level using the unconditional versions of TM and HM. The data covers four years from January 2007 to December 2010. For the unconditional TM the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p r_{m,t}^2 + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield and $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield at time t. $\beta_p$ represents the systematic risk of fund p and $u_{p,t}$ is a random error term of fund p at time t. The coefficient $\gamma_p$ measures the market timing and $\alpha_p$ measures the selectivity of the fund manager. For the unconditional HM the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p D r_{m,t} + u_{p,t}$$

where $\alpha_p$, $r_{p,t}$, $r_{m,t}$ and $u_{p,t}$ are defined as above and $D$ is a dummy variable that equals 1 in up-markets ($r_{m,t} \geq r_{f,t}$), and 0 in down-markets ($r_{m,t} \leq r_{f,t}$). The coefficient $\gamma$ measures the market timing of the fund manager and $\alpha_p$ measures the selectivity of the fund manager. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

**Panel A: Selectivity and market timing of China funds using unconditional TM and HM**

| | Treynor-Mazuy model | | | | | Henriksson-Merton model | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Fund** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** |
| *A. China funds* | | | | | | | | | | |
| Baring Hong Kong China A | 0.00595* | (1.88) | -0.890*** | (-3.18) | 0.956 | 0.00893* | (1.90) | -0.280** | (-2.04) | 0.951 |
| Callander Fund China Universe C1 | 0.000962 | (0.34) | -0.555** | (-2.44) | 0.963 | 0.00445 | (1.15) | -0.227** | (-2.18) | 0.963 |
| Danske Invest China K | -0.00311 | (-0.78) | 0.159 | (0.65) | 0.898 | -0.00358 | (-0.66) | 0.0478 | (0.36) | 0.898 |
| Dexia Eqs B Red Chips C Acc | -0.00306 | (-0.70) | 0.629** | (2.16) | 0.918 | -0.00469 | (-0.77) | 0.182 | (1.27) | 0.916 |
| FF - China Focus A | 0.00104 | (0.41) | 0.0178 | (0.12) | 0.967 | 0.00154 | (0.39) | -0.0127 | (-0.15) | 0.967 |
| HSBC GIF Chinese Equity A Acc | -0.000208 | (-0.13) | -0.346** | (-2.25) | 0.990 | 0.00201 | (0.89) | -0.143** | (-2.24) | 0.990 |
| Invesco PRC Equity A | 0.00420 | (1.53) | -0.469* | (-1.70) | 0.960 | 0.00655* | (1.73) | -0.172 | (-1.57) | 0.960 |
| JF China A Acc | 0.00245 | (1.28) | -0.239 | (-1.44) | 0.982 | 0.00487* | (1.98) | -0.128** | (-2.13) | 0.982 |
| Parvest Equity China C | -0.00227 | (-1.30) | -0.169 | (-1.10) | 0.982 | -0.00101 | (-0.50) | -0.0756 | (-1.15) | 0.982 |
| Saint-Honoré Chine A | 0.00573 | (1.18) | -0.698* | (-1.73) | 0.900 | 0.00641 | (0.95) | -0.165 | (-0.93) | 0.896 |
| Schroder ISF China Opportunities A | 0.00652** | (2.34) | -0.478** | (-2.20) | 0.973 | 0.00854** | (2.42) | -0.164** | (-2.06) | 0.972 |
| SGAM Fund Eqs China A | 0.00165 | (0.60) | -0.541* | (-1.81) | 0.959 | 0.00507 | (1.24) | -0.222* | (-1.87) | 0.959 |
| Standard Life SICAV China Eqs A | 0.0107*** | (3.84) | -0.753*** | (-3.07) | 0.960 | 0.0149*** | (4.58) | -0.293*** | (-2.81) | 0.960 |
| Ålandsbanken China Growth | -0.00207 | (-0.93) | 0.167 | (0.71) | 0.972 | -0.00108 | (-0.37) | 0.00236 | (0.03) | 0.972 |
| Pooled regression of China funds | 0.00203* | (1.83) | -0.298** | (-2.64) | 0.953 | 0.00378** | (2.64) | -0.118*** | (-3.29) | 0.953 |

