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BIASES IN THE PERFORMANCE OF ASSET MANAGERS

This paper illustrates 2 main issues in the performance of asset managers: the first one is that there are large and statistically significant biases in the performance evaluation of mutual funds undertaken by Morningstar and Lipper Analytical Services. The second issue is that managers deviate from their claimed benchmark. We find that, on average, the bias is about 0.7% per annum and, when using a correct procedure to evaluate, managers convert a positive alpha to a negative one in most of the funds. The procedure to provide more accurate performance evaluation also reveals that managers systematically deviate from their claimed asset class. This deviation from asset class is an indication of principal agent conflict. In the attempt to obtain better performance, managers, also called agents, undertake riskier strategies to invest in assets to the detriment of investors who pay the consequences during downturns when their investments drop more than the benchmark. Along the way, managers have earned fees on larger funds than their performance, if correctly measured, would justify. Lack of clarity and information in the A.M. industry allows these conflicts to persist.

Keywords: principal-agent problem, instrumental variables, American and international funds, European stocks, SPY, MDY, EAFE.

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СУПЕРЕЧНОСТІ В ДІЯЛЬНОСТІ РОЗПОРЯДНИКІВ АКТИВІВ

У статті описано дві основних проблеми в діяльності розпорядників активів: існування значних похибок в оцінюванні ефективності пайових інвестиційних фондів, що проводяться компаніями "Morningstar" та "Lipper Analytical Services". Друга проблема полягає в тому, що діяльність менеджерів відхиляється від прийнятих еталонів. У середньому, зсув становить близько 0,7% річних, менеджери перетворюють позитивну альфа в негативну в більшості фондів. Методика отримання більш точної оцінки ефективності також показує, що менеджери систематично відхиляються від заявлених ними класів активів, що є проявом конфлікту "агент−принципал". У спробі отримати вищу продуктивність менеджери, які також називаються агентами, здійснюють ризиковані стратегії інвестування в активи, що шкодить інвесторам, які розплачуються за наслідки під час спадів. Крім того, заробітна плата менеджерів перевищує розміри отриманих ними прибутків. Ці суперечності підтримуються відсутністю ясності та інформації у сфері діяльності розпорядників активів.

Ключові слова: проблема агента-принципала, інструментальні змінні, американські та міжнародні фонди, європейські акції, акції фонду S&P 500, компанії середньої ринкової капіталізації, індекс EAFE.

Рис. 4. Табл. 3. Форм. 3. Літ. 14.

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ПРОТИВОРЕЧИЯ В ДЕЯТЕЛЬНОСТИ РАСПОРЯДИТЕЛЕЙ АКТИВОВ

В статье описаны две основных проблемы в деятельности распорядителей активов: существование значительных погрешностей в оценке эффективности паевых инвестиционных фондов, проводимых компаниями Morningstar и Lipper Analytical Services. Вторая проблема заключается в том, что деятельность менеджеров отклоняется от принятых эталонов. В среднем, смещение составляет около 0,7% годовых, менеджеры

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превращают положительную альфа в отрицательную в большинстве фондов. Методика получения более точной оценки эффективности также показывает, что менеджеры систематически отклоняются от заявленных ими классов активов, что является проявлением конфликта "агент-принципал". В попытке получить более высокую производительность менеджеры, которые также называются агентами, осуществляют рискованные стратегии инвестирования в активы в ущерб инвесторам, которые расплачиваются за последствия во время спадов. Кроме того, заработная плата менеджеров превышает размеры полученных ими прибылей. Эти противоречия поддерживаются отсутствием ясности и информации в сфере деятельности распорядителей активов.

Ключевые слова: проблема агента-принципала, инструментальные переменные, американские и международные фонды, европейские акции, акции фонда S&P500, компании средней рыночной капитализации, индекс EAFE.

Introduction. Mutual funds are one of the fastest growing financial intermediaries in developed and emerging economies alike. Recently they have been involved in several problems that highlight principal agent and ethical problems. During the subprime crisis, money market mutual funds were major players with several mutual fund companies facing the "break of the buck"[3] situation because they invested in risky assets with negative consequences for investors[4].

