

The Mutual Fund Industry Worldwide: Explicit and Closet Indexing, Fees, and Performance*

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Abstract

We examine the relation between indexing and active management in the mutual fund industry worldwide. Explicit indexing is rare in countries with weaker regulation and less developed financial markets, and many actively managed funds engage in closet indexing. We find that actively managed funds are more active and charge lower fees when they face more competitive pressure from explicitly indexed funds. Moreover, truly active funds generate higher risk-adjusted net returns than closet indexers. Overall, our evidence suggests that explicit indexing improves the levels of competition and efficiency of the mutual fund industry.

Keywords: Mutual funds, Active management, Index funds, Exchange-traded funds, Competition, Fees, Performance

JEL classification: G15, G18, G23

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1. Introduction

Practitioners and academics have long debated the societal benefits and degree of competition in the asset management industry, particularly among equity mutual funds. This debate has primarily focused on two dimensions. First, for over 45 years, academic researchers have pondered the relative value of passive versus active management. While many argue that indexed portfolios are superior investment vehicles, others provide evidence that some mutual fund managers add value through active management.¹ Second, the question of price competition in the mutual fund industry has generated significant disagreement, with some maintaining that average fund fees are high and there is an excessive dispersion in fees (even for seemingly homogeneous products such as S&P 500 index funds), while others contend that there is extensive price competition in the industry.²

In this paper, we address these two dimensions employing a new data set on open-end equity mutual funds and exchange-traded funds (ETFs) in 32 countries from 2002 to 2010. The mutual fund industry has grown extensively over the last half century across the world, with nearly 25,000 equity funds and \$10 trillion in assets under management as of December 2010. There have also been significant changes in the relative amounts of passive versus active management. In particular, the percentage invested in explicitly indexed equity funds – index funds and exchange-traded funds (ETFs) – has seen large increases worldwide, from about 14% of assets under management in 2002 to about 22% in 2010. These explicitly indexed funds have become a common low-cost alternative for investors to access the stock markets, allowing them to buy

¹ For example, Sharpe (1966), Jensen (1968), Grinblatt and Titman (1989, 1993), Gruber (1996), Kacperczyk, Sialm, and Zheng (2005), French (2008), and Cremers and Petajisto (2009). See also Wermers (2000), Bollen and Busse (2001), Avramov and Wermers (2006), Kosowski, Timmermann, Wermers, and White (2006), and Kacperczyk and Seru (2007). For evidence on pension plans, see Dyck, Lins, and Pomorski (2011) and Andonov, Bauer, and Cremers (2012).

² For example, Elton, Gruber, and Busse (2004), Hortacsu and Syverson (2004), Collins (2005), Coates and Hubbard (2007), Gil-Bazo and Ruiz-Verdu (2009), Wahal and Wang (2011), and Khorana and Servaes (2012).

“beta exposure” (i.e., investing in a diversified portfolio tracking a stock index) at substantially lower fees as compared to active funds.

In a Grossman and Stiglitz (1980) world, one would expect passive and active funds to co-exist in equilibrium and their relative market shares to depend on information costs and overall market efficiency. We consider alternative hypotheses regarding how such equilibriums are expected to change given flows into explicitly indexed funds. The first aspect we examine is how the increased presence of indexed funds in a market affects active funds’ product differentiation (relative to indexed funds) or price (fees). The second aspect we examine is how the competition from indexed funds relates to the ability of active funds to generate positive “alpha,” where alpha is the part of the active fund’s return in excess of its benchmark.

Our hypothesis is that the presence of low-cost explicitly indexed funds increases competition for buying beta exposure. Economic theory suggests that, when faced with increased competition from indexed funds, active funds could compete on price (by lowering their fees) and they could compete via product differentiation (by diverging from their benchmark index). Such competitive pressure effects could be beneficial to investors because they would be able to obtain lower fees and higher expected returns (alpha) from active funds.

The alternative hypothesis is that competition from indexed funds may not lead to lower fees and higher differentiation by the active funds. For example, threats to market share could force active funds to increase fees due to higher marketing expenses. Such an outcome is similar to the “generics paradox” in the pharmaceutical industry where the introduction of generic drugs (index funds and ETFs in our context) does not lead to price drops by the branded drugs (i.e., the fees of active funds in our context).³ Additionally, increased competitive pressure from indexed

³ This literature finds that generics are cheaper and gain market share, but generic entry does not bring the prices of branded drugs down as expected; see, for example, Morton and Kyle (2011) and Vandoros and Kanovos (2012).

products that deliver beta exposure cheaply could have adverse effects for investors in active funds seeking both alpha and beta. The comparison to passive funds could render all fund managers more concerned about short-term performance shortfalls relative to their benchmark index, and thus increasing closet indexing (i.e., decrease their willingness to deviate from their benchmarks). For example, Wurgler (2011) argues that the growth of index-based investing could allow stock prices to be more divorced from fundamentals, thereby lowering fund managers' incentives to gather information and leading to a "race to the bottom" where active managers do not become informed, in which case they may perform worse.⁴

The null hypothesis is that investors do not treat active and passive mutual funds as substitutes, but rather perceive active funds as different investment vehicles whose higher fees pay for alpha but also to satisfy different investor needs than what is delivered by passive funds.⁵ In this case, the introduction of passive funds expands the overall fund market with active funds maintaining their assets under management and not changing their prices or product differentiation, with no effects on returns to active management.

Our multi-country sample with equity mutual funds and ETFs from 32 countries is an ideal testing ground for the effects of the growth in indexing due to the wide variation in conditions across markets and the fact that markets tend to be segmented (e.g., Stulz (2005)). To capture the different markets where funds compete, we consider where funds are legally domiciled but also cross-border fund sales.⁶

We first examine the extent of explicit indexing and find considerable cross-country and time

⁴ This argument is based on price effects that are associated with a stock being included in a popular benchmark index. Further, if demand shocks for stocks included in the index lead to sustained price premiums for these stocks, it becomes harder for active managers to outperform by buying stocks that are not included in the index.

⁵ Berk and Green (2004) and Pastor and Stambaugh (2012) argue that fund managers may have skill and investors invest in active funds even in the absence of *ex post* average positive alphas.

⁶ The European Union, for example, has adopted the "European passport" system (Directive 2001/107/EC), which facilitates cross-border marketing of mutual funds among EU member countries.

series variation as shown in Figures 1 and 2. For funds domiciled in the United States, the market share of explicitly indexed funds grew from 16% of assets under management in 2002 to 27% in 2010. For funds domiciled in other countries, explicit indexing is less common but has been growing faster, from 6% in 2002 to 13% in 2010. The popularity of explicit indexing has particularly risen after the 2007-2008 financial crisis. However, the prevalence of indexing is not universal and in some countries there are no explicitly indexed funds, although we find that this deficit is in part mitigated through cross-border fund sales.