* p<0.10, ** p<0.05, *** p<0.01

**Panel B: Selectivity and market timing of Greater China funds using unconditional TM and HM**

| | Treynor-Mazuy model | | | | | Henriksson-Merton model | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Fund** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** |
| *B. Greater China funds* | | | | | | | | | | |
| AB Greater China A | 0.000914 | (0.30) | -0.475 | (-1.37) | 0.944 | 0.00108 | (0.24) | -0.0839 | (-0.60) | 0.943 |
| Amundi Funds Greater China AU C | 0.00940** | (2.59) | -0.548 | (-1.36) | 0.937 | 0.0139*** | (3.31) | -0.286* | (-1.93) | 0.940 |
| BNPP L1 Equity China C Acc | 0.00554 | (1.34) | -1.343*** | (-3.58) | 0.909 | 0.0107** | (2.06) | -0.443*** | (-3.18) | 0.909 |
| Carnegie Kinafond | 0.00732 | (1.34) | -1.793** | (-2.52) | 0.880 | 0.0153** | (2.08) | -0.642*** | (-2.76) | 0.883 |
| Comgest Growth Greater China | 0.00301 | (0.88) | -0.519 | (-1.34) | 0.891 | 0.00401 | (0.90) | -0.128 | (-0.93) | 0.890 |
| Danske Invest Greater China A | 0.00371 | (1.52) | 0.152 | (0.58) | 0.968 | 0.00224 | (0.73) | 0.0890 | (1.19) | 0.968 |
| FF - Greater China A | 0.00184 | (0.83) | 0.862** | (2.67) | 0.958 | -0.000345 | (-0.11) | 0.235** | (2.60) | 0.957 |
| FIM China | 0.00188 | (0.55) | -1.195** | (-2.03) | 0.892 | 0.00694* | (1.76) | -0.415** | (-2.32) | 0.893 |
| First State Greater China Growth A | 0.00845** | (2.67) | -0.892** | (-2.09) | 0.913 | 0.0103** | (2.33) | -0.226 | (-1.58) | 0.910 |
| Ignis Intl Greater China Opp A Acc | 0.00472 | (1.32) | -1.156** | (-2.03) | 0.905 | 0.00768 | (1.56) | -0.316 | (-1.56) | 0.902 |
| ING (L) Invest Greater China P Acc | 0.00327 | (1.35) | -0.0341 | (-0.13) | 0.956 | 0.00538* | (1.72) | -0.0985 | (-0.92) | 0.957 |
| Invesco Greater China Equity A | 0.00918*** | (3.14) | -0.666** | (-2.26) | 0.952 | 0.0128*** | (3.39) | -0.266** | (-2.51) | 0.954 |
| JF Greater China A Acc | 0.00542*** | (2.74) | -0.00919 | (-0.03) | 0.968 | 0.00627** | (2.23) | -0.0389 | (-0.33) | 0.968 |
| Martin Currie GF Greater China | 0.00622 | (1.56) | -0.197 | (-0.38) | 0.935 | 0.00582 | (1.07) | -0.0139 | (-0.08) | 0.934 |
| Nordea Kiina Kasvu | -0.000354 | (-0.19) | 0.0421 | (0.11) | 0.969 | -0.000660 | (-0.23) | 0.0203 | (0.17) | 0.969 |
| Pictet-Greater China P | 0.00211 | (0.74) | 0.378 | (1.15) | 0.958 | 0.00143 | (0.37) | 0.0908 | (0.86) | 0.958 |
| PineBridge Greater China Equity A | 0.00141 | (0.70) | -0.404 | (-1.29) | 0.976 | 0.00346 | (1.38) | -0.156* | (-1.84) | 0.976 |
| Schroder ISF Greater China A Acc | 0.00576** | (2.46) | -0.309 | (-1.24) | 0.972 | 0.00602** | (2.05) | -0.0612 | (-0.84) | 0.972 |
| Skandia Greater China Equity A1 | 0.00657** | (2.30) | -0.637* | (-1.79) | 0.911 | 0.00822** | (2.06) | -0.176 | (-1.26) | 0.910 |
| Swedbank Robur Kinafond | 0.000622 | (0.48) | 0.0952 | (0.56) | 0.982 | 0.000461 | (0.30) | 0.0225 | (0.45) | 0.982 |
| Templeton China A Acc | 0.00743*** | (3.13) | -0.336 | (-0.98) | 0.943 | 0.00967*** | (3.28) | -0.153 | (-1.29) | 0.944 |
| UBS (Lux) EF Greater China P | 0.01395*** | (3.20) | -1.191*** | (-3.14) | 0.932 | 0.01867*** | (3.26) | -0.3999*** | (-2.97) | 0.932 |
| Pooled regression of Greater China funds | 0.00493*** | (6.57) | -0.462*** | (-3.45) | 0.930 | 0.00679*** | (6.00) | -0.157*** | (-3.56) | 0.930 |

