International Asset Allocation: The Benchmark Effect

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Abstract

We study the impact of well-known benchmark indexes as a coordinating mechanism on asset allocation and capital flows across countries. Using unique monthly micro-level data between 1996 and 2012 on equity and bond mutual funds from around the world, we find that benchmarks have significant and large effects on mutual fund international investments, generating significant pro-cyclicality. Benchmarks are closely related to market capitalization, so shocks to returns get fully transmitted. Moreover, because mutual funds tend to follow their respective benchmarks, benchmark weights significantly affect how mutual funds allocate their injections across countries. Benchmarks explain between 60 and 90 percent of the allocations. On average, a 1 percent change in benchmark weights implies a 0.7 percent change in mutual funds' country weights. We find that reverse causality is not driving our results and that exogenous shocks to the benchmarks explain changes in asset allocations. Moreover, we find that benchmark effects can explain capital flows and the financial linkages across countries.

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1. Introduction

International mutual funds have become an increasingly important channel of cross-border portfolio capital flows, as individuals pour their savings into these institutions (Khorana et al., 2005; Gelos, 2011; Cremers et al., 2011; Didier et al., 2012). The assets of these mutual funds and their flows to countries increased rapidly during the 1990s and 2000s, but they also retrenched forcefully during past crises. Although the retrenchment was very important during the height of the 2008 global financial crisis, the recovery was fast in the crisis aftermath. Not surprisingly, the literature has linked the behavior of these institutional investors to the propagation of shocks across countries and to the turmoil in financial markets.[1] However, important questions related to what drives the behavior of institutional investors and the channels of international financial contagion remain to be tackled.

One factor that has received relatively little attention in the literature is the effect of benchmark indexes as a coordinating mechanism to guide asset allocation across countries and the ensuing consequences for capital flows. Most mutual funds nowadays either explicitly track a major index or benchmark their performance against one. Thus, in principle, the behavior of these indexes and the weight they give to different assets and countries may have an impact on how mutual funds invest across countries and transmit shocks across borders.[2] This mechanism, which we call "the benchmark effect," is the focus of this paper.[3] Consistently with this mechanism,

[1] See, for example, Kaminsky et al. (2004), Broner et al. (2006), Shiller (2008), Eichengreen et al. (2009), Hellwig (2009), Mishkin (2011), Jotikasthira et al. (2012), Levy Yeyati and Williams (2012), and Raddatz and Schmukler (2012).

[2] Basak and Pavlova (2012) conclude in a theoretical model that institutional investors that care about performance relative to a benchmark index optimally tilt their portfolio to the stocks in that index.

[3] The literature has already started to study the importance of benchmarks to understand how mutual funds behave. But it has focused primarily on the performance evaluation of mutual funds relative to their benchmarks (Lehmann and Modest, 1987; Sharpe, 1992; Wermers, 2000), in particular, whether active management pays (Cremers and Petajisto, 2009; Busse et al., 2011; Cremers et al., 2011). Another part of the finance literature has focused on how benchmark re-definitions affect particular stocks. An increase in the weight of a stock raises its price up and vice versa for a reduction in the

our main result shows that a 1 percent change in the weight given to a country in an index results in a 0.7 percent change in the weight given to that country for the average mutual fund (passive or active) that benchmark its performance against that index. This central result has consequences for the pro-cyclicality of mutual fund's country allocations, the propagation of shocks across countries, and the magnitude of international capital flows that are also discussed and studied in this paper.

Benchmarks are important to mutual funds because they might help managers guide their investment allocation and compare themselves. Otherwise, when investors delegate their assets it is difficult for them to assess the performance of portfolio managers and typical principal-agent problems arise. As a consequence, international mutual funds have increasingly benchmarked themselves against different well-known indexes, which act as useful comparators and disciplining devices. The use of benchmarks helps not only the underlying investors but also the owners of the companies when they reward the managers in charge of the portfolios. In fact, past relative performance against a well-known benchmark is a significant determinant of a fund's subsequent cash inflows (Sensoy, 2009). However, to our understanding, little is known about the behavior of these benchmarks, how funds use them when investing around the world, and what effects they have on international capital flows. For instance, in principle, a country's introduction into a benchmark index should make managers with index-tracking strategies to rebalance their portfolio and direct capital flows into that country (The Economist, 2012).

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weight. Also, co-movement between stock increases when they belong to the same benchmark. See Harris and Gurel (1986), Shleifer (1986) and Chen, Noronja and Singal (2004) for evidence on the additions and deletions in a benchmark index. Greenwood (2005) and Hau (2010) provide general evidence on benchmark re-definitions and Barberis, Shleifer and Wurgler (2005) on co-movement of stocks belonging to the same index. Vayanos and Wooley (2011) try to establish these documented facts of index re-definitions in a theoretical model.

Benchmarks might also act as a coordinating mechanism that leads mutual funds to move in tandem in given markets and have quantitatively significant aggregate effects on capital flows.[4] A coordinating mechanism is important for funds to have aggregate effects because individual funds are in most cases relatively small compared to the size of capital flows to a country. While the use of indexes as benchmarks provides a coordinating mechanism that may direct investment into and out of countries and transmit shocks with systemic consequences on prices or quantities, these effects are not obvious. Mutual funds declare prospectus benchmarks, but they do not need to follow them. In fact, it is possible that greater deviations from benchmarks could bring greater profitability (Cremers and Petajisto, 2009). Thus, quantifying the extent of this coordinating mechanism is important.

This paper documents the "benchmark effect." In particular, five types of questions guide our research. (i) How pro-cyclical are benchmark indexes? That is, when a country is hit by a shock that lowers prices, to what extent is that country's weight reduced, possibly triggering further selloffs by financial intermediaries?[5] (ii) To what extent do mutual funds follow benchmarks to invest internationally? (iii) How do countries that share a benchmark portfolio are affected by each others' shocks and how do mutual funds react to these shocks? (iv) Are movements in benchmarks causing movements in asset allocation of mutual funds? Do mutual funds respond to exogenous changes in benchmark indexes? (v) How much of the behavior of capital flows is related to fluctuations in benchmark indexes?

[4] Other possible mechanisms are the exposure to common funding shocks, pure herding, or the use of similar investment strategies.

[5] As we are going to be using the terms pro-cyclicality, counter-cyclicality and a-cyclicality throughout the paper we need to define them first. We are going to define pro-cyclicality as a positive and significant response in country allocations (country weights) to a shock in present (or past) country (or relative) returns. Counter-cyclicality is defined as a negative significant response to a shock in present (or past) country (or relative) returns, while a-cyclicality is defined as a neutral response to these shocks.

To conduct the research, we collect new and unique data on common benchmarks and match them with detailed data on portfolio allocations across countries by a large number of individual mutual funds based in major financial centers around the world. The data set covers the period from January 1996 to July 2012. A total of 2,837 equity and 838 bond funds are in the sample. These equity and bond funds collectively have 1,052 and 293 billion U.S. dollars in assets under management (AUM) as of December 2011 respectively.[6]

The main findings of the paper can be summarized as follows. Benchmarks have significant and large effects on mutual fund allocations and capital flows across countries and generate a significant degree of pro-cyclicality. In particular, benchmarks are closely related to the capitalization of each market. There is a full immediate pass-through from returns to the benchmark weights. Therefore, any positive (negative) shock to a country implies that its weight increases (decreases) in the relevant benchmark index. This has important consequences because we also document that mutual funds' country allocations tend to follow the allocations of their respective benchmarks, although the degree to which they track the benchmarks depends on the type of fund. As one may expect, explicit indexing funds follow the benchmarks almost one-for-one, but there is also an increasing number of "closet indexing" funds that also tracks benchmark allocations very closely. In fact, even the most active funds in our sample are strongly influenced by the behavior of their benchmark indexes, with about 50 percent of their allocation being explained by the benchmark effect. In the end, if there is a positive (negative) shock to a country's

[6] Mutual funds are offered to investors in different ways, for example, in different currencies and with different costs. These funds have the same portfolios but many times they are counted as separate funds. In our data, we just count them once to avoid repeating the portfolios, but we report their aggregated AUM.

returns, its benchmark weight increases (decreases) and mutual funds increase (decrease) their allocation in this country generating a pro-cyclical behavior.

Furthermore, benchmark weights also affect mutual funds' capital flows to countries. Funds allocate the injections they receive by investing it proportionally to the weights that different countries have in the relevant benchmark. For every dollar a fund that explicitly follows the index receives, it instantaneously directs 80 cents according to the weight each country has in the index. This pattern decreases with the degree of activism.

There are spillovers across countries sharing the same benchmark. When a country is hit by a large shock, benchmark indexes that include that country perform a full re-weighting of all countries they track. This induces similar reallocations in all mutual funds that benchmark themselves against that index, and potential inflows or outflows of money into third party countries that are included in the index. We provide evidence of this mechanism, and show that the portfolio weight of a given country increases (decreases) relatively more in mutual funds following a benchmark that includes another country hit by a large negative (positive) shock than in the rest of mutual funds. Finally, we provide evidence that our results are not driven by reverse causality since international mutual funds respond to likely exogenous changes in benchmark indexes such as downgrades/upgrades of countries from benchmark indexes, changes in the market capitalization coverage, changes in the free float rate, regulatory changes and others.[7]

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 analyzes how benchmarks behave. Section 4 studies to what degree mutual funds follow benchmarks. Section 5 discusses the portfolio re-allocations triggered by

[7] There could be concern that in reality benchmark indexes are changing through market capitalization by the effect of mutual funds on the price of a country's stock market.

large shocks to relative returns. Section 6 deals with the effect of exogenous changes in benchmarks on mutual funds allocations. Section 7 studies the effects on capital flows. Section 8 concludes.

2. Data

We construct a unique database of country portfolio allocations and benchmarks of international mutual funds (i.e. those investing in several countries) by cleaning and merging several sources of data, some of which had not been previously used in the literature.

Our two main sources for country portfolio allocations of international mutual funds are EPFR (Emerging Portfolio Fund Research) and Morningstar Direct. Both sources include dead and alive mutual funds. Data from EPFR are at a monthly frequency, and include open-end equity and bond funds classified according to their geographical investment scope as global, global emerging, and regional. Global funds invest anywhere in the world, global emerging funds only in emerging countries, and regional funds in groups of countries within a specific geographical region (e.g. developed Asia). [8] Frontier-market dedicated funds are usually classified as either global emerging or regional funds. The data also comprise portfolios of exchange-traded funds (ETFs).[9] We use only funds that have at least one year of information. For each fund, the data contain information on the share of the fund's assets invested in each of 124 countries—henceforth referred to as the *country-weights* or just the *weights*—and cash, as well as its total net assets (TNAs). There is also information on each fund's static characteristics, such as the asset class, domicile, currency, declared

[8] While global funds theoretically can invest anywhere in the world, a large proportion of them benchmark themselves against the MSCI World Index which only has developed countries as it constituents. A minor proportion of these funds gauge their performance relative to the MSCI All Country World Index that contains both developed and emerging countries.
[9] More detailed information about this dataset can be found in Raddatz and Schmukler (2012).

benchmark, whether it is an ETF, and its strategy (passive or active funds). We complement these data with information on each fund's net asset value (NAV), obtained from Datastream and Morningstar Direct by matching the funds from these different databases.

Data from Morningstar Direct (MS) complement that from EPFR. From this source, we compile similar data on country weights, TNAs, NAVs, and static fund characteristics for additional international mutual funds not included in EPFR.[10] This increases importantly the cross sectional coverage of our final dataset. While complementary to EPFR, MS reports country weights in only 52 countries and does not contain data on cash allocations either. For our dataset, we only kept funds that report at monthly frequency (MS includes funds that report quarterly) and have at least twelve observations. Of course, in consolidating the datasets, we checked that there is no repetition of funds across the two sources. The combination of the two databases provides us with a balanced cross sectional and time-series coverage of funds. MS contains a large number of funds after 2007 but very few in earlier years, while EPFR has a more balanced number of funds dating back to 1996.[11]

We complement these data with information on the level of country indexes from JPMorgan and MSCI, which we use to compute the country returns we impute to each fund's investment in a country. We obtained this information from Datastream and MSCI.

Table 1 shows the composition of our database for equity and bond funds. It contains 2,837 equity funds and 838 bond funds in the three geographical investment

[10] We focus on funds in the same categories reported by EPFR: Global, Global Emerging, and Regional.

[11] In our consolidated database we kept the country coverage of MS (52 countries) and adapted the EPFR database to this format, lumping countries outside these 52 in a residual category called "other equity" (also present in MS).We have also performed robustness tests for the impact of this change for the EPFR database. The results remain the same.

scopes: global, global emerging, and regional funds. Equity funds are domiciled around the entire world but most of the funds are located in Canada, France, Ireland, Luxembourg, the United States (U.S.), and the United Kingdom (U.K.). Instead, most bond funds are domiciled in Denmark, Germany, Ireland, Israel, Italy, Luxembourg, the U.S., and the U.K.

Funds in our combined dataset capture an important part of the industry assets in the relevant categories. For example, TNAs of equity mutual funds in our sample are 1.05 trillion dollars in December 2011, while those of bond funds correspond to 292 billion dollars. These data cover a significant fraction of the funds that invest internationally. For instance, we have U.S.-domiciled funds with 442 billion dollars in TNAs as of December 2011. For the same date, the Investment Company Institute (ICI) reports that (non-domestic) international funds in the U.S. hold 1.4 trillion dollars including country funds. Considering that ICI data include funds dedicated to invest in single countries, which we exclude from our sample because of our interest on country weights, our sample represents a large share of the relevant industry assets. [12] Similar estimates for Europe show that our sample accounts for approximately 53 percent of the international funds in this region.[13]

Figures 1 and 2 show more details on data coverage, plotting the number of funds and the average TNAs per year for equity and bond funds respectively, divided by fund type and by their degree of activism. Figure 1, Panel A, displays the importance of regional funds in the total number of equity funds. This is not

[12] Notice that this number is bound to be even greater, but ICI does not report the amount of AUM in country funds (i.e. funds that invest internationally but only in one particular country).

[13] International funds are only a fraction of the entire mutual fund industry. A large portion of the funds is dedicated to domestic investments. For example ICI reports that 27 percent of the U.S.-domiciled equity mutual funds invest internationally as of December 2011 and the European Fund Asset Management Association (EFAMA) indicates that European domestic funds are 60 percent of the European mutual fund industry at the end of 2011. But of course, by definition these domestically oriented funds do not contribute to international capital flows. But of course, by definition these domestically oriented funds do not contribute to international capital flows.

surprising, because for each global or global emerging fund there are several regional funds. The figure also shows that the total number of funds in our sample increases in 2007, when MS starts to report a higher number of funds. Figure 1 also shows that TNAs also increase significantly over time (Panel B), although there is an important drop in 2008 and 2009 during the global financial crisis of 2008 and 2009. Compared to equity funds, bond funds start reporting later. Moreover, the fluctuation in TNAs during global financial crisis is less pronounced for bond funds because bond values declined much less.

We also group funds according to the extent their country allocations deviate from those of their prospectus benchmark as explicit indexing, closet indexing, mildly and truly active funds. The classification procedure, which follows Cremers and Petajisto (2009), is explained in detail in the next section. Roughly speaking, explicit indexing funds are either ETFs or passive funds. Closet indexing funds do not declare to be passive but behave similarly to explicit indexing funds. Mildly and truly active funds are those that deviate importantly from their self-declared benchmarks. Figure 2 shows that explicit indexing funds (mostly ETFs) represent a small but fast growing share of the industry. Furthermore, both the level and growth rate of the funds that closely track benchmark indexes is significantly increased by also including closet indexing funds.[14]

In addition to our data on fund's country weights, we also collect data on the country composition and returns of several major benchmark indexes. These data were gathered directly from FTSE, JPMorgan, and MSCI, and indirectly through

[14] The trends exhibited by the number and share of total assets of ETFs in our sample are also visible in data from the Investment Company Institute (ICI). Appendix Figure 1 shows that the number (Panel A) and assets (Panel B) of ETFs are growing faster than those of all US mutual funds, although, as also shown by our data, ETFs still represent a relatively small fraction of open-end mutual funds despite their impressive growth. Nonetheless, ICI data does not allow us to identify closet indexing funds, which according to our data represent an important share of the industry nowadays.

Morningstar for indexes produced by Dow Jones, Euro Stoxx, and S&P, forming an unbalanced sample covering from January 1996 to July 2012.[15,16]

Our analysis requires matching the data on international mutual funds with the data on benchmark indexes. We assign to each fund the index declared in its prospectus. For funds with no declared index, we impute the benchmark assigned to it by industry analysts, as reported by MS. We were able to match 88 percent of the equity funds and 18 percent of the bond funds in our database.[17]

3. Benchmarks: What do they do and how do they allocate their portfolios?

Mutual funds use benchmarks to explain their investment strategies to potential investors and to measure their performance. This section briefly describes the main characteristics of the benchmark producing industry, and characterizes the country weights of benchmark indexes based on data in our sample.

[15] We collect from MS and MSCI information on the performance of benchmark indexes. Specifically, we collect data on price returns, gross returns, and net returns for each of the benchmark indexes we have. The differences from these return types come from the dividend reinvestment policies of the index. A price index measures the price performance of markets without including dividends. Gross and net returns indexes include dividends, gross without withholding taxes, net counting the tax withholding.