Not all indexing is necessarily explicit – some active funds are largely passively managed, even if fund managers market their funds and charge fees as if they are active (a practice that is commonly called “closet indexing”). To examine this possibility, we use fund portfolio holdings to calculate the Cremers and Petajisto (2009) active share measure, which captures the proportion of a fund’s holdings that differs from its benchmark. If fund holdings overlap with index holdings, investors are effectively earning index-like gross returns (the beta part of return), which they could obtain at lower fees through explicitly indexed funds. Our results show that closet indexing is common, especially in mutual fund markets outside the United States. Defining closet indexers as funds with an active share below 60%, we find that outside the United States about 30% of the assets are managed by closet indexers. This represents twice the level of closet indexing that prevails in the United States.⁷

In cross-country regressions, we find that explicit indexing is more frequent in countries with stronger laws and protections to mutual fund investors and with larger mutual fund industries. Strong regulations and industry size have opposite effects on the prevalence of closet indexing. Our evidence thus extends Khorana, Servaes, and Tufano (2005), who show that countries with

⁷ We cannot differentiate between closet indexers that do not attempt to deviate from their benchmarks from those that *ex ante* commit resources to identify private information but *ex post* fail in identifying such opportunities. Observationally these cases are equivalent, as both funds exhibit low active share measures.

stronger regulations and laws tend to have larger and more developed fund industries.

We next test the hypotheses regarding the effects of explicit indexing (in terms of market share and cost) on active fund behavior and outcomes. First, we find that active funds have higher active shares in markets with more explicit indexing. This is consistent with our main hypothesis that increased competition from explicit indexing results in active fund managers differentiating themselves more from their benchmarks.

Second, we find that active funds charge lower fees in markets with a higher presence of low-cost explicitly indexed funds. Figures 3 and 4 report the cross-country variation and time series evolution of fund fees over the 2002-2010 period. Not surprisingly, explicitly indexed funds charge significantly lower fees than active funds. Regression tests show that active funds tend to charge lower fees, on average, in countries with higher availability of low-cost explicit indexing. These findings support the hypothesis that the pervasiveness of explicit indexing leads to more competition in a market. In contrast, we find that active funds tend to charge higher fees in countries where closet indexing is more pervasive. Indeed, Figure 4 shows that, on average, closet indexers charge fees as high as those of truly active funds (i.e., funds with an active share above 60%). Further, the figure shows evidence of a decrease in fees for closet indexers during the sample period, but only in the United States.⁸

The availability of explicitly indexed funds and the active share and fees of active funds are likely jointly determined. We employ two strategies to address this issue. We show that results are robust when we use benchmark and country fixed effects to address the issue that the availability of explicit indexing might be related to some unobserved (and time invariant) benchmark or country characteristic that explains the active share and fees of active funds.

⁸ Competition among active mutual funds can also drive down fees. Wahal and Wang (2011) show that the entry of new active mutual funds in the U.S. industry that are close substitutes to incumbent funds (as measured by the overlap in their portfolio holdings) forces incumbents to reduce fees.

We also employ instrumental-variable methods to provide evidence that causality runs from explicitly indexed funds to active fund behavior. Hence, we need instruments for explicitly indexing, i.e., variables that are correlated with the availability of explicitly indexed funds in a given market but uncorrelated with the active share and fees charged by active funds except indirectly through other independent variables. The first instrument is the financial sophistication of retail investors in a country, which should be associated with the demand for low-cost alternatives to get beta exposure. Financially literate investors are more likely to be aware that passive funds can deliver the same fundamental beta exposure as active funds but at a lower cost. The second instrument is the prevalence of defined contribution pension schemes in a country, which can increase the demand for passive funds providing beta exposure (for example, by offering at least one passive fund in their menu of investment options).⁹ Employing these instruments in our tests, we find that the results are robust correcting for endogeneity. These results, however, should be interpreted with caution since they depend on the validity of the instruments we use.

Finally, we examine the performance from investing in truly active funds and how that relates to the availability of explicitly indexed products. That is, we measure the ability of the active funds in these markets to provide more than beta exposure by generating alpha for the investor. We start by comparing fund batting averages, defined as the percentage of funds with net return above the return on its benchmark. Figure 5 shows that, despite the majority of active funds underperforming their benchmarks, the batting averages for truly active funds tend to be superior to those for closet indexers.

In more formal regression tests, we show that a fund's active share predicts its future risk-

⁹ According to the 2012 Deloitte Annual 401(k) Benchmarking Survey, 78% of plans in the United States offer passively managed domestic equity funds.

adjusted performance. The effect is economically significant: a one standard deviation increase in active share is associated with an increase of about 1% per year in future benchmark-adjusted returns and 0.7% per year in future four-factor alpha.

There is also evidence that the average alpha generated by active management is higher in countries where low-cost passive alternatives are more popular, while the average alpha is lower in markets where closet indexing is more prevalent. Overall, our evidence suggests that enhanced competitive pressure from index funds and ETFs creates more incentives for skilled managers to pass on alpha to fund investors whereas closet indexing has an opposite effect.

In sum, our findings suggest that the availability of explicit indexing is associated with improved levels of competition and efficiency in a fund industry, while closet indexing is indicative of the reverse. Previous evidence regarding competition in the mutual fund industry has almost totally focused on the U.S. market. The few papers analyzing mutual funds worldwide have so far focused on the determinants of industry size and fees across countries. Khorana, Servaes, and Tufano (2005, 2009) find a positive link between the level of development of fund industries worldwide and a combination of legal, regulatory, and demand- and supply-side factors. To the best of our knowledge, we are the first to study how indexing is related to the structure and performance of actively managed mutual funds around the world.

2. Data and Variables

Our analysis uses two primary databases: Lipper and FactSet/LionShares. The Lipper database provides a comprehensive sample of mutual funds offered across a large number of countries. Mutual funds, while taking a variety of names around the globe, are fairly comparable investment vehicles worldwide (Khorana, Servaes, and Tufano (2005)). We focus exclusively on open-end equity mutual funds and exchange-traded funds (ETFs) in the 2002-2010 period. From

this database we obtain individual fund characteristics, such as fund name, domicile, sponsor, benchmark, monthly returns, total net assets (TNA), fees, and expenses. The data is survivorship bias-free, as it includes both active and defunct funds. Although multiple share classes are listed as separate observations in Lipper, they have the same holdings, the same manager, and the same returns before expenses. Thus, we keep as our unit of observation the share class that Lipper identifies as the primary share class and aggregate fund-level variables across the different share classes. As we describe below, we also conduct our tests using the individual share classes.¹⁰

The sample comprises 24,492 funds with a combined TNA totaling over \$9.8 trillion as of December 2010. This means that mutual funds held roughly 20% of world stock market capitalization. We identify funds' nationalities by their legal domicile, which characterizes the relevant regulatory and legal system. The funds are domiciled in 32 countries across several regions: North America (Canada, the United States); Europe (Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, the United Kingdom); Asia-Pacific (Australia, China, Hong Kong, India, Japan, Malaysia, Singapore, Taiwan, Thailand); other regions (Brazil, Israel, South Africa); and off-shore (Ireland, Liechtenstein, Luxembourg).¹¹ Equity mutual funds domiciled in the United States represent the majority of the TNA (over \$5.7 trillion), but other markets are also sizable. Lipper's coverage of funds can be compared with aggregate statistics on mutual funds from other sources. As of December 2010, the Investment Company Institute (2011) reported a total of 27,754 equity mutual funds worldwide with a TNA of \$10.5 trillion. Therefore, we conclude that the Lipper sample is nearly comprehensive of the equity mutual fund universe.