* p<0.10, ** p<0.05, *** p<0.01

## Table 11: Selectivity and market timing using conditional TM and HM

Table 11 presents the alphas, their t-ratios and the adjusted R-square values for the regressions on the individual fund level using the conditional versions of TM and HM. The data covers four years from January 2007 to December 2010. For the conditional TM the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + \gamma_p * r_{m,t}^2 + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month bill yield, $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield and $u_{p,t}$ is a random error term of fund p at time t. $TS_{t-1}$ is the lagged and demeaned value of the term structure, which is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield, $TB_{t-1}$ is the lagged and demeaned value of the one-month China Treasury bill bid yield and $DY_{t-1}$ is the lagged and demeaned value of the dividend yield of the China AMEX index. The coefficient $\gamma_p$ measures the market timing and $\alpha_p$ measures the selectivity of the fund manager. For the conditional HM the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1(r_{m,t} * TS_{t-1}) + b_2(r_{m,t} * TB_{t-1}) + b_3(r_{m,t} * DY_{t-1}) + \gamma_p * r_{m,t}^* + b_1^*(r_{m,t}^* * TS_{t-1}) + b_2^*(r_{m,t}^* * TB_{t-1}) + b_3^*(r_{m,t}^* * DY_{t-1}) + u_{p,t}$$

where $r_{p,t}$, $r_{m,t}$, $TS_{t-1}$, $TB_{t-1}$, $DY_{t-1}$ and $u_{p,t}$ are specified as for the conditional version of TM. Further, $r_{m,t}^*$ is the product of the excess return of the market index used and an indicator dummy for positive values of the difference between the excess return on the index and the conditional mean of the excess return. $\gamma_p$ is the market timing coefficient which measures the difference between the up- and down-market conditional beta and $\alpha_p$ measures the selectivity of the fund manager. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