Also in 2003, mutual funds were in the eye of the storm because of some scandals regarding market timing and late trading (Frankel & Cunningham, 2007). The later operations were illegal because the US Securities Exchange Commission (SEC) found they induced unfair trading and negative consequences in the long run investor's portfolio[5].

Despite the 2003 mutual fund scandals and the subprime crisis of 2007/2008, the mutual fund industry seems to recover from all problems. In fact, the industry is growing fairly well. There are more than 10,000 mutual funds in the US. They vary from retail (small initial investment) to institutional (large initial investment of up to $10 mln).

Our study will focus the attention in American large capital blend funds as well as international funds because they represent the largest categories in the mutual fund industry. There are studies that attempt to measure the performance of these funds. We can start with the traditional readings: Jensen (1968), Gruber (1996) and Wermers (2011). The most popular model used to asses return in mutual funds was developed by Carhart (1997). This model examines the fund's portfolio by including the proxy of aggregate market index returns and control variables, such as return on value-weighted, zero-investment factor-mimicking portfolios for size, book-to-market equity, and one-year momentum in stock returns.

Since we have chosen large capitalization blend and international (non-American) funds, we will explain the fund returns with market indexes and verify if they deviate from their reported category due to the moral hazard problem.

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[3] It is assumed that money market mutual funds always trade above $1.00 of NAV, indicating that there are no losses of principal. With investments in banks bonds this was not the case, so the government had to intervene to help these funds.
[4] For detailed information regarding the first international crisis of XXI century see: Krugman (2009).
[5] While market timing apparently seems legal, the SEC has cleaned up the practice since it passes the trading costs to long-term investors. Therefore, the order of market timing will not be permitted.

Smith (2010), Starks (1987) and Golec (1992) studied how moral hazard and principal agent affect fund managers' decisions. Basically the literature agrees that the optimal level of effort for investor (principal) can be endogenized from manager's wealth.

The literature on microeconomics points out the typical conflict of interest between shareholders of a company and their chief executive officer (CEO). If shareholders would have complete information regarding CEO's activities and firm's investment opportunities, they could design a contract specifying and enforcing managerial actions to be taken for every scenario that goes from pessimistic to optimistic. Managerial actions and investment opportunities are not, however, perfectly observable by shareholders. In these situations, the agency theory helps us to predict compensation policy to be designed to give the manager correct incentives leading to increase in shareholder wealth.

In our case, the investor is the principal and the agent is the manager of the fund where there is not complete information regarding what the agent's activities are. We report that for many funds we find deviations from stated category that sacrifice principal wealth in the long run. This is in part due to the fact that it is the agent who writes the contracts and does not provides agents full information to maintain the current situation.

In addition Brown, Harlow and Starks (1996) explored how the "loser" manager can manipulate fund risk in comparison to "winners". These authors run the empirical assessment of 334 growth-oriented funds during 1976–1991 and reported higher volatilities of "losers" in comparison to "winners". This is reflected in worst performance in the long run, although managers have increased their assets under management (AUM) as well as their fees.

Information regarding past returns plays an important role in the input choice of a portfolio made by the investor (principal). The investor behavior to look for best funds allows the risky characteristic of certain funds (Goetzmann, Greenwald, Huberman, 1992; Capon, Fitzsimons, Prince, 1992)[6].

The purpose of this paper is to show that there are principal agent problems represented in a bias in performance evaluation from Lipper and Morningstar in American and international mutual funds. The willingness to increase risk in their funds allows them gain in the short run with negative consequences for investors in the long run.

This paper is organized as follows: the first part analyzes in general the asset management industry to classify funds. The second section studies the performance of funds over the last decade. In the third section we describe the data. The fourth part presents the model and then we explain the results in the next section. The conclusions are in the last section.

2. The Asset Management Industry and Mutual Funds. Asset management represents a large and fast growing industry worldwide. Mutual funds are the type of asset management that includes several asset classes and target clients.