¹⁰ In the European Union, mutual funds fall under the umbrella of UCITS (Undertakings for Collective Investment in Transferable Securities), a regulatory attempt to harmonize investment vehicles across the EU.

¹¹ We require a minimum of 50 funds to include a country in the sample. We combine the Asia-Pacific countries and Other Regions into single observations because the holdings data are limited for many funds in those countries.

The LionShares database covers portfolio equity holdings for institutional investors worldwide, including mutual funds and ETFs. Ferreira and Matos (2008) provide a detailed description of this data source. We match the Lipper (fund characteristics and performance) and LionShares (fund holdings) databases by CUSIP, ISIN or fund name.

Panel A of Table 1 provides key statistics on the sample of funds for which portfolio holdings are available by country of domicile as of December 2010. It shows that detailed holdings are available from LionShares for 11,776 funds with TNA of approximately \$7.9 trillion. In total, we have holdings data from the LionShares database for about 81% of the TNA in the Lipper database, but coverage varies across countries. For the 20 countries in North America and Europe, we have portfolio holdings for about 86% of the countries' TNA. This compares to holdings being available for only 32% of the TNA of funds domiciled in Asia-Pacific countries and 22% in the Other Regions.¹²

Panel A of Table 1 also reports the number of funds per country using the funds' declared investment type according to prospectus disclosures: explicitly indexed funds (ETFs and index funds) and active funds. There are a total of 1,218 explicitly indexed funds (561 ETFs and 657 index funds), and 10,558 active funds in our sample as of December 2010, with \$1.7 trillion in assets under management in explicitly indexed funds (\$0.8 in ETFs and \$0.9 in index funds) and \$6.2 trillion in active funds. Although passively managed funds have become increasingly popular, active funds still dominate mutual fund markets throughout the world.¹³

We control for fund and country characteristics in our subsequent tests. Table IA.1 in the

¹² LionShares coverage of fund holdings is lower in some countries because disclosure is not mandatory. We obtain similar results when we exclude these countries and conclude that our results are not driven by selective disclosure.

¹³ Although we recognize that ETFs can be used by investors for market timing and other investment strategies beyond purely beta exposure and may not always be viewed as substitute investment products relative to active funds, we combine them together with index funds and define both as the set of explicitly indexed funds available to investors.

Internet Appendix provides summary statistics of all variables for the sample of open-end active funds in the 2002-2010 period, and Table IA.2 reports time series averages of country variables per country. Appendix A provides all variable definitions.

For many funds in our sample, the country of domicile corresponds to the single country of sale. For example, funds domiciled in the U.S. and Canada are mostly sold in their home markets. However, funds domiciled in other markets such as France, Germany and the off-shore markets of Ireland and Luxembourg are registered for sale in multiple countries. Thus, these multi-country registrations create competition across domiciles. Table IA.3 in the Internet Appendix provides details on the number of share classes by country of domicile and country of sale in 2010. Because some funds have multiple share classes and are offered in more than one country, we can have multiple observations for the same fund in a given year.¹⁴

Panel B of Table 1 provides the key statistics for our sample alternatively based on the fund share class by country of sale as of December 2010. This panel shows that the competitive landscape for funds is much broader when the country of sale is considered. For example, Italy has no domiciled ETFs or index funds, but there are 62 ETFs and 127 index funds legally approved for sale, which can be accessed by Italian investors. We adopt both market perspectives in our tests: by country of domicile (as in Panel A) and by country of sale (as in Panel B).

3. Explicit and Closet Fund Indexing Around the World

3.1. Explicit Indexing

We start by describing the availability of explicitly indexed funds across different countries. Panel A of Table 1 shows that 22% of equity mutual fund assets under management worldwide

¹⁴ For each fund share class, Lipper provides the list of countries where it is approved for sale but does not have exact amount of shares that were sold to each market. We basically multiply each fund share class for each country of sale and that causes some duplication. Some aggregate totals in Panel B of Table 1 suffer from this issue.

are explicitly indexed as of 2010. The countries with the highest levels of explicit indexing among their domicile funds are Switzerland (58%), Ireland (31%) and the United States (27%). Some countries have almost no passively managed funds domiciled. However, for these countries, Panel B shows that investors are still able to purchase indexed funds domiciled elsewhere, but approved for sale in their countries. For example, large asset managers such as Vanguard and iShares manage indexed funds domiciled in Ireland and offer these funds across several European markets. Of course, the same is also true for many active funds that tend to be domiciled in Luxembourg and distributed widely across Europe. While both Panels A and B suggest that roughly one-fifth of equity fund assets are explicitly indexed, there is substantial variation across countries.¹⁵

3.2. Active Funds and Closet Indexing

Not all indexing is explicit as mutual fund managers classified as active may in fact practice a form of closet indexing, while still marketing the funds and charging fees as if they engage in active management. Instead of relying on what funds declare in their investment prospectus, we use portfolio holdings-based information and assess whether fund holdings are similar to the holdings of their benchmark indices.

We measure active management versus closet indexing using the active share measure developed by Cremers and Petajisto (2009). The measure represents the share of portfolio holdings that differs from the benchmark index holdings and is calculated as:

$$\text{Active Share} = \frac{1}{2} \sum_{i=1}^N |w_{fund,i} - w_{benchmark,i}| \quad (1)$$

¹⁵ The calculation of the market share of explicitly indexed funds does not require LionShares holdings data. To investigate the possibility of selection bias from using the sample of 11,776 funds with holdings data in LionShares, we calculate the market share of explicit indexing using the sample of 24,492 funds in Lipper (i.e., including those without holdings data). The degree of explicit indexing is similar to that reported in Table 1.

where $w_{fund,i}$ and $w_{benchmark,i}$ are the portfolio weights of stock i in the fund and its benchmark index, respectively, and the sum is taken over the universe of stocks. For a mutual fund that does not short stocks or buy on margin, its active share will always lie between zero and 100%. Given our international setting, funds may hold different securities in the same company (e.g., common shares, depository receipts and dual listings) that represent the same stake in a company. We therefore sum all equity holdings in the same company as part of the portfolio position.

Our analysis of active management requires funds' benchmarks as assigned by Lipper according to a fund's investment strategy.¹⁶ Table IA.4 in the Internet Appendix lists the 88 specific benchmarks, which can be classified into three types: world (funds that invest worldwide), regional (funds that invest in a specific geographic region), and country (funds that invest in a specific country). Some of the world, regional, and country funds may have specific industry or investment styles. We keep only benchmarks with at least \$10 billion of assets under management in 2010. For some countries with less than \$10 billion of assets under management, we keep the major country index as benchmark.