[16] Appendix Table 1 presents detailed list of the benchmarks indexes included in our data. We rely heavily on the MSCI benchmark indexes because approximately 86 percent of our data on mutual funds declare to follow them.

[17] There is no agreement in the literature on how to assign benchmarks. Sensoy (2009) mentions that it is easy to "mismatch" benchmarks because some mutual funds declare benchmarks that do not match their style to try to get more cash inflows. To control for this, Cremers and Petajisto (2009) suggest using the benchmark with less *active share* at each point in time, which assigns the benchmark that the fund is actually following according to this measure. Active share is defined as the active part of the portfolio (relative to a benchmark). This methodology is also used by Jiang, Verbeek, and Wang (2010). Instead, Busse, Goyal, and Wahal (2011) resort to the benchmarks reported in the prospectus first, and when they do not have data, they match a fund's asset class with a benchmark. If the benchmark asset class were to be, for example, "Latin American Funds" it would be matched to "MSCI EM Latin America." Cremers, Ferreira, Matos, and Starks (2011) rely primarily on a technical benchmark assigned by a Lipper analyst and complement these data with self-declared benchmarks. They rely on the former to avoid concerns related to self-declared benchmarks that are chosen for strategic purposes to improve in the performance rankings. While Cremers and Petajisto's (2009) method assigns a benchmark in a way that the strategic-choosing problem discussed by Sensoy (2009) could be solved, this procedure could be wrong if the database with benchmarks do not have the complete population of benchmarks, as one could be assigning a completely mistaken benchmark.

3.1. What are benchmark indexes?

International benchmark indexes are typically composite stock (or bond) market indexes that include securities from many countries as constituents. As of May of 2012, there were 267,415 active equity indexes and 63,616 active bond indexes in Datastream, including those focused on single markets and different industrial sectors.

There are 18 companies producing bond indexes, but many more involved in the production of equity indexes including the large international indexing companies (such as FTSE, MSCI, and S&P) and the national producers of indexes and national stock exchanges.

The largest producer of bond indexes is JP Morgan with 20,390 indexes, followed by Merrill Lynch with 18,897 indexes, Citigroup with 10,281 indexes, and Barclays Capital with 3,963 indexes. For equity indexes, MSCI has 126,821 indexes, FTSE 39,738 indexes, Russell 27,826 indexes, S&P 17,723 indexes, and, Dow Jones 14,771 indexes.[18]

While there are broad indexes such as those focusing in world markets, advanced (or developed) markets, or emerging markets, these are further subdivided by different characteristics. For instance, MSCI has different indexes within the *All Country World Index* according to the currency (USD, EUR, or local), the index level (price, net returns, gross returns, total return, and exchange return), the index family (the type of weighting, the industry, and other factors), the size (of market capitalization of an index), and the style (value (large firms) or growth (small firms)). This generates wide diversity among indexes, which has been increasing over time, as many of these new subdivisions have been created recently. For example, in September 2010 MSCI created a new branch of indexes (ESG-Environment and

[18] All figures as of December 2012.

Social Governance) aimed at investors who want to benchmark themselves against the performance of green firms.

Broadly speaking, once defined the scope of an index in terms of geographical, industrial, or firm coverage, an index-producing company selects a number of securities that fall within the scope and also meet some requirements in terms of size of issuance, liquidity, etc. Each of these securities gets a weight in the index portfolio, and subsequently the index tracks the market price (return) of those securities in time to compute the value of the index, using various approaches to aggregate fluctuations in individual securities (Laspeyres, chain-weighting, et.) and periodically rebalancing it to ensure its continuity and representativeness.. To illustrate the procedure, Appendix 1 shows a more detailed example of the construction of indexes by MSCI.

The prevalence of the use of benchmarks can be readily observed in our sample. In our complete sample, only 9 percent of equity funds do not report (or are assigned) a benchmark, while that number is 16 percent for bond funds. This prevalence has also been growing in time. For instance, among funds covered by EPFR (the dataset with the longest history, as explained in the previous section) 28.4 percent of equity funds do not report a benchmark in 1996, while this number decreases to 5.1 percent in July 2012. Among global emerging funds, these numbers are 13 percent and 2.1 percent, respectively.[19]

3.2. How do benchmark indexes allocate their portfolios across countries?

The portfolio weight of individual securities included in a benchmark index can be

[19] The benchmark declared by a fund is a static characteristic in EPFR. Thus, these figures indicate that the use of benchmarks is more prevalent among funds recently incorporated to EPFR than among funds with a longer history in the database. This would not be a useful indicator if EPFR would have aimed to increase its coverage of benchmark tracking funds, but, to the best of our knowledge this is not the case

aggregated at the country level according to the market where the security was issued to obtain a country weight. This is the level of aggregation we work at to study the country allocations of mutual funds.

A first characteristic of portfolio allocations of benchmark indexes is that each index assigns vastly different weights to the various countries within its investment scope. For instance, the MSCI BRIC has an average weight of 20 percent and a standard deviation across countries of 13.87 percent, having the minimum coefficient of variation in our sample (0.69). On the other hand, these numbers for the MSCI All Country World are 2.13 and 6.98 percent respectively for a coefficient of variation of 3.28 (the maximum in our sample). Thus, there is a large variation across indexes in benchmark weights with the narrower indexes having a low standard deviation compared to the average weight and the opposite happening in the broader indexes.[20]

A cross-sectional regression of the (log) average weight assigned by a benchmark to each country sheds some light on the determinants of these differences. [21] Among equity benchmarks, the average country weight is correlated with the country's market capitalization, risk (as measured by ICRG country risk composite) and quality of institutions (as captured by polity2 from Polity Database) (columns (1), (3), (4) and (6)). The relation with market capitalization is not totally surprising since the methodology used to construct these indexes consider each security's market capitalization (plus several adjustment factors see Appendix 1). However, the relation with country level market capitalization is not mechanical and indicates that, roughly speaking, the selection of securities across countries is related to the size of different

[20] We calculate first the average country weight within an index across time and then calculate the standard deviation across countries within an index.

[21] In this analysis and what follows of the paper we will concentrate mainly on the intensive margin (the movements of weights for a country that is already in the benchmark), by using log weights (or simply discarding zero weights. We will not be analyzing in detail the extensive margin (countries in and out of a benchmark), except when we specifically mention it.

markets. The relation with the quality of institutions suggests that this characteristic matters for the deviations from market cap weighting that are associated with factors such as free float. In slight contrast, average country weights of bond benchmarks are mostly related to market capitalization (Column 6)

In addition to explaining an important fraction of the cross sectional variation of benchmark country weights, changes in a country's market capitalization also drive most of their time series variation (Table 3). It is easy to show that, assuming a constant number of securities in an index, the change in the market capitalization of a country relative to the other countries in a portfolio equals its relative return. So, our regressions have as dependent variable the log weight of each fund in a given country, and the independent variables are the lagged value of that weight and the net relative returns of a country vis-à-vis the fund (net country returns minus net benchmark returns). The regressions also include different sets of fixed effects and at different frequencies.

Panel A shows the results for equity benchmarks and Panel B for bond benchmarks. Both sets of results are remarkably similar. Benchmarks country-weights move almost one-to-one with relative returns and are highly serially correlated, as the coefficient on the lagged weights shows. Said differently, changes in benchmark weights are almost completely driven by changes in a country's relative market capitalization, and, as such, exhibit almost complete pass-through from relative returns at the monthly frequency.

These results show that benchmark country portfolio weights are pro-cyclical, and shocks to country returns get transmitted entirely to the benchmark weights in the short run. The results are robust to the inclusion of different types of fixed effects capturing shocks of higher dimension. For instance, benchmark-time fixed effects

could capture particular benchmark cycles in time, while country-benchmark fixed effects is capturing the average weight in a country within a benchmark. The inclusion of these fixed effects mean that the identification comes exclusively from the time variation of the data (within a fund-country). At lower frequencies, these benchmarks are still pro-cyclical but the importance of pass-through declines, which is consistent with other factors (changes in free floats, foreign inclusion factors, and so forth) affecting these benchmarks.

To the extent that international mutual funds follow benchmarks in guiding their investment strategies, our findings suggest that the pro-cyclicality of benchmark weights may impinge a similar cyclical bias to the allocations of these institutional investors. The rest of the paper explores this possibility.

4. How closely do mutual funds follow benchmarks?

As discussed above, most mutual funds declare a benchmark index as a guide for their investment strategy and as a metric for their performance. Of course, this does not mean that their portfolio allocations need to resemble those of the benchmark index they declare. However, to the extent that they do, the pro-cyclicality of benchmark country weights documented in the previous section may act as a coordinating device among funds and contribute to transmit and amplify pro-cyclicality. We follow two approaches to study how closely the country weights of funds follow those of their benchmark indexes. First, we follow Cremers and Petajisto (2009) to compute a measure of a fund's deviation from their benchmark allocation (their active share). Second, we use regression analysis to document how a fund's country weight responds to movements in benchmark weights.

Following Cremers and Petajisto (2009), we construct the following active share (AS) measure to compute how much funds deviate from the country allocations of their benchmarks:

$$Active\ Share_{it} = \frac{1}{2}\sum_{c}\left|w_{ict} - w_{ict}^{B}\right| \quad (1)$$

where w_{ict} is the percentage of assets held in country c by fund i at time t, and w_{ict}^{B} is the country weight in country c at time t for the benchmark assigned to fund i.[22]

This measure gives us the percentage of a fund's portfolio that is deviating from the portfolio of their benchmark and, as mutual funds have only long positions, it ranges from 0 to 100 percent. As it is standard in the literature, we divide our funds according to their degree of activism. Explicit indexing funds are those that declare to be either ETFs or passive funds. Next in terms of activism are the so called *closet indexing* funds, which are those that at a given point in time have an active share within two standard deviations of the active share of explicit index funds.[23] Funds not belonging to either of these two groups are classified into *mildly active* (*truly active*) if they are in the lower part (upper) of the distribution of AS (measured by the median of AS).[24]

After classifying our funds we study how active these funds are. Appendix Table 1 presents descriptive statistics for AS in equity (Panel A) and bond funds (Panel B). The results show an important degree of activism in international mutual funds, even after considering only countries inside the benchmark. Also, investments

[22] Cremers et al. (2011) also use this measure for international mutual funds.

[23] More precisely, a fund is classified as closet indexing t time if $AS_i < \overline{AS}_i^{EI} + 2 * SD(AS_i^{EI})$, where AS_i is the active share sample mean of fund i, $\overline{AS}_i^{EI}$ is the sample mean of active share across explicit indexing funds and $SD(AS_i^{EI})$ is the standard deviation of AS across explicit indexing funds.

[24] Two caveats should be made here. Firstly, Cremers and Petajisto (2009) have detailed asset allocations, while our database only covers country allocations. They define a fund to be Truly Active if AS>60 percent, because it has more than half of its portfolio outside the benchmark. However, for our database covering country allocations, this definition no longer applies. Secondly, we propose dividing funds into four categories instead of three to have a more balanced composition of each group.

in countries inside the benchmark appear less volatile than outside the benchmark investments for equity and bond funds. Among the different type of funds, global equity funds seem to be the more active, followed by global emerging and regional funds, but these differences are small in magnitude. Furthermore, our classification of the degree of activism highlights the differences in AS across groups. Explicit indexing equity funds have 4.3 percent (22.8 percent in bond funds) of their portfolio outside their assigned benchmark, while truly active funds have 37.1 percent (48.1 percent).

The active share measure offers an overall view of how close are funds country weights to those of their respective benchmarks but do not show how country weights respond to changes in benchmark weights. To this end, we estimate a set of panel regressions where we relate a fund's (log) country weight to its (log) benchmark weights including different sets of fixed effects to capture shocks from various dimensions (Table 4).[25] Results reported in Panel A focus on equity funds, which seem to closely follow benchmark country weights. Considering all equity funds, the estimated coefficient of benchmark weights is near 0.7 when we include fund-country and fund-time fixed effects. Moreover, the log country benchmark weights and the fixed effects explain almost 86 percent of the variation in log country weights. The results for global and global emerging funds are similar, while regional funds appear to be more responsive to log country benchmark weights.

Unsurprisingly, we find that the relation between fund's and benchmark's weights decreases with the degree of activism (columns 5 to 8), but our findings offer a quantitative perspective on the extent to which benchmark weights matter. The results show that explicit indexing funds move almost one-to-one with benchmarks,

[25] As we mention earlier, we are focusing in the intensive margin of country allocations by using log weights instead of all (including zero) country weights. The main advantage is to have a better fit, although results for all the weights are qualitatively similar and are available upon request.

the estimated coefficient is 0.96 and 98 percent of the variance of their country weights is explained by the benchmark, and closet indexing funds are not far away from them, with an estimated coefficient of 0.88 and an explained variation of 92 percent. Among active funds, mildly active funds display a coefficient of 0.68 (87 percent of the variation explained by movements in the benchmark) and truly active funds have a beta of 0.5 (and an R-squared of 85 percent). Another interesting feature of these results is that without including fixed effects benchmark weights explain 40 percent of the variation in country weights of truly active funds. But once fund-country fixed effects are included this explained variation increases to almost 80 percent. This indicates that an important part of their "activism" comes from persistent deviations from the benchmark.

Panel B presents results for bond funds, which are qualitatively similar, but where explicit indexing funds do not move one-to-one with benchmarks (although the explained variation by benchmarks is still 99 percent). However, this might be due to a small sample problem given that we have few explicit indexing bond funds in our sample.

While our results points to mutual funds following benchmark allocations closely, it could be that they are following the average industry allocation instead.[26] The results in Table 5, which control for the log industry weight (the median weight across a specified segment of mutual funds), do not support this hypothesis. . Benchmark weights appear much more important than industry weights in the country allocation of mutual funds.

Results are also robust to the inclusion of actual and forecasted macroeconomic variables. Benchmarks could be just reflecting this information and

[26] The literature on managerial incentives highlights the use of relative performance evaluation, where individual managers' performance is measured against the industry to control for common shocks. The literature on herding also relates individual to average behavior.

thus mutual funds could be deciding their country allocations considering these variables. However, in exercises that include standard high frequency measures of actual and expected macroeconomic variables as controls, the coefficient from the benchmark index remains almost unaltered (Table 6).[27]

To sum up, mutual funds follow benchmarks to a large extent even when considering movements in weights on top of fund-time and country-fund fixed effects. While, on average there is some active behavior, more than 80 percent of the movements in country weights are explained by movements in benchmark weights and fixed effects. For explicit and closet indexing funds there is an almost complete pass-through from benchmarks to country allocations, while active funds move less than one-to-one with benchmark weights.

5. Shocks to relative returns and portfolio re-allocations

Our finding that the country-weights of international mutual funds track those of their benchmark indexes suggests that shocks to a country's relative returns may spillover to other countries through a portfolio rebalancing effect.[28] To test for the presence of this rebalancing effect and quantifying its importance, we identify cases where a benchmark index is hit by a shock to one of its constituent countries, and compare the change in weights of third-party countries in funds that follow that index and funds that do not follow it.

[27] Results are also robust to the selection of benchmarks. Appendix Table 4 shows similar estimations to that of Table 4 but assigning the minimum active share benchmark to each fund as in Cremers and Petajisto (2009). The conclusions remain the same.

[28] The mechanism is the following: Let us consider a country hit by a large positive shock to its returns. Ceteris paribus, our previous results indicate that the weight of this country should increase in all benchmark indexes that include it. Conversely, the weights of all other countries included in those same benchmark indexes should decrease since weights must add up to 100. Now consider another benchmark in which the country having the shock is not included. Since no country included in the latter benchmark is hit by a shock, country weights do not change. Thus, there are spillovers to countries sharing the same portfolio (benchmark) with a country that is severely shocked.

Figure 4 shows two cases of international spillovers and illustrates our more formal identification strategy (explained in more detail below). In July 2008 Turkey experienced an increase in its relative returns of 35.78 percent respect to other emerging markets of the region (Panel A). Russia shares the MSCI Emerging Markets EMEA index with Turkey, but is also part of the MSCI Emerging Markets Eastern Europe where Turkey is not included. The figure shows that the weight of Russia in both indexes declined, but its decline was much larger in the EMEA than in the EMEE. Furthermore, the decline was larger among funds following the EMEA than among those following EMEE (-12.64 percent versus -8.08 percent). Panel B displays another example focused on developed countries. In this case, a positive shock (17.05 percent) to Spain in November 2010, reduces more the weight of Japan in an index that it shares with Spain (MSCI AC World Ex US), than in an index where Spain is absent (MSCI AC Asia Pacific).

