Emerging Market Hedge Funds: Analysis of Security Selection and Market Timing

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Recent studies have documented that it is only very recently that the Emerging Market Hedge Funds (EMHFs) have started mimicking the performance pattern of regular Hedge Funds. These findings therefore motivate us to analyze the market timing and security selection skills of EMHF managers. Rolling regression technique is employed to analyze the above mentioned issues on a time-varying dimension. The rolling market timing regression results suggest that the EMHF managers do not exhibit consistently superior security selection or market timing skills even in an up-market scenario. The static market timing models however, indicate significant outperformance due to superior security selection and significant underperformance due to perverse market timing for the EMHFs in general. Multifactor asset class regressions, using fund-level data, reaffirm the notion that the EMHFs mimic the performance pattern reported for mutual funds in the mutual fund literature.

JEL classification: G11; G15
Keywords: Emerging Market; Hedge Funds; Security Selection

1. Introduction

In this paper we analyze the security selection and market timing abilities of Emerging Market Hedge Fund (EMHF) managers. While investigation of the performance of hedge funds has witnessed increased research interest in recent times, most of these studies examine only the hedge funds that operate in developed markets like the United States (e.g., Fung and Hsieh, 1997; Ackermann et al., 1999; Brown et al., 1999; Fung and Hsieh, 1999; Lo, 2001) and Australia (Do et al., 2005). In contrast, the literature on EMHFs is quite sparse and some studies suggest that the behavior of EMHFs may be different from those focused on advanced markets (Eling and Faust 2010 and Abugri and Dutta 2009). In their recent study Abugri and Dutta (2009) report that prior to 2007, the performance pattern of EMHFs mimics that of Mutual Funds. In particular, they find that during the pre-2007 sample period, the EMHF Indices appear to be positively and significantly correlated with various asset classes, a typical result for Mutual Funds. Further, they report that in the post-2007 sample period the EMHFs started performing like regular Hedge Funds. These findings therefore motivate us to investigate the security selection and market timing activities of EMHFs for the pre-2007 sample period.

In this study, we are particularly interested in addressing the following two research questions: (i) Can the results documented in Abugri and Dutta (2009), that EMHFs mimic the performance pattern reported for mutual funds in the mutual fund literature be corroborated with fund-level data? (ii) How do the market timing and security selection skills change with changing market conditions?

For this study we use fund level data on four EMHF categories; Asia, Eastern Europe and Russia (EER), Latin America (Lat. Am.) and Emerging Market Global (Emg. Global). Although the focus of this study is on the security selection and market-timing skills of EMHF managers, we do present a brief analysis on the performance pattern of EMHFs. We begin with a brief analysis of fund performance along the lines discussed in Abugri and Dutta (2009). Abugri and Dutta (2009) use index level data. We however, employ fund level data and verify their findings. We also analyze the shifts in fund performance vis-à-vis the traditional asset classes over time by using the rolling regression technique. Next, we employ the quadratic (Chen and Stockum, 1986) and the dual-beta (Henriksson & Merton, 1981) market timing models to investigate the security selection and market timing skills of EMHFs managers. These two models have been used extensively in the mutual fund literature. In view of the results presented in Abugri and Dutta (2009) that EMHFs mimic the performance pattern reported for mutual funds, these models may be used to examine the market timing and security selection abilities of EMHF managers as well. The rolling regression technique is used to examine the security selection and market timing skills of EMHF managers during up or down-market scenarios. Model specification issues are addressed by means of the specification tests suggested by Jagannathan & Korajczyk (1986).

Our empirical results confirm the notion that EMHFs mimic the performance pattern reported for mutual funds in the mutual fund literature. The distributions of the significant asset classes obtained from the multifactor asset class regressions using all the four EMHF categories reveal that quite a few asset classes are significant, which is typical for asset class regressions involving mutual funds. These results are therefore consistent with Abugri and Dutta (2009). The static and rolling multifactor asset class regression results both reveal that for the sample period considered, the EMHFs managed to register a more or less superior performance pattern vis-à-vis the benchmarks in general.

Results for the static regressions using the Chen and Stockum (1986) quadratic market timing model and the Henriksson and Merton (1981) dual-beta market timing model indicate significant outperformance due to superior security selection and significant underperformance due to perverse market timing for the EMHFs in general. Reported results for both models further indicate that the EMHFs in general register consistent outperformance vis-à-vis the emerging market equity benchmark after adjustment for market timing. The dual-beta model further reveals that for the sample period considered, the EMHFs are likely to be affected more during the down-market scenario, and that these funds do not provide good downside protection for the investors. Rolling regression results involving the two market timing models indicate that the EMHF managers do not exhibit a consistently superior or at least a stable security selection or market timing strategy in an up-market scenario. In fact, in most cases, the rolling regression results indicate a steadily declining security selection skill set. As far as market timing skills are concerned, rolling regression results indicate that the EMHF managers are generally unable to produce any effective market timing strategy, despite the fact that the EMHF benchmark equities index registered steady improvement during the sample period considered. We do however, observe an aggressive attempt on the part of the fund managers to improve their respective market timing strategies. Overall, the rolling market timing model results provide reasonably strong evidence to conclude that the EMHFs in general do not consistently outperform the EMHF equities benchmark. The remainder of the study is organized as follows. A brief literature review is presented in the next section followed by a discussion on the data. Methodology and results are presented next followed by the conclusion of this study.

2. Literature review

Recent studies which concentrate exclusively on EMHFs are Sancetta and Satchell (2004), Abugri and Dutta (2009) and Eling and Faust (2010). Sancetta and Satchell (2004) develop a new test statistic to examine market timing abilities of hedge fund managers with special emphasis on managers of EMHFs. Their sample is however quite small and they look at five years of data. Abugri and Dutta (2009) examine whether the performance of EMHFs mimic the same reported for advanced market hedge funds. Using four EMHF indices, they find that the EMHFs have only quite recently started behaving like hedge funds that operate in advanced markets. In particular, they find that until 2007, the performance patterns of EMHFs actually mimic those reported for mutual funds. Finally, Eling and Faust (2010) find that while some EMHFs do outperform the traditional benchmarks, most mutual funds do not.

This study contributes to the literature on hedge funds in two ways. First, in view of the findings documented in Abugri and Dutta (2009), it is imperative that their findings are validated with fund level data. Furthermore, since the performance pattern of EMHFs is quite unique in that they mimic the same reported for mutual funds, it is also worthwhile to investigate the market timing and security selection skills of EMHF managers. The time varying regressions used in this study allow us to investigate such skills of EMHF managers under changing market scenarios.

3. Data

In this study we use fund level monthly returns data (net of fees) provided by Hedge Fund Research (HFR). Based on the distribution of the hedge funds across their respective regional focus, our data comprises of 13 funds focusing on Asia, 20 funds focusing on EER, 6 funds focusing on Lat. Am. and 22 funds with a Global emerging market focus (i.e., the Emg. Global category). The sample period ranges from January 2000 to December 2007[1], resulting in 96 observations for each of the 61 hedge funds. Monthly data on the benchmark equity indices, the asset class factors as well as the data on all other variables are obtained from DataStream. The monthly excess fund returns are returns in excess of the monthly returns for the 90-day T-bill. Summary statistics of the fund level dataset used in this study are presented in Table 1.

Table 1
Summary Statistics of Returns for the Hedge Fund Categories

Emerging Market Hedge Fund category	Mean Returns	St. Dev. of Returns	Skewness of Returns	Kurtosis of Returns	Mean Excess Returns	Modified Sharpe Ratio
Asia	0.94	5.41	-0.02	3.43	0.67	0.047
Eastern Europe & Russia	2.80	6.86	0.45	5.61	2.53	0.395
Latin America	1.57	6.78	-0.10	4.18	1.30	0.228
Emerging Markets Global	1.29	3.54	0.37	6.47	1.03	0.309

Note: This Table presents the summary statistics for the four categories of hedge funds considered in this study. The sample period ranges from January 2000 to December 2007. The returns are net of fees. The returns data are obtained from Hedge Fund Research (HFR). The figures presented above are averages for the total number of funds in each category.