We construct portfolio weights for the 88 different benchmark indices using the aggregate portfolio holdings of the explicitly indexed funds tracking each benchmark.¹⁷ Therefore, the active share is measured in excess of explicitly indexed funds. Using the actual weights of explicitly indexed funds tracking each benchmark has the advantage that some of the weights in the official benchmark include stocks that, in practice, may not be fully investable by mutual funds due to illiquidity or other constraints. On average (TNA-weighted), active funds in our

¹⁶ We rely on the "Technical Indicator Benchmark" (assigned by Lipper) rather than "Fund Manager Benchmark" (self-declared by fund) because the Fund Manager Benchmark is sparsely available and to avoid the concern that a fund strategically chooses its benchmark. However, we obtain similar results with the Fund Manager Benchmark.

¹⁷ The benchmark weights are calculated excluding synthetic ETFs that do not physically replicate the underlying benchmark index. In addition, for about 2% of the fund-year observations where there are not at least five explicitly indexed funds tracking a particular benchmark, we use as an alternative the aggregate portfolio of all active funds that track that benchmark.

sample have an active share of 69%, while passive funds have an active share of 16%.¹⁸

Table 1 and Figure 1 provide the market share (as a percentage of TNA) of explicitly indexed funds, closet indexers and truly active funds across countries of domicile as of December 2010. We use an active share below 60% as the cutoff for an active fund to be classified as a *closet indexer* as in Cremers and Petajisto (2009).¹⁹ All other funds with active shares above 60% are classified as *truly active*. We find considerable variation in the extent of closet indexing across countries. The United States has one of the highest levels of explicit indexing (with 27% of assets managed by explicitly indexed funds), as well as the lowest level of closet indexing among all countries at 15%. In countries with little explicit indexing, the active funds are relatively passive. For example, Canada has a low level of explicit indexing at 8% but a high level of closet indexing at 37%. Although in Table 1 we report on active share for 2010, we find that the active share of funds is an extremely persistent fund attribute over time (the pooled average serial correlation of active share at the fund-level is 0.95). Table IA.5 in the Internet Appendix reports the levels of explicit and closet indexing by country and benchmark type.

Figure 2 shows the time series of the market shares of explicitly indexed funds, closet indexers, and truly active funds over the 2002-2010 period. Panels A and B show the evolution in the United States and elsewhere, respectively. Explicit indexing has been increasing over time in both the United States and other countries. While assets under management by active funds dropped during the financial crisis (from \$7 trillion in 2007 to \$6.2 trillion at the end of 2010), explicitly indexed assets actually grew over the crisis period (from \$1.3 trillion to \$1.7 trillion).

¹⁸ Explicitly indexed funds may have non-zero active shares if they do not engage in full physical index replication. For example, passive funds that track the S&P 500 index have an average active share of 4%.

¹⁹ An active share of 60% means that 40% of the fund portfolio weights overlap with the benchmark index weights. The 60% cutoff is somewhat arbitrary, but as, on average, half the holdings in any portfolio will beat the portfolio's average return, then an active fund (with a manager who tries to beat the benchmark) should have an active share of at least 50%. In addition, the 60% threshold corresponds to classifying funds in the bottom tercile of the distribution of active share as closet indexers.

Closet indexing in the United States appears to have remained relatively stable over time (with some decline during the 2007-2009 financial crisis) but it dropped significantly outside the United States over the 2002-2010 period.

3.3. Fees

We measure fees and expenses charged to mutual fund shareholders using the total expense ratio (TER) and loads. TER is broader than just management fees and includes all annual expenses that a fund charges its investors for investment management, administration, servicing, transfer agency, audit, and legal costs. Because TER excludes certain distribution fees, such as front-end or back-end loads, we calculate the average annual total shareholder costs (TSC), which is defined as TER plus one-fifth of the front-end load following Khorana, Servaes, and Tufano (2009). This calculation assumes the typical investor holds a fund for five years, and that back-end loads are waived if the fund is held for that length of time. If information on TER is not available (13% of the fund-year observations), we use instead the annual management fee, which constitutes a lower bound for the TER.²⁰

The last three columns of Panels A and B in Table 1 report the (TNA-weighted) average TSC per country for each of the different fund types (explicitly indexed funds, closet indexers, and truly active) as of the end of 2010. Whether considering country of domicile or country of sale, the costs for explicitly indexed funds are lower than for active funds across all countries. The United States stands out as having the lowest cost for explicitly indexed funds at 0.26% per year. In most countries of domicile, closet indexers are as costly as truly active funds, with an average TSC of 1.64% and 1.66% per year, respectively. Figure 3 illustrates the range of the average TSC across the three types of funds for each country in our sample. These statistics confirm that

²⁰ The TSC ignores annual fees charged by distributors as well as bid-ask spreads in the case of ETFs, which are typically narrow. For example, Morningstar (2012) reports that the Lyxor ETF Euro Stoxx 50 (the largest ETF on the Euro Stoxx 50 index) had a trailing 30-day average spread of 0.017% at the NYSE Euronext Paris.

explicitly indexed funds are a low-cost alternative to active funds worldwide but closet indexers charge fees at par with those of truly active funds. Figure 4 reports the time series evolution of fees, which shows some evidence of fee reduction for closet indexers relative to truly active funds in the United States.

4. Determinants of Explicit and Closet Indexing Across Countries

Explicitly indexed funds provide a low-cost alternative for investors to get beta exposure while closet indexers offer that same beta exposure but at higher fees. The evidence so far has shown wide variation in the range of fees across countries suggesting that some degree of market segmentation exists. A major influence on market segmentation arises from the funds' location, i.e., the regulatory environment and conditions in the local fund industry. For example, Khorana, Servaes, and Tufano (2005, 2009) show that countries with stronger regulations and laws tend to have larger mutual fund industries, lower fund costs and a higher spectrum of funds offered. These results suggest that if competition is driving the effects, then we should find more low-cost explicitly indexed products (and less closet indexers) in environments where regulations are stronger and the fund industry is more developed.

Table 2 provides results on the determinants of explicit and closet indexing across countries over the 2002-2010 period where we define the market alternatively by country of domicile (Panel A) and country of sale (Panel B). We use two measures of explicit indexing as dependent variables. *Explicit Indexing (% TNA)* is the market share of explicitly indexed funds as a percentage of the TNA in each country in a given year. *Explicit Indexing (TSC)* is the TNA-weighted average total shareholder cost (TSC) of explicitly indexed funds in each country in a given year. We also use a measure of the extent of closet indexing in a market, *Closet Indexing (% TNA)*, which is the market share of active funds with an active share below 60% as a

percentage of the TNA in each country in a given year.

We examine the potential country-level determinants in separate regressions due to the limited number of country-years in our sample. In columns (1), (3), and (5) we test whether indexing is related to regulatory factors (Khorana, Servaes, and Tufano (2005)): the extent to which regulatory approvals are required to set up a fund (*Approval*) and the quality of a country's judicial system (*Judicial*).²¹ We find that a more restrictive regulatory approval regime for new funds is positively associated with the availability of explicit indexing. The economic impact of *Approval* and *Judicial* is significant. For example, if one takes the estimates in column (1) of Panel A, an increase in *Approval* from one to two is associated with an increase of about 6% in the market share of explicitly indexed funds. Columns (3) and (5) show that *Judicial* is negatively associated with both the cost of index funds and the level of closet indexing in a country.