The industry is growing globally with more than 5 trln. dollars of assets under management (AUM). There are several ways to classify the industry: a) by asset class,

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[6] These are the survey studies of household purchases of mutual funds.

b) by client type and, c) by investment vehicle. The classification of asset managers by asset class is the most extensive; therefore we have left for the end of the paper. We can start by looking into two categories of managers: a) alternative managers, and b) traditional managers. Alternative managers are those who are allowed to perform 3 types of transactions, which are short-selling, leverage, and derivates use, transactions not allowed to traditional managers. Alternative managers may undertake: a) hedge funds, b) managed futures and c) private equity. Within hedge funds, we have up to 20 sub-categories.

Traditional managers basically buy and sell stocks and bonds in different asset categories to be detailed later. Note that we are stating that alternative managers represent a set of different asset classes. Additionally, there are several ETF's and ETN's that would conventionally be classified as traditional, but can also undertake some of the types of transactions allowed only to alternative managers.

In terms of client type, there are individuals, institutions with several types of institutions, including corporate pensions, and different types of private pension systems. Investment vehicles comprise mutual funds, ETF's, separately managed accounts and whole accounts. Company pensions in the US and Europe are the examples of what we may call whole accounts. In Latin America and Australia, private pension plans are some examples of separately managed accounts. A single manager collectively and equally manages the accounts of all its clients who own the assets in the accounts, as these are all the same, but does not manage the shares in the fund. Mutual funds and ETF's/ETN's represent another way to manage collectively: a manager gathers assets from clients and handles a single account but the investor own shares in mutual fund or ETF, which they can buy or sell; in this case, the clients do not own the assets in the single account but the shares in the fund.

Opposite to alternative managers come traditional asset managers. They may be classified in 2 main groups: a) type of instrument, and b) geographic concentration, although there are two more levels of classification that will not be discussed. The first group deals with basic types of instruments, which are shares and bonds. The geographic classification mainly refers to USA, EAFE, emerging markets and FRONTEER markets.

Shares are classified using 2 additional criteria: a) company size; b) level or dividend payments or equivalently price earnings ratios. Bonds can be classified into a) type of issuer, b) maturity of instrument, c) credit quality, and d) currency of issuance. The types of asset managers are the result of different combinations of all these criteria.

These are both essential and quite cumbersome for our analysis of performance evaluation. We have therefore decided to limit our study to a narrow but significant section of the asset management industry.

We will look at equity managers in the US and developed world outside the US Simultaneously, we will work with mutual funds, both retail and institutional.

We have observed that within the asset management industry managers tend to invest in riskier instruments and we therefore have chosen the largest asset classes. In the US, we use large cap core or large cap blend. This category represents the S&P 500, and includes both high dividends as well as low dividends stocks. Utilizing S&P classification, S&P 500 represents large stocks, S&P 400 is mid cap stocks and S&P 600 represents small stocks. In terms of P/E, or dividend for each one of these 3 cat-

egories, there is also high and low P/E in addition to core of blend. Therefore, for the S&P 500 we have S&P500 value, S&P 500 Core/Blend and S&P 500 Growth.

In short, the S&P 500 represents a) equity, b) US companies, c) large cap companies, and d) blend, that is average P/E dividends or P/B. The other group we have decided to work with is international stock, EAFE. This represents a) equity, b) developed country – non-US companies, c) large cap, and d) blend.

In both of these two markets, they represent the largest classes in assets under managements (AUM). The selection of these categories gave us the added advantage that managers are typically compared against the S&P 500 index as well as the MSCI EAFE index.

Sample selection proceeded further once we decided on the asset classes. We wished to identify managers in each of these two categories. We further wanted to provide robust results and decided to work with the top 50% of managers in each category, including not only retail but institutional managers as well.

When the performance of asset managers is measured against indexes, managers complained they were being compared to theoretical constructs that did not have to incur in trading cost. To mitigate this complain, we decided to use ETF's in the categories we have selected to work on[7]. This is an additional reason for the selection of the categories we utilize; the ETF's in these categories have been in existence for more than a decade.

3. Performance Evaluation of Mutual Funds. Our analysis is concentrated on the last 10 years, capturing the bubble at the stock market and the 2008 crash. The period of study is very important to identify moral hazard behavior and consequently deviation from the stated category for international and American mutual funds.

