

# The Forecasting Ability of World Mutual Funds

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## Abstract

I empirically examine the forecasting ability of US-based world mutual funds during the 2001-2007 time period. World mutual funds are treated as portfolios composed of two sets of securities, i.e. domestic and foreign. Although changing economic conditions in both markets provided plenty of opportunities to outperform market benchmarks, I find that as a group world mutual funds lack forecasting skill. The results of two empirical tests reveal that fund managers fail to effectively manage their exposure to the domestic and international markets.

*JEL classification:* G11; G15

*Keywords:* World mutual funds, Portfolio evaluation, Market timing

## **1. Introduction**

In a perhaps simplistic view, US-based world or global mutual funds can be thought as claims on a portfolio composed of domestic (US) and foreign securities. As such, these fund managers have the very delicate task of balancing their portfolio exposure to these two markets. This is an important undertaking especially since for the most part of this decade international markets have outperformed the US market. This paper empirically examines the timing ability and forecasting skill of world mutual funds as reflected in changes in their portfolios' exposures to domestic and international securities. The goal here is to implement a methodology first introduced in Comer (2006) and later used in Boney, Comer, and Kelly (2009), to examine managers' ability to successfully shift allocations between several markets.

The work by Comer (2006) and Boney et al. (2009) is based on the idea that a fund manager that demonstrates timing ability and forecasting skill will have a higher portion of his portfolio invested in a market sector which outperforms other sectors available to the manager during a particular time period. This approach deviates from the quadratic regression approach to measure timing skill and evaluates the forecasting skill of managers by their ability to effectively shift portfolio allocations in changing economic conditions. Comer used this approach as a robustness check in his examination of the timing ability of hybrid mutual funds. Boney et al. implemented the same approach as Comer to examine the timing and forecasting skill of high quality bond fund managers. This study applies this portfolio-based methodology to examine the forecasting skill of a sample of world fund managers for the period of 2001-2007. During this sample time period world fund managers had plenty of opportunities to put to work their forecasting skill. Comparing the S&P 500 index with the Morgan Stanley Capital International World excluding

the US index (MSCI ex US) reveals that during 50 months of the 2001-2007 time period, the MSCI ex US index outperformed the S&P 500 index.

## **2. Data**

The sample of world mutual funds contains all funds classified as world funds in the December 2000 Principia CD. A total of 94 funds are included in the sample, of which 68 (or 72 percent of the sample) are surviving funds and 26 are non-surviving funds. In order to constraint any survivorship bias, I include the complete sample in all the tests, surviving and non-surviving funds. A brief revision of the fund sample reveals that the average total net asset of the fund sample is \$1,603 million, the average expense ratio is 1.45 percent and the average turnover ratio is 82.92 percent. The median values of these fund characteristics are \$108 million, 1.43 percent and 69.28 percent respectively. The presence of very large funds in the sample is apparent from the significant difference between the average and median total net assets value.

For the portfolio-based methodology used here, I need to specify a set of indices that best describe the markets that these fund managers invest in. The S&P 500 is the index representing the domestic market while the Morgan Stanley Capital International World excluding the US (MSCI ex US) index, represents the international market. For the cash portion of the fund's portfolios, the Lehman short Treasury index is used. Persuade by Bollen and Busse (2001, 2004), Chance and Hemler (2001), and others, who praise the use of daily data in performance and timing studies, I use daily fund and S&P 500 index returns. Fund and S&P 500 returns come from the Center for Research in Security Prices (CRSP) database, while daily returns for the MSCI ex US are computed from index levels obtained from Bloomberg.