We also examine the characteristics of a country's fund industry (*Fund Industry Size*, *Fund Industry Herfindahl*) and level of economic development (*GDP per capita*). Columns (2), (4) and (6) show that the larger the fund industry, the higher the market share of explicitly indexed funds and the lower their cost, and also the less widespread is closet indexing. These results are consistent with the argument that industry development and economies of scale make it easier to offer low-cost explicitly indexed products and, at the same time, mitigate closet indexing by active funds. Industry concentration is significantly related only to the market share of explicitly indexed funds. GDP per capita is insignificant in all specifications.

Some funds are offered for sale in multiple countries so competition in a market comes from

²¹ *Approval* is the sum of two dummy variables: (1) whether regulatory approval is required to start a fund and (2) whether the prospectus requires regulatory approval. *Judicial* is the sum of five variables (all variables are scaled between 0 and 10): the efficiency of the judicial system, rule of law, corruption, risk of expropriation and risk of contract repudiation.

both funds domiciled locally and funds registered elsewhere but also offered for sale in that market. We thus run our regressions with all variables calculated by country of sale. The results reported in Panel B of Table 2 are consistent with those in Panel A. In Table IA.6 of the Internet Appendix, we show that results are robust when we further refine the analysis by measuring explicit and closet indexing separately by benchmark type (world, regional, country-domestic, and country-foreign) in each country.

5. Does Competitive Pressure by Explicitly Indexed Funds Affect Active Funds?

In this section, we study the association between explicit indexing in a market and the product differentiation (active share) and price that investors pay for active management (total shareholder costs). Specifically, for investors primarily interested in achieving exposure to beta, explicitly indexed funds are low-cost substitutes to the more expensive actively managed funds. If indexed funds create competitive pressure, then we expect active funds to differentiate themselves by more actively deviating from their benchmarks through stock picking, sector bets, and market timing or lowering their prices when facing higher market penetration by indexed products.

Previous research on mutual fund competition in the United States has arrived at diverse conclusions. For example, Elton, Gruber, and Busse (2004) and Hortascu and Syverson (2004) argue that S&P 500 index funds are commodities and that the price dispersion observed in the market for these funds reflects a lack of investor rationality and sizable information/search frictions.²² Collins (2005) argues that these funds are not commodities because they differ across other dimensions beyond the securities in their portfolios (for example, services provided to fund

²² Carlin and Manso (2011) suggest that funds create a perception among investors that they offer a differentiated product by expanding fund offerings to preserve rents and slow down investor learning about the benefits of indexed funds. Choi, Laibson, and Madrian (2010) provide experimental evidence regarding investors' choice of funds.

shareholders). With regard to the U.S. mutual fund industry as a whole, Coates and Hubbard (2007), Wahal and Wang (2011) and Khorana and Servaes (2012) provide evidence consistent with the competition argument whereas Gil-Bazo and Ruiz-Verdu (2009) provide evidence counter to competition.

5.1. Product Differentiation

To test our main hypothesis, we estimate panel regressions using the sample of active equity funds. The dependent variable is the yearly fund-level active share whereas the main explanatory variables are the market share and average total shareholder costs (TSC) of explicitly indexed funds located in the same country as the fund. We control for fund characteristics, dummies for particular types of funds (international, fund of fund, off-shore), country characteristics and year dummies, and standard errors are clustered by country-year.²³ Importantly, regressions also include fund benchmark dummies, which control for any unobserved (time invariant) heterogeneity in portfolio management across different benchmarks.

Table 3 presents the results. Columns (1) and (2) show the results at the fund-level when we measure the indexing variables by country of domicile. Columns (3) and (4) show the results using the individual share class offered for sale in a given country and year as a unit of observation and we measure indexing variables and other country variables by country of sale.²⁴

In columns (1) and (3) we examine the relation between product differentiation by active funds and the relative prominence of explicitly indexed funds. Although in the analysis using country of domicile we do not find this relation to be significant, in the country of sale analysis

²³ We obtain similar estimates when we use double-clustered standard errors by country and year.

²⁴ This set up takes into account that a fund can be offered for sale in multiple countries. A fund with two share classes, each offered for sale in three countries, will have six different observations per year in this sample. In these tests, fund-level variables are measured at the individual share class level, and country-level variables are measured by the country of sale. The indexing variables (market share and cost of explicitly indexed funds and the market share of closet indexers) are measured by country of sale.

shown in column (3) we find that active funds tend to have higher active shares in countries in which explicitly indexed funds have higher market share. Further consistent with our hypothesis, columns (2) and (4) show that in both the country of domicile and the country of sale, the coefficient on the average TSC of explicitly indexed funds is negative and significant. These results suggest that funds tend to engage in more active management in markets where they face more competitive pressure from explicitly indexed funds. The effects are economically meaningful, as we find that a one standard deviation increase in the TSC of passive funds (0.53) is associated with an decrease in average active share of 1.5 percentage points.

Overall, the tests in Table 3 are consistent with the hypothesis that active fund managers perceive low-cost explicitly indexed funds as a competitive threat. These results also provide additional insights into the organization of mutual fund markets. For example, we find that funds are more active in larger fund markets and those with higher judicial quality. Further, active shares are higher for funds with higher tracking error (i.e., volatility of the difference between a portfolio return and its benchmark index return), higher TSC, younger funds, and those affiliated to smaller fund families. Moreover, we find that fund managers who have been more successful (in terms of performance and attracting flows) have higher active shares. These results are in line with those in Cremers and Petajisto (2009) for US equity mutual funds.

The active share regression results are robust to a number of specification checks. In Table IA.7 of the Internet Appendix we estimate the regression using the sample of non-U.S. funds to alleviate any concerns that results are driven by the fact that funds domiciled in the United States represent a large fraction of the observations. We also consider alternative methods to estimate a fund's active share.²⁵ Next, we estimate the regression model using weighted least squares,

²⁵ We use two alternative methods to calculate active share: (1) we construct the index weights based only on ETFs (SPDR or iShares ETFs) that engage in full physical replication of the indices; and (2) we assign benchmarks

where the total net assets of the fund are employed as the weights and estimate regressions using country fixed effects. Finally, we measure the indexing variables for each country and benchmark type, and consider only the sample of domestic funds. All of these robustness checks produce results consistent with those in Table 3.

5.2. Total Shareholder Costs

We next test the hypothesis that actively managed fund managers tend to charge lower fees when they face more competition from (low-cost) explicitly indexed funds. To test this hypothesis, we estimate panel regressions of yearly fund-level total shareholder costs (TSC) using the sample of active funds. The main explanatory variables are the prevalence and cost of explicit indexing in the country in which the fund is domiciled or offered for sale. We include fund-level active share as a determinant of the TSC, as well as the same fund and country characteristics used in Table 3. Regressions also include year and fund benchmark dummies and standard errors are clustered by country-year.