To formally test for the presence and extent of rebalancing spillovers beyond these simple examples, we run the following regression:

$$\ln(w_{ict}) - \ln(w_{ijc-1}) = \alpha + \theta_c + \gamma_t + \phi S_{ct} + \delta D_{it} + \varepsilon_{cjt} \quad (2)$$

where w_{ict} is the weight of a fund or benchmark (indexed by i) in country c at time t, θ_c are country fixed effects, γ_t are time fixed effects, S_{ct} is a dummy that takes the value 1 if country c is hit by a large shock to relative returns (defined below) at time t, and D_{it} is another dummy that takes the value 1 if any of the countries included in benchmark i is hit by a large shock at time t (but not in $t-1$). The variable ε_{ict} is an error term. We normalize the dummies such that positive and negative shocks go in the same direction and are symmetric (i.e., dummies take the value -1 for a large negative shocks). A country is considered hit by a large shock at time t if its relative return falls in the 1, 5, or 10 percent tails of the distribution of relative returns. The

coefficient of interest is δ, which captures the average difference in (percentage) weight change of country *j* between a fund or benchmark that is hit by a shock (i.e. $D_{it} = 1$) and one that it is not ($D_{it} = 0$),

Table 7 displays the results from this estimation. Consecutive columns report regressions using the change in mutual funds weights and in benchmark weights as dependent variables. The main finding is that, across specifications, δ is negative and statistically significant. Since shocks are normalized to be positive, this means that the portfolio weight of a country in a fund or a benchmark hit by a positive shock declines relative to its weight in a fund or a country that it is not hit. This relative decline results from the relative rise of the country hit by the positive shock (the source country), whose coefficient is positive and statistically significant. Quantitatively, a positive return shock to a country corresponds on average to a 19 percent increase in its weight in funds and benchmarks that include it. Other (third-party) countries included in these funds and benchmarks experience a percent decline in weight between 0.6 and 0.8 relative to the behavior of their weights in other funds. Results controlling for the relative importance of the source country by interacting D_{it} with the initial country weight of the source country are similar. Results obtained for equity funds are robust to using different cutoffs to define a large shock, but for bond funds the results are robustly significant only when using benchmark weights.

6. Exogenous shocks to benchmarks

The previous results show that mutual fund country weights track those of their declared benchmarks. Since the calculation of benchmark weights follows a pre-defined, mechanical formula, one can reasonably argue that movements in benchmark country weights cause movements in mutual fund country weights. However, since

our data come at monthly frequency, it is possible that, at that level of aggregation, decisions of mutual fund managers may have price effects that change relative market capitalizations, affecting benchmark weights and inducing some reverse causality.

We provide two types of evidence to tackle these concerns. First, we focus on a few case studies of exogenous changes in MSCI benchmark indexes and show that these changes affect mutual funds portfolio weights. Second, we move beyond these cases and provide evidence that the component of benchmark weights that is unrelated to changes in relative returns (which is the component that could be affected by reverse causality) induces changes in mutual fund country weights.

From time to time, index-producing companies announce major changes to the calculation of indexes. The most important changes have to do with upgrades/downgrades of countries between three broad categories: developed, emerging, and frontier markets. These movements are driven by long-term considerations unrelated to movements in relative prices. In addition to these broad changes, the addition/deletion of securities from the indexes has in some cases a measurable impact in a country's benchmark weights. We have collected information of several such changes that we use to study the impact of these exogenous (respect to contemporaneous country returns) changes in benchmark weights.[29]

In May of 2010, MSCI decided to upgrade Israel from the emerging market index to the developed market index. This means that, at the time of the upgrade, the benchmark weight of Israel in the MSCI Emerging Market index moved from about 3 percent to zero and its weight in the MSCI World index moved from zero to 0.39 percent.[30] Figure 5 shows the behavior of the average country weight of Israel among

[29] There are also examples of changes in the free float rates and changes in the calculation of exchange rates that exogenously affect the calculation of the country benchmark weight and not through prices.
[30] In time, we observe a lot of downgrades by MSCI, but these are countries that when the downgrade is formalized their importance in the index is almost 0 percent.

funds that declare to follow the MSCI Emerging Market index (left panel) and the MSCI World index (right panel). Each panel divides funds according to their degree of activism and shows those at the two extremes: explicit indexing and truly active funds.[31] Both panels show that explicit indexing funds track the benchmark very closely. When Israel is dropped from the MSCI Emerging Market index, funds that follow this benchmark quickly drop Israel's weight to zero, and those following the MSCI World index quickly incorporate Israel in their portfolios. Truly active funds do not react so quickly to the upgrade, but still they gradually adjust their portfolio in a manner that is consistent with the movement in the benchmark weights.

Figure 6 reports similar information on the trajectories of average country-weights in several other upgrade/downgrade episodes. Panels A and B show the upgrades of Portugal and Greece from the emerging market index to the developed market index in the late 1990s and early 2000s, respectively. We only show the behavior of funds following the global emerging funds without separating between passive and active funds because our sample includes few global funds and also few passive funds at that time. There is, again, a gradual adjustment of country weights to levels close to zero in both cases.[32]

Two types of systematic econometric evidence of the impact of exogenous changes of benchmark weights on country weights complement the visual evidence of the case studies presented above. First, we conduct a systematic version of the case studies by testing whether the relation between a fund's country weight and a country's relative return is as strong in episodes of exogenous changes in benchmark weights as in the rest of the sample. The idea behind the test is that if changes in

[31] In all cases, averages are weighted by TNAs.

[32] Appendix Figure 1 presents similar evidence for events that are not downgrade/upgrades of countries but have a considerable impact on benchmark weights. While benchmarks are followed during these episodes by all mutual funds, passive (explicit and closet indexing) funds respond more importantly to these exogenous events than active (mildly and truly) funds.

funds' country weights around exogenous changes in benchmark weights are driven by contemporaneous changes in relative returns, the relation between fund country weights and relative returns should be as strong during these episodes as in the rest of the sample.[33]

The case studies described above were gathered from major news and are too sporadic to warrant an econometric analysis. However, we lack complete information on other methodological changes in the calculation of benchmark weights that we could use to identify other episodes. For this reason, we follow a de-facto approach to complement our episodes with other likely exogenous changes in benchmark weights. We identify the latter by first noticing that exogenous changes to MSCI indexes are released in the months of March, June, September and December. Next, we compute the difference between actual changes in log benchmark weight and the changes implied by relative returns (see the evidence in Table 3) during these months. We assume that finding a large difference in any of these months is likely due to the announcement of an exogenous change in the calculation of the index. We consider as large differences those below the 1^{th} and above the 99^{th} percentile of the sample distribution. We implement our test by running a regression of (log) country weights against its lagged value, relative returns, and the interaction between these variables and a dummy indicating the occurrence of one of our exogenous episodes. Results, presented in Table 8, systematically show that the relation between (log) country weights and relative returns is significantly weaker in months when we identify an exogenous episode, as indicated by the significantly negative coefficient obtained for the interaction between relative returns and the episode dummy.

[33] On the contrary, if the component of benchmark weights that is unrelated to returns matters during these episodes one should a weaker relation between country weights and relative returns.

Then, we extend to a more general setting our systematic econometric analysis of the relation between changes in country weights and changes in benchmark weights unrelated to relative returns. Instead of focusing only in large episodes of exogenous changes in the benchmark weights we use all available information by noticing that the same approach used to identify de-facto likely exogenous changes in benchmark weights can be applied to the whole sample. Thus, we decompose each actual benchmark weight into a component that is consistent with its previous value and the movement in relative returns (which we label the "buy-and-hold" benchmark weight) and a residual. Next, we estimate the same specifications of Table 4 replacing the benchmark weight by its two components. The results, reported in Table 9, systematically show that the residual component, which is unrelated to the changes in benchmark weight related to relative returns, has a significantly positive effect on a fund's country weight. As expected, the relation is decreasing in the degree of activism, but even active funds' allocations are positively correlated to this component of benchmark weights.

Overall, the evidence presented in this section indicates that it is unlikely that our main results about "the benchmark effect" are mainly driven by reverse causality, and that there is a causal link between changes in benchmark weights and changes in funds country weights.

7. From country weights to capital flows

The results presented so far provide evidence of a causal relation between benchmark and mutual fund country weights. In this section we show that this relation extends beyond portfolio allocations to have consequences for capital flows. While there is a direct relation between changes in mutual fund country weights and country flows

when a fund's TNAs are constant, the possibility of redemptions breaks this simple link. Furthermore, in this section we move beyond the capital flows implied by our sample of mutual funds and relate the benchmark effect to actual portfolio flows from balance of payment data.

We first test whether mutual funds' country flows follow the benchmark, in the sense of being correlated with the country flows of a hypothetical fund that perfectly follows the benchmark, and has the same injections/redemptions. We label the country flows of such hypothetical benchmark as "benchmark flows". Formally, the benchmark flow from fund i to country c at time t, F_{ict}^{B}, is defined as

$$F_{ict}^{B} = F_{it} * w_{ict}^{B}, \tag{5}$$

where F_{it} are the injections/redemptions to fund i at time t (in billions of U.S. dollars) and w_{ict}^{B} is the weight of country c in the benchmark index declared by fund i (the benchmark weight). [34] The intuition behind this definition is simple: a fund that perfectly follows a benchmark has to allocate every dollar it gets proportionally to benchmark weights, otherwise its final country allocations will deviate from those of the benchmark.

Starting from this definition, we estimate the following regression to test for a relation between a fund's country flows and its corresponding benchmark flow:

$$F_{ict} = \alpha + \beta * F_{ict}^{B} + \lambda_{it} + \gamma_{ic} + \varepsilon_{ict}, \tag{6}$$

where F_{ict} is the flow from fund i to country c at time t, λ_{it} and γ_{ic} are potential sets of fixed effects, and ε_{ict} is an error term.[35]

[34] These injections/redemptions are calculated as $F_{it} = (AUM_{it} - AUM_{it-1} * R_{it})$, where AUM denotes the assets under management of a fund and R_{it} are the gross returns of a fund obtained from the NAV.

[35] Country flows are computed as $F_{ict} = (w_{ict} * AUM_{it} - w_{ict-1} * AUM_{it-1} * R_{ct})$, where R_{ct} are the gross returns of the MSCI country index between time t and $t-1$.Country flows, benchmark flows and fund returns are controlled for outliers at the 1 and 99 percent plus a window of 2 standard deviations.

The results from estimating equation (6), reported in Table 11, show that mutual funds country flows are highly correlated with benchmark flows. On average across all funds, an injection of 1 dollar to a fund results in country flows of 0.74 dollars times the benchmark weight. This coefficient is higher for global emerging and regional (0.82 and 0.68) funds and lower for global funds (0.44). The results are similar when we include different types of fixed effects capturing fund-time and country-fund shocks. Benchmark flows explain between 30 and 41 percent of the variations of country equity flows, depending on whether fixed effects are included. There is also, as expected, a clear link between the degree of activism and the sensitivity of fund country flows to benchmark flows. An explicit indexing fund allocates 80 cents of every dollar received proportionally to the benchmark weight. This number declines for funds that are more active, being 0.62, 0.45, and 0.23 for closet indexing, mildly active, and truly active funds respectively.

Results for bond funds (Panel B) are similar, although the smaller magnitude of the estimated coefficients suggests that these funds are less linked to benchmark flows than equity funds.

All in all, the results presented in this section show that the relation between mutual funds and their declared benchmarks extend beyond country allocations to country flows. This means that the pro-cyclicality of benchmark weights not only impinges pro-cyclicality to funds country allocations but also to the resulting fund country flows. Thus the coordinating mechanism provided by movement in benchmark weights may have large consequences for aggregate country capital inflows and market returns.

8. Conclusions

This paper shows how benchmarks affect asset allocations and capital flows across countries using a novel data set on global, global emerging, and regional mutual funds based around the world that invest in equities and bonds. We find that benchmarks have important effects not only because more funds are explicitly declaring that they follow benchmarks but also because they tend to follow these benchmarks closely. Given that benchmarks are based on market capitalization, they instantaneously absorb any shock to the countries in the index and this effect triggers immediate reactions by international mutual funds receiving injections or redemptions. Although different types of funds follow their declared benchmarks, there is significant variation. Some of them are tightly closed to the benchmarks (the ones that explicitly follow an index or that are closet indexing) while others take a more active investment approach.

These results have many implications for the allocation of assets across countries and the ensuing capital flows. First, as a country becomes more important in a benchmark, it becomes more sensitive to shocks because injections and redemptions have a stronger effect on the capital flows to this country. While this effect might be entirely driven by fundamentals, for example by the country growing in importance in the world economy, it can also be driven by non-fundamental factors such as bubbles or self-fulfilling expectations. For example, if investors suddenly favor a country and drive its asset value upward, the subsequent injections that the mutual funds (that include this country in their portfolio) receive will be more tilted toward this country. This in turn might generate more upward pressure in prices, reinforcing the effect. This positive-feedback effect increases as more funds follow benchmarks indexes more closely over time, generating more pro-cyclicality. Cremers et al. (2011) present

evidence worldwide that funds are becoming less active, which could generate this increase in pro-cyclicality.

Second, the findings in this paper explain part of the pro-cyclicality previously documented in Raddatz and Schmukler (2012) by international mutual funds. While the underlying investors injecting funds during good times and retrenching during bad times drive this pro-cyclicality, a significant portion is explained by manager behavior. Our paper suggests that a non-trivial part of the manager behavior is driven by the fact that managers follow standard benchmark indexes. Therefore, the use of benchmarks as disciplining mechanisms coordinates the asset allocation across institutions, which might explain the observed herding and information cascade effects.

Third, the evidence suggests that the inclusion or exclusion from the benchmark indexes can have significant effects on the countries and firms that constitute these indexes. The clear example of Israel illustrated in this paper shows that funds reduce their exposure when a country is removed from an index and increase it when it is added. This case is useful because the reduction in exposure from the country that is removed is triggered through the liquidation of those assets, not through price effects. On the contrary, when countries are removed from indexes because of bad performance, the final selloff effect seems to be low because prices had declined over time before these events occur, driving the exposure close to zero. Furthermore, the reclassification of countries from emerging to developed, like the case of Israel, is likely to have significant effects on capital flows given that the assets under management in global funds tends to be much larger than those in emerging market funds, even when the weight in a global portfolio is smaller. These changes might pose difficulties to investors and policymakers, particularly in countries with a

limited number of assets in the short run. For example, countries that improve its standing by conducting a restrictive fiscal policy will reduce the number of bonds in the market and increase the probability of being included in more indexes, triggering a larger price effect in the prices of the available assets.

The findings in this paper open several other avenues for further research. One possibility is that, by trying to replicate the benchmark index, these funds anticipate some type of reaction by other funds and overreact to relative returns. Another natural extension is to measure the contagion effects across countries in light of the behavior of mutual funds that follow benchmark indexes. Another interesting question is to what extent the more active funds' behavior is related to performance following the research already under way. Are they able to exploit arbitrage opportunities unreachable to funds that need to closely follow indexes? Moreover, what is the effect of indexing on asset allocation, returns, capital markets, and the real economy? Are the behaviors that we observe for international mutual funds mirrored by domestic funds that manage a large part of global savings? All these are possible interesting extensions. Some of them will be pursued in future versions of this paper, while others will be material of other work.

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Appendix 1: An Example of the MSCI Index Calculation Methodology

The MSCI equity indexes measure the performance of a set of equity securities over time. The MSCI equity indexes are calculated using the Laspeyres' concept of a weighted arithmetic average together with the concept of chain-linking. MSCI country and regional equity indexes are calculated in local currency as well as in USD, with price, gross and net returns. Index levels are also available in several other currencies such as AUD, BRL, CAD, CHF, CNY, EUR, GBP, HKD, INR, JPY, KRW (starting on December 1, 2010), RUB and SGD. While the local currency series of regional indexes cannot be replicated in the real world, it represents the theoretical performance of an index without any impact from foreign exchange fluctuations — a continuously hedged portfolio. Indexes are calculated five days a week, from Monday to Friday with the exception of a selection of indexes that have a Sunday calculation available.

In certain cases, where there are no qualifying securities, it is possible for MSCI indexes to be empty following a security deletion or a change in GICS (Global Industry Classification Standard, which reviews these indexes). If an index becomes empty it would be dynamically discontinued. It is then possible for the index to be re-started once a new security qualifies for the index, and this index level would be rebased to an appropriate level at that time.

Price indexes measure the market price performance for a selection of securities. They are calculated daily and, for some of them, on a real time basis. Each index captures the market capitalization weighted return of all constituents included in the index.

As a general principle, index level at time *t* is obtained by applying the change in the market performance to the previous period index level.

$$P_t^{USD} = P_{t-1}^{USD} \frac{Ajdusted\ Mcap_t^{USD}}{Initial\ Mcap_t^{USD}}, \quad \text{(A1)}$$

where the numerator is the adjusted market capitalization in USD and the denominator is the initial market capitalization in USD. The exact definition of the adjusted market capitalization in USD is,

$$\sum_{s \in I,t} \frac{End\ of\ Day\ Number\ of\ Shares_{t-1} * Price\ per\ Share_t * Inclusion\ Factor_t * PAF_t}{FX_t}, \quad \text{(A2)}$$

and the definition for the initial market capitalization in USD is,

$$\sum_{s \in I,t} \frac{End\ of\ Day\ Number\ of\ Shares_{t-1} * Price\ per\ Share_{t-1} * Inclusion\ Factor_t}{FX_{t-1}}. \quad \text{(A3)}$$

The inclusion factor in the numerator is the inclusion factor of the security *s* at time *t*. The inclusion factor can be one or the combination of the following factors: foreign inclusion factor, domestic inclusion factor, growth inclusion factor, value inclusion factor, and index inclusion factor. These are inclusion factors that determine the free float market capitalization according to different characteristics of each security *s*. The *PAF* is the price adjustment factor of the security *s*, which is the adjustment factor that takes place after the payment of dividends, the split of shares, and so forth.