We will describe two reference indexes for American and international funds: Standard and Poor's 500 Index (SPY) and Mid Cap Standard and Poor's 400 Index (MDY). The former is the index for American large funds and the latter is the index for Mid Cap index. International funds are compared against MSCI EAFE and MSCI emerging market index ETF's EFA and ADRE.

Figure 1 shows the performance of the ETF: SPY which has been low during the DOT.COM crisis[8]. The index hit the lowest value of 84.16, then it recovered and achieved 156.33 in late 2007. This performance marked the subprime crisis that permitted to achieve returns of approximately 89% within 5 years (Data recovered from Morningstar and Bloomberg).

Suddenly, the gains dropped to the negative return of 50% in less than a year. The latter result is attributed to the financial crisis or subprime crisis. Krugman (2009) explains the causes of the latest international financial turmoil, which is also known as the crisis of the XXI century. Basically this phenomenon is explained by the appetite to purchase certain mortgage stocks with high return incentive funds even though the risk was high[9]. The collapse of these stocks induced a drop in liquidity and moved all the stock indexes down because of the uncertainty gained over the 2007–2011 years.

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[7] Therefore, we have 4 ETF's to compare our managers against: SPY for S&P500, EFA for EAFA, ADRE for MSCIEM and MDY for S&P 400. The evaluator Lipper uses average rates, Morningstar uses S&P500 and EFA for their assessment respectively.

[8] This was a speculative bubble that happened roughly over 1995-2000, with the climax in March 2000. See Goldfarb, Kirsch, and Miller (2006) for the discussion of the relevant literature.

[9] The risk of these assets was undervalued by the most prestigious risk evaluators (Soros, (2008)).
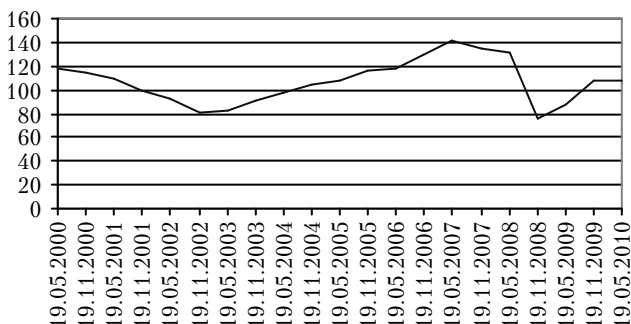
Figure 1. **Standard and Poor 500 Index (SPY)**

Also, the behavior of Morgan Stanley Capital Investment EAFE (EFA) differs to SPY (see Figure 2). EAFE or EFA is the index for international funds who entered after the 2000's DOT. COM crisis, but the international financial crisis hit negatively this index. In less than a year the EFA dropped by more than 50% after the start of the financial turmoil. We may infer that there should had been a common pattern of looking for return that permitted this index as well as SPY hit the lowest value with negative consequences for investors.
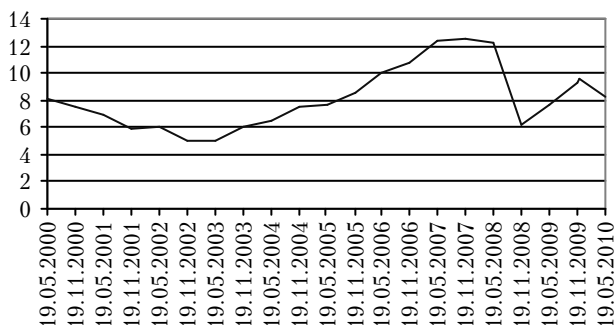

Figure 2. **Morgan Stanley Capital International EAFE Index (EFA)**

In addition, American and European economies entered a recession with the highest record of unemployment in the last 50 years (Census Bureau, 2011). According to Krugman (2009), the recent stock crash can be compared to the 1929 financial depression and we are now suffering the consequences of risk taking by most of the funds.

3.1. Biases in the performance of Asset Managers. This section will describe the data used to prove the hypothesis of portfolio deviation of mutual funds. There are 2 main companies that undertake performance evaluation for asset managers in the US: 1) Lipper Analytical Services, and 2) Morningstar. These companies use different approaches to evaluate managers. The main difference is the choice of benchmark against which the manager's performance will be measured. For equity managers, Morningstar basically compares all managers against the "market", otherwise known as the S&P500 index. For non-US managers, the choice of benchmark is the MSCI

EAFE index, regardless the manager's stated asset class or category (for example, emerging market managers). The choices Morningstar makes can be theoretically justified based on some version of the CAPM.