Table 1 reveals that the mean return for the EER category is the highest and it also happens to be the most volatile EMHF category. Asian funds have the least average returns and are quite volatile. The mean return for the Emg. Global category is quite impressive, in that the mean return (1.29%) is higher than Asia funds and it also happens to be least volatile EMHF category. Modified Sharpe Ratios[2] reveal that EER funds lead in terms of performance, while the performance of Asia funds is the least impressive. Finally, none of the funds have the first twelve months of data. Hence, we may assume that the dataset is free from backfill bias.

4. Methodology and Empirical Results

4.1 Multifactor asset class regressions

The focus of this study is not performance, but we begin with a brief overview of EMHF performance just to verify the findings in Abugri and Dutta (2009) and to buttress our argument that the security selection and market timing models that we use in our study –and which are more appropriate for Mutual Funds- are appropriate for EMHFs as well. We use modified versions of

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[1] Despite our sincere attempts to use a longer time series and more hedge funds for the study, we were unable to achieve that goal due to severe missing data issues. Our data is therefore not free from the usual biases. We do not consider post 2007 time period because EMHFs perform like mutual funds during the pre-2007 period only. Consideration of post-2007 time period would have rendered the security selection and market timing models inappropriate. The asset-class regressions that we use to verify the results in Abugri and Dutta (2009) are not appropriate for post-2007 period because Abugri and Dutta (2009) report that EMHFs behave like regular hedge funds during that period. Therefore the appropriate model for the post-2007 period is the Fung and Hsieh (2001; 2004) eight factor hedge fund model.

[2] Some of the excess returns are negative, hence we use the Modified Sharpe Ratio (MSR) instead of the regular Sharpe Ratio. See Abugri and Dutta (2009) for a detailed discussion on the relevance of MSR in this study.

"Sharpe's (1992) style" multifactor asset class regressions as demonstrated in Abugri and Dutta (2009)[3]. Fung and Hsieh (1997) suggest that Sharpe's (1992) "style regression" works well in capturing the styles of open-ended mutual funds, whose returns are highly correlated to those of standard asset classes. In view of the findings reported in Abugri and Dutta (2009), the multifactor models presented below, may be considered not only appropriate for our study but also enable the comparison of our estimated results with those reported in the prior literature.

The three equity classes corresponding to each hedge fund category are: a regional MSCI equities class specific to the hedge fund regional focus, a composite MSCI emerging market equities benchmark and the MSCI non-US equities class. The three bond classes are: Barclays-Lehman emerging market bond index specific to the hedge fund regional focus, Barclays-Lehman emerging market composite bond index and Barclays non-US Global bond index[4]. Spot price of gold is the proxy for the commodities asset class and one-month Eurodollar deposit index is the proxy for the cash asset class and. Finally, the JP Morgan Trade Weighted Dollar Index is used as a proxy for the currency asset class. The extended models for the three regional hedge fund categories may be stated as follows.

$$\begin{aligned} HFRAsia_{it} &= \alpha_i + \beta_{i1} MSCIAsiaEq_{it} + \beta_{i2} MSCIEmgMktEq_{it} + \beta_{i3} MSCINonUSEq_{it} \\ &+ \beta_{i4} BCLMNAsiaBnds_{it} + \beta_{i5} BCLMNEmgBnds_{it} + \beta_{i6} BCLYSNonUSGlobal_{it} + \beta_{i7} Gold_{it} \\ &+ \beta_{i8} Euro\$Indx_{it} + \beta_{i9} JPMTrdWghtd\$Indx_{it} + \varepsilon_{it} \end{aligned} \tag{1}$$

$$\begin{aligned} HFREEuRussia_{it} &= \alpha_i + \beta_{i1} MSCIEEuRussiaEq_{it} + \beta_{i2} MSCIEmgMktEq_{it} \\ &+ \beta_{i3} MSCINonUSEq_{it} + \beta_{i4} BCLMNEEuRussiaBnds_{it} + \beta_{i5} BCLMNEmgBnds_{it} \\ &+ \beta_{i6} BCLYSNonUSGlobal_{it} + \beta_{i7} Gold_{it} + \beta_{i8} Euro\$Indx_{it} + \beta_{i9} JPMTrdWghtd\$Indx_{it} + \varepsilon_{it} \end{aligned} \tag{2}$$

$$\begin{aligned} HFRLatAm_{it} &= \alpha_i + \beta_{i1} MSCILatAmEq_{it} + \beta_{i2} MSCIEmgMktEq_{it} \\ &+ \beta_{i3} MSCINonUSEq_{it} + \beta_{i4} BCLMNLatAmBnds_{it} + \beta_{i5} BCLMNEmgBnds_{it} \\ &+ \beta_{i6} BCLYSNonUSGlobal_{it} + \beta_{i7} Gold_{it} + \beta_{i8} Euro\$Indx_{it} + \beta_{i9} JPMTrdWghtd\$Indx_{it} + \varepsilon_{it} \end{aligned} \tag{3}$$

where $HFRAsia_i$, $HFREEuRussia_i$ and $HFRLatAm_i$ are the monthly return series for funds focusing on Asia, EER and Lat. Am., respectively. $MSCIAsiaEq_i$ is the return on the MSCI Asia Equities Index, $MSCIEEuRussiaEq_i$ is the return on the MSCI Eastern Europe & Russia Equities Index, $MSCILatAmEq_i$ is the return on the MSCI Latin America Equities Index, $MSCIEmgMktEq_i$ is the return on the MSCI Emerging Market Equities Index, $MSCINonUSEq_i$ is the return on the MSCI Non-US Equities Index, $BCLMNAsiaBnds_i$ is the return on the Barclays-Lehman Asia Bond Index, $BCLMNEEuRussiaBnds_i$ is the return on the Barclays-Lehman Eastern Europe & Russia Bond Index, $BCLMNLatAmBnds_i$ is the return on the Barclays-Lehman Latin America Bond Index, $BCLMNEmgBnds_i$ is the return on the Barclays-Lehman Emerging Market Composite Bond Index, $BCLYSNonUSGlobalBnds_i$ is the return on the Barclays Non-US Global Bond Index, $Gold_i$ is the return on Gold spot price, $Euro\$Indx_i$ is the return on 1-month Eurodollar Deposit and

[3] A careful review of the emerging market hedge fund data provided by HFR inc. reveals that none of the EMHFs use short selling as a major strategy or sub-strategy. Moreover, Abugri and Dutta (2009) find strong evidence in support of the notion that EMHFs perform more like mutual funds. Furthermore, trading restrictions and market imperfections of emerging markets in general prevent EMHFs from employing common hedge fund strategies like short-selling/derivatives. We therefore do not use the trend following factors (see Fung and Hsieh 2001) that are generally used for evaluating the performance of hedge funds that focus on advanced markets only.

[4] Since we are using fund –level data, the assumption is that funds will invest in bonds specific to that region and they might also explore other opportunities in Non-US area. Hence, we include the region-specific bond indices and the Non-USGlobal Bond Index in addition to the Emerging Market Bond Index as in Abugri and Dutta (2009).

$JPMTrdWghtd_i$ is the return on JP Morgan Trade Weighted Dollar Index. The extended model for the emerging market global hedge funds may be stated as follows:

$$\begin{aligned} &HFREmgMktGbl_{it} = \alpha_i + \beta_{i1} MSCIEmgMktEq_{it} + \beta_{i2} MSCINonUSEq_{it} \\ &+\beta_{i3} BCLMNEmgBnds_{it} + \beta_{i4} BCLYSNonUSGlobal_{it} + \beta_{i5} Gold_{it} + \beta_{i6} Euro\$Indx_{it} \\ &+\beta_{i7} JPMTrdWghtd\$Indx_{it} + \varepsilon_{it} \end{aligned} \tag{4}$$

where $HFREmgMktGbl_i$ is the return on emerging market global funds and the other variables are as explained before. Positive and significant intercepts in the above regressions suggest superior performance vis-à-vis the benchmarks in general. The results of the multifactor asset class regressions as specified above are presented in Table 2 below:

Table 2
Multifactor Performance Model Results

Emerging Market Hedge Fund Category	Equally weighted portfolio	Distribution of Individual Fund Alphas					% -ve and significant Alphas	% +ve and significant Alphas
	Alpha	Min	1st Quartile	Median	3rd Quartile	Max		
Asia	0.43	-0.36	-0.19	0.26	1.29	1.59	0.00	23.08
Eastern Europe & Russia	1.85***	0.29	1.25	1.92	2.17	3.76	0.00	90.00
Latin America	1.01***	0.57	0.59	0.85	1.01	2.61	0.00	83.33
Emerging Markets Global	1.01***	0.18	0.80	0.96	1.19	2.07	0.00	81.82

Note: This Table presents the results of multifactor asset class regressions. The underlying model used here is a modified version of Sharpe's (1992) style regressions, as described in Abugri and Dutta (2009). The sample period is from January 2000 through December 2007. The three equity classes corresponding to each hedge fund category are: a regional MSCI equities class specific to the hedge fund regional focus, a composite MSCI emerging market equities benchmark and MSCI non-US equities class. The three bond classes are: Barclays-Lehman emerging market bond index specific to the hedge fund regional focus, Barclays-Lehman emerging market composite bond index and Barclays-Lehman non-US Global bond index. Spot price of gold is the proxy for the commodities asset class and one-month Eurodollar deposit index is the same for the cash asset class and. Finally, the JP Morgan Trade Weighted Dollar Index is the proxy for the currency asset class. *Significant at the 10%, level, **Significant at the 5% level, and ***Significant at the 1% level.