**Panel A: Selectivity and market timing of China funds using conditional TM and HM**

| | Treynor-Mazuy model | | | | | Henriksson-Merton model | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Fund** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** |
| *A. China funds* | | | | | | | | | | |
| Baring Hong Kong China A | 0.00340 | (1.22) | -1.034*** | (-4.58) | 0.966 | 0.00390 | (0.96) | -0.165 | (-1.56) | 0.961 |
| Callander Fund China Universe C1 | -0.0000929 | (-0.03) | -0.645** | (-2.31) | 0.965 | 0.00336 | (0.83) | -0.260** | (-2.07) | 0.963 |
| Danske Invest China K | -0.00426 | (-0.92) | -0.0767 | (-0.24) | 0.909 | -0.00369 | (-0.57) | -0.0192 | (-0.10) | 0.904 |
| Dexia Eqs B Red Chips C Acc | -0.00402 | (-0.86) | 0.585* | (1.92) | 0.913 | -0.00497 | (-0.73) | 0.155 | (0.77) | 0.909 |
| FF - China Focus A | 0.000398 | (0.15) | 0.0241 | (0.14) | 0.967 | -0.000415 | (-0.09) | 0.0506 | (0.37) | 0.965 |
| HSBC GIF Chinese Equity A Acc | -0.000599 | (-0.41) | -0.440*** | (-2.72) | 0.991 | 0.00158 | (0.71) | -0.158** | (-2.63) | 0.991 |
| Invesco PRC Equity A | 0.00327 | (1.13) | -0.581* | (-1.98) | 0.961 | 0.00370 | (1.02) | -0.0928 | (-0.82) | 0.959 |
| JF China A Acc | 0.00184 | (0.93) | -0.293 | (-1.52) | 0.982 | 0.00495* | (1.77) | -0.179** | (-2.14) | 0.982 |
| Parvest Equity China C | -0.00222 | (-1.12) | -0.120 | (-0.74) | 0.985 | -0.000488 | (-0.22) | -0.104 | (-1.27) | 0.984 |
| Saint-Honoré Chine A | 0.00280 | (0.63) | -0.757* | (-1.74) | 0.918 | 0.000307 | (0.05) | 0.00125 | (0.01) | 0.911 |
| Schroder ISF China Opportunities A | 0.00461** | (2.23) | -0.287 | (-1.37) | 0.982 | 0.00601** | (2.03) | -0.119 | (-1.36) | 0.982 |
| SGAM Fund Eqs China A | 0.000479 | (0.17) | -0.770** | (-2.64) | 0.964 | 0.00353 | (0.80) | -0.250* | (-2.00) | 0.961 |
| Standard Life SICAV China Eqs A | 0.00950*** | (3.35) | -0.754*** | (-3.28) | 0.962 | 0.0118*** | (3.29) | -0.194* | (-1.82) | 0.960 |
| Ålandsbanken China Growth | -0.000729 | (-0.35) | 0.128 | (0.73) | 0.977 | 0.000258 | (0.09) | -0.0118 | (-0.12) | 0.976 |
| Pooled regression of China funds | 0.00103 | (1.05) | -0.359*** | (-3.05) | 0.957 | 0.00213* | (1.88) | -0.0960** | (-3.01) | 0.957 |