Lipper, on the other hand, uses indexes that build themselves by averaging the performance of all the managers in a specific category. Interestingly enough, the choice of benchmark as the average of the managers in one category cannot be justified under any circumstances.

As stated before, the purpose of this paper is to document of the biases generated by the choice of benchmarks when performing evaluation of asset managers. To elucidate the choice of categories to consider, it is important to explain a standard practice in the industry. The asset management business suffers from what is euphemistically called "drift". What this means is that managers advertise a category they are supposed to invest but often deviate from it. For Lipper this drift does not create any difficulty in the performance evaluation, but clouds the situation further. For Morningstar, a drift practically implies that the asset manager is not only adding more risk but, in some cases, different kinds of risks not measured in the benchmark. Because of this practice, a correct performance evaluation would require correcting drift first. In the Morningstar procedure, this is possible for the academic by adding an additional factor; under the Lipper technique this is not possible at all.

The general measurement of the bias caused by these two types of systems is quite cumbersome considering that we would need to analyze individually each of the more than 10 ths funds. To simplify the analysis we have chosen the sample of asset managers with two properties: 1) an important actual drift in the asset class, and 2) large assets under management. This leads us to US equities and non-US equities. In general terms, equities at the US market can be classified as US, EAFE, and Emerging Markets. For the last decade, the risk and return has increased from US to EAFE to EM. This has led to two obvious drifts: 1) US managers choose to invest in EAFE stocks, and 2) EAFE managers choose to put some of their money in emerging markets.

The asset management business can be classified in many different ways. One way is whether the clients are individuals or institutions. The quality of institutional managers is generally better than those offered to individuals due to better oversight of managers in an institutional setting. We have, therefore, decided to concentrate on institutional asset managers; in general these managers have minimum initial investment amounts of between 2 and 10 mln. dollars.

To control the amount of drift we have chosen the best institutional and retail asset managers in US stocks and international stocks, and apply to them 3 alternative benchmarks. These benchmarks are the average for the category (Lipper), the advertised category (Morningstar) and the advertised category plus the second benchmark for the direction of the drift (drift correction)[10].

We have chosen this subset of managers because, if we find biases in it, the bias in the industry is much larger since there is less oversight in managers that offer their wares to the clients.

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[10] They will be tested in section 5.

4. Data. The data used for this article comes from crossing information given by Yahoo and Morning Star databases. Table 1 summarizes the main statistics for the variables used to test our hypothesis. We have put the average of return for SPY, MDY and the funds under assessment.

Table 1. **Data Summary***

	Individual American funds	
	Maximize funds	Maximize periods
Average SPY**	-0.03172	-0.01768
Average MDY	0.01976	0.05148
Average Stocks	-0.00208	0.01612
Volatility of Stocks	1.84444	1.75656
Observations	40	23
	Institutional American funds	
	Maximize funds	Maximize periods
Average SPY	-0.06344	0.00936
Average MDY	-0.01456	0.06032
Averagae Stocks	-0.06396	0.01092
Volatility of Stocks	1.45236	0.75972
Observations	137	39
	Individual international funds	
	Maximize funds	Maximize periods
Average EFA	-0.04004	0.02652
Average ADRE	-0.02756	0.14248
Averagae Stocks	-0.04316	-0.013
Volatility of Stocks	1.13828	1.12164
Observations	76	20
	Institutional international funds	
	Maximize funds	Maximize periods
Average EFA	-0.00728	0.0338
Average ADRE	0.01872	0.15756
Averagae Stocks	0.00832	-0.00624
Volatility of Stocks	1.25684	1.10916
Observations	88	26

*The return and volatility is annualized.
** The average SPY and EFA is different for institutional and individual funds because of the criteria to split the sample in 2.

Our data is weekly, starting from January, 3rd, 2000 to January, 3rd, 2011. We use the annualized return of each fund as well as the reference indexes: MDY, SPY, EAFE and ADRE[11].