Table 4 presents the results by country of domicile in columns (1)-(3), and by country of sale in columns (4)-(6). Consistent with our hypothesis, we find that the TSC charged by active funds are higher in countries where explicitly indexed funds have less market share and are more expensive. The effect of the market share of explicitly indexed funds is statistically significant only when we define the indexing variable by country of sale in column (4). The effect of the cost of explicitly indexed funds is statistically significant in both columns (2) and (5). The estimates in column (2) show that a decline in the TSC of indexed funds of 50 basis points (the difference in TSC between U.S. and non-U.S. explicitly indexed funds) is associated with 16 basis point lower fees charged by active funds. Overall, the results suggest that investors pay a

ourselves, taking the most representative benchmark every year for a fund, based on the one against which it has the lowest active share. More details are provided in the Internet Appendix.

higher price for active funds in markets where explicitly indexed products exert less competitive pressure.

Columns (3) and (6) of Table 4 show that active fund fees are higher in markets where closet indexing is more pervasive. According to estimates in column (3), an increase in the level of closet indexing of 15 percentage points (the difference between the United States and the rest of the world) is associated with an increase in TSC of about 4 basis points. This indicates that closet indexing is reflective of a less competitive fund industry in which funds are able to charge higher fees.

We additionally find that fund characteristics matter for TSC. A higher active share (i.e., more active portfolio management by a fund) is associated with funds charging higher fees. More active management as measured by a higher tracking error of a fund relative to its benchmark is also positively related to fees. Larger funds and younger funds charge lower fees. The regulatory and mutual fund industry environment in a country also seems to matter. Consistent with the evidence in Khorana, Servaes and Tufano (2009), fees are lower in stronger regulatory environments and when fund industries are larger.

We subject these TSC regression to a number of robustness checks. In Table IA.8 of the Internet Appendix we consider the sample of non-U.S. funds, as well as alternative measures of active share, weighted least squares, country fixed effect, analysis by country-benchmark type, and restricting the sample to domestic funds. We conclude that TSC regression results are robust to these checks.

5.3. Endogeneity

A potential concern with our findings is endogeneity, that is, the active share and fees charged by active funds are likely jointly determined with the market share and cost of explicitly

indexed funds (and closet indexers). So far, we have used funds' benchmarks or country fixed effects to address the concern that the availability of explicit indexing might be related to some unobserved (time invariant) benchmark or country characteristic that explains the active share and fees of active funds. In this section, we use instrumental-variable methods to address the concern that causality may run from active funds to passive funds. Hence, we need instruments for the availability of indexed products in a market. That is, we need variables that are correlated with the availability of indexed funds, but uncorrelated with the active share and fees charged by active funds except indirectly through other independent variables. Our international setting is unique as we can use factors that vary across countries (and time) as instruments. We only use instruments that arguably determine the investor demand for indexing and avoid using fund industry or overall stock market factors, which would be more questionable.

The first instrument we use is the financial sophistication of retail investors in each country. A large body of evidence suggests that the average investor is better off with passive investment funds that diversify and provide beta at lower costs than active funds. The awareness in the investment public that passive and active funds deliver fundamentally the same beta exposure should drive the demand for explicitly indexed funds. We proxy for financial literacy in a country using the variable *Financial Sophistication* measured by the World Economic Forum in the annual Global Competitiveness Report using the question "The level of sophistication of financial markets is higher than international norms." This variable is also used in Griffin, Hirschey, and Kelly (2011).

The second instrument deals with an in-built institutional demand for beta exposure via indexing that comes from the structure of a country's retirement system. It consists of a dummy variable that takes the value of one if a country's pension system is based on defined contribution

(DC) plans and zero otherwise (*DC pensions dummy*). To categorize countries in terms of the prevalence of defined contribution or defined benefits plans, we collect data from the Pension Funds Online website and the OECD. We expect countries with more reliance on DC plans for their pension systems to have a greater demand for explicit indexing in equity mutual funds for several reasons. First, in DC plans future benefits fluctuate on the basis of investment earnings and risk is not borne by the employer as in a defined benefit plan. Thus, each individual has an increased incentive to invest in instruments that explicitly try to match market returns in each asset class (such as equities and bonds) and will be concerned about his beta exposure. Second, many DC plans make passive investment options available to plan participants. For example, the 2012 Deloitte survey of 401(k) plans finds that 78% of DC plans in the United States offer passively managed equity funds.²⁶

Table 5 reports estimates of two-stage least squares (2SLS) regressions of the active share of active funds using instrumental variables methods. Panel A reports estimates when indexing variables and other country-level variables are measured by country of domicile, while Panel B reports estimates when these variables are measured by country of sale. Regressions include the other fund and country characteristics used in Table 3 as well as year and benchmark dummies.

The first-stage regression results support the view that the availability of explicitly indexed funds is positively related to financial sophistication and the DC pensions dummy (column (1)), while the cost of investing in explicitly indexed funds is negatively related to these instruments (column (2)). F-tests indicate the rejection of the hypotheses that instruments can be excluded from the first-stage regressions, which shows that the instruments are not weak.

In the second-stage regressions, the dependent variable is active share. Columns (3) and (4)

²⁶ Some countries may also require default investment options in DC plans and these force equity exposures following pre-defined rules allocations. For example, the U.S. Congress passing of the Pension Protection Act of 2006 led to increased popularity of target-date funds. This may also increase demand for indexing.

show that a higher market share and a lower cost of explicitly indexed funds are associated with an increase in the active share of funds. These results suggest that the higher competitive pressure created by the presence of low-cost passive funds in the market leads their active fund rivals to differentiate more.

Panel B of Table 5 reports estimates of the same regressions as shown in Panel A, but now taking into account that a fund may have multiple share classes offered for sale in multiple countries as in Table 3, columns (3)-(4). The first-stage and second-stage results by country of sale are consistent with those by country of domicile.

Table 6 reports similar 2SLS regressions of the total shareholder cost (TSC) of active funds. The specifications follow those of Table 4. After we take into account that the availability and price of explicitly indexed funds may be endogenous, we continue to find evidence that active funds charge less fees if there is more competitive pressure by low-cost explicitly indexed funds and the opposite if closet indexing is more prevalent.

We conclude that indexing plays an important role in enhancing market contestability in the fund industry worldwide. This evidence suggests a link from passive management to fees and competition by active funds but these results should be interpreted with caution since they rely on the validity of the instruments.

6. Returns to Active Management

We next test whether investors stand to benefit in terms of performance from investing in truly active funds and how that relates to the availability of explicitly indexed products.

To measure the performance benefits, we calculate the returns to active management using several approaches. We first examine batting averages, defined as the percentage of fund-year observations with positive benchmark-adjusted returns (i.e., when an active fund's net return

exceeds the return on its benchmark). Figure 5 shows that the majority of active funds underperform their benchmarks between 2002 and 2010. On average, benchmark-adjusted returns are positive only for 45% of fund-years. Interestingly, batting averages are higher for U.S. funds in Panel B than for non-U.S. funds in Panel A, albeit also more volatile. When we divide the funds based on their active shares, we find that the truly active funds have higher batting averages than closet indexers (47% versus 41%), with the exception of 2008.