The results for the equally weighted portfolios of funds belonging to each of the four categories, reported in columns two and three, suggest that except for Asia funds, the hedge funds belonging to the other three categories have positive and significant alphas, thereby suggesting superior fund performance vis-à-vis the benchmarks in general. Asia fund portfolio has the smallest alpha, but it is not significant. Overall, the equally weighted fund portfolios depict superior performance as compared to the benchmarks in general. Not surprisingly, the distribution of alphas for Asia funds reveals that this category of funds has the least number of positive and significant alphas (23.08%), which explains the smallest alpha for the Asia equally weighted portfolio. On the other hand, for EER, Lat. Am. and Emg. Global funds, we find that a substantial proportion of the alphas are positive and significant. EER (90.00%), Lat. Am. (83.33%) and Emg. Global (81.82%) funds have an overwhelming percentage of positive and significant alphas. Finally, none of the fund alphas, for any of the four categories are negative and significant. Overall, we find that except for the Asia funds, the funds belonging to the other three categories depict significantly superior performance patterns, vis-à-vis the benchmarks in general. Fig. I, presents the distributions of significant asset classes, obtained from the multifactor asset class performance regression models presented above. As is evident from Fig. I, quite a few asset classes are significant in the asset class regressions, which is typical for asset class regressions involving mutual funds. In the case of Asia funds, emerging market equities, non-US equities, Asia bonds and non-US global bonds turn out to be the most significant asset classes. In the case of EER funds, Eastern Europe & Russia equities, emerging market equities and non-US equities turn out to be the most significant asset classes. In the case of Lat. Am. funds, emerging market equities, non-US equities and gold are the most significant asset classes. Finally, in the case of Emg. Global category, emerging market equities, non-US equities, emerging market bonds and gold turn out to be the most significant asset classes.

Fig. 1 results are therefore consistent with the key finding in Abugri and Dutta (2009), that the EMHFs mimic the performance pattern reported for mutual funds in the mutual fund literature.

Figure I

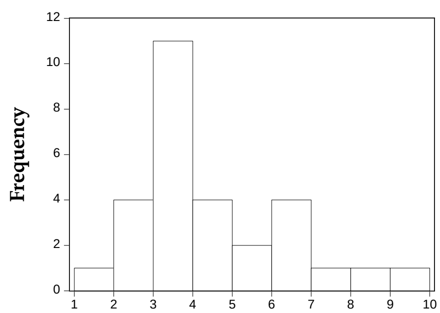

Figure 1a

Significant Asset Class Distribution (Multifactor Performance Model for Asia Funds) 1: MSCI Asia Equities; 2: MSCI Emerging Market Equities; 3: MSCI Non-US Equities; 4: Barclays-Lehman Asia Bonds; 5: Barclays-Lehman Emerging Market Bonds; 6: Barclays Non-US Global Bonds; 7: Gold; 8: Euro Dollar Index; 9: JP Morgan Trade

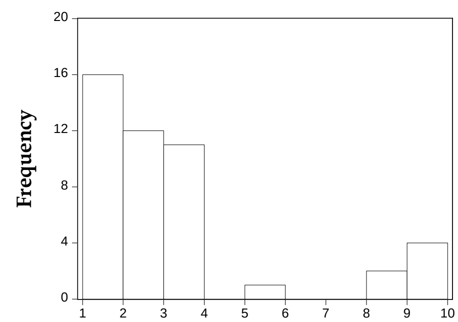

Figure 1b

Significant Asset Class Distribution (Multifactor Performance Model for Eastern Europe and Russia Funds) 1: MSCI Eastern Europe and Russia Equities; 2: MSCI Emerging Market Equities; 3: MSCI Non-US Equities; 4: Barclays-Lehman Eastern Europe and Russia Bonds; 5: Barclays-Lehman Emerging Market Bonds; 6: Barclays Non-US Global Bonds; 7: Gold; 8:

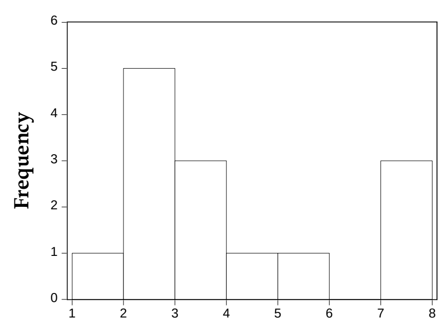

Figure 1c

Significant Asset Class Distribution (Multifactor Performance Model for Latin America Funds) 1: MSCI Latin America Equities; 2: MSCI Emerging Market Equities; 3: MSCI Non-US Equities; 4: Barclays-Lehman Latin America Bonds; 5: Barclays-Lehman

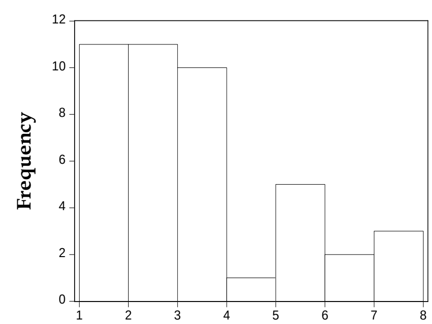

Figure 1d

Significant Asset Class Distribution (Multifactor Performance Model for Emerging Market Global Funds) 1: MSCI Emerging Market Equities; 2: MSCI Non-US Equities; 3: Barclays-Lehman Emerging Market Bonds; 4: Barclays Non-US Global Bonds; 5: Gold; 6: Euro Dollar Index; 7: JP Morgan Trade

This figure presents the distributions of the significant asset classes obtained from the multifactor asset class regressions.

4.2 Rolling multifactor asset class regressions

In order to capture the movements of the fund alphas over time, we employ the rolling regression technique. Our other objective is to document the movements of the fund alphas during upward and downward movements of the MSCI Emerging Market Equities Index, i.e, the emerging market equity benchmark. We also compare the movements of the fund alphas with time-varying MSCI Emerging Market Equities index returns. The multifactor asset class regression models discussed earlier are used for the rolling regressions, with a 3-year time window for each regression. Equally weighted returns for each of the four categories of EMHFs are used as dependent variables. The rolling regression analysis is presented in Figure II below. The significance tests of the performance alphas are referred to in the discussion but are not reported due to space constraint[5].

For the Asia funds, Fig. II a. reveals that the overall performance pattern, as depicted by the alphas obtained from the rolling regressions, more or less mimics the same for the MSCI Emerging Market Equities Index (i.e., the equities benchmark, see Fig. II e.). While the index exhibits a strong upward trend till the end of 2007, the Asia fund alphas exhibit underperformance till the end of 2003, but gradually begin to register strong outperformance vis-à-vis the multifactor asset classes in general and that trend continues till the end of 2007. None of the negative alphas are however significant while a modest percentage (33%) of the positive fund alphas are significant. Fig II b. reveals that the alphas for the EER funds are all positive. The performance alphas exhibit a downward trend till 2005 and then depict an upward trend till the end of 2007. A sizeable proportion of the EER alphas obtained from the rolling regressions are also significant. The Lat. Am. fund alphas (Fig. II c.), exhibit a more or less steady superior performance throughout and also mimic the performance pattern presented in Fig. II e. for the MSCI emerging market equities benchmark. Quite a few of the Lat. Am. fund alphas are also significant. The same observation applies for the Emg. Global category (Fig. IId) as well. In contrast to the performance alphas for the Asia funds, some of which are negative, we find that the alphas pertaining to the other three categories of funds are all positive. For the EER, Lat. Am. and Emg. Global categories, the percentage of positive and significant alphas are; 93%, 47% and 87% respectively. Figure II collectively indicates that the multifactor performance alphas generally mimic the movements of the MSCI equities benchmark.