Also, Table 1 splits the data in to 2 parts according to some criteria: maximizing funds or observations. The former means that we have attempted to preserve the most funds over the time but sacrificing for periods of time missed.

Conversely, if we try to keep periods, then we should get rid of some funds in the collection of the data. Unambiguously, there is a tradeoff between data and periods; we cannot have both of them maximized at the same time because some funds disappeared, appeared or merged over the last decade.

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[11] EAFE and ADRE are reference indexes that will help us test our hypothesis. EAFE is the stock market index designed to measure the equity market performance of developed markets outside of the US and Canada. ADRE is based on the emerging market 50 ADR Index.

According to Table 1 for the retail American funds, there are 40 funds under the criteria of keeping the maximum of funds while this number drops to 23 under the criteria of preserving periods of time. The same pattern can be observed for the institutional American fund and international funds.

At first sight, it seems that returns of funds can be located below its reference index. The latter result can be attributed to the drop of funds over time. Also, the volatility[12] is high for all the funds under the two criteria in consideration, which means there is an aspect involving risk that comes with return. Therefore, we need a methodology to find out whether or not the funds being assessed in the paper are under- or over-performing.

5. Statistical Model of Performance. In this section we will explain the methodology to conclude our assessment of funds. In order to verify mutual fund under assessment can deviate from the normal portfolio, we have to test if they performed above their reference index. The formulation is

$$R_i - R_f = \alpha_i^1 + \beta_{im}^1 \, (\text{Reference Index}_m - R_f), \qquad (1)$$

where: R_i is the excess return of the fund i; the variable R_f the risk free asset; the coefficient $_i$ is the performance of the fund i; the slope $_{im}$ is the beta or market risk of portfolio i in market m and finally the *Reference Index$_m$* stands for market return: SPY and EFA discounted by risk free asset.

We basically verified whether $_i$ is positive to draw the conclusion that the fund performs above the market index. SPY is used for American funds and EFA is used for international funds. These are the typical reference index for the 2 particular funds.

In order to verify how well some funds behave between themselves, we can test the significance and sign of the intercept in the following equation[13]:

$$R_i - R_f = \alpha_i^2 + \beta_{im}^2 \, (\text{Average Return of Portfolio}_m - R_f). \qquad (2)$$

However, we cannot test yet if the fund deviates from the normal portfolio. Keeping in mind this issue, we need to consider another benchmarking that is represented in the following equation:

$$R_i - R_f = \alpha_i^3 + \beta_{iA}^3 \, (\text{Reference Index}_A - R_f) +$$
$$+ \beta_{iB}^3 \, (\text{Estimated Reference Index}_B - R_f), \qquad (3)$$

where now the two new variables are: $_{iA}$ which stands for the beta or market risk of portfolio i in market m. The Reference *Index$_A$* is the market return for SPY and EFA discounted by risk free asset. The Coefficient $_{iB}$ is the beta or market risk of portfolio i in market m. The estimated reference *Index$_B$* is the estimated market return for MDY and ADRE discounted by risk free asset.

Latter equation 3 is what we may call the corrected model because it considers the respective reference index as well as the index for any deviation in the portfolio. For American funds we use SPY and MDY for we suspect that some of these particular funds deviate to outside their frontiers in Europe, Asia. The latter behavior corresponds to a search for extra return.

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[12] Volatility and return is annualized using the exponential formula. The average SPY and EFA is different for institutional and individual funds because of the criteria to divide the sample in 2.

[13] Also discounted by risk free asset.