* p<0.10, ** p<0.05, *** p<0.01

**Panel B: Selectivity and market timing of Greater China funds using conditional TM and HM**

| | Treynor-Mazuy model | | | | | Henriksson-Merton model | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Fund** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** |
| *B. Greater China funds* | | | | | | | | | | |
| AB Greater China A | -0.000273 | (-0.09) | -0.0678 | (-0.19) | 0.948 | -0.00161 | (-0.35) | 0.0572 | (0.45) | 0.946 |
| Amundi Funds Greater China AU C | 0.00894** | (2.31) | -0.589 | (-0.96) | 0.936 | 0.0161*** | (3.71) | -0.526*** | (-3.36) | 0.948 |
| BNPP L1 Equity China C Acc | 0.00408 | (0.98) | -1.318*** | (-2.76) | 0.911 | 0.0120** | (2.07) | -0.606*** | (-2.79) | 0.918 |
| Carnegie Kinafond | 0.00719 | (1.33) | -1.241* | (-1.72) | 0.899 | 0.0149* | (1.89) | -0.648** | (-2.58) | 0.910 |
| Comgest Growth Greater China | 0.00269 | (0.77) | -0.455 | (-0.83) | 0.902 | 0.00159 | (0.34) | 0.0426 | (0.33) | 0.913 |
| Danske Invest Greater China A | 0.00173 | (0.98) | 0.0481 | (0.25) | 0.978 | 0.00161 | (0.69) | 0.0363 | (0.50) | 0.978 |
| FF - Greater China A | 0.000432 | (0.18) | 0.565 | (1.43) | 0.965 | 0.000983 | (0.31) | 0.0327 | (0.26) | 0.963 |
| FIM China | 0.00168 | (0.48) | -1.100 | (-1.56) | 0.886 | 0.00808* | (1.71) | -0.485** | (-2.34) | 0.886 |
| First State Greater China Growth A | 0.00702** | (2.11) | -1.464** | (-2.50) | 0.920 | 0.00868* | (1.85) | -0.217 | (-1.34) | 0.919 |
| Ignis Intl Greater China Opp A Acc | 0.00831*** | (3.03) | 0.421 | (0.84) | 0.947 | 0.00953*** | (2.95) | 0.00465 | (0.03) | 0.949 |
| ING (L) Invest Greater China P Acc | 0.00457 | (1.20) | -0.308 | (-0.44) | 0.905 | 0.00416 | (0.76) | -0.135 | (-0.85) | 0.912 |
| Invesco Greater China Equity A | 0.00371 | (1.38) | -0.0591 | (-0.14) | 0.954 | 0.00668* | (1.88) | -0.158 | (-1.09) | 0.954 |
| JF Greater China A Acc | 0.00867*** | (2.79) | -0.539 | (-1.18) | 0.950 | 0.0132*** | (3.30) | -0.305** | (-2.12) | 0.952 |
| Martin Currie GF Greater China | 0.00526** | (2.49) | 0.278 | (0.82) | 0.967 | 0.00632** | (2.31) | -0.00832 | (-0.07) | 0.967 |
| Nordea Kiina Kasvu | 0.00423 | (1.12) | -0.578 | (-1.15) | 0.940 | 0.00491 | (0.91) | -0.0651 | (-0.28) | 0.937 |
| Pictet-Greater China P | -0.000494 | (-0.26) | -0.115 | (-0.26) | 0.968 | -0.000650 | (-0.22) | 0.00521 | (0.04) | 0.966 |
| PineBridge Greater China Equity A | 0.000811 | (0.29) | 0.478 | (1.45) | 0.962 | 0.00102 | (0.28) | 0.0558 | (0.44) | 0.960 |
| Schroder ISF Greater China A Acc | 0.000482 | (0.25) | -0.516 | (-0.97) | 0.977 | 0.00266 | (1.01) | -0.159 | (-1.64) | 0.979 |
| Skandia Greater China Equity A1 | 0.00395** | (2.47) | -0.444** | (-2.19) | 0.983 | 0.00502** | (2.35) | -0.0890 | (-1.13) | 0.982 |
| Swedbank Robur Kinafond | 0.00569* | (1.85) | -0.945* | (-1.94) | 0.924 | 0.00724 | (1.55) | -0.191 | (-1.21) | 0.923 |
| Templeton China A Acc | 0.000683 | (0.52) | 0.0990 | (0.40) | 0.982 | 0.000534 | (0.33) | 0.0323 | (0.40) | 0.981 |
| UBS (Lux) EF Greater China P | 0.0131*** | (2.83) | -0.996* | (-1.87) | 0.929 | 0.0180*** | (2.79) | -0.368* | (-1.70) | 0.928 |
| Pooled regression of Greater China funds | 0.00420*** | (5.50) | -0.402*** | (-3.14) | 0.933 | 0.00640*** | (5.29) | -0.168*** | (-3.45) | 0.933 |

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

### Table 12: Results of pooled regressions for both unconditional and conditional Jensen's alpha with subsamples for each year

Table 12 presents the alphas, their t-ratios and the adjusted R-square values for the pooled regressions of the funds divided into subsamples for each year using Jensen's model. The pooled data consists of combined time-series observations across the 36 mutual funds. The data are monthly from January 2007 to December 2010. For the unconditional Jensen's alpha, the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield and $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield at time t. $\beta_p$ represents the systematic risk of fund p and $u_{p,t}$ is the random error term of fund p at time t. $\alpha_p$ represents Jensen's alpha. For the conditional models, the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + u_{p,t}$$

where $\alpha_p$, $r_{p,t}$, $r_{m,t}$ and $u_{p,t}$ are defined as above. $TS_{t-1}$ is the lagged and demeaned value of the term structure, which is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield, $TB_{t-1}$ is the lagged and demeaned value of the one-month China Treasury bill bid yield and $DY_{t-1}$ is the lagged and demeaned value of the dividend yield of the China AMEX index. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