Figure II

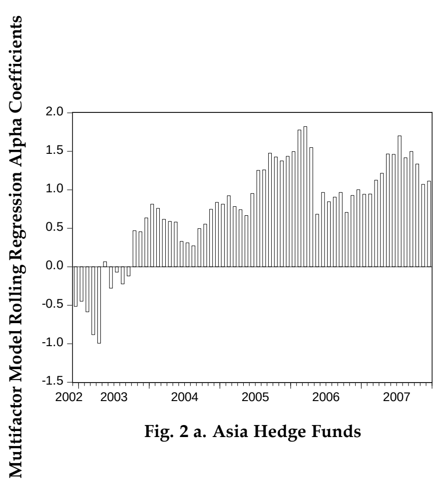

Fig. 2 a. Asia Hedge Funds

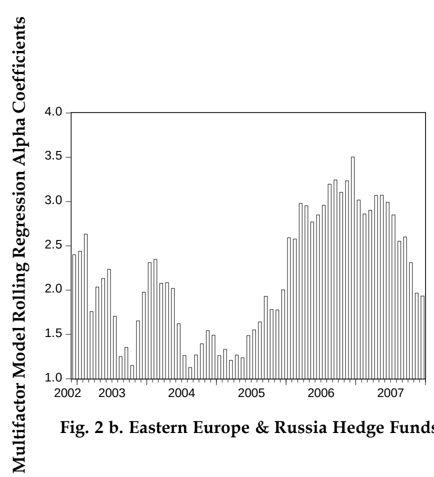

Fig. 2 b. Eastern Europe & Russia Hedge Funds

[5] These results are available upon request.

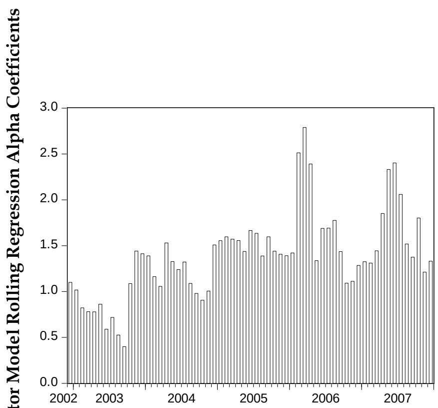

Fig. 2 c. Latin America Hedge Funds

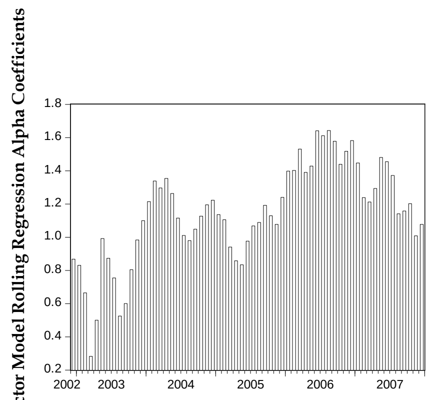

Fig. 2 d. Emerging Market Global Hedge Funds

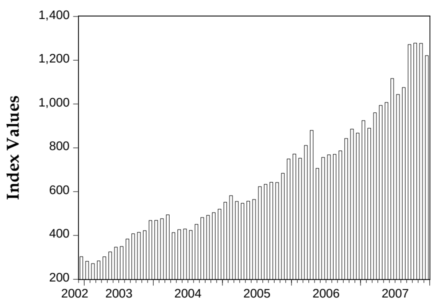

Fig. 2 e. MSCI Emerging Market Equities

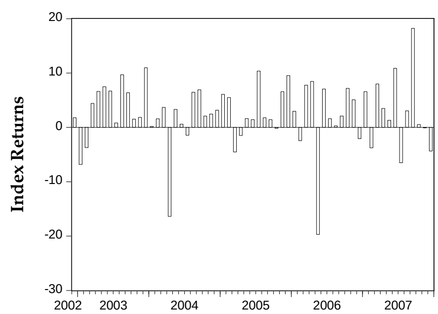

Fig. 2 f. MSCI Emerging Market Equities

The multifactor alphas obtained from the rolling regressions are presented above. The multifactor models (equations 1 through 4) discussed above are used for the rolling regressions. A 3-year time window is used for each regression. Our sample period is January 2000 through December 2007. The last two graphs depict the index values for the MSCI Emerging Market Equities Index and the index returns respectively.

4.3 Security selection and market timing skills of EMHF managers

We begin with the traditional excess returns market model, which assumes that the fund managers have no market timing ability, and then analyze the security selection and market timing abilities of fund managers by means of the Chen and Stockum (1986) quadratic market model and the Henriksson and Merton (1981) dual-beta market timing model. These two models have been used extensively in the mutual fund literature (e.g., Coggin and Hunter, 1993; Connor and Korajcyzk, 1991; Cumby and Glen, 1990; Henriksson, 1984; Lehmann and Modest, 1987). In view of the findings in Abugri and Dutta (2009) that EMHFs mimic the performance patterns reported for mutual funds in the literature, these models may considered appropriate for analyzing the market timing and security selection abilities of EMHF managers. The standard excess returns market model is as specified below:

$$r_{it} = \alpha_{1i} + \beta_{1i} r_{mt} + \varepsilon_{it} \tag{5}$$

where r_{it} is the excess returns series for the hedge funds belonging to each of the four categories analyzed in this study, α_{1i} is interpreted as the Jensen's (1968) alpha and is a measure of outperformance (a positive and significant α_{1i}) or underperformance (a negative and significant α_{1i}) relative to the proxy (the MSCI Emerging Market Equities Index) for emerging market equities. The Jensen's (1968) alpha is interpreted under the assumption that the systematic risk is stationary across all market conditions. β_{1i} is a measure of the market beta risk for the hedge fund under consideration and r_{mt} is the excess return for the benchmark emerging market equities portfolio (the MSCI Emerging Market Equities Index). Eq. 5 is just a foundation based on which the market timing models have been developed in the literature. The results are therefore presented in Table 3, Panel A only to facilitate the discussion on security selection and market timing below. As mentioned earlier, the standard excess returns market model assumes that the fund managers have no market timing skills. Hence, we proceed to analyze the security selection and market timing abilities of fund managers by means of a quadratic market model. This model was originally proposed by Treynor and Mazuy (1966) and was later modified by Chen and Stockum (1986). The quadratic market model proposed by Chen and Stockum (1986) may be specified as follows:

$$r_{it} = \alpha_{2i} + \beta_{2i} r_{mt} + \beta_{3i} r_{mt}^2 + \varepsilon_{it} \qquad (6)$$

where r_{it} and r_{mt} are as defined earlier, α_{2i} (the security selection coefficient) is now a measure of market timing filtered performance and is also the hedge fund manager's security selection ability. A positive/negative and significant α_{2i} indicates superior/perverse security selection ability. β_{3i} (the market timing coefficient) is a measure of the hedge fund manager's market timing ability. Specifically, a significantly positive/negative β_{3i} indicates superior/perverse market timing ability. Finally, EMHF managers may generate superior returns (a positive and significant α_{1i} in Eq. 5) by means of superior security selection ability (a positive and significant α_{2i} in Eq. 6) and/or by means of superior market timing ability (a positive and significant β_{3i} in Eq. 6), see Fung et al. (2002). Hence, the outperformance/underperformance, as measured by α_{1i} (in Eq. 5), decomposes into outperformance/underperformance attributed to superior/perverse security selection, as measured by α_{2i} (in Eq. 6) and outperformance/underperformance attributed to market timing, as measured by α_{1i} - α_{2i}, see Hallahan and Faff (1999). The results of the quadratic market model are as presented in Panel B of Table 3 and the decomposed performance coefficients (for the individual funds only) are presented in Table 4 below.