In addition, for international funds we employ EFA and ADRE for the same reason explained above. This particular fund may go to emerging markets with the negative consequences in the risk of the portfolio. Also, figures below shows the behavior of SPY and EAFE against their perfect substitutes; that is MDY and ADRE respectively. The return of MDY and ADRE is higher than SPY and EAFE; hence, the funds deviate from SPY to MDY and EAFE to ADRE in their search for more return.
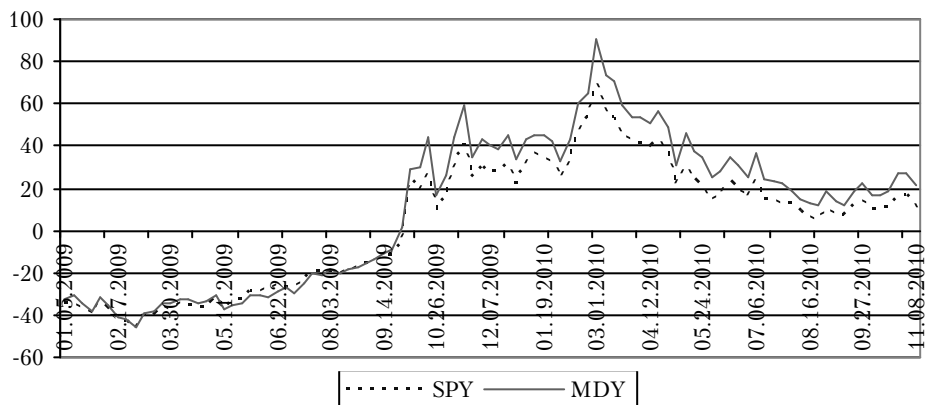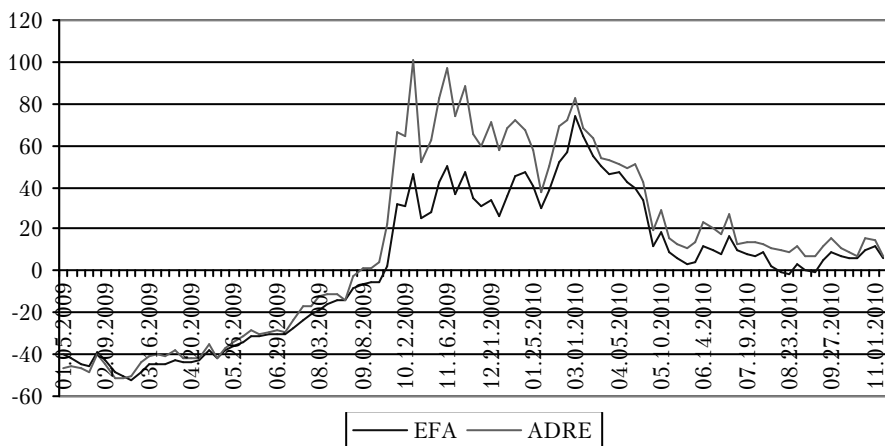

Figure 3. **SPY vs. MDY (Annual Return)**

Figure 4. **EFA vs. ADRE (Annual Return)**

In order to avoid endogeneity, we have included the predicted value of reference index. The predicted value comes from the residuals of a previous regression between the market reference index and EAFE or ADRE. For instance, in the case of American funds, we use SPY as market index, then we suspect that these fund deviates to MDY. In the first stage, we capture the residuals of the regression MDY against SPY, to get the predicted values of MDY[14].

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[14] The predicted values of EAFE represent significant values of EAFE that cannot be explained by the market index.

Similarly, for the case of international funds, the market index is EAFE, but we suspect these funds deviate to ADRE, so we follow the same first stage regression between ADRE and EAFE to get their predicted values in the residuals. The residuals capture the values of ADRE that is not related to the index market EAFE.

In order to prove our hypothesis, we expect that the difference between $\alpha_i^1 - \alpha_i^3$ be positive. By looking at equation 3, if α_i^3 is significant as wells as β_{iB}^3, then funds deviate to their natural portfolio[15]. Therefore, if the difference $\alpha_i^1 - \alpha_i^3$ is positive, then funds deviate to get more return with the consequences in risk. The result of the 3 equations above are explained in Section 6.

6. Results. Tables 2 and 3 summarize the result given in every equation of models 1, 2 and 3, as shown above. We have run the regression for each fun i and then we added the value of each intercept[16]. Next step was to make the difference between the intercept in specification 1 minus the intercept in equation 3. Also, we did the same operation between intercepts in equations 2 and 3.

The difference between intercepts are represented on Table 2 and the coefficient of determination is expressed in Table 3, below. We found that the difference between ($\alpha_i^1 - \alpha_i^3$) and ($\alpha_i^1 - \alpha_i^2$) is positive for each of the different class of model, that is American funds (Large Capital Blend) and international funds.