Appendix 2: The transmission of pro-cyclicality

To complete this section, we analyze in more detail what our results imply about how exogenous shocks to benchmarks affect country allocations by these funds, and also how pro-cyclicality is transmitted from benchmarks to international mutual funds. So far, we have run the following estimations for log benchmark weights ω_{ijt}^{B},

$$\omega_{ijt}^{B} = \beta_0 + \beta_1 * \omega_{ijt-1}^{B} + \beta_2 * \left(r_{jt} - r_{it}\right) + \varepsilon_{ijt}^{B} \quad \text{(A4)}$$

where $\left(r_{jt} - r_{it}\right)$ are net relative returns (country minus benchmark returns) and also a specification for log country weights in international mutual funds,

$$\omega_{ijt} = \gamma_0 + \gamma_1 * \omega_{ijt}^{B} + \varepsilon_{ijt} \quad \text{(A5)}$$

By combining the two, we obtain

$$\omega_{ijt} = \delta_0 + \delta_1 * \omega_{ijt-1}^{B} + \delta_2 * \left(r_{jt} - r_{it}\right) + \varepsilon_{ijt} + \gamma_1 * \varepsilon_{ijt}^{B} \quad \text{(A6)}$$

where $\delta_0 = \gamma_0 + \gamma_1 * \beta_0$, $\delta_1 = \gamma_1 * \beta_1$, and $\delta_2 = \gamma_1 * \beta_2$. This equation for mutual fund allocations shows the effect of exogenous shocks to the fund-time-country dimension ε_{ijt} and of exogenous shocks to benchmark ε_{ijt}^{B}. Moreover, it shows the pro-cyclicality implied by the benchmark captured by δ_2.

We focus on some examples for equity funds. We start with an exogenous 1 percent shock to the log benchmark weight at time t (for instance, an upgrade of Israel in the MSCI World). Then, explicit indexing funds should see their weight in that country increased by 1 percent as $\hat{\gamma}_1 \cong 1$. Instead, the more truly active funds should have an instantaneous increase in this particular country allocation of 0.5 percent.

Furthermore, we analyze the effect of an exogenous shock to relative returns $\left(r_{jt} - r_{it}\right)$, past or present. Again, for explicit indexing funds, $\hat{\delta}_2 \cong 1$ from the results

in Table 3 and Table 4. Thus, a positive 1 percent shock to relative returns at time t translates into an increase in 1 percent of country weights for that country, implying a complete pass-through. For truly active funds the pass-through is around half. Also, not only present shocks to relative returns affect country weights through the benchmark but also shocks to past relative returns. Let us consider a 1 percent shock to relative returns at time $t-1$. This shock affects w^{B}_{ijt-1}. In fact,

$$\frac{\partial \omega_{ijt}}{\partial (r_{jt-1} - r_{it-1})} = \beta_2 * \delta_1 = \beta_2 * \beta_1 * \gamma_1 \qquad \text{(A7)}$$

From our results, we get that the estimated $\frac{\partial \omega_{ijt}}{\partial (r_{jt-1} - r_{it-1})} \cong 1 * 0.98 * 1 = 0.98$ for explicit indexing funds implying an almost complete pass-through for a shock to relative returns at $t-1$. For truly active funds this number would be closer to 0.49. This simple example shows how our estimations imply that shocks to the benchmarks are transmitted to different type of funds. Moreover, we observe that the pro-cyclicality implied by the benchmarks (β_2) for present returns and (β_1) for past returns, has an effect on the pro-cyclicality of country allocations of international mutual funds.

Figure 1
Total Net Assets and Number of Equity Funds
(by Type of Fund and by Degree of Activism)

This figure presents the sum of annual's average total net assets per fund and year in our databases. Panel A shows the time series by type of fund and Panel B shows the same time series classified by degree of activism.

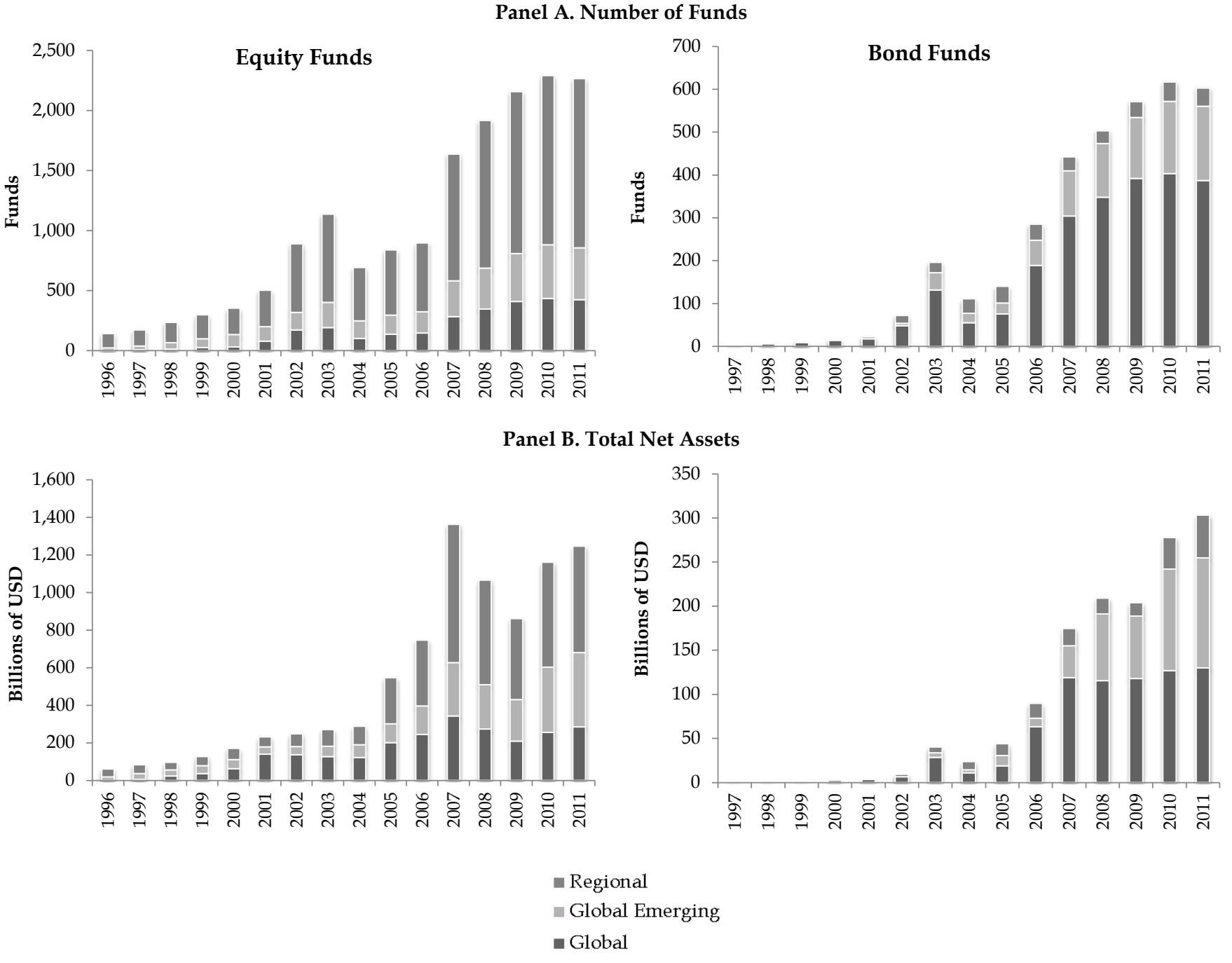
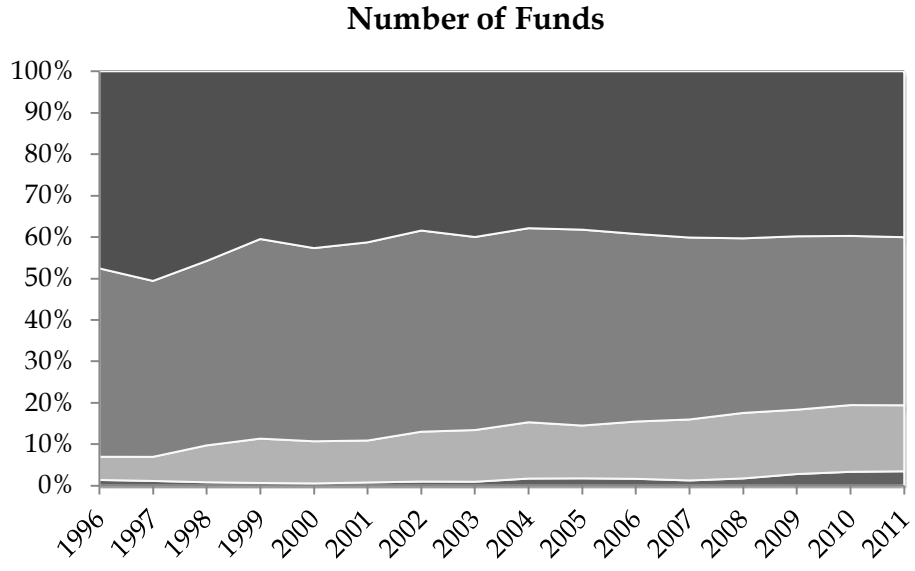
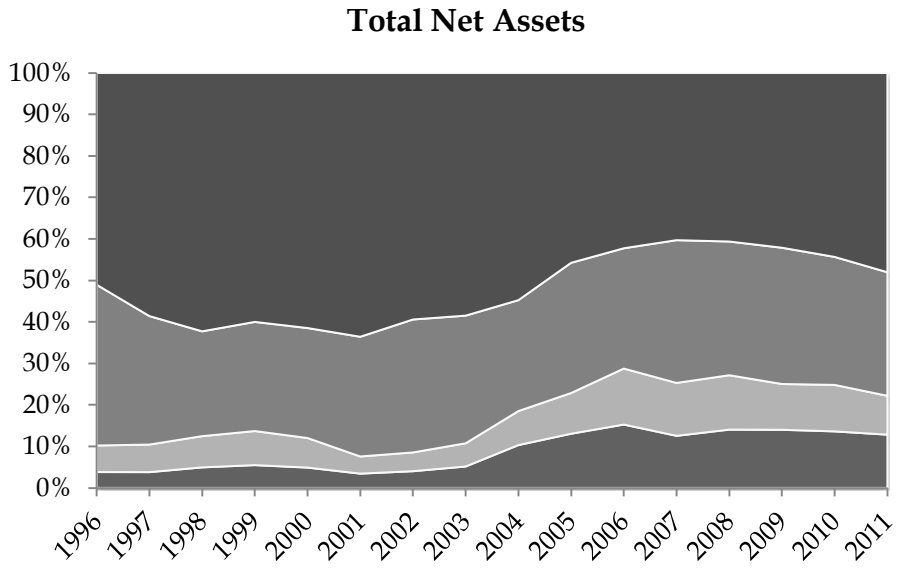


Figure 2
Total Net Assets and Number of Bond Funds
(by Type of Fund and by Degree of Activism)

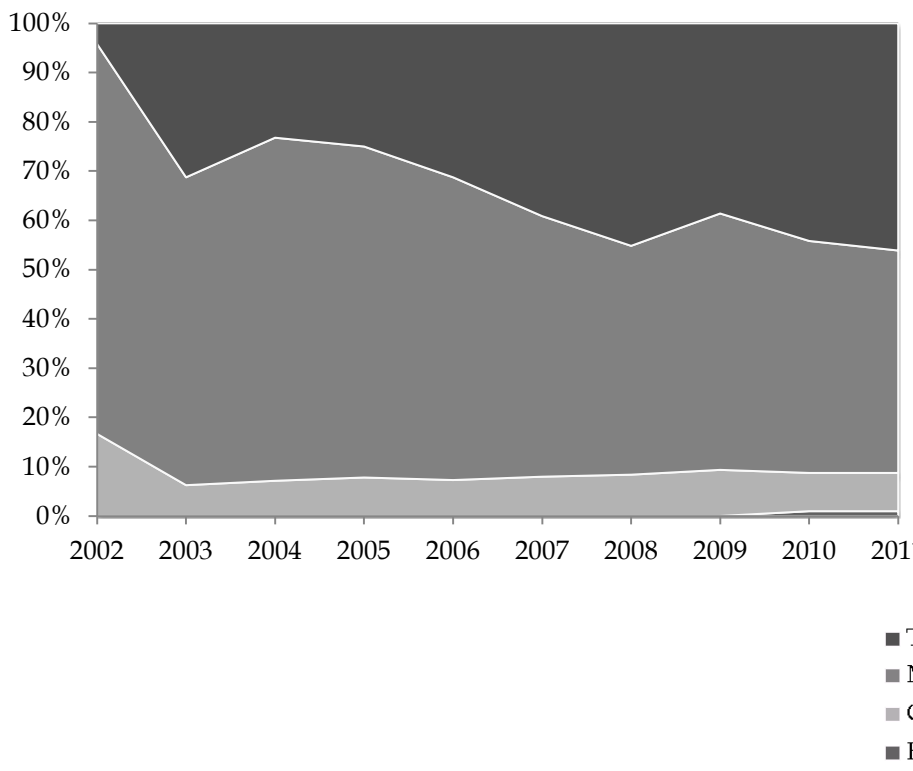
This figure presents the percentage of different type of funds and total net assets by degree of activism in each year in our databases. Panel A shows the time series for equity funds and Panel B shows the same time series by bond funds.

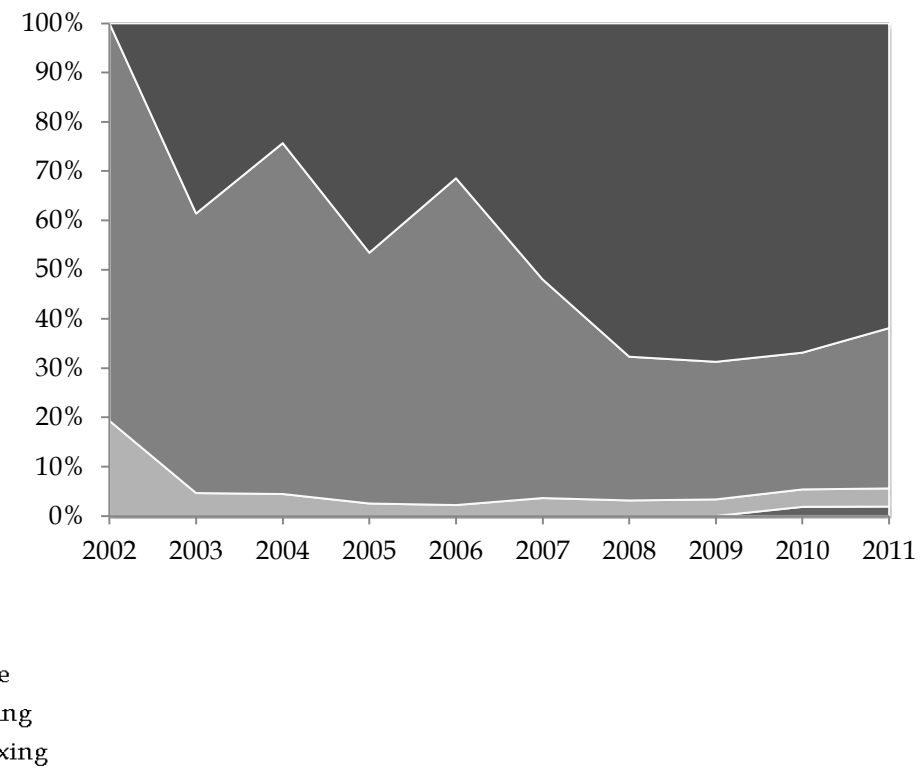
Panel A. Equity Funds





Panel B. Bond Funds





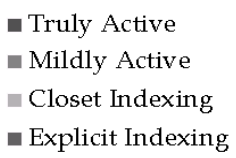
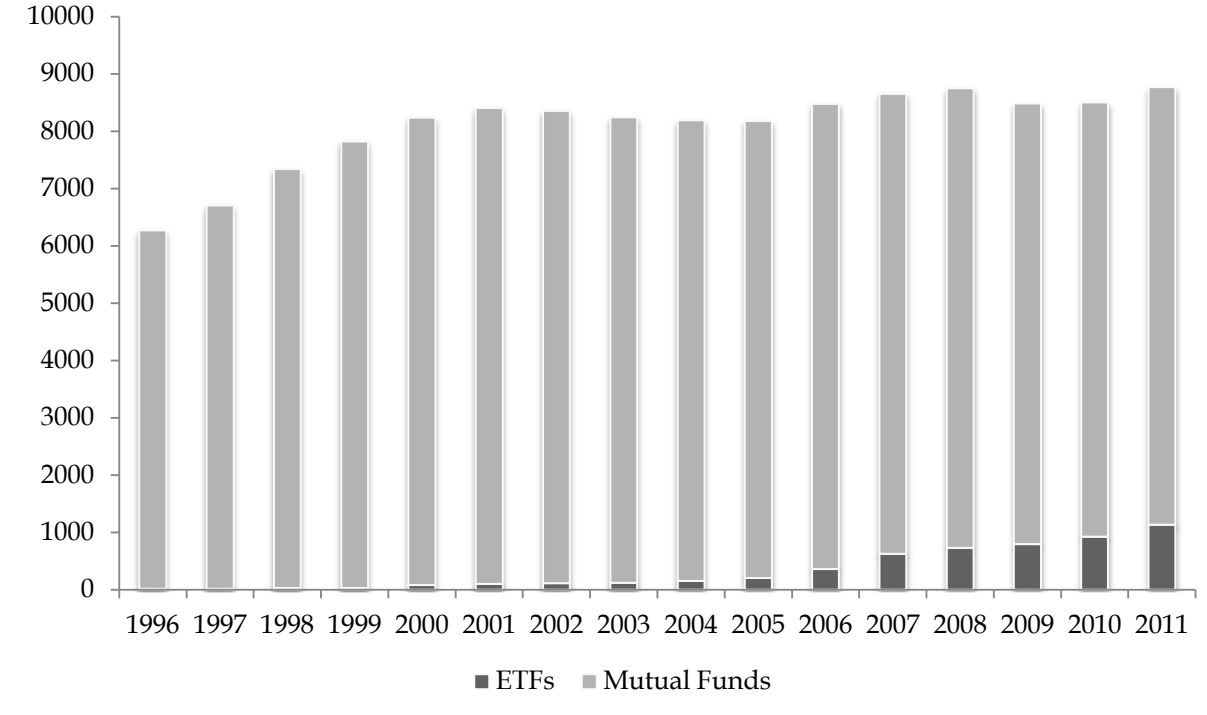


Figure 3
Open-end Mutual Funds versus ETFs (ICI Data)

This figure presents data from the Investment Company Institute on the number of funds and total net assets (in billions) of open end mutual funds versus ETFs in the United States.