For all the four portfolios, we find strong evidence of superior security selection. As mentioned earlier, the security selection alphas in the quadratic market model are also indicative of market timing filtered performance. The positive and significant equally weighted EMHF portfolio alphas therefore further indicate that these portfolios outperform the emerging market equities benchmark after adjustment for market timing. Except for the Lat. Am. portfolio, the market timing coefficients for all the portfolios are negative and significant (Table 3, Panel B). A comparison with the standard market model (Table 3, Panel A) reveals that for the Asia portfolio, an overall monthly outperformance of 0.35% decomposes into a monthly outperformance of 0.64% due to superior security selection and a monthly underperformance of 0.29% due to perverse market timing, for the sample period considered. Similarly, for the EER, Lat. Am and Emg. Global fund portfolios, overall monthly outperformance of 2.22%, 0.85% and 0.86%, may be broken up into monthly outperformance of 2.65%, 1.16% and 1.08% due to superior security selection and monthly underperformance of 0.43%, 0.31% and 0.22% due to perverse market timing skills of EMHF managers respectively. Results for the equally weighted EMHF portfolios therefore provide conclusive evidence in favor of consistently superior security selection and consistently perverse market timing abilities for the EMHFs in general. The results also provide conclusive evidence which indicate that the EMHFs in general, consistently outperform the benchmark equities index after adjustment for market timing.

Table 3
Market Timing and Security Selection Ability of Fund Managers

Panel A: Standard Excess Returns Market Model Results

Emerging Market Hedge Fund Category	EW portfolio Jensen's Alpha	Distribution of Individual Fund Jensen's Alphas: Min	1st Quartile	Median	3rd Quartile	Max	% -ve and significant Jensen's Alphas	% +ve and significant Jensen's Alphas
Asia	0.35	-0.52	-0.20	0.20	1.02	1.52	0.00	15.38
Eastern Europe & Russia	2.22***	0.39	1.48	2.12	2.86	4.28	0.00	100.00
Latin America	0.85**	0.42	0.52	0.73	0.85	1.87	0.00	66.70
Emerging Markets Global	0.86***	0.16	0.60	0.70	0.92	2.26	0.00	77.27

	EW portfolio Portfolio Beta	Distribution of Individual Fund Betas: Min	1st Quartile	Median	3rd Quartile	Max	% significant Betas
Asia	0.36***	0.06	0.30	0.42	0.45	0.50	92.31
Eastern Europe & Russia	0.36***	0.02	0.25	0.39	0.47	0.57	90.00
Latin America	0.51***	0.11	0.16	0.29	0.78	1.34	100.00
Emerging Markets Global	0.19***	-0.07	0.02	0.13	0.37	0.60	77.27

Panel B: Quadratic Market Timing Model Results

Emerging Market Hedge Fund Category	EW portfolio Security Selection Coeff.	Distribution of Individual Fund Security Selection Coeffs.: Min	1st Quartile	Median	3rd Quartile	Max	% -ve and significant Security Selection Coeff	% +ve and significant Security Selection Coeff
Asia	0.64*	-0.35	-0.06	0.17	1.23	2.74	0.00	38.46
Eastern Europe & Russia	2.65***	0.74	1.90	2.60	3.39	4.49	0.00	100.00
Latin America	1.16**	0.49	0.76	1.02	1.59	2.01	0.00	50.00
Emerging Markets Global	1.08***	0.29	0.73	0.93	1.30	2.68	0.00	86.36

	EW portfolio Market Timing Coeff	Distribution of Individual Fund Market Timing Coeffs.: Min	1st Quartile	Median	3rd Quartile	Max	% -ve and significant Market Timing Coeffs.	% +ve and significant Market Timing Coeffs.
Asia	-0.006*	-0.027	-0.008	-0.006	-0.002	0.001	15.38	0.00
Eastern Europe & Russia	-0.009**	-0.016	-0.012	-0.009	-0.007	-0.001	40.00	0.00
Latin America	-0.007	-0.020	-0.008	-0.004	-0.003	-0.002	16.67	0.00
Emerging Markets Global	-0.005**	-0.014	-0.006	-0.004	-0.003	0.002	40.91	0.00

Table 3- continued

Panel C: Dual-Beta Market Timing Model Results

Emerging Market Hedge Fund Category	EW portfolio Security Selection Coeff.	Distribution of Individual Fund Security Selection Coeffs. Min	1st Quartile	Median	3rd Quartile	Max	% -ve and significant Security Selection Coeff	% +ve and significant Security Selection Coeff
Asia	0.10**	-0.31	0.41	0.56	1.39	4.13	0.00	30.78
Eastern Europe & Russia	2.78***	0.98	2.23	2.77	3.31	4.68	0.00	100.00
Latin America	1.67**	0.62	0.81	1.08	2.57	3.44	0.00	66.67
Emerging Markets Global	1.32***	0.49	0.96	1.11	1.57	3.32	0.00	90.91
	EW portfolio Market Timing Coeff	Distribution of Individual Fund Market Timing Coeffs. Min	1st Quartile	Median	3rd Quartile	Max	% -ve and significant Market Timing Coeffs.	% +ve and significant Market Timing Coeffs.
Asia	-0.25**	-1.01	-0.28	-0.19	-0.09	-0.01	23.08	0.00
Eastern Europe & Russia	-0.21	-0.51	-0.31	-0.24	-0.12	0.32	20.00	0.00
Latin America	-0.32*	-0.83	-0.50	-0.15	-0.10	-0.08	33.33	0.00
Emerging Markets Global	-0.18**	-0.52	-0.22	-0.16	-0.08	0.05	45.45	0.00

Note: This Table presents the results of the market timing regressions. The sample period is from January 2000 through December 2007. Panel A presents the results of the standard excess returns market model. Panel B presents the results of the Chen and Stockum (1986) quadratic market model and Panel C presents the results of the Henriksson and Merton (1981) dual-beta market model. *Significant at the 10%, level, **Significant at the 5% level, and ***Significant at the 1% level.

Next, we examine the distributions of individual fund security selection coefficients. We find that the individual fund security selection coefficients are overwhelmingly positive (Table 3, Panel B). Except for Asia funds, substantial percentages of the individual fund security selection coefficients are significant for the other three categories (Table 3, Panel B). None of the security selection coefficients are negative and significant. Overall, the quadratic market timing model results provide strong evidence of outperformance due to superior security selection. As mentioned earlier, the security selection alphas may also be interpreted as market timing filtered performance. The distributions of individual fund security selection alphas therefore indicate that the EMHFs consistently outperform the emerging market equity benchmark after adjustment for market timing. The distributions of market timing coefficients for the individual funds are also presented in Table 3 (Panel B). We find that the individual fund market timing coefficients are overwhelmingly negative. We also observe that none of the market timing coefficients are positive and significant. Modest percentages of the market timing coefficients are negative and significant across the four categories (Table 3, Panel B). Overall, the quadratic market timing model results provide strong evidence of outperformance due to superior security selection, but do not provide any conclusive evidence in favor of outperformance/underperformance due to superior/perverse market timing ability for the EMHFs in general.

Decompositions of overall performance for the individual funds using the standard market model results (in Table 3, Panel A) and the quadratic market timing model results (in Table 3, Panel B), are presented in Panel A of Table 4 below.

Overall, the performance decomposition presented in Panel A (Table 4) depict outperformance due to superior security selection skills and underperformance due to perverse market timing skills of EMHF managers. The general trend of outperformance due to superior security selection, as presented in Table 4 (Panel A), is consistent with the high volume of positive and significant security selection coefficients and the high volume negative and significant market timing coefficients in Table 3 (Panel B). The results discussed above therefore collectively indicate that the quadratic market timing model provides strong evidence significant outperformance due to superior security selection and significant underperformance due to perverse market timing for the EMHFs in general. Reported results for this model further indicate that the EMHFs in general register consistent outperformance vis-à-vis the emerging market equity benchmark after adjustment for market timing.