### 3. Methodology

#### 3.1. Estimation of market exposures

The basic idea of this study is to empirically examine the timing ability of fund managers between the domestic and international markets during the 2001-2007 time period. In order to achieve this goal, it's imperative to study the exposure of each fund to these two markets. In order to estimate the average fund exposure, I employ Sharpe's (1992) quadratic programming technique, also known as style analysis. Style analysis allows for the estimation of each fund's portfolio exposure, to each market index from the publicly available daily fund returns. To implement this methodology it is assumed that daily fund returns can be expressed as:

$$r_i = \sum_{j=1}^n w_{i,j} r_j + e_i \quad (1)$$

where

$r_i$  : is the daily total return of fund  $i$

$w_{i,j}$  : is the exposure of fund  $i$  to index  $j$

$r_j$  : is the daily total return of index  $j$

$e_i$  : is the unexplained component of fund return

Three factors are included in equation (1). The domestic S&P 500 index, representing the domestic market, the MSCI World ex US, representing the foreign market, and finally the Lehman Brothers Short Treasury index is used as a proxy for the cash portion of the fund portfolio. The portfolio weights are the solution of a quadratic programming problem; these weights represent factor loadings on an index strategy that does the best job explaining the fund's return:

$$\text{Min} \left[ \text{var} \left( r_i - \sum_{j=1}^n w_{i,j} r_j \right) \right] \quad (2)$$

*subject to*

$$1 \geq w_{i,j} \geq 0 \quad \forall j$$

$$\sum_{j=1}^n w_{i,j} = 1$$

The following section explains how this methodology is used to measure fund managers timing and forecasting skill.

### *3.2. A test of timing between the domestic and the foreign market*

In a first attempt to measure the timing ability of global fund managers the method used is based on the work by Comer (2006) and also implemented by Boney et al (2009). The basic concept behind the methodology is very straightforward. The idea is to empirically examine the shifts in portfolio allocations between two or more markets. A successful fund manager will adjust his exposure to the domestic market when this market outperforms the international market and vice versa. To measure the timing ability of this sample of global fund managers, I first partition the time period of the study in two groups. The first series will contain all the monthly observations when the performance of the S&P 500 index is higher than that of the MSCI ex US. The second series contains all the observations when the opposite happens, that is, the MSCI ex US outperforms the S&P 500. The first group contains 34 monthly observations, while the second partition contains 50 observations. Then, using Sharpe's technique described in the previous section, I estimate the exposure of each fund to the three factors in equation (1) during both partitions. Let  $w_{i,S\&P}^1$  and  $w_{i,S\&P}^2$  be the exposure of fund  $i$  to the S&P 500 during the first and

second partition, respectively. I then compute the domestic differential exposure as the difference between the two estimated exposures. That is:

$$\text{domestic differential exposure} = w_{i,S\&P}^1 - w_{i,S\&P}^2 \quad (3)$$

I compute the domestic differential exposure to each fund in the sample. A positive domestic differential exposure reflects successful timing ability and good forecasting skill.

### *3.3. Assertion rate*

To measure the forecasting skill and timing ability of this sample of fund managers I perform a second test similar to the domestic differential exposure. On this test I examine the ability of fund managers to pick, on a monthly basis, an out performing market. Using again Sharpe's style technique, I estimate the exposures on the factors on equation (1). For each fund and for the life of the fund I estimate the exposures to S&P 500, MSCI ex US and the cash index. I then verify if the fund has the higher exposure to the best performing index between the S&P 500 and the MSCI ex US index. Finally, I compute an assertion rate. This measure is defined as the number of months a mutual fund has the highest exposure to an out performing market divided by the total number of months of the estimation period. The estimation period is either the complete sample period or the life of the fund.

## **4. Empirical results**

### *4.1. Market exposures*

Table 2 shows the results for the style analysis. Panel A presents the results for the complete sample period. It seems that the three factor model works very well. The adjusted r-squared is 95 percent and all three estimated portfolio weights are statistically significant. The exposure to the domestic market is the highest, with an estimated portfolio weight of 55.87 percent, followed by

the exposure to the foreign market at 41.46 percent. As expected, the exposure to the cash index is low at less than three percent. Panel B show the results for each of the yearly periods. Once again the adjusted r-squared is high, ranging from 94 to 98 percent. Also, all the exposures to the domestic and the foreign markets are highly statistically significant. The estimated domestic portfolio weights range from a low of 46 percent in 2002 to a high of 77 percent in 2007. The highest exposure to the foreign market is 47 percent in 2003, while the lowest is 22 percent in 2007. The cash exposure ranges from 0 to 10 percent. The results show that global fund managers do actively manage their domestic/foreign exposure, whether they are successful in doing so or not is the topic of the next section.