Panel A. Number of Funds



Panel B. Total Net Assets (in Billions USD)

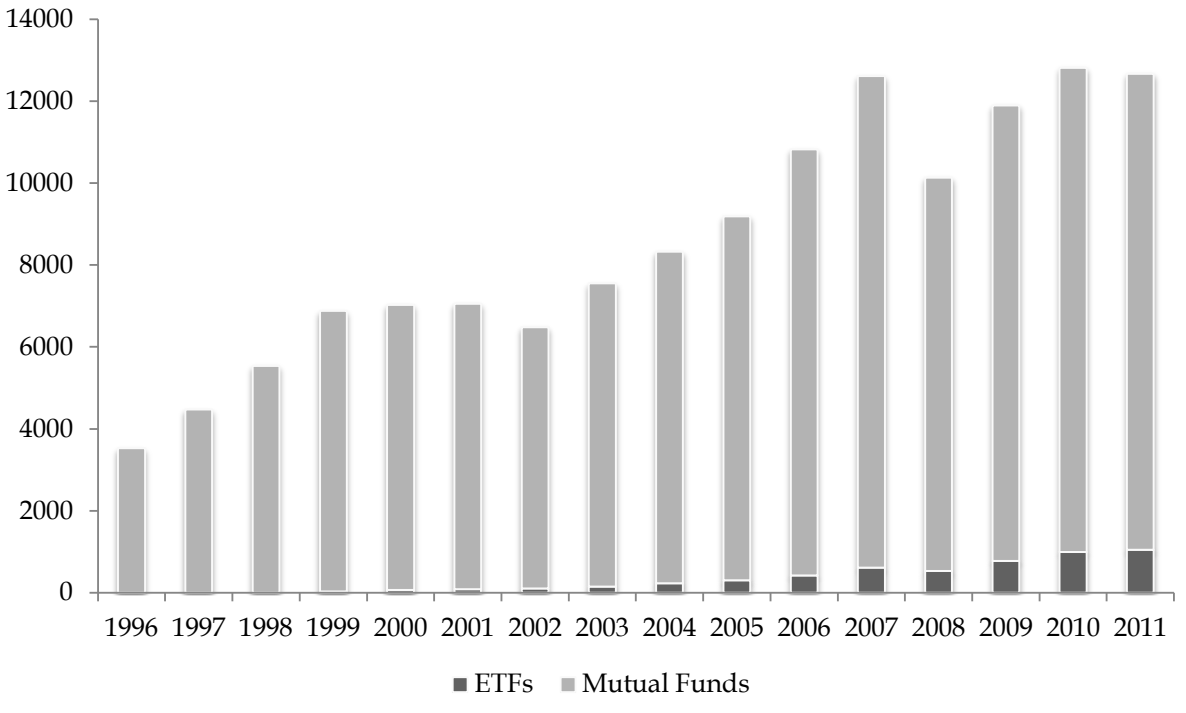
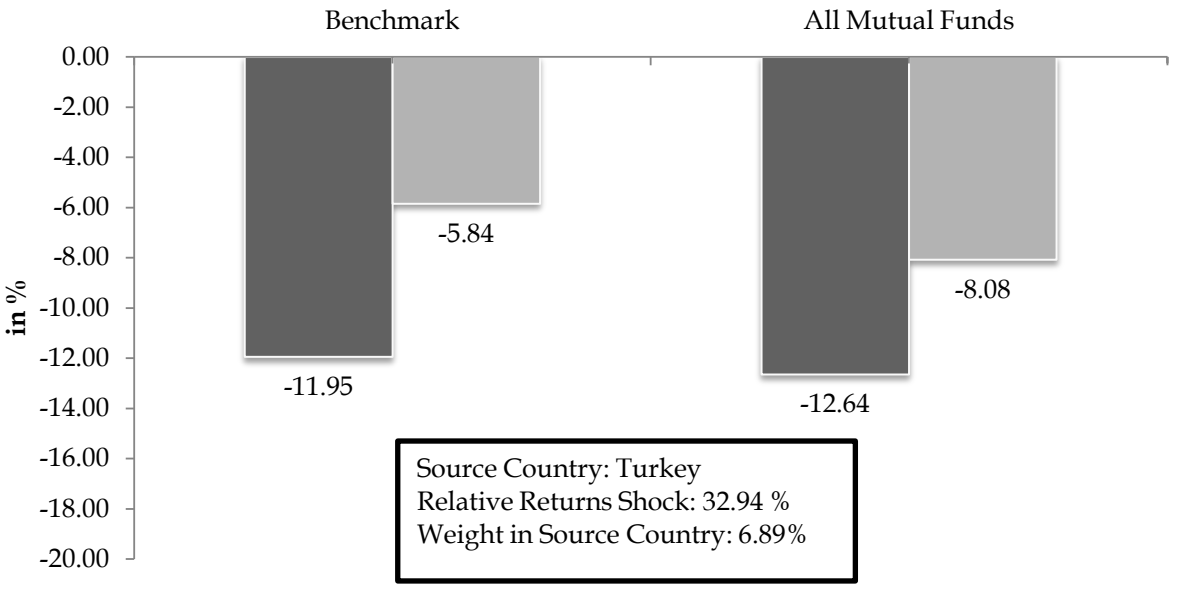


Figure 4
Shocks to Relative Returns and Portfolio re-allocations

This figure presents examples of portfolio re-allocations by benchmarks and funds when there are large shocks to relative returns in one country. Panel A displays the effect of a shock to Turkey in July 2008 in Russia. Panel B displays the effect of a shock to Spain in November 2010 for Japan. The effect is shown in a benchmark they share together (shocked benchmark) and in a benchmark they do not share (non-shocked benchmark). Numbers shown are the percentage change in weights for benchmarks and all mutual funds. In the case of funds the median percentage change was calculated.

Panel A. Shock to Turkey and effect in Russia (percentage change in weights)



Panel B. Shock in Spain and effect in Japan (percentage change in weights)

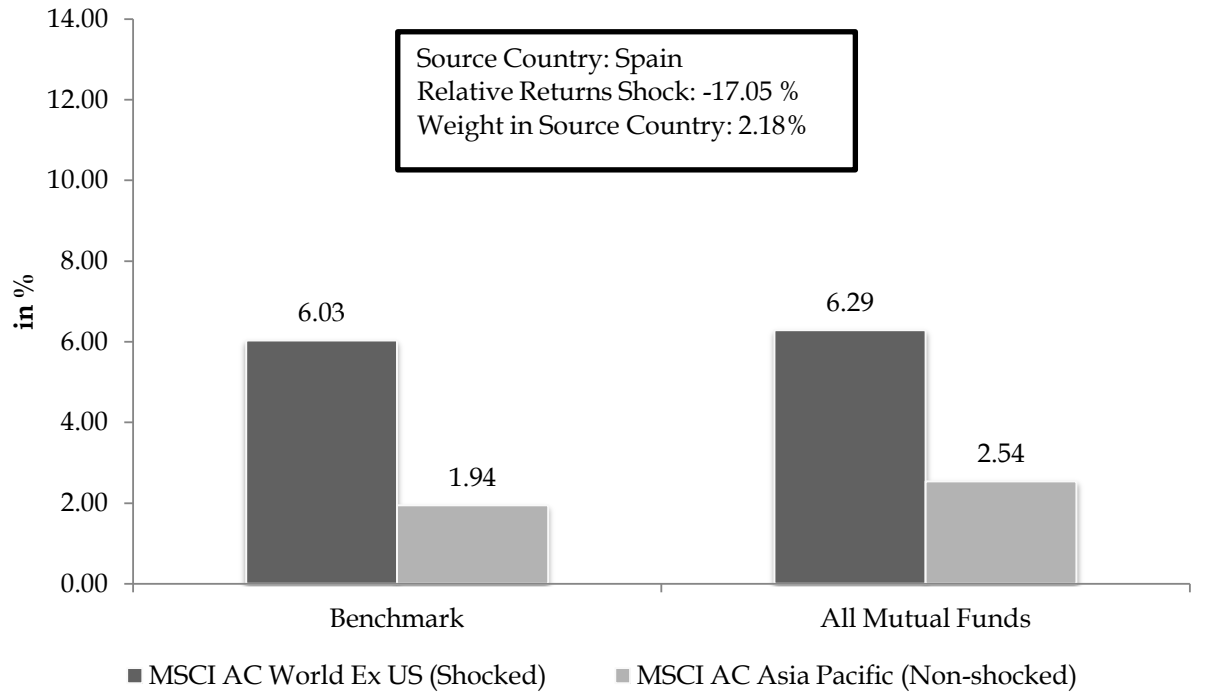


Figure 5
Israel Switch from Emerging Markets to Developed Markets in MSCI

This figures present an illustration of the Israel upgrade in MSCI benchmarks in May 2010. Mean weight Israel is the weighted (by TNAs) average of each type of fund. In the left panel funds considered are only included if they are following the MSCI Emerging Markets benchmark, and in the right panel funds considered are only included if they are following the MSCI World benchmark. In each case we included the correspondent benchmark weight (MSCI EM or MSCI World). The grey bar indicates the exact month of the upgrade.

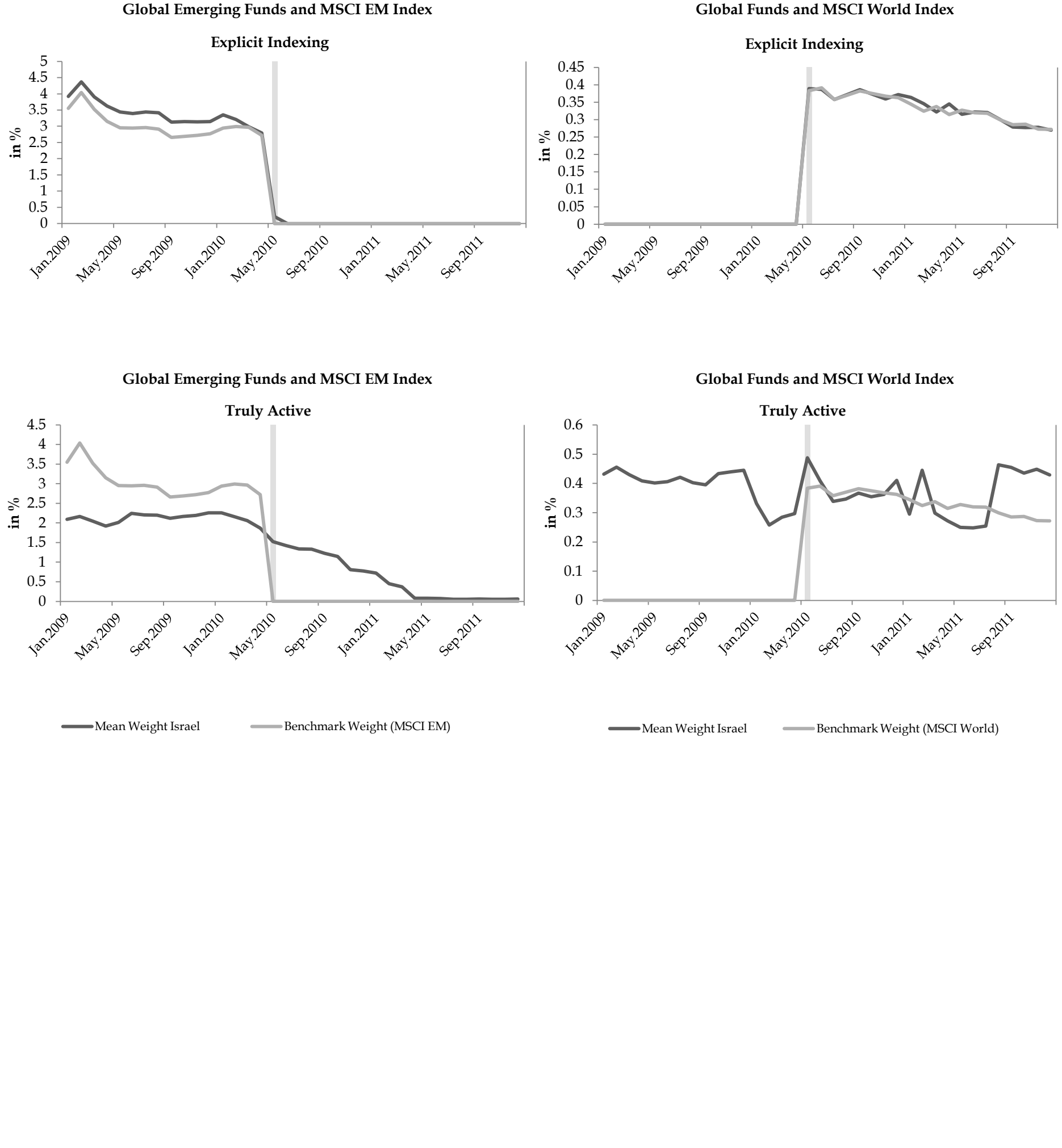
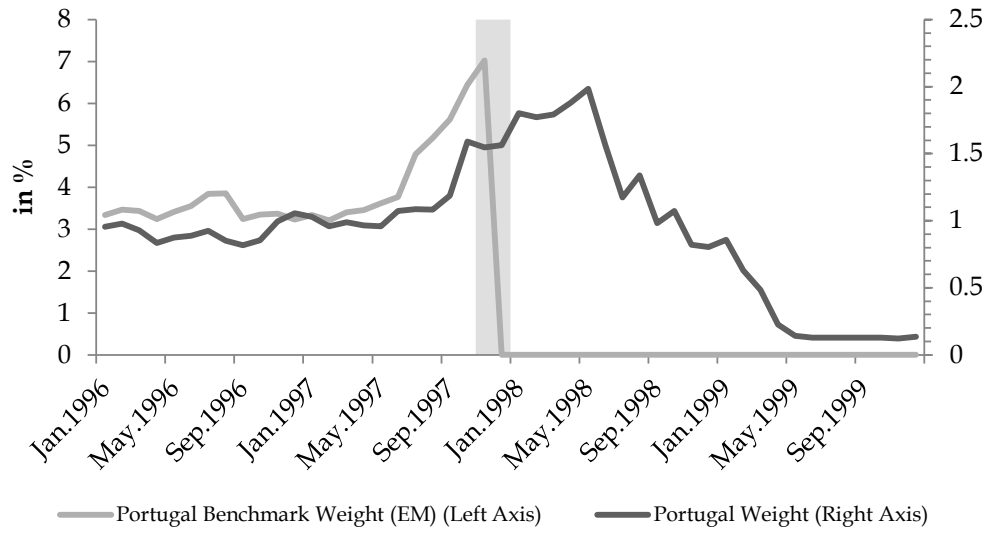


Figure 6
Downgrades and Upgrades from MSCI Emerging Markets Benchmark

This figure presents an illustration of the Portugal and Greece upgrade from MSCI Emerging Markets to MSCI Developed Markets benchmarks in December 1997 an June 2001 respectively. The weight is the weighted (by TNAs) average of funds with complete coverage in the period illustrated by the figure. We only presents figur for global emerging funds as there are few global and frontier markets funds in that period. In each case we included the correspondent benchmark weight (MSCI EM The grey bar indicates the exact month of the removal.