Table 4
Decomposition of Fund Performance into Security Selection and Market Timing Components

Panel A	**Performance attributed to security**				
Emerging Market Hedge Fund Category	Min.	1st Quartile	Median	3rd Quartile	Max
Asia	-0.35	-0.06	0.17	1.23	2.74
Eastern Europe & Russia	0.74	1.90	2.60	3.39	4.49
Latin America	0.49	0.76	1.02	1.59	2.01
Emerging Markets Global	0.29	0.73	0.93	1.30	2.68
	Performance attributed to market				
Emerging Market Hedge Fund Category	Min.	1st Quartile	Median	3rd Quartile	Max
Asia	0.35	0.06	-0.17	-1.23	-2.74
Eastern Europe & Russia	-0.74	-1.9	-2.60	-3.39	-4.49
Latin America	-0.49	-0.76	-1.02	-1.59	-2.01
Emerging Markets Global	-0.29	-0.73	-0.93	-1.30	-2.68
Panel B	**Performance attributed to security**				
Emerging Market Hedge Fund Category	Min.	1st Quartile	Median	3rd Quartile	Max
Asia	-0.31	0.41	0.56	1.39	4.13
Eastern Europe & Russia	0.98	2.23	2.77	3.31	4.68
Latin America	0.62	0.81	1.08	2.57	3.44
Emerging Markets Global	0.49	0.96	1.11	1.57	3.32
	Performance attributed to market				
Emerging Market Hedge Fund Category	Min.	1st Quartile	Median	3rd Quartile	Max
Asia	0.31	-0.41	-0.56	-1.39	-4.13
Eastern Europe & Russia	-0.98	-2.23	-2.77	-3.31	-4.68
Latin America	-0.62	-0.81	-1.08	-2.57	-3.44
Emerging Markets Global	-0.49	-0.96	-1.11	-1.57	-3.32

Note: This Table presents the decomposition of Jensen's (1968) alpha from the standard excess returns market model into performance attributed to security selection and the same attributed to market timing respectively. The distributions of Jensen's (1968) alpha and the security selection coefficients presented in Table 3 are used to compute the outperformance/underperformance attributed to security selection and the same attributed to market timing respectively. The Jensen's (1968) alpha and the security selection coefficients corresponding to each quartile are used to compute the decomposed values. Panel A presents the decomposed performance values using the standard excess returns market model and the quadratic market timing model. Panel B presents the decomposed values using the standard excess returns market model and the Henriksson and Merton (1981) dual-beta market model.

Finally, in order to test the validity of the quadratic market timing model presented in Eq. (6), we use the Jagannathan and Korajczyk (1986) model specification test. The specification test augments the original market timing model by an additional variable of a higher order. If the additional variable is found to be insignificant, then the model is correctly specified. The regression equation for the specification test for the quadratic market timing model is as specified below:

$$r_{it} = \alpha_{2i} + \beta_{2i} r_{mt} + \beta_{3i} r_{mt}^2 + \beta_{4i} r_{mt}^3 + \varepsilon_{it} \tag{7}$$

In the above equation, the quadratic market timing model is augmented by a cubic term. If β_{4i} is found to be insignificant, then the quadratic market timing model is correctly specified. Results[6] indicate that among all the four EMHF categories considered, the model is incorrectly specified for only six hedge funds. We therefore conclude that the quadratic market timing model (Eq. (6)) is indeed correctly specified.

Next, we proceed to further analyze the security selection and market timing abilities of EMHF managers by means of the dual-beta market timing model proposed by Henriksson and Merton (1981). The original model proposed may be specified as follows:

$$Z_p(t) - R(t) = \alpha + \beta_1 x(t) + \beta_2 y(t) + \varepsilon(t) \tag{8}$$

where $Z_p(t) - R(t)$ is the realized excess return on a portfolio, $x(t)$ is the realized excess return on the market index and $y(t) \equiv \max[0, -x(t)]$, which may be easily incorporated by means of an interaction dummy. For the purposes of this study, we restate the above model as follows:

$$r_{it} = \alpha_{3i} + \beta_{5i} r_{mt} + \beta_{6i} D r_{mt} + \varepsilon_{it} \tag{9}$$

where all variables are as defined before and D is the interaction dummy which takes a value of negative unity for months during which r_{mt} is negative and a value of zero otherwise. α_{3i} is a measure of the EMHF manager's security selection ability and β_{6i} is a measure of the manager's market timing ability. In particular, a significantly positive/negative alpha indicates superior/perverse security selection ability and a significantly positive/negative β_{6i} indicates superior/perverse market timing ability. Additional interpretations of the security selection coefficient are the same as those discussed earlier for Eq. (6). Henriksson and Merton (1981) also show that by a linear transformation of Eq. (8), we get an alternative regression equation, which may be specified as follows:

$$Z_p(t) - R(t) = \alpha' + \beta_1' x_1(t) + \beta_2' x_2(t) + \varepsilon(t) \tag{10}$$

where $x_1(t) \equiv \min[0, x(t)]$, $x_2(t) \equiv \max[0, x(t)]$ and $Z_p(t) - R(t)$ is the realized excess return of a portfolio, as mentioned earlier. Henriksson and Merton (1981) argue that since $x_1(t) = 0$ and $x_2(t) = x(t)$ when $x(t) > 0$, β_2' may be interpreted as the "up-market beta" of the portfolio. Similarly, since $x_1(t) = x(t)$ and $x_2(t) = 0$ when $x(t) \leq 0$, β_1' may be interpreted as the "down-market beta" of the portfolio. Therefore, in Eq. (9), β_{5i} is the "up-market beta" of the funds/equally weighted fund portfolio under consideration and β_{61} is the "up-market beta" minus the "down-market beta" (see Fung et al. 2002). Finally, Henriksson and Merton (1981) further show that in Eq. (10), the test for market timing would be to show that $\hat{\beta}_2'$ is significantly greater than $\hat{\beta}_1'$, i.e., the estimated "up-market beta" of the portfolio is significantly greater than the estimated "down-market beta" of the same. A significantly positive β_{6i} in Eq. (9) therefore indicates superior market timing, as mentioned before. Furthermore, in Eq. (9), since β_{5i} is the "up-market beta" and β_{61} is the

[6] These results are not presented here, but are available upon request.

"up-market beta" minus the "down-market beta", the "down-market beta" may be computed as $\beta_{5i} - \beta_{6i}$. Finally, if the computed "down-market beta" is positive/negative and if either β_{5i} or β_{61} is significant, then the "down-market beta" is assumed to be positive and significant/negative and significant.

The results for the Henriksson and Merton (1981) market timing model are presented in Panel C of Table 3. We observe that the sign and significance patterns for the equally weighted portfolio/individual fund security selection and market timing coefficients are more or less the same across Panels B and C, i.e., for the two models. The performance decompositions of the Jensen's (1968) alphas for both the equally weighted EMHF portfolios (not reported here) and the individual funds (Table 4, Panel B) also yield identical results as compared to the quadratic market timing model.

The results obtained from the quadratic and the dual-beta market timing models are therefore consistent and collectively indicate significant outperformance due to superior security selection and significant underperformance due to perverse market timing for the EMHFs in general. Reported results for both models further indicate that the EMHFs in general register consistent outperformance vis-à-vis the emerging market equity benchmark after adjustment for market timing.

Table 5
Dual-Beta Analysis

Up-Market Beta Analysis								
	EW portfolio	Distribution of Individual Fund Up-market Betas						
Emerging Market Hedge Fund Category	Up-Market Beta	Min	1st Quartile	Median	3rd Quartile	Max	% -ve and significant Up-Market Beta	% +ve and significant Up-Market Beta
Asia	0.23***	-0.26	0.24	0.30	0.35	0.38	0.00	76.92
Eastern Europe & Russia	0.24**	0.00	0.18	0.26	0.35	0.45	0.00	55.00
Latin America	0.35***	0.04	0.11	0.22	0.44	1.02	0.00	50.00
Emerging Markets Global	0.10**	-0.11	-0.04	0.02	0.23	0.55	0.00	36.36

Down-Market Beta Analysis								
	EW portfolio	Distribution of Individual Fund Down-market Betas						
Emerging Market Hedge Fund Category	Down-Market Beta	Min	1st Quartile	Median	3rd Quartile	Max	% -ve and significant Down-Market Beta	% +ve and significant Down-Market Beta
Asia	0.23	0.15	0.41	0.50	0.62	0.75	0.00	84.62
Eastern Europe & Russia	0.24	0.03	0.29	0.51	0.65	0.75	0.00	65.00
Latin America	0.35	0.16	0.21	0.36	1.08	1.63	0.00	66.67
Emerging Markets Global	0.10	-0.03	0.07	0.22	0.46	0.72	0.00	63.64

Note: This Table presents the statistics of up-market and down-market betas. The up-market and down-market betas are computed from the Henriksson and Merton (1981) dual-beta market model. The up-market and down-market betas are computed both for the equally-weighted portfolios and for the individual funds.