| | Unconditional Jensen's alpha | | | Conditional Jensen's alpha | | |
|---|---|---|---|---|---|---|
| | α | t(α) | adj. $R^2$ | α | t(α) | adj. $R^2$ |
| *A. China funds* | | | | | | |
| All funds 2007 | 0.000162 | (0.11) | 0.935 | 0.00648*** | (3.00) | 0.950 |
| All funds 2008 | -0.00784*** | (-4.70) | 0.965 | -0.00836*** | (-4.50) | 0.964 |
| All funds 2009 | 0.00237 | (1.35) | 0.891 | 0.00853*** | (3.28) | 0.893 |
| All funds 2010 | 0.00225** | (2.31) | 0.889 | 0.00104 | (0.84) | 0.892 |
| | | | | | | |
| *B. Greater China funds* | | | | | | |
| All funds 2007 | 0.00924*** | (6.40) | 0.883 | 0.0113*** | (4.63) | 0.899 |
| All funds 2008 | 0.00223 | (1.35) | 0.937 | 0.00182 | (0.96) | 0.939 |
| All funds 2009 | 0.00180 | (1.24) | 0.857 | 0.00888*** | (3.93) | 0.865 |
| All funds 2010 | 0.00130* | (1.67) | 0.869 | 0.00367*** | (3.98) | 0.883 |

* p<0.10, ** p<0.05, *** p<0.01

### Table 13: Results of pooled regressions using unconditional TM and HM with subsamples for each year

Table 13 presents the alphas, their t-ratios and the adjusted R-square values for the pooled regressions of the funds divided into subsamples for each year using the unconditional versions of TM and HM. The pooled data consists of combined time-series observations across the 36 mutual funds. The data are monthly from January 2007 to December 2010. For the unconditional TM the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p r_{m,t}^2 + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield and $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield at time t. $\beta_p$ represents the systematic risk of fund p and $u_{p,t}$ is a random error term of fund p at time t. The coefficient $\gamma_p$ measures the market timing and $\alpha_p$ measures the selectivity of the fund manager. For the unconditional HM the regression is:

$$r_{p,t} = \alpha_p + \beta_p r_{m,t} + \gamma_p D r_{m,t} + u_{p,t}$$

where $\alpha_p$, $r_{p,t}$, $r_{m,t}$ and $u_{p,t}$ are defined as above and $D$ is a dummy variable that equals 1 in up-markets ($r_{m,t} \geq r_{f,t}$), and 0 in down-markets ($r_{m,t} \leq r_{f,t}$). The coefficient $\gamma_p$ measures the market timing of the fund manager and $\alpha_p$ measures the selectivity of the fund manager. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

| | Treynor Mazuy model | | | | | Henriksson Merton model | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | α | t(α) | γ | t(γ) | adj. $R^2$ | α | t(α) | γ | t(γ) | adj. $R^2$ |
| *A. China funds* | | | | | | | | | | |
| All funds 2007 | 0.00498** | (2.40) | -0.724*** | (-4.21) | 0.939 | 0.00821*** | (2.88) | -0.227*** | (-3.68) | 0.938 |
| All funds 2008 | -0.00803*** | (-3.81) | 0.0195 | (0.21) | 0.964 | -0.00594* | (-1.79) | -0.00864 | (-0.13) | 0.965 |
| All funds 2009 | 0.00801*** | (3.37) | -1.588*** | (-3.57) | 0.897 | 0.0115*** | (3.90) | -0.339*** | (-3.47) | 0.891 |
| All funds 2010 | 0.00296** | (2.38) | -0.619 | (-1.12) | 0.889 | 0.00246 | (1.62) | -0.0171 | (-0.21) | 0.888 |
| | | | | | | | | | | |
| *B. Greater China funds* | | | | | | | | | | |
| All funds 2007 | 0.0106*** | (7.21) | -0.646** | (-2.01) | 0.885 | 0.0133*** | (5.88) | -0.209** | (-2.06) | 0.885 |
| All funds 2008 | 0.00340* | (1.96) | -0.531** | (-2.42) | 0.935 | 0.00523** | (2.01) | -0.143* | (-1.74) | 0.934 |
| All funds 2009 | 0.00596*** | (3.32) | -1.443*** | (-3.79) | 0.861 | 0.0108*** | (4.43) | -0.396*** | (-4.66) | 0.865 |
| All funds 2010 | 0.00203** | (2.07) | -0.794 | (-1.53) | 0.869 | 0.00315*** | (2.82) | -0.165** | (-2.43) | 0.871 |