Panel A. Portugal upgraded to DM from EM



Panel B. Greece upgraded to DM from EM

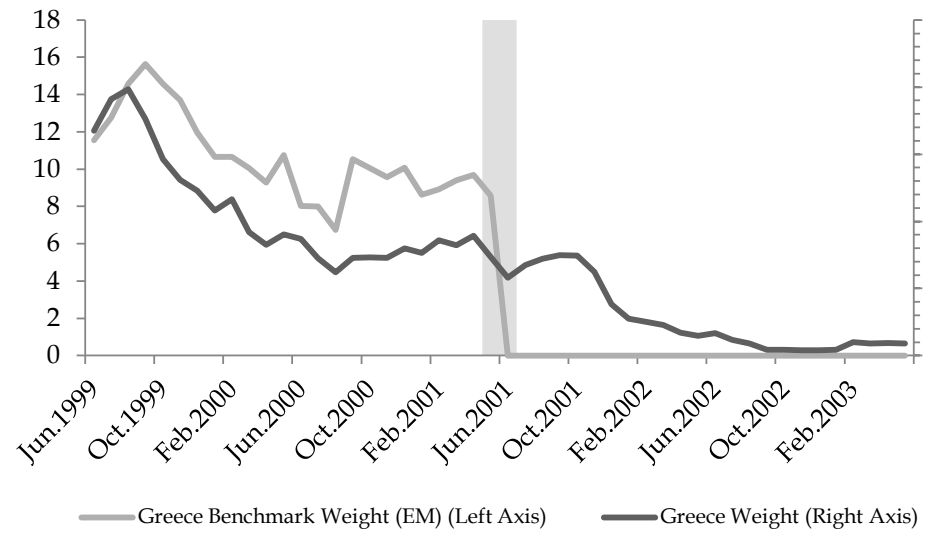


Table 1
Mutual Fund Summary Statistics

This table presents summary statistics on equity mutual funds from the joint Morningstar Direct/EPFR database. Panels A and C show statistics across the whole sample of equity and bond funds respectively. Column (1) presents the number of funds in each category. Column (2) presents the number of monthly observations among all funds within each category. Columns (3) and (4) present the first and last date, respectively, with available data in each category. Column (5) presents the median number of monthly reports within funds. Panels B and D present the number of funds and observations by different partitions for Equity and Bond Funds respectively. Funds are divided by degree of activism, type of fund, and according to the country in which the fund is based. When divided by domicile the category Others includes Andorra, Australia, Austria, Bahrain, Bermuda, British Virgin Islands, Cayman Islands, Estonia, Finland, Germany, Greece, Guernsey, Hong Kong, India, Isle of Man, Israel, Italy, Japan, Jersey, Liechtenstein, Lithuania, Mauritius, Netherlands, Netherlands Antilles, Norway, Portugal, Singapore, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, United Arab Emirates, and funds with unassigned domicile.

Panel A. Equity Funds

Number of Funds	Number of Observations (Fund-Month)	First Available Date	Last Available Date	Median Observations per Fund (Months)
(1)	(2)	(3)	(4)	(5)
2,837	156,253	January 1996	July 2012	70

Panel B. Number of Equity Funds and Observations by Different Attributes

	Number of Funds	Number of Observations (Fund-Month)		Number of Funds	Number of Observations (Fund-Month)
	(1)	(2)		(1)	(2)
By Degree of Activism			**By Type of Fund**		
Explicit Indexing	85	3,420	Global	569	29,037
Closet Indexing	939	50,906	Global Emerging	594	32,950
Mildly Active	994	58,960	Regional	1,674	94,266
Truly Active	819	42,967			
By Domicile					
Belgium	51	2,495	Luxembourg	348	22,360
Canada	349	22,225	United Kingdom	225	16,615
Denmark	85	4,995	United States	495	25,887
France	158	6,206	Others	917	44,588
Ireland	209	10,882			

Panel C. Bond Funds

Number of Funds	Number of Observations (Fund-Month)	First Available Date	Last Available Date	Median Observations per Fund (Months)
(1)	(2)	(3)	(4)	(5)
838	35,219	March 1997	June 2012	54

Panel D. Number of Bond Funds and Observations by Different Attributes

	Number of Funds	Number of Observations (Fund-Month)		Number of Funds	Number of Observations (Fund-Month)
	(1)	(2)		(1)	(2)
By Degree of Activism			**By Type of Fund**		
Explicit Indexing	21	588	Global	554	22,958
Closet Indexing	54	2,851	Global Emerging	220	8,568
Mildly Active	714	29,768	Regional	64	3,693
Truly Active	49	2,012			
By Domicile					
Denmark	40	2,002	Luxembourg	31	1,700
Germany	35	1,421	United Kingdom	36	2,008
Ireland	56	2,314	United States	85	4,725
Israel	43	1,367	Others	405	18,720
Italy	33	953			

Table 2
The Cross Section of Log Country Benchmark Weights

This table presents the results of ordinary least squares regressions of the log country weights for equity benchmarks on different variables. Panel A presents results for equity benchmarks and Panel B for bond benchmarks. This are cross sectional regressions. Weights were obtained first for December of each year. Then, we compute the average of each variable across years for each country-benchmark combination. Only the intensive margin is considered for each benchmark (0 weights are not considered). Country Risk is the country risk composite from ICRG, Quality of Institutions is the variable polity2 from Polity Database and Capital Account openness is the Chinn-Ito de jure index for capital account openness (available at their website). Errors are clustered by country. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Benchmarks

	Log Country Weights					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Cross Section					
Log Market Cap.	0.635 ***					0.604 ***
	(0.104)					(0.112)
Log Real GDP PPP per Capita		0.646 ***				0.115
		(0.181)				(0.172)
Country Risk			0.08 ***			0.038 *
			(0.019)			(0.022)
Quality of Institutions				0.023		0.042 ***
				(0.038)		(0.011)
Capital Account Openness					0.175	0.041
					(0.110)	(0.087)
Constant	-7.472 ***	-5.836 ***	-5.658 ***	0.300	0.213	-11.482 ***
	(1.254)	(1.768)	(1.475)	(0.304)	(0.195)	(1.515)
Benchmark Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	916	915	916	916	916	915
R-squared	0.474	0.334	0.344	0.287	0.295	0.507

Panel B. Bond Benchmarks

	Log Country Weights					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Cross Section					
Log Market Cap.	0.993 ***					0.994 ***
	(0.009)					(0.010)
Log Real GDP PPP per Capita		0.501 *				0.031
		(0.260)				(0.025)
Country Risk			0.021 ***			-0.002
			(0.029)			(0.002)
Quality of Institutions				0.064 **		-0.005
				(0.028)		(0.004)
Capital Account Openness					0.079	0.004
					(0.119)	(0.010)
Constant	-21.324 ***	-4.082 *	-1.056	0.047	0.346 *	-21.455 ***
	(0.206)	(2.294)	(2.044)	(0.215)	(0.201)	(0.229)
Benchmark Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	100	100	100	98	100	98
R-squared	0.995	0.166	0.102	0.159	0.099	0.996

Table 3
Behavior of Log Country Benchmark Weights

This table presents the results of ordinary least squares regressions of the log country benchmark weights on different variables. Panel A shows results for equity benchmarks and Panel B for bond benchmarks. The "relative returns" variable is the difference between country net returns and benchmark net returns, expressed as decimals. Estimations are performed at different frequencies and include different combinations of fixed effects. Only countries in the benchmark are considered for each estimation. Errors are clustered by country-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Benchmarks

	Log Country Weights							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Monthly					Semi Annual	Annual	Biannual
Log Lagged Weights	1.000 ***	1.000 ***	1.000 ***	0.984 ***	0.983 ***	0.878 ***	0.777 ***	0.626 ***
	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)	(0.014)	(0.017)	(0.021)
Relative Returns	0.959 ***	0.957 ***	0.960 ***	0.950 ***	0.950 ***	0.886 ***	0.767 ***	0.566 ***
	(0.013)	(0.013)	(0.014)	(0.013)	(0.014)	(0.018)	(0.018)	(0.019)
Benchmark Fixed Effects	No	Yes	No	No	No	No	No	No
Time Fixed Effects	No	Yes	No	No	No	No	No	No
Benchmark-Time Fixed Effects	No	No	Yes	No	Yes	Yes	Yes	Yes
Country of Destiny-Benchmark Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	98,549	98,549	98,549	98,549	98,549	93,704	88,751	79,687
R-squared	0.997	0.998	0.998	0.998	0.998	0.988	0.982	0.979

Panel B. Bond Benchmarks

	Log Country Weights							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Monthly					Semi Annual	Annual	Biannual
Log Lagged Weights	0.999 ***	0.998 ***	0.998 ***	0.976 ***	0.976 ***	0.858 ***	0.689 ***	0.425 ***
	(0.001)	(0.001)	(0.001)	(0.007)	(0.007)	(0.042)	(0.089)	(0.114)
Relative Returns	1.024 ***	1.023 ***	1.023 ***	1.009 ***	1.009 ***	0.737 ***	0.610 ***	0.509 ***
	(0.030)	(0.033)	(0.033)	(0.027)	(0.030)	(0.048)	(0.100)	(0.142)
Benchmark Fixed Effects	No	Yes	No	No	No	No	No	No
Time Fixed Effects	No	Yes	No	No	No	No	No	No
Benchmark-Time Fixed Effects	No	No	Yes	No	Yes	Yes	Yes	Yes
Country of Destiny-Benchmark Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes
Number of Observations	10,076	10,076	10,076	10,076	10,076	9,430	8,689	7,331
R-squared	0.996	0.996	0.997	0.997	0.997	0.983	0.973	0.965

Table 4
Log Weights vs. Log Benchmark Weights

This table presents OLS regressions with different set of fixed effects of log country weights against log benchmark country weights. Panel A displays results for equity funds and Panel B for bond funds. Funds are divided by fund type and degree of activism. Errors are clustered by country of origin-time. Standard errors are in parentheses. Standard errors for the fund by fund estimations are cross-sectional standard errors *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Funds

Variable	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
Log Weights (Fund by Fund-Median Coefficient)								
Log Benchmark Weights	0.793***	0.665***	0.759***	0.865***	0.998***	0.957***	0.761***	0.552***
	(0.292)	(0.219)	(0.297)	(0.305)	(0.049)	(0.190)	(0.177)	(0.343)
Median Observations per Fund	524	624	592	462	336	441	658	483
Number of Funds	2478	552	561	1365	70	772	818	818
R-Squared	0.645	0.589	0.574	0.720	0.991	0.825	0.628	0.420
(%) of Significant Coefficients at the 1% level	98.4	100.0	97.5	98.1	100.0	100.0	99.9	95.2
Log Weights								
Log Benchmark Weights	0.771***	0.734***	0.729***	0.804***	0.965***	0.929***	0.774***	0.604***
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Observations	1,619,985	419,817	475,224	724,944	37,187	449,715	641,816	491,267
R-Squared	0.609	0.586	0.502	0.644	0.943	0.816	0.618	0.398
Log Weights (Fund-Country Fixed Effects)								
Log Benchmark Weights	0.671***	0.533***	0.603***	0.779***	0.950***	0.870***	0.680***	0.473***
	(0.005)	(0.010)	(0.006)	(0.006)	(0.009)	(0.006)	(0.006)	(0.006)
Observations	1,619,985	419,817	475,224	724,944	37,187	449,715	641,816	491,267
R-Squared	0.845	0.858	0.802	0.842	0.978	0.905	0.819	0.802
Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)								
Log Benchmark Weights	0.687***	0.540***	0.612***	0.816***	0.956***	0.862***	0.685***	0.521***
	(0.005)	(0.031)	(0.018)	(0.006)	(0.010)	(0.006)	(0.007)	(0.006)
Observations	1,619,985	419,817	475,224	724,944	37,187	449,715	641,816	491,267
R-Squared	0.861	0.873	0.818	0.860	0.980	0.913	0.834	0.827

Panel B. Bond Funds

Variable	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
Log Weights (Fund by Fund-Median Coefficient)								
Log Benchmark Weights	0.785***	-	0.836***	0.726***	0.789***	0.919***	0.746***	0.349***
	(0.400)	-	(0.375)	(0.433)	(0.005)	(0.141)	(0.234)	(0.564)
Median Observations per Fund	511	-	551	486	338	782	609	237
Number of Funds	153	-	89	64	2	54	49	48
R-Squared	0.479	-	0.510	0.395	0.839	0.658	0.441	0.108
(%) of Significant Coefficients at the 1% level	91.5	-	89.9	93.8	100.0	100.0	100.0	72.9
Log Weights								
Log Benchmark Weights	0.777***	-	0.814***	0.732***	0.789***	0.909***	0.806***	0.434***
	(0.006)	-	(0.008)	(0.005)	(0.004)	(0.006)	(0.007)	(0.012)
Observations	91,466	-	50,870	40,596	676	38,264	34,337	18,189
R-Squared	0.445	-	0.461	0.430	0.838	0.655	0.471	0.123
Log Weights (Fund-Country Fixed Effects)								
Log Benchmark Weights	0.535***	-	0.645***	0.444***	0.646***	0.714***	0.587***	0.146***
	(0.016)	-	(0.023)	(0.018)	(0.032)	(0.020)	(0.017)	(0.026)
Observations	91,466	-	50,870	40,596	676	38,264	34,337	18,189
R-Squared	0.768	-	0.769	0.766	0.989	0.812	0.765	0.694
Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)								
Log Benchmark Weights	0.586***	-	0.733***	0.475***	0.640***	0.733***	0.603***	0.243***
	(0.016)	-	(0.023)	(0.018)	(0.032)	(0.021)	(0.017)	(0.032)
Observations	91,466	-	50,870	40,596	676	38,264	34,337	18,189
R-Squared	0.791	-	0.792	0.789	0.990	0.824	0.789	0.734

Table 5
Log Weights vs. Log Benchmark Weights and Log Industry Weights

This table presents OLS regressions with different set of fixed effects of log country weights against log benchmark country weights and log industry weights. Log industry weights is the median weight in a certain country at a certain point in time for different segments of the mutual funds industry. Panel A displays results for equity funds and Panel B for bond funds. Funds are divided by fund type and degree of activism. Errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Funds

Variable	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
				Log Weights				
Log Benchmark Weights	0.757***	0.734***	0.718***	0.798***	0.963***	0.924***	0.763***	0.582***
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Log Industry Weights	0.140***	0.109***	0.209***	0.097***	0.014***	0.035***	0.135***	0.253***
	(0.003)	(0.042)	(0.008)	(0.005)	(0.003)	(0.003)	(0.004)	(0.006)
Observations	1,619,985	419,817	475,224	724,944	37,187	449,715	641,816	491,267
R-Squared	0.610	0.586	0.504	0.645	0.943	0.816	0.619	0.404
				Log Weights (Fund-Country Fixed Effects)				
Log Benchmark Weights	0.667***	0.518***	0.603***	0.774***	0.947***	0.866***	0.677***	0.470***
	(0.005)	(0.010)	(0.006)	(0.006)	(0.009)	(0.006)	(0.006)	(0.006)
Log Industry Weights	0.140***	0.431***	0.014	0.131***	0.138***	0.101***	0.132***	0.157***
	(0.009)	(0.027)	(0.019)	(0.009)	(0.021)	(0.009)	(0.014)	(0.017)
Observations	1,619,985	419,817	475,224	724,944	37,187	449,715	641,816	491,267
R-Squared	0.845	0.859	0.802	0.843	0.978	0.905	0.819	0.802
				Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)				
Log Benchmark Weights	0.707***	0.574***	0.629***	0.823***	0.962***	0.861***	0.693***	0.534***
	(0.012)	(0.031)	(0.017)	(0.018)	(0.024)	(0.016)	(0.018)	(0.026)
Log Industry Weights	-1.459***	-2.337***	-0.800***	-3.087	0.597	1.689***	0.084	-0.966***
	(0.078)	(0.248)	(0.032)	(2.207)	(0.928)	(0.311)	(2.762)	(0.042)
Observations	1,457,988	346,475	432,438	679,075	37,171	436,237	591,178	393,402
R-Squared	0.865	0.882	0.823	0.862	0.980	0.912	0.833	0.838

Panel B. Bond Funds

Variable	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
				Log Weights				
Log Benchmark Weights	0.775***	-	0.813***	0.729***	0.789***	0.931***	0.763***	0.457***
	(0.006)	-	(0.008)	(0.005)	(0.004)	(0.006)	(0.008)	(0.011)
Log Industry Weights	0.240***	-	0.119*	0.365***	0.096	0.609***	0.133*	0.001
	(0.051)	-	(0.067)	(0.057)	(0.156)	(0.044)	(0.073)	(0.077)
Observations	91,466	-	50,870	40,596	676	43,112	26,719	20,959
R-Squared	0.446	-	0.461	0.430	0.838	0.686	0.445	0.132
				Log Weights (Fund-Country Fixed Effects)				
Log Benchmark Weights	0.534***	-	0.649***	0.444***	0.642***	0.710***	0.544***	0.218***
	(0.016)	-	(0.022)	(0.018)	(0.032)	(0.021)	(0.022)	(0.030)
Log Industry Weights	0.029	-	-0.118**	0.256***	-0.334***	0.165***	0.282***	-0.148**
	(0.031)	-	(0.047)	(0.043)	(0.088)	(0.027)	(0.053)	(0.072)
Observations	91,466	-	50,870	40,596	676	43,112	26,719	20,959
R-Squared	0.768	-	0.769	0.766	0.989	0.856	0.824	0.742
				Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)				
Log Benchmark Weights	0.586***	-	0.733***	0.475***	0.640***	0.733***	0.603***	0.243
	(0.053)	-	(0.061)	(0.073)	(0.023)	(0.048)	(0.072)	(0.151)
Log Industry Weights	-0.661**	-	-0.893***	-0.049	-0.367***	1.817	0.626**	-0.183
	(0.280)	-	(0.301)	(0.250)	(0.005)	(1.797)	(0.309)	(0.302)
Observations	91,466	-	50,870	40,596	676	38,264	34,337	18,189
R-Squared	0.791	-	0.792	0.789	0.990	0.824	0.789	0.734