Next, we employ the specification test suggested by Jagannathan and Korajczyk (1968) to examine if Eq. (9) is correctly specified. The specification test equation for the Henriksson and Merton (1981) market timing model may be specified as follows:

$$r_{it} = \alpha_{4i} + \beta_{7i} r_{mt} + \beta_{8i} D r_{mt} + \beta_{9i} r_{mt}^2 + \varepsilon_{it} \quad (11)$$

where all variables are as specified earlier. In the above equation, the original model is augmented by a quadratic term (i.e., a higher order term). If β_{9i} is found to be insignificant, then the dual-beta model is said to be correctly specified. The results[7] indicate that among all the four EMHF categories considered, the model is correctly specified for 80% of the hedge funds that we consider in this study. We therefore conclude that the dual-beta market timing model (Eq. (9)) is indeed correctly specified.

Finally, we conclude our discussion on the dual-beta model with an analysis of the up-market and down-market betas. The up-market and down-market beta analysis follows from the statistics presented in Table 5.

Table 5 presents the up-market and down-market betas for the equally weighted portfolios and their distributions for the individual funds as well. For both the equally weighted portfolios and for the individual funds we find that the down-market betas are greater than the up-market betas and are mostly positive and significant. A sizeable proportion of the up-market betas are positive and significant as well. In view of this result, we conclude that EMHFs in general are likely to be affected more in down-markets than in up-markets and that the EMHFs do not provide good downside protection for the investors. Fung et al. (2002) draw similar conclusions with a global hedge funds dataset. This concludes our analysis of the Henriksson and Merton (1981) dual-beta market timing model.

4.4 Rolling market timing regressions

In order to capture the security selection and market timing skills of fund managers over time and also to analyze such skills during upward and downward movements of the MSCI Emerging Market Equities Index, we employ the rolling regression technique. The quadratic market model and the dual-beta market model are used for the rolling regressions. We use a 3-year time window for these regressions. The equally weighted excess returns for each of the EMHF categories are used as dependent variables. The security selection and market timing coefficients obtained from the quadratic market model rolling regressions are documented in Figures III and IV respectively. The significance test results for the security selection and market timing coefficients obtained from the rolling regressions are discussed but are not reported due to space constraint[8].

We observe that the MSCI Emerging Market Equities Index depicts a strong upward trend till the end of 2007(Fig. IIIe). While almost all the security selection coefficients are positive in Fig. III, we also observe that none of the hedge funds depict a stable or a strong upward trend. For the Asia funds, we find that most of the security selection coefficients during the pre-2006 period are significant (Fig. IIIa), thereby indicating that funds belonging to this category exhibit a significantly superior security selection strategy during the same period, but with a steadily declining trend. Almost all of the remaining coefficients are insignificant in Fig III a. Given the fact that the EMHF benchmark equities index depicts a strong upward trend, a steadily declining trend of security selection coefficients during the pre-2006 period, albeit positive and significant, indicates that the Asia fund managers are not able to register consistently superior security selection skills in an up-market scenario. The same observation applies for Emg. Global funds (Fig. III d.) as well. While all the security selection coefficients are significant, we do observe a steadily declining pattern till 2006. The EER funds (Fig. IIIb) exhibit a declining trend of security selection coefficients during the pre-2005 period and an upward trend during the post-2005 period. The EER fund managers

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[7] Not reported here but are available upon request

[8] Those results are available upon request

therefore register quite a volatile performance as far as security selection strategy is concerned. The EER funds do however, mimic the strong upward trend depicted by the EMHF benchmark equities index and register a significantly superior security selection strategy at least during the post-2005 period. A somewhat parallel observation applies for Lat. Am. Funds (Fig. III c.) as well. We find that the Lat. Am. funds exhibit a declining trend of security selection coefficients during the pre-2004 period and an upward trend during the post-2004 period. Almost all of the security selection coefficients during the post-2004 period are significant. Hence, we may conclude that funds belonging to the Lat. Am. and EER categories are the only ones which to some extent, mimic the strong upward trend depicted by the EMHF benchmark equities index and register a significantly superior security selection strategy during the post-2004 and post-2005 periods respectively.

Figure III

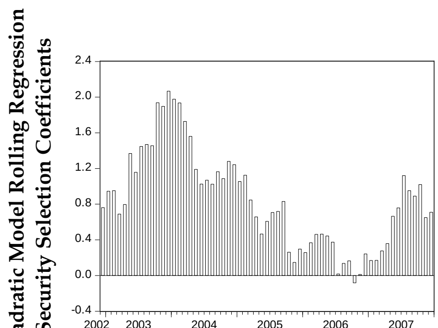

Fig. 3 a. Asia Hedge Funds

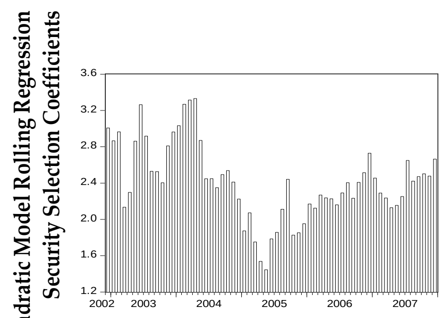

Fig. 3 b. Eastern Europe & Russia Hedge Funds

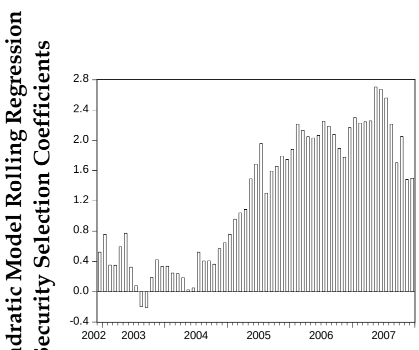

Fig. 3 c. Latin America Hedge Funds

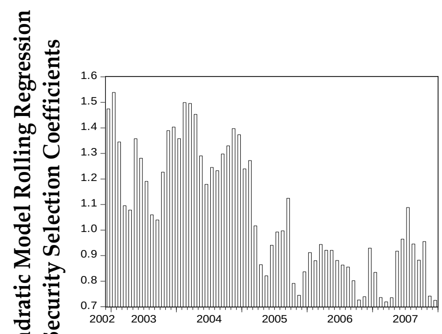

Fig 3 d. Emerging Market Global Hedge Funds

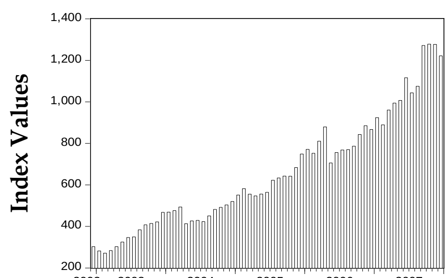

Fig. 3 e. MSCI Emerging Market Equities

The security selection coefficients obtained from the Chen and Stockum (1986) quadratic market model rolling regressions are presented in this Figure. Graphs III a. through III d. present the security selection coefficients for the four emerging market hedge fund categories, while Graph III e. presents the movements of the MSCI Emerging Market Equities Index.

Overall, we find that the EMHFs are not able to register consistently superior security selection skills or market timing adjusted performance even in an up-market scenario, for the sample period considered. In fact, the graphs indicate that in most cases, the fund managers exhibit a declining security selection skill set, even though the EMHF benchmark equities index steadily improved over the years till the end of 2007. Funds belonging to Lat. Am. and EER categories however, to some extent, track the strong upward trend of the EMHF benchmark equities index during the post-2004 and post-2005 periods respectively.