The average benchmark-adjusted after-cost return for all active funds in our sample is about zero, which is consistent with results in other studies of mutual fund performance. Both equal-weighted and value-weighted average fund performance show a similar pattern, and truly active funds significantly outperform closet indexers. Further, we find that the truly active funds are able to outperform their benchmarks on average by 1.04% per year (0.12% if equal-weighting).

We next examine whether active share predicts future fund performance using benchmark-adjusted four-factor alphas as a measure of performance. The four-factor alphas are estimated using three years of past monthly fund (benchmark-adjusted) returns with regional factors (Asia, Europe, North America, and Emerging Markets) or world factors in the case of world funds in the manner of Bekaert, Hodrick and Zhang (2009). Ferreira, Keswani, Miguel, and Ramos (2013) provide details on the construction of the factors. We then subtract the expected return from the realized fund return to estimate the fund abnormal return (alpha) in each year, which is measured as the sum of the intercept of the model and the residual as in Carhart (1997). We then regress four-factor alphas on active share and fund and country characteristics in pooled panel regressions. All independent variables are measured with a one-year lag. The regressions also include benchmark and year dummies, and standard errors are clustered by country-year.

Table 7 reports the results. Panel A reports estimates when indexing variables and other

country variables are measured by country of domicile, while Panel B reports estimates when these variables are measured by country of sale and the unit of observation is a fund share class offered for sale in each country. Column (1) shows that funds with higher active share perform better. Thus, active share is a predictor of future fund performance across world markets, consistent with the Cremers and Petajisto (2009) results for U.S. domestic equity mutual funds. The effect of active share on future fund performance is both statistically and economically significant. A one standard deviation increase in active share is associated with a 0.7% increase in four-factor alphas in the subsequent year using the estimate in column (1), Panel A.

Table 7 also shows that tracking error (an alternative measure of active management) is actually negatively related to future fund performance. This suggests that the market rewards funds that are most active in stock selection (which is captured by active share) but does not reward factor bets (which is captured by tracking error). The coefficients of the other fund characteristics are consistent with previous findings for the U.S. mutual fund literature. Fund size is negatively related to performance, while family size is positively related (Chen, Hong, Huang, and Kubik (2004)). Total shareholder costs are negatively related to performance (Malkiel (1995), Carhart (1997), and Gil-Bazo and Ruiz-Verdu (2009)).

Table IA.9 in the Internet Appendix shows that estimates are consistent using different fund performance measures commonly used in the literature (benchmark-adjusted returns, excess return four-factor alphas, and information ratio). For example, we estimate that a one standard deviation increase in active share is associated with a 1% increase in future benchmark-adjusted returns. Table IA.9 also shows that funds with higher active share perform better using the sample of non-U.S. funds, weighted least squares, country fixed effects, the sample of domestic funds, alternative active share measures (the pure-ETF active share and the minimum active

share), and controlling for the Amihud and Goyenko (2012) R-squared measure.

We next test the hypothesis that the presence of passive funds affects the returns to active management. To test this, in the performance regressions we include the market shares (and average cost) of explicitly indexing and closet indexing and the interactions of these variables with a fund's active share. Columns (2)-(4) of Table 7 present the estimates of these regressions. We find that average fund performance is positively related to the market share of explicitly indexed funds in column (2) of Panel B and negatively related to the average cost of explicit indexing in column (3) in both Panels A and B. It suggests that active funds perform better in markets where low-cost explicitly indexed funds are more available. This finding is consistent with the idea that enhanced competition by low-cost explicitly indexed funds spurs active funds to deliver better after-fee performance to investors. Moreover, the coefficient on the interaction between active share and the market share of explicitly indexed funds is negative and significant (in Panel B) and the interaction of active share and the average TSC of explicitly index funds is positive and significant (in both Panels A and B). We thus conclude that the marginal returns to active management are lower in markets with more prevalent and cheaper explicitly indexed funds.

Finally, we find that the market share of closet indexing coefficient is negative and significant in column (4) of Panel B, while the interaction term with active share is positive and significant. This suggests that there are marginal returns to active management when active funds are more generally passive and there is less competition in a given market.

7. Conclusion

We examine the consequences of indexing in the equity mutual fund industry across 32 countries. We show that explicit indexing has been growing over the last decade, affecting the

competitive structure of mutual fund markets. Our evidence suggests that in markets with more competition from explicitly indexed funds the active funds have to pursue more differentiated product strategies (i.e., funds exhibit higher active shares) to deliver alpha to investors and charge lower fees for active management. In contrast, in countries where investors have limited options of paying lower fees for beta exposure through passive management, many active fund managers are effectively closet indexers but charge higher fees and underperform.

Our findings suggest that the growth of explicitly indexed funds worldwide improves the efficiency of the asset management industry. The growth of index-based investing could have broader implications for markets and asset prices that deserve attention from future research.

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Table 1
Explicit and Closet Indexing by Country of Domicile and Country of Sale

This table presents the number of funds and TNA in billions of U.S. dollars per country as of December 2010 for the sample of open-end equity mutual funds in Lipper for which holdings are available in LionShares. Explicit indexing includes index funds and exchange-traded funds. Closet indexing includes active funds with active share below 0.6. Truly active includes active funds with active share above 0.6. Total shareholder cost is the annual total expense ratio plus one-fifth of the front-end load. Panel A presents statistics based on the primary fund country of domicile and Panel B presents statistics based on the fund share class country of sale.

Panel A: by Country of Domicile												
	Funds with Holdings		Explicitly Indexed Funds		Active Funds		Market Share (% TNA)			Total Shareholder Cost (%)		
	Number	TNA (\$ billion)	Number	TNA (\$ billion)	Number	TNA (\$ billion)	Explicit Indexing	Closet Indexing	Truly Active	Explicit Indexing	Closet Indexing	Truly Active
Austria	167	15.0	11	0.5	156	14.5	3	36	61	2.23	2.58	2.61
Belgium	150	17.9	24	3.7	126	14.2	21	43	36	1.16	2.01	1.98
Canada	895	326.4	53	24.4	842	302.0	8	37	55	0.42	2.11	2.80
Denmark	201	30.5	12	0.5	189	30.0	2	27	71	0.83	1.87	2.09
Finland	147	26.2	8	0.8	139	25.4	3	44	53	0.34	2.16	1.91
France	492	134.1	89	33.8	403	100.3	25	29	46	0.77	2.07	2.22
Germany	356	139.5	51	22.3	305	117.2	16	34	50	0.69	2.34	2.37
Ireland	484	222.5	62	68.8	422	153.7	31	25	44	0.56	1.89	2.17
Italy	125	31.4	0	0.0	125	31.4	0	36	64		2.44	2.59
Liechtenstein	101	6.0	0	0.0	101	6.0	0	18	82		1.70	1.98
Luxembourg	2,057	750.5	107	30.7	1,950	719.8	4	26	70	1.21	2.60	2.43
Netherlands	75	33.6	3	0.3	72	33.3	1	21	78	0.59	1.40	1.30
Norway	117	41.4	8	2.6	109	38.8	6	26	68	0.42	1.44	1.82
Poland	46	8.4	0	0.0	46	8.4	0	58	42		4.02	3.00
Portugal	53	2.0	1	0.0	52	2.0	0	39	61	1.03	2.01	2.08
Spain	267	13.1	27	1.2	240	11.9	9	42	49	1.51	2.12	1.97
Sweden	266	113.5	36	11.7	230	101.8	10	56	34	0.56	1.47	1.42
Switzerland	220	69.7	45	40.6	175	29.1	58	24	18	1.01	1.73	2.08
U.K.	975	504.1	46	45.6	929	458.5	9	32	59	0.62	2.33	2.38
U.S.	3,153	5,150.3	547	1,393.2	2,606	3,757.1	27	15	58	0.26	1.07	1.31
Asia Pacific	1,204	255.5	86	62.3	1,118	193.2	24	20	56	0.75	1.46	1.90
Other Regions	225	29.3	2	0.1	223	29.2	0	41	59	1.35	2.14	2.08
Total Non-U.S.	8,623	2,770.8	671	350.0	7,952	2,420.8	13	30	57	0.74	2.17	2.32
Total	11,776	7,921.1	1,218	1,743.2	10,558	6,177.9	22	20	58	0.35	1.64	1.66