Table 6
Log Weights vs. Log Benchmark Weights with Additional Variables

This table presents OLS regressions with different set of fixed effects of log country weights against log benchmark country weights. Panel A displays results for equity funds and Panel B for bond funds. Funds are divided by fund type and degree of activism. Control variables were added in all estimations. Control variables (Expected) includes one and two year consensus forecasts of GDP growth, inflation and exchange rate growth. Control variables (Actual) includes 4-month lagged industrial production growth, 2-month lagged inflation, exchange rate growth and stock market returns. Errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Funds

		Fund Type			Degree of Activism			
Variable	Total Sample	Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)								
Log Benchmark Weights	0.866***	0.784***	0.711***	1.038***	1.037***	1.012***	0.924***	0.642***
	(0.013)	(0.013)	(0.021)	(0.020)	(0.021)	(0.015)	(0.018)	(0.016)
Expected Variables as Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Actual Variables as Controls	No	No	No	No	No	No	No	No
Observations	761,058	249,227	200,683	311,148	19,428	202,894	288,924	249,812
R-Squared	0.896	0.878	0.897	0.891	0.981	0.935	0.878	0.867
Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)								
Log Benchmark Weights	0.719***	0.696***	0.568***	0.796***	0.961***	0.858***	0.717***	0.566***
	(0.005)	(0.006)	(0.012)	(0.007)	(0.011)	(0.007)	(0.007)	(0.007)
Expected Variables as Controls	No	No	No	No	No	No	No	No
Actual Variables as Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,164,715	338,087	334,991	491,637	26,558	321,420	464,310	352,427
R-Squared	0.886	0.855	0.894	0.886	0.983	0.930	0.863	0.858

Panel B. Bond Funds

		Fund Type			Degree of Activism			
Variable	Total Sample	Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)								
Log Benchmark Weights	0.573***	-	0.690***	0.420***	0.748***	0.767***	0.566***	0.127***
	(0.023)	-	(0.030)	(0.027)	(0.029)	(0.025)	(0.027)	(0.042)
Expected Variables as Controls	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
Actual Variables as Controls	No	-	No	No	No	No	No	No
Observations	62,182	-	37,293	24,889	578	26,672	23,110	11,822
R-Squared	0.778	-	0.759	0.804	0.986	0.787	0.776	0.775
Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)								
Log Benchmark Weights	0.552***	-	0.743***	0.449***	0.744***	0.742***	0.587***	0.115***
	(0.021)	-	(0.032)	(0.021)	(0.035)	(0.026)	(0.023)	(0.034)
Expected Variables as Controls	No	-	No	No	No	No	No	No
Actual Variables as Controls	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
Observations	62,274	-	30,434	31,840	532	26,103	23,415	12,224
R-Squared	0.815	-	0.810	0.815	0.991	0.839	0.810	0.777

Table 7
Relative Returns Shocks and Portfolio re-allocations

This table presents OLS regressions with fund-country fixed effects of log weights difference against a dummy when there is an episode of a large shock to relative returns. Panel A displays results for equity funds and Panel B for bond funds. A shock to relative returns is classified as large when it belongs to a country with a weight higher than 2 percent and is in the tails of the distribution of of relative returns. We consider three windows for the tails, the 1-99, 5-95, and 10-90 percentiles. Only countries with weights larger than 2 percent are considered in the estimations. Funds are divided by degree of activism. Errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Funds

	Top, Bottom 1%		Top, Bottom 5%		Top, Bottom 10%	
Variable	Benchmarks	Mutual Funds	Benchmarks	Mutual Funds	Benchmarks	Mutual Funds
Log Weights Difference (Country and Time Fixed Effects)						
Source Country Dummy	19.674***	19.161***	10.868***	10.807***	7.974***	8.081***
	(0.553)	(0.492)	(0.360)	(0.211)	(0.351)	(0.171)
Shocks to Relative Returns Dummy	-0.613***	-0.846***	-0.589***	-0.630***	-0.568***	-0.524***
	(0.143)	(0.092)	(0.107)	(0.047)	(0.087)	(0.037)
Observations	36,879	798,919	36,879	799,211	36,879	799,327
R-Squared	0.116	0.017	0.108	0.022	0.082	0.017
Log Weights Difference (Country and Time Fixed Effects)						
Source Country Dummy	19.974***	19.462***	10.999***	11.117***	8.038***	8.126***
	(0.589)	(0.503)	(0.381)	(0.215)	(0.352)	(0.183)
Shocks to Relative Returns Dummy*ln(Weight Shock)	-0.581***	-0.829***	-0.315***	-0.510***	-0.320***	-0.330***
	(0.136)	(0.151)	(0.052)	(0.036)	(0.052)	(0.025)
Observations	2,334	27,942	6,300	113,811	7,454	136,087
R-Squared	0.548	0.228	0.475	0.120	0.395	0.085

Panel B. Bond Funds

	Top, Bottom 1%		Top, Bottom 5%		Top, Bottom 10%	
Variable	Benchmarks	Mutual Funds	Benchmarks	Mutual Funds	Benchmarks	Mutual Funds
Log Weights Difference (Country and Time Fixed Effects)						
Source Country Dummy	0.508	2.234*	1.427	2.234*	0.508	0.775
	(0.550)	(1.206)	(1.417)	(1.206)	(0.550)	(2.419)
Shocks to Relative Returns Dummy	-0.905**	0.055	-0.319*	0.055	-0.905**	-2.666*
	(0.414)	(0.592)	(0.183)	(0.592)	(0.414)	(1.369)
Observations	4,085	6,353	4,085	6,353	4,085	6,347
R-Squared	0.044	0.036	0.044	0.036	0.044	0.031
Log Weights Difference (Country and Time Fixed Effects)						
Source Country Dummy	2.404	2.214*	-0.535	2.214*	-0.535	1.076
	(1.498)	(1.233)	(0.410)	(1.233)	(0.410)	(2.475)
Shocks to Relative Returns Dummy*ln(Weight Shock)	-0.966	0.020	-3.058***	0.020	-3.058***	-0.762**
	(0.640)	(0.149)	(0.335)	(0.149)	(0.335)	(0.365)
Observations	406	6,353	136	6,353	136	6,347
R-Squared	0.142	0.036	0.745	0.036	0.745	0.031

Table 8
Behavior of Log Country Benchmark Weights with Exogenous Episodes

This table presents the results of ordinary least squares regressions of the log country benchmark weights on different variables. Panel A shows results for equity benchmarks. The "relative returns" variable is the difference between country net returns and benchmark net returns, expressed as decimals. Exogenous Episodes is a dummy indicating an episode that is outside the 1-99 percentile of the distribution of benchmark weights minus buy and hold benchmark weights and they appear in months where there are Quarterly Index Reviews in MSCI. Estimations are performed at different frequencies and include different combinations of fixed effects. Only countries in the benchmark are considered for each estimation. Errors are clustered by country-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Benchmarks

	Log Country Weights				
	(1)	(2)	(3)	(4)	(5)
Variables	Monthly				
Log Lagged Weights	1.000***	1.000***	1.000***	0.984***	0.983***
	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)
Log Lagged Weights*Exogenous Episodes	0.001	0.001	0.010*	0.001	0.010*
	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
Relative Returns	0.962***	0.960***	0.963***	0.953***	0.953***
	(0.013)	(0.013)	(0.014)	(0.013)	(0.014)
Relative Returns*Exogenous Episodes	-0.392***	-0.382***	-0.382***	-0.371***	-0.360***
	(0.119)	(0.115)	(0.117)	(0.125)	(0.123)
Benchmark Fixed Effects	No	Yes	No	No	No
Time Fixed Effects	No	Yes	No	No	No
Benchmark-Time Fixed Effects	No	No	Yes	No	Yes
Country of Destiny-Benchmark Fixed Effects	No	No	No	Yes	Yes
Number of Observations	98,549	98,549	98,549	98,549	98,549
R-squared	0.997	0.998	0.998	0.998	0.998

Table 9
Log Weights vs. Log Benchmark Weights: A Decomposition

This table presents OLS regressions with different set of fixed effects of log country weights against log buy and hold benchmark weights and the residual between log benchmark weights and log buy and hold benchmark weights. Panel A displays results for equity funds and Panel B for bond funds. Funds are divided by fund type and degree of activism. Errors are clustered by country of origin-time. Standard errors are in parentheses. Standard errors for the fund by fund estimations are cross-sectional standard errors *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Funds

		Fund Type			Degree of Activism			
Variable	Total Sample	Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
			Log Weights					
Log Buy and Hold Benchmark Weight	0.794***	0.746***	0.797***	0.815***	0.970***	0.937***	0.798***	0.635***
	(0.001)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Residual	0.636***	0.440***	0.616***	0.583***	0.776***	0.735***	0.678***	0.482***
	(0.034)	(0.103)	(0.045)	(0.038)	(0.091)	(0.043)	(0.043)	(0.057)
Observations	1,381,151	377,339	405,118	598,694	31,920	384,982	551,297	412,952
R-Squared	0.646	0.609	0.587	0.669	0.949	0.835	0.656	0.441
			Log Weights (Fund-Country Fixed Effects)					
Log Buy and Hold Benchmark Weight	0.708***	0.543***	0.682***	0.789***	0.969***	0.865***	0.714***	0.528***
	(0.004)	(0.011)	(0.005)	(0.005)	(0.009)	(0.005)	(0.006)	(0.006)
Residual	0.528***	0.374***	0.534***	0.567***	0.835***	0.674***	0.547***	0.338***
	(0.022)	(0.055)	(0.028)	(0.027)	(0.062)	(0.029)	(0.029)	(0.035)
Observations	1,381,151	377,339	405,118	598,694	31,920	384,982	551,297	412,952
R-Squared	0.861	0.869	0.825	0.860	0.982	0.915	0.838	0.820
			Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)					
Log Buy and Hold Benchmark Weight	0.715***	0.548***	0.682***	0.805***	0.971***	0.855***	0.717***	0.558***
	(0.005)	(0.011)	(0.006)	(0.006)	(0.010)	(0.006)	(0.006)	(0.006)
Residual	0.498***	0.392***	0.464***	0.574***	0.712***	0.651***	0.505***	0.322***
	(0.024)	(0.049)	(0.035)	(0.030)	(0.082)	(0.034)	(0.032)	(0.042)
Observations	1,381,151	377,339	405,118	598,694	31,920	384,982	551,297	412,952
R-Squared	0.875	0.882	0.840	0.875	0.983	0.922	0.851	0.843

Panel B. Bond Funds

		Fund Type			Degree of Activism			
Variable	Total Sample	Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
			Log Weights					
Log Buy and Hold Benchmark Weight	0.759***	-	0.776***	0.731***	0.787***	0.892***	0.775***	0.419***
	(0.006)	-	(0.009)	(0.006)	(0.004)	(0.006)	(0.008)	(0.012)
Residual	0.686***	-	0.718***	0.611***	0.617***	0.793***	0.625***	0.608***
	(0.049)	-	(0.053)	(0.100)	(0.177)	(0.061)	(0.072)	(0.115)
Observations	76,964	-	38,807	38,157	640	32,043	28,861	15,420
R-Squared	0.424	-	0.409	0.435	0.840	0.632	0.443	0.110
			Log Weights (Fund-Country Fixed Effects)					
Log Buy and Hold Benchmark Weight	0.557***	-	0.747***	0.442***	0.699***	0.724***	0.603***	0.132***
	(0.017)	-	(0.025)	(0.018)	(0.034)	(0.022)	(0.018)	(0.030)
Residual	0.519***	-	0.710***	0.382***	0.444***	0.663***	0.547***	0.218***
	(0.032)	-	(0.039)	(0.059)	(0.057)	(0.045)	(0.048)	(0.061)
Observations	76,964	-	38,807	38,157	640	32,043	28,861	15,420
R-Squared	0.768	-	0.758	0.774	0.991	0.806	0.762	0.711
			Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)					
Log Buy and Hold Benchmark Weight	0.580***	-	0.762***	0.470***	0.693***	0.752***	0.606***	0.180***
	(0.017)	-	(0.026)	(0.019)	(0.034)	(0.023)	(0.019)	(0.032)
Residual	0.502***	-	0.675***	0.384***	0.439***	0.637***	0.539***	0.201**
	(0.037)	-	(0.045)	(0.064)	(0.054)	(0.050)	(0.054)	(0.078)
Observations	76,964	-	38,807	38,157	640	32,043	28,861	15,420
R-Squared	0.794	-	0.787	0.797	0.991	0.820	0.789	0.753

Table 10
Country Flows vs. Benchmark Flows

This table presents OLS regressions with different set of fixed effects of country flows in billions of USD against benchmark flows. Panel A displays results for equity funds and Panel B for bond funds. Funds are divided by fund type and degree of activism. Benchmark flows are constructed as the flows (in levels) to a fund at some point in time multiplied by the benchmark weight of that fund at the same point in time. Explicit indexing funds are not included due to the low number of observations. Errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Funds

Statistic	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
Country Flows in Billions USD								
Benchmark Weight*Fund Flows	0.744***	0.440***	0.818***	0.678***	0.839***	0.690***	0.547***	0.407***
	(0.028)	(0.052)	(0.033)	(0.046)	(0.037)	(0.016)	(0.017)	(0.017)
Observations	962,344	251,110	282,142	429,092	12,895	286,890	378,626	283,933
R-Squared	0.296	0.046	0.462	0.220	0.627	0.177	0.081	0.045
Country Flows in Billions USD (Fund-Country Fixed Effects)								
Benchmark Weight*Fund Flows	0.730***	0.390***	0.808***	0.659***	0.829***	0.679***	0.530***	0.360***
	(0.031)	(0.045)	(0.035)	(0.050)	(0.039)	(0.017)	(0.018)	(0.018)
Observations	962,344	251,110	282,142	429,092	12,895	286,890	378,626	283,933
R-Squared	0.314	0.073	0.478	0.236	0.632	0.196	0.099	0.085
Country Flows in Billions USD (Fund-Country Fixed Effects and Fund-Time Fixed Effects)								
Benchmark Weight*Fund Flows	0.700***	0.394***	0.786***	0.613***	0.794***	0.644***	0.468***	0.254***
	(0.035)	(0.055)	(0.038)	(0.067)	(0.044)	(0.020)	(0.020)	(0.019)
Observations	962,344	251,110	282,142	429,092	12,895	286,890	378,626	283,933
R-Squared	0.410	0.175	0.552	0.348	0.700	0.299	0.192	0.214

Panel B. Bond Funds

Statistic	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
Country Flows in Billions USD								
Benchmark Weight*Fund Flows	0.605***	-	0.634***	0.585***	-	0.800***	0.599***	0.469***
	(0.030)	-	(0.039)	(0.042)	-	(0.043)	(0.042)	(0.060)
Observations	59,791	-	29,933	29,858	-	25,540	23,387	10,548
R-Squared	0.072	-	0.072	0.073	-	0.111	0.070	0.043
Country Flows in Billions USD (Fund-Country Fixed Effects)								
Benchmark Weight*Fund Flows	0.604***	-	0.632***	0.587***	-	0.798***	0.571***	0.494***
	(0.032)	-	(0.041)	(0.044)	-	(0.044)	(0.047)	(0.066)
Observations	59,791	-	29,933	29,858	-	25,540	23,387	10,548
R-Squared	0.101	-	0.098	0.103	-	0.124	0.091	0.099
Country Flows in Billions USD (Fund-Country Fixed Effects and Fund-Time Fixed Effects)								
Benchmark Weight*Fund Flows	0.375***	-	0.481***	0.312***	-	0.765***	0.349***	-0.019
	(0.044)	-	(0.061)	(0.059)	-	(0.060)	(0.068)	(0.083)
Observations	59,791	-	29,933	29,858	-	25,540	23,387	10,548
R-Squared	0.245	-	0.224	0.260	-	0.228	0.238	0.279

Appendix Table 1
List of Benchmarks Used

This table presents the complete list of equity and bond benchmarks in our database. Only EMBI+, EMBI Global, and EMBI Global Diversified are bond benchmarks.