Figure IV

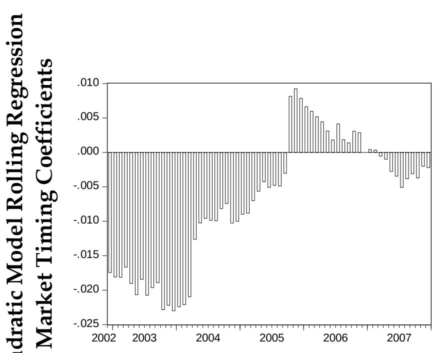

Fig. 4 a. Asia Hedge Funds

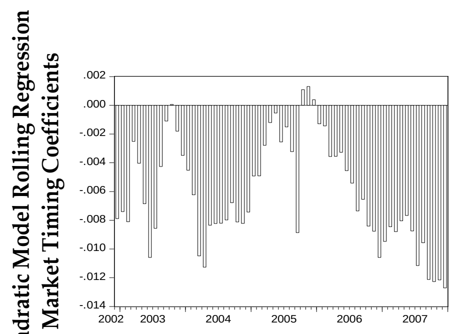

Fig. 4 b. Eastern Europe & Russia Hedge Funds

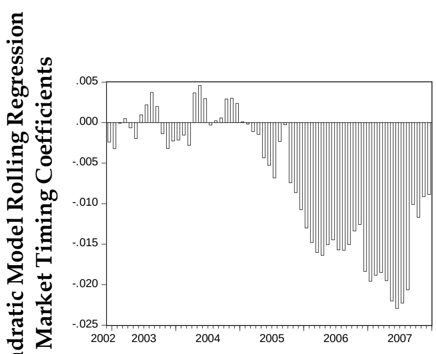

Fig. 4 c. Latin America Hedge Funds

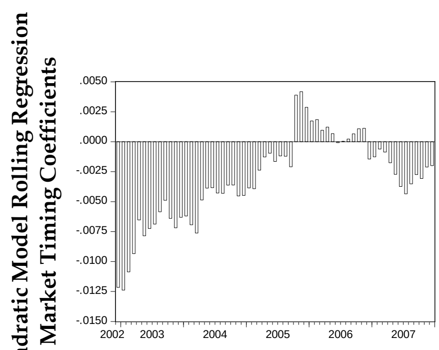

Fig. 4 d. Emerging Market Global Hedge Funds

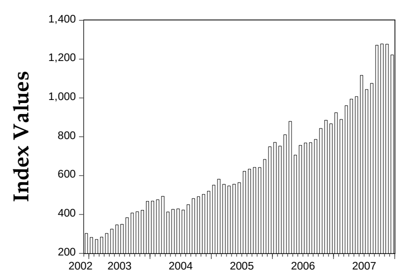

Fig. 4 e. MSCI Emerging Market Equities

The market timing coefficients obtained from the Chen and Stockum (1986) quadratic market model rolling regressions are graphed in this Figure. Graphs IV a. through IV d. present the market timing coefficients for the four emerging market hedge fund categories, while Graph IVe. presents the movements of the MSCI Emerging Market Equities Index.

Next, we analyze the market timing coefficients obtained from the quadratic market model rolling regressions. Most of the market timing coefficients are negative and for the Asia funds (Fig.

IV a.), we observe that almost all of the negative market timing coefficients pertaining to the pre-2005 period are significant. All of the coefficients pertaining to the post-2005 period are insignificant. These observations apply for the Emg. Global fund category (Fig. IV d.) as well. However, for both of those fund categories, we also observe that during the pre-2005 period, while the market timing coefficients are all negative, they do depict a steady trend of improvement till 2005. In fact, while all of the post-2005 market timing coefficients are insignificant, we do observe that the trend of improvement continues till 2006. We therefore conclude that while the Asia and Emg. Global fund categories generally exhibit a significantly perverse market timing strategy in an up-market scenario, the rolling regression results do indicate an aggressive attempt on the part of the managers of these two categories of funds to improve the situation, at least till 2005. For the EER funds (Fig. IV b.) we observe that almost all of the market timing coefficients are insignificant. We therefore conclude that the EER fund managers are generally unsuccessful in producing an effective market timing strategy during a steadily improving market scenario. For the Lat. Am. Funds (Fig. IV c.), we observe that a sizeable proportion of the negative coefficients during the post-2004 period are significant, thereby implying that the managers of this fund category exhibit a significantly perverse market timing strategy in an up-market scenario, at least during the post-2004 period. In fact, we further observe that although the EMHF benchmark index steadily improved since the beginning of 2003, during the post-2004 period, the Lat. Am. funds exhibit a steadily worsening situation as far as market timing strategy is concerned.

The market timing coefficients obtained from the rolling regressions therefore provide mixed results. Overall, the graphs indicate that the EMHF managers are not able to produce any effective or consistently superior market timing strategy during a period within which the EMHF benchmark equities index registered steady improvement. While the graphs in general indicate significantly perverse market timing skills in most cases, the patterns however, do allow us to report some interesting conclusions. For the Asia and Emg. Global fund categories, on the one hand we observe significantly perverse market timing skills till 2005, while on the other hand, we also observe a steady trend of improvement till 2006. This indicates an aggressive attempt on the part of the managers of these two fund categories to improve the situation. For the sample period considered, the EER fund managers are unable to come up with any effective market timing strategy worth mentioning. For the Lat. Am. category, the managers are not able to produce any effective market timing strategy till 2004 and in fact, exhibit a steadily worsening market timing strategy during the post-2004 period, even though the EMHF benchmark index depicts a strong upward trend during the same period (i.e., post-2004).

We also obtain the security selection and market-timing graphs[9] using the Henriksson and Merton (1981) dual-beta market model rolling regressions. We observe that the graphs are almost identical to those in Figs. III and IV.

The key findings that emerge out of the above discussion are that the EMHF managers do not exhibit a consistently superior or at least a stable security selection or market timing strategy in an up-market scenario, i.e., when the MSCI Emerging Market Equities Index depicts a strong upward trend. In fact, in most cases, the rolling regression results indicate a steadily declining security selection skill set. As far as market timing skills are concerned, rolling regression results indicate that the EMHF managers are generally unable to produce any effective market timing strategy, despite that fact that the EMHF benchmark equities index registered steady improvement during the sample period considered. We do, however, observe an aggressive attempt on the part of the fund managers to improve their respective market timing strategies.

5. Conclusions

This study examines the security selection and market timing aspects of emerging market hedge funds (EMHFs). Rolling regressions are also employed to illustrate the security selection and

[9] Not reported here but available upon request.

market timing skills of EMHF managers on a time-varying dimension. Results for the Sharpe's (1992) style multifactor asset class regressions are consistent with one key finding in Abugri and Dutta (2009), that the EMHFs mimic the performance pattern reported for mutual funds in the mutual fund literature. The static and rolling multifactor asset class regression results both suggest that for the sample period considered, the EMHFs managed to register a somewhat superior performance pattern vis-à-vis the benchmarks in general, particularly, the MSCI equity benchmark.

We employ two market timing models to examine the security selection and market timing skills of EMHF managers. Results for the Chen and Stockum (1986) quadratic market model and the Henriksson and Merton (1981) dual-beta market timing model collectively indicate significant outperformance due to superior security selection and significant underperformance due to perverse market timing for the EMHFs in general. In tune with the static and rolling multifactor asset class regression results, the static market timing model results also indicate significant outperformance vis-à-vis the EMHF equities benchmark even after adjustment for market timing. The Henriksson and Merton (1981) dual-beta market timing model results further indicate that the EMHFs do not provide good downside protection for the investors.

The rolling market timing regression results, in contrast, do not provide any conclusive evidence of consistently superior or at least a stable security selection or market timing strategy in an up-market scenario, i.e., when the MSCI Emerging Market Equities Index depicts a strong upward trend. In fact, in most cases, the rolling regression results indicate a steadily declining security selection skill set. As far market timing skills are concerned, rolling regression results indicate that the EMHF managers are generally unable to produce any effective or consistently superior market timing strategy, despite that fact that the EMHF benchmark equities index registered steady improvement during the sample period considered. The lack of market timing is not surprising given the limited opportunities for derivatives trading in emerging markets. EMHFs trade mostly stocks and bonds contrary to the hedge funds that are focused on advanced markets which offer significantly more opportunities for derivatives trading, thereby resulting in non-linear payoffs for such hedge funds. Abugri and Dutta (2009) find that EMHFs actually perform like regular mutual funds until 2006. Furthermore, emerging markets are less liquid as compared to advanced markets. It is therefore quite difficult for the managers of EMHFs to apply market timing without incurring significant costs. A hedge fund manager who intends to change his/her exposure would find it quite difficult to accomplish that in an efficient manner in emerging markets because, the less liquid the market, the lower the possibility that trading will occur at a better price. We do, however, observe an aggressive attempt on the part of the fund managers to improve their respective market timing strategies.

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