* p<0.10, ** p<0.05, *** p<0.01

## Table 14: Results of pooled regressions using conditional TM and HM with subsamples for each year

Table 14 presents the alphas, their t-ratios and the adjusted R-square values for the pooled regressions of the funds divided into subsamples for each year using the conditional versions of TM and HM. The pooled data consists of combined time-series observations across the 36 mutual funds. The data are monthly from January 2007 to December 2010. For the conditional TM the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1 r_{m,t} * TS_{t-1} + b_2 r_{m,t} * TB_{t-1} + b_3 r_{m,t} * DY_{t-1} + \gamma_p * r_{m,t}^2 + u_{p,t}$$

where $r_{p,t}$ is the return of fund p in excess of the Swedish one-month Treasury bill yield, $r_{m,t}$ is the return of the market in excess of the Swedish one-month Treasury bill yield and $u_{p,t}$ is a random error term of fund p at time t. $TS_{t-1}$ is the lagged and demeaned value of the term structure, which is calculated as the difference between the ten-year China government bond bid yield and the three-month China Treasury bill bid yield, $TB_{t-1}$ is the lagged and demeaned value of the one-month China Treasury bill bid yield and $DY_{t-1}$ is the lagged and demeaned value of the dividend yield of the China AMEX index. The coefficient $\gamma_p$ measures the market timing and $\alpha_p$ measures the selectivity of the fund manager. For the conditional HM the regression is:

$$r_{p,t} = \alpha_p + b_0 r_{m,t} + b_1(r_{m,t} * TS_{t-1}) + b_2(r_{m,t} * TB_{t-1}) + b_3(r_{m,t} * DY_{t-1}) + \gamma_p * r_{m,t}^* + b_1^*(r_{m,t}^* * TS_{t-1}) + b_2^*(r_{m,t}^* * TB_{t-1}) + b_3^*(r_{m,t}^* * DY_{t-1}) + u_{p,t}$$

where $r_{p,t}$, $r_{m,t}$, $TS_{t-1}$, $TB_{t-1}$, $DY_{t-1}$ and $u_{p,t}$ are specified as for the conditional version of TM. Further, $r_{m,t}^*$ is the product of the excess return of the market index used and an indicator dummy for positive values of the difference between the excess return on the index and the conditional mean of the excess return. $\gamma_p$ is the market timing coefficient which measures the difference between the up- and down-market conditional beta and $\alpha_p$ measures the selectivity of the fund manager. The Newey-West procedure is used for all regressions to correct for any potential heteroscedasticity or serial correlation in the residuals.