Equity and Bond Benchmarks

MSCI Emerging Markets	MSCI AC Europe	FTSE World Europe ex-UK
MSCI AC Far East Ex-Japan	MSCI AC World Investable Mkt	FTSE World Pacific ex-Japan
MSCI EM Latin America	MSCI Arabian Markets Ex-Saudi Arabia	S&P Asia 50 TR
MSCI World	MSCI Frontier Markets	S&P BRIC 40
MSCI AC Asia Ex-Japan	MSCI GCC Ex Saudi Arabia	S&P Europe 350
MSCI Europe	MSCI EM Far East	S&P Global 100
MSCI EAFE	MSCI Europe Small Cap	S&P Latin America 40
MSCI AC Asia Pacific Ex-Japan	25% MSCI Brazil+25% MSCI Russia+25% MSCI India+25% MSCI China	S&P Citi BMI Emerging Markets
MSCI EM Eastern Europe	50% MSCI AC Far East 50% MSCI AC Far East ex-Japan	S&P Citi BMI European Em Capped
MSCI EM Europe	50% MSCI Japan + 50% MSCI AC Asia-Pacific Free ex-Japan	S&P Citi EM EPAC
MSCI EM Asia	60% MSCI AC Asia Pacific ex-Japan + 40% MSCI Japan	S&P Citi EMI Global
MSCI Pacific	75% MSCI AC Far East Free ex-Japan + 25% MSCI Japan	S&P Citi PMI Eurozone Growth
MSCI EMU	75% MSCI Arabian Markets ex Saudi Arabia + 25% MSCI Saudi Arabian Domest	S&P Citi PMI World Value
MSCI AC World	87% MSCI Eastern Europe + 13% MSCI Russia	S&P IFC Investable Composite
MSCI AC World Ex-US	MSCI EM Eastern Europe ex Russia	S&PIFC Investable Latin America
MSCI BRIC	Citigroup World ex-US Extended	S&P IFCG Asia
MSCI AC Pacific	DJ Asia Pac Select Dividend 30	S&P IFCG Latin America
MSCI Europe Ex-UK	DJ Asian Titans	S&P IFCG Middle East & Africa
MSCI EM EMEA	DJ Global Titans 50	S&P IFCI Composite
MSCI AC ASIA Pacific	DJ Asia Pacific Selected Div 30	S&P IFCI Latin America
MSCI AC Pacific Ex-Japan	FTSE AW Eastern Europe	S&P IFC Investable
MSCI AC Far East	FTSE RAFI Emerging Markets	Euro STOXX 50
MSCI EAFE Small Cap	FTSE World	Euro Stoxx
MSCI Pacific Ex-Japan	FTSE World Asia Pacific	EMBI+
MSCI Emerging Markets Europe+Middle East	FTSE World Eurobloc	EMBI Global
MSCI World Small Cap	FTSE World Europe	EMBI Global Diversified

Appendix Table 2
Active Share: Descriptive Statistics

This table presents descriptive statistics for the active share measure for equity funds. Panel A presents statistics for equity funds and Panel B displays statistics for bond funds. The first column presents statistics for the complete sample. Active share is divided for countries inside benchmark, countries outside benchmark and cash weights. We also compute statistics for the total active share, the re-normalized active share (active share when we only consider and re-normalize weights inside the benchmark), and the total active share divided by the number of countries a fund is investing in. The mean was computed first within funds, and then across funds. The standard deviation is the standard deviation across funds of the average active share within funds.

Panel A. Equity Funds

Statistic	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
Inside Benchmark								
Mean	21.3	22.0	24.6	19.7	3.5	10.3	19.6	35.0
SD	12.7	11.6	11.1	13.5	3.9	4.2	3.2	11.5
Outside Benchmark								
Mean	3.4	5.1	4.3	2.4	0.8	1.0	2.4	6.9
SD	6.2	7.2	5.7	5.7	3.0	1.2	2.3	9.4
Total Active Share								
Mean	24.7	27.1	28.9	22.1	4.3	11.3	22.0	41.9
SD	16.0	16.3	13.9	16.1	6.5	4.4	2.8	15.3
Total Active Share (Re-Normalized)								
Mean	21.7	23.0	24.9	19.9	3.2	10.3	19.8	35.9
SD	13.9	13.5	11.9	14.5	2.8	4.3	3.5	14.1
Total Active Share/N								
Mean	2.3	1.8	2.2	2.6	0.5	1.1	1.6	4.3
SD	4.3	1.8	3.9	5.0	1.4	0.7	0.8	6.9

Panel B. Bond Funds

Statistic	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
Inside Benchmark								
Mean	26.6	-	27.9	24.5	11.4	16.6	24.7	40.1
SD	11.8	-	12.3	10.6	0.0	3.8	4.7	9.6
Outside Benchmark								
Mean	10.2	-	8.0	12.6	11.4	6.3	9.4	15.2
SD	7.1	-	7.0	4.6	0.7	2.7	4.1	9.6
Total Active Share								
Mean	36.8	-	35.9	37.1	22.8	22.9	34.1	55.3
SD	15.4	-	16.2	12.6	0.7	4.6	3.6	11.6
Total Active Share (Re-Normalized)								
Mean	29.3	-	29.3	29.7	13.4	18.7	28.8	42.1
SD	13.0	-	13.9	11.2	0.0	3.9	4.8	13.9
Total Active Share/N								
Mean	3.0	-	3.0	3.0	1.2	1.4	2.3	5.5
SD	2.6	-	3.2	1.6	0.0	0.5	0.6	3.5

Appendix Table 3
Log Weights vs. Log Benchmark Weights (Minimum AS Benchmark for all Funds)

This table presents OLS regressions with different set of fixed effects of log country weights against log benchmark country weights. Panel A displays results for equity funds and Panel B for bond funds. Funds are divided by fund type and degree of activism. Errors are clustered by country of origin-time. Standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Equity Funds

Variable	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
				Log Weights				
Log Benchmark Weights	0.774***	0.724***	0.729***	0.811***	0.965***	0.979***	0.835***	0.613***
	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Observations	1,717,748	498,023	435,167	784,558	37,242	257,381	732,078	691,047
R-Squared	0.616	0.497	0.581	0.658	0.943	0.908	0.692	0.415
				Log Weights (Fund-Country Fixed Effects)				
Log Benchmark Weights	0.657***	0.588***	0.524***	0.755***	0.950***	0.936***	0.774***	0.462***
	(0.005)	(0.006)	(0.010)	(0.006)	(0.009)	(0.007)	(0.006)	(0.006)
Observations	1,717,748	498,023	435,167	784,558	37,242	257,381	732,078	691,047
R-Squared	0.849	0.801	0.857	0.850	0.978	0.959	0.870	0.822
				Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)				
Log Benchmark Weights	0.684***	0.600***	0.537***	0.817***	0.956***	0.926***	0.772***	0.513***
	(0.005)	(0.007)	(0.010)	(0.006)	(0.010)	(0.008)	(0.006)	(0.006)
Observations	1,717,748	498,023	435,167	784,558	37,242	257,381	732,078	691,047
R-Squared	0.864	0.817	0.872	0.868	0.980	0.962	0.880	0.842

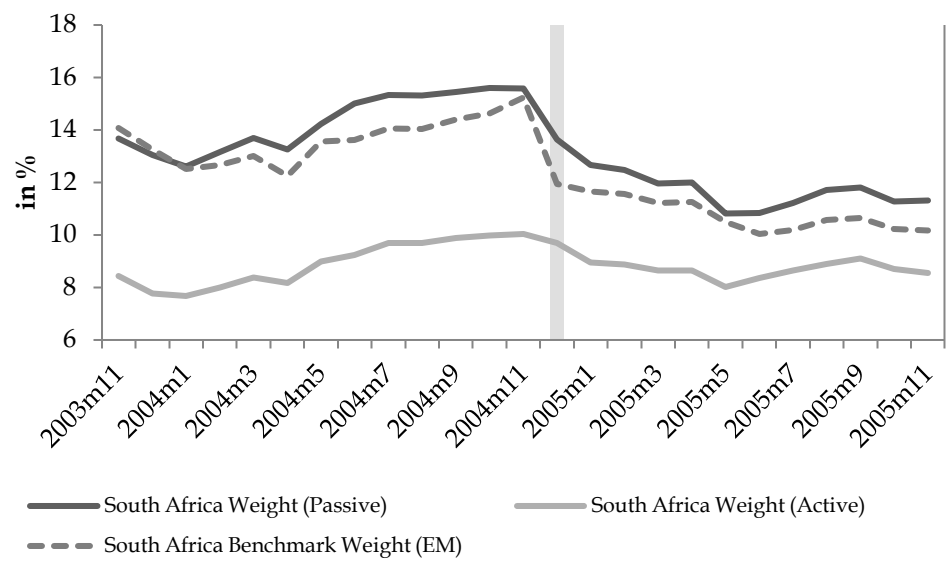
Panel B. Bond Funds

Variable	Total Sample	Fund Type			Degree of Activism			
		Global	Global Emerging	Regional	Explicit Indexing	Closet Indexing	Mildly Active	Truly Active
				Log Weights				
Log Benchmark Weights	0.641***	-	0.613***	0.732***	0.789***	0.952***	0.758***	0.381***
	(0.004)	-	(0.004)	(0.005)	(0.004)	(0.007)	(0.006)	(0.015)
Observations	95,389	-	54,793	40,596	676	14,151	74,732	5,830
R-Squared	0.405	-	0.405	0.430	0.838	0.727	0.432	0.166
				Log Weights (Fund-Country Fixed Effects)				
Log Benchmark Weights	0.535***	-	0.645***	0.444***	0.646***	0.843***	0.488***	-0.003
	(0.016)	-	(0.023)	(0.018)	(0.032)	(0.031)	(0.016)	(0.125)
Observations	95,389	-	54,793	40,596	676	14,151	74,732	5,830
R-Squared	0.778	-	0.786	0.766	0.989	0.828	0.762	0.795
				Log Weights (Fund-Country Fixed Effects and Fund-Time Fixed Effects)				
Log Benchmark Weights	0.586***	-	0.733***	0.475***	0.640***	0.862***	0.534***	0.446
	(0.017)	-	(0.023)	(0.018)	(0.032)	(0.032)	(0.016)	(0.430)
Observations	95,389	-	54,793	40,596	676	14,151	74,732	5,830
R-Squared	0.807	-	0.819	0.789	0.990	0.838	0.785	0.900

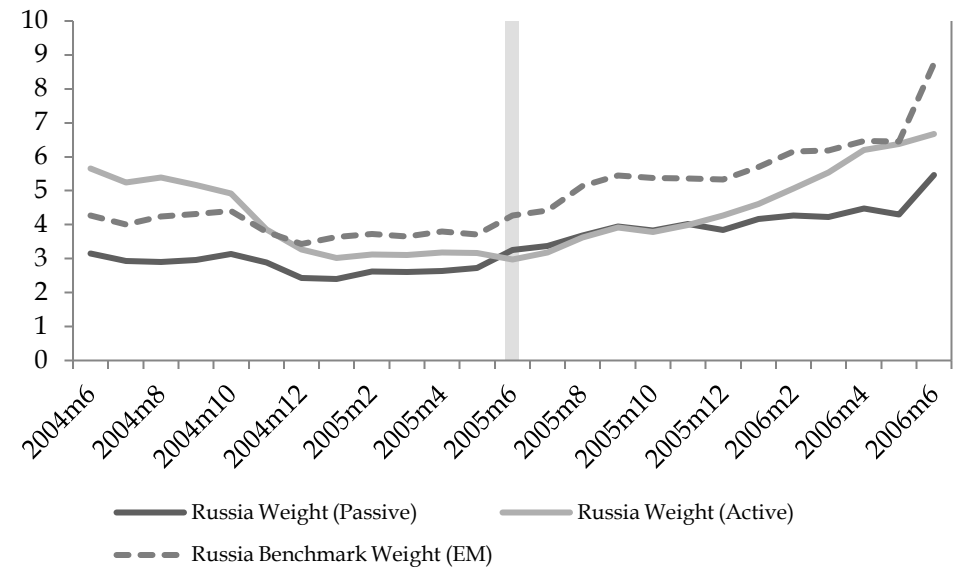
Appendix Figure 1
Exogenous Changes in MSCI Indexes

This figure presents the activity of mutual funds and benchmarks around exogenous changes announced by MSCI. For mutual funds we compute the weighted (by TNAs) average of the weights of each type of fund. Passive funds includes explicit and closet indexing. Active funds include mildly and truly active funds. The benchmark weight corresponds to the benchmark index between parenthesis. The grey bar indicates the date where the announcement was effective.

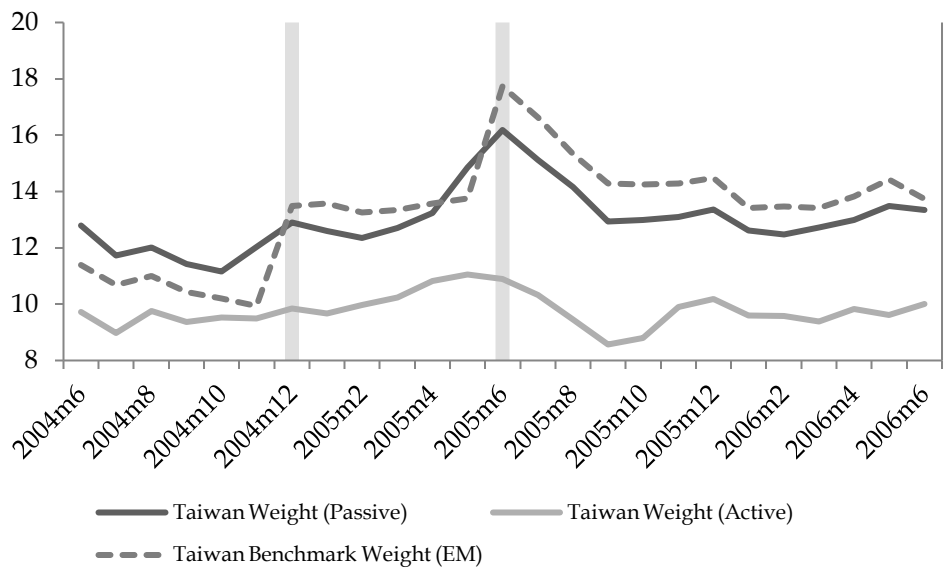
Panel A. South Africa's market capitalization coverage decreased



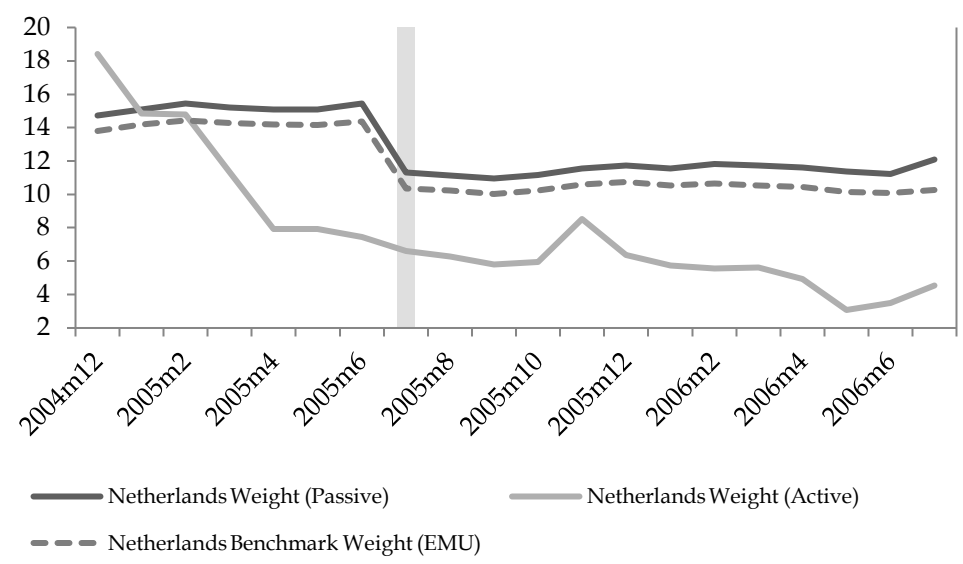
Panel B. Russia's market capitalization coverage increased



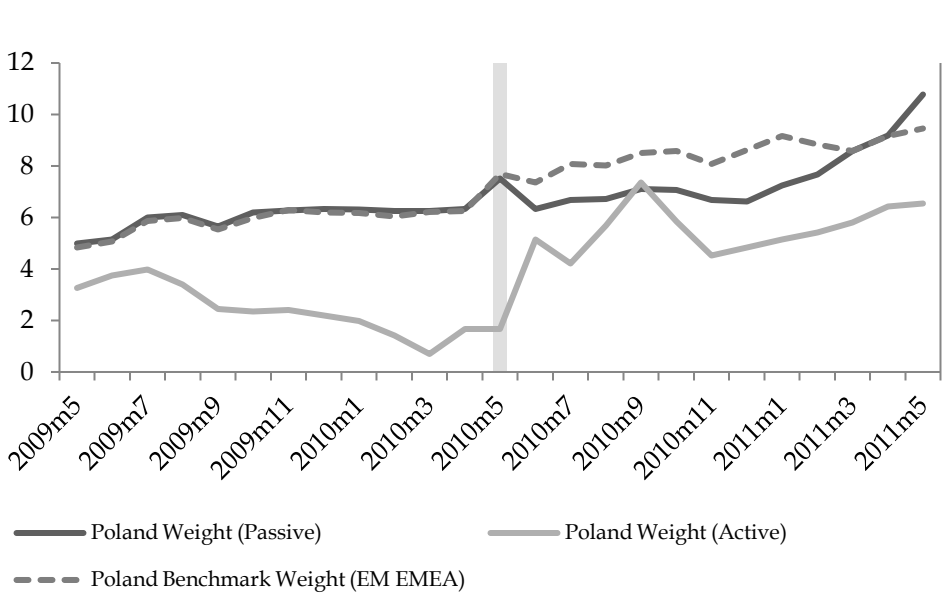
Panel C. Taiwan's free float increased



Panel D. Netherlands' market capitalization coverage decreased



Panel E. Poland's market capitalization coverage increased



Panel F. Russia's market capitalization coverage increased