#### *4.2. Timing between the domestic and the foreign market*

In this section I employ a measure that empirically examines the shifts in portfolio allocations of the sample of world mutual funds between the domestic and the foreign markets. Table 2 presents the results of the domestic differential exposure. The results show that as a group, this sample of world mutual funds lacks forecasting skill. The average and median domestic differential exposure are -0.0503 and -0.0468, respectively. The mean value is significant at the one percent level. At the individual fund level, evidence of perverse forecasting skill is undisputable, 78 individual funds or more than 82 percent of the sample attained a negative domestic differential exposure.

#### *4.3. Assertion rate*

Assertion rates are computed as a second test of forecasting skill. I compute an assertion rate as the ratio of the number of months a mutual fund picks an outperforming market divided by the total number of months of the estimation period or the life of the fund. Table 2 Panel B shows

the results for the assertion rates. The average and median assertion rates for this sample of world funds are 0.4604 and 0.4404, respectively. Meaning that in less than fifty percent of the time fund managers pick an outperforming market. Apparently, these results are not affected by outliers as the mean and the median are relatively close to each other.

## **5. Conclusion**

This paper empirically examines the forecasting ability of world mutual funds during the 2001-2007 time period. The purpose was to treat these funds as portfolios composed of two sets of securities, domestic and foreign. I examine the ability of fund managers to effectively manage and balance their exposure to these two markets. The empirical evidence is consistent between the results of two tests. The results show that this sample of fund managers lacks forecasting skill. As a group, they fail to effectively balance their portfolio exposures to take advantage of changing economic conditions at home and abroad.

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Table 1  
 Estimation of the Portfolio Weights for an Equally Weighted Portfolio

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Panel A: Estimated Portfolio Weights for the Complete Sample Period

	Weight	p-value
Cash	0.0267***	0.0006
US	0.5587***	0.0001
Foreign	0.4146***	0.0001
Adj. R2	0.9591	

Panel B: Yearly Estimated Portfolio Weights

Year	2001	2002	2003	2004	2005	2006	2007
Cash	0.0755***	0.1036***	0.0486***	0.0000	0.0000	0.0000	0.0000
US	0.5002***	0.4692***	0.4795***	0.5905***	0.6166***	0.6403***	0.7749***
Foreign	0.4244***	0.4272***	0.4719***	0.4095***	0.3834***	0.3597***	0.2251***
Adj. R2	0.9843	0.9892	0.9835	0.9679	0.9504	0.9482	0.9601

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Table 1 shows the results from a style analysis performed on an equally weighted portfolio composed by all the existing funds in any given day during the complete estimation period (January 2001 – December 2007). Panel A of the table presents the estimated portfolio weight and corresponding *p-value* for the complete sample period. Panel B shows the yearly average exposure. \*\*\*, \*\*, \* denotes statistical significance at the 1, 5 and 10 percent level, respectively.

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Table 2  
Timing between the Domestic and the Foreign Markets

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Panel A: Domestic Differential Exposure

Mean	-0.0503***
Median	-0.0468
Standard deviation	0.0515
Maximum	0.0591
Minimum	-0.1994
Funds with positive value	16
Funds with negative value	78

Panel B: Assertion Rate

Mean	0.4604
Median	0.4404
Standard Deviation	0.0799
Maximum	0.7142
Minimum	0.3333

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Table 2 shows the results for the tests of timing ability. Panel A presents the results for the domestic differential exposure. This test measures the ability of fund managers to have the highest portfolio exposure to the domestic market during periods when this is the outperforming market. The statistics on Panel A are based on the difference between each fund exposure to the domestic market when this is the outperforming market and the portfolio exposure to the domestic market when the foreign market is outperforming. Panel B shows the results for the assertion rate. This test measures the ability of fund managers to have their highest portfolio exposure to the market (domestic or international) with the best performance. This test is done on a monthly basis during the complete estimation period (January 2001 – December 2007). \*\*\*, \*\*, \* denotes statistical significance at the 1, 5 and 10 percent level, respectively.

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