We have also divided the 2 classes of fund explained above into retail and institutional, obtaining the same positive difference between intercepts. Therefore, no matter the size of American or international funds, they deviate to a different portfolio in order to search for more return.

Table 2. **Size of bias for mutual funds with respect to the average and the drift to other asset classes***

	US LARGE CAP BLEND (LCB)		INTERNATIONAL FUNDS (EAFE)	
	Maximizing funds (%)			
	REFERENCIAL ($\alpha_i^1 - \alpha_i^3$)	AVERAGE ($\alpha_i^1 - \alpha_i^2$)	REFERENCIAL ($\alpha_i^1 - \alpha_i^3$)	AVERAGE ($\alpha_i^1 - \alpha_i^2$)
	Maximizing observations (%)			
	REFERENCIAL ($\alpha_i^1 - \alpha_i^3$)	AVERAGE ($\alpha_i^1 - \alpha_i^2$)	REFERENCIAL ($\alpha_i^1 - \alpha_i^3$)	AVERAGE ($\alpha_i^1 - \alpha_i^2$)
RETAIL FUNDS	51.428	13.832	38.636	40.144
INSTITUTIONAL	70.512	45.552	35.464	34.944
RETAIL FUNDS	44.564	17.420	21.008	27.196

*Annual return

In addition, we can notice that the difference between ($\alpha_i^1 - \alpha_i^3$) is bigger than ($\alpha_i^1 - \alpha_i^2$) for each of the classes and size of fund under assessment. This means that our hypothesis that funds deviate to its regular portfolio holds because the first difference represents the bias with respect to the index where they deviate[17].

[15] If β_{iB}^3 is significant, then α_i^3 reduces its value below α_i^1.
[16] The intercept resulted significant for most of the regression run under each of the 3 specifications detailed in the preceding section.
[17] For American funds, we have the reference index SPY and their proxy for deviation MDY. For the case of international funds, we consider EAFE as a reference index and ADRE like the portfolio where they deviate.

Table 3. **Coefficient of determination for every specification in assessment**

(Maximized Funds)	$\overline{R}^2$ (eq 1)	$\overline{R}^2$ (eq 3)
Institutional funds USA	0.949	0.954
Retail funds USA	0.836	0.845
Institutional funds international	0.939	0.944
Retail funds international	0.956	0.959
(Maximized Observations)	$\overline{R}^2$ (eq 1)	$\overline{R}^2$ (eq 3)
Institutional funds USA	0.960	0.966
Retail funds USA	0.750	0.758
Institutional funds international	0.902	0.911
Retail funds international	0.907	0.915

Table 3 shows the result of the average coefficient of determination for each of the regression run maximizing fund or portfolio. In all the cases we have R^2 bigger than 0.7, which means that there is a good adjustment. However, for the equation 3 the adjustment is much better in comparison to equation 1; this means that the inclusion of the additional index where the portfolios deviates (MDY or ADRE for each case) is a good proxy that may explain better the return of the fund[18].

7. Conclusions. American funds deviate to its normal portfolio. These funds invest in local stocks, but their search for more return makes them deviate to mid cap firms' stock. By comparing to an index different than their regular benchmarking, we can verify that MDY can be a significant benchmarking besides their SPY index.

MDY measures the performance of the mid capitalization sector of the US equity market. The fact that our results give this index significance for international funds means there is some arrangement in the regular portfolio of American funds that invest recurrently in large firms' stock.

Instrumental variables were used in the paper in order to avoid endogeneity between SPY and MDY. We have also shown that the arrangement of portfolio allows American funds to hit more return. Similarly, international funds behave like American funds. They regularly invest in stocks from Australia, Asia and Canada (EAFE). We can capture their benchmarking with EAFE. However, their search for return makes them deviate to an investment in emerging economies.

Our results give internationals funds to be benchmarked by EAFE and ADRE. In turn, ADRE is the index for emerging economies that was captured with instrumental variables. Along the line with American funds, international funds obtain more return by rearranging their portfolio towards emerging economies.

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[18] The inclusion of the new variable does not introduce correlation because it is estimated in the second stage.

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