| | **Treynor Mazuy model** | | | | | **Henriksson Merton model** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** | **α** | **t(α)** | **γ** | **t(γ)** | **adj. $R^2$** |
| *A. China funds* | | | | | | | | | | |
| All funds 2007 | 0.00737*** | (3.31) | -0.609 | (-1.24) | 0.951 | 0.000214 | (0.07) | -0.134 | (-0.09) | 0.951 |
| All funds 2008 | -0.00751** | (-2.34) | -0.0744 | (-0.41) | 0.964 | -0.00873** | (-2.42) | -0.123 | (-0.50) | 0.964 |
| All funds 2009 | 0.00644** | (2.55) | -4.844*** | (-2.85) | 0.899 | 0.0148*** | (4.69) | -0.680 | (-0.83) | 0.898 |
| All funds 2010 | 0.00135 | (0.92) | -0.312 | (-0.42) | 0.891 | -0.00404 | (-1.59) | -23.66* | (-1.93) | 0.897 |
| *B. Greater China funds* | | | | | | | | | | |
| All funds 2007 | 0.0101*** | (4.12) | 1.578** | (1.97) | 0.900 | 0.00684** | (2.06) | 3.706** | (2.35) | 0.901 |
| All funds 2008 | 0.00211 | (0.97) | -0.0816 | (-0.29) | 0.939 | 0.00595 | (1.56) | -8.432*** | (-2.98) | 0.941 |
| All funds 2009 | 0.00874*** | (3.90) | -2.972** | (-2.04) | 0.867 | 0.0148*** | (5.10) | -0.891 | (-1.40) | 0.870 |
| All funds 2010 | 0.00309*** | (2.88) | 0.739 | (1.19) | 0.884 | 0.00457*** | (3.57) | 4.532 | (1.21) | 0.888 |

* p<0.10, ** p<0.05, *** p<0.01

### Table 15: Sharpe ratios of funds and benchmark indices

Table 15 presents the Sharpe ratios of the funds and benchmark indices. When comparing assets, the asset with the higher Sharpe ratio is preferred. To calculate the Sharpe ratio the following formula have been used:

$$S_p = \frac{R_p - R_f}{\sigma_p}$$

where $R_p$ is the average return of fund p or the benchmark index p, $R_f$ is the average risk free rate represented by the Swedish one-month Treasury bill yield and $\sigma_p$ is the standard deviation of fund p or the benchmark index p. $S_p$ denotes the Sharpe ratio of fund p or benchmark p.

| **Fund** | **Sharpe ratio** |
|---|---|
| *A. China funds* | |
| Baring Hong Kong China A | -0.1379 |
| Callander Fund China Universe C1 | -0.1723 |
| Danske Invest China K | -0.1624 |
| Dexia Eqs B Red Chips C Acc | -0.1288 |
| FF - China Focus A | -0.1286 |
| HSBC GIF Chinese Equity A Acc | -0.1719 |
| Invesco PRC Equity A | -0.1280 |
| JF China A Acc | -0.1332 |
| Parvest Equity China C | -0.1801 |
| Saint-Honoré Chine A | -0.1223 |
| Schroder ISF China Opportunities A | -0.1022 |
| SGAM Fund Eqs China A | -0.1625 |
| Standard Life SICAV China Eqs A | -0.0771 |
| Ålandsbanken China Growth | -0.1550 |
| *B. Greater China funds* | |
| AB Greater China A | -0.2287 |
| Amundi Funds Greater China AU C | -0.1285 |
| BNPP L1 Equity China C Acc | -0.2047 |
| Carnegie Kinafond | -0.1988 |
| Comgest Growth Greater China | -0.1934 |
| Danske Invest Greater China A | -0.1618 |
| FF - Greater China A | -0.1464 |
| FIM China | -0.2433 |
| First State Greater China Growth A | -0.1341 |
| Ignis Intl Greater China Opp A Acc | -0.2055 |
| ING (L) Invest Greater China P Acc | -0.1733 |
| Invesco Greater China Equity A | -0.1314 |
| JF Greater China A Acc | -0.1473 |
| Martin Currie GF Greater China | -0.1500 |
| Nordea Kiina Kasvu | -0.2231 |
| Pictet-Greater China P | -0.1703 |
| PineBridge Greater China Equity A | -0.2217 |
| Schroder ISF Greater China A Acc | -0.1573 |
| Skandia Greater China Equity A1 | -0.1484 |
| Swedbank Robur Kinafond | -0.2075 |
| Templeton China A Acc | -0.1327 |
| UBS (Lux) EF Greater China P | -0.1034 |
| *C. Benchmark indices* | |
| MSCI EM China Free | -0.1453 |
| MSCI AC Golden Dragon | -0.2235 |