Table 1 (continued)

Panel B: by Country of Sale												
	Funds with Holdings		Explicitly Indexed Funds		Active Funds		Market Share (% TNA)			Total Shareholder Cost (%)		
	Number	TNA (\$ billion)	Number	TNA (\$ billion)	Number	TNA (\$ billion)	Explicit Indexing	Closet Indexing	Truly Active	Explicit Indexing	Closet Indexing	Truly Active
Austria	5,861	1,020	269	114.9	5,592	904.9	11	24	65	0.76	2.61	2.53
Belgium	3,301	519	154	20.9	3,147	498.1	4	27	69	0.90	2.82	2.74
Canada	2,114	326	82	24.3	2,032	302.1	7	37	55	0.41	2.11	2.78
Denmark	2,741	476	65	55.8	2,676	420.6	12	26	62	0.53	2.65	2.58
Finland	3,973	582	115	35.9	3,858	545.8	6	28	66	0.88	2.67	2.56
France	6,269	1,024	370	137.7	5,899	886.7	13	24	62	0.68	2.54	2.53
Germany	7,360	1,186	399	149.5	6,961	1,036.1	13	24	63	0.71	2.53	2.48
Ireland	2,846	595	156	87.9	2,690	507.4	15	24	62	0.63	2.48	2.49
Italy	4,359	706	189	51	4,170	654.9	7	27	66	0.84	2.69	2.62
Liechtenstein	60	1	8	0.0	52	1.3	0	31	69	1.61	2.59	2.54
Luxembourg	7,485	1,048	355	125.2	7,130	922.6	12	24	64	0.77	2.58	2.43
Netherlands	5,194	900	267	134.8	4,927	765.1	15	22	63	0.63	2.58	2.49
Norway	3,324	482	40	7.6	3,284	474.7	2	31	68	0.70	2.55	2.59
Poland	1,755	233	0	0.0	1,755	233.0	0	30	70		2.84	2.64
Portugal	3,390	440	90	7.5	3,300	432.6	2	30	68	1.45	2.71	2.70
Spain	5,359	806	215	84.7	5,144	721.1	11	25	64	0.69	2.66	2.57
Sweden	5,311	856	248	96.1	5,063	760.0	11	27	62	0.72	2.30	2.43
Switzerland	6,809	1,106	387	170.9	6,422	934.6	15	21	63	0.78	2.55	2.46
U.K.	6,924	1,307	329	161.8	6,595	1,145.5	12	26	62	0.65	2.47	2.42
U.S.	8,976	5,079	918	1,392.1	8,058	3,686.6	27	15	58	0.25	1.09	1.32
Asia Pacific	8,675	2,103	220	520.6	8,455	1,582.5	25	18	57	0.31	2.63	2.61
Other Regions	542	163	3	0.1	539	163.1	0	25	75	1.36	2.64	2.80
Other Countries	21,294	5,661	692	1,457.2	20,602	4,203.3	26	22	52	0.28	2.34	2.49
Total Non-U.S.	114,946	21,541	4,653	3,444.7	110,293	18,096.1	16	24	60	0.46	2.51	2.53
Total	123,922	26,620	5,571	4,836.8	118,351	21,782.7	18	22	60	0.40	2.33	2.30

Table 2
Determinants of Explicit and Closet Indexing at Country-Level

This table presents estimates of yearly country-level regressions where the dependent variable is the percentage that explicitly indexed funds represent of the TNA in a country (Explicit Indexing (% TNA)), the TNA-weighted average total shareholder cost of explicitly indexed funds in a country (Explicit Indexing (TSC)), and the percentage that active funds with active share measure below 0.6 represent of the TNA in a country (Closet Indexing (% TNA)). The sample includes open-end equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In Panel A the unit of observation is a country of domicile j in year t . In Panel B the unit of observation is a country of sale k in year t . Regressions include year dummies. Refer to Appendix A for variable definitions. Robust t -statistics are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

Panel A: by Country of Domicile						
	Explicit Indexing (% TNA)		Explicit Indexing (TSC)		Closet Indexing (% TNA)	
	(1)	(2)	(3)	(4)	(5)	(6)
Approval	0.0575** (2.51)		0.1174 (1.54)		-0.0099 (-0.40)	
Judicial	0.0041** (2.44)		-0.0245*** (-4.27)		-0.0063*** (-3.53)	
Fund industry size (log)		0.0298*** (3.38)		-0.0833*** (-2.77)		-0.0330*** (-3.52)
Fund industry Herfindahl		0.8183*** (4.28)		0.1241 (0.20)		-0.0335 (-0.16)
GDP per capita (log)		-0.0024 (-0.17)		-0.0603 (-1.39)		-0.0160 (-1.09)
Observations	259	250	212	212	258	249
R-squared	0.066	0.104	0.110	0.125	0.156	0.205
Panel B: by Country of Sale						
	Explicit Indexing (% TNA)		Explicit Indexing (TSC)		Closet Indexing (% TNA)	
	(1)	(2)	(3)	(4)	(5)	(6)
Approval	0.1098*** (4.69)		-0.0223 (-0.38)		-0.0009 (-0.06)	
Judicial	0.0051*** (2.87)		-0.0244*** (-5.21)		-0.0045*** (-4.17)	
Fund industry size (log)		0.0360*** (4.14)		-0.0922*** (-4.50)		-0.0151*** (-2.88)
Fund industry Herfindahl		0.2874** (2.49)		0.2181 (0.63)		-0.2013*** (-2.89)
GDP per capita (log)		-0.0037 (-0.26)		-0.1061*** (-3.26)		-0.0123 (-1.42)
Observations	254	254	240	240	254	254
R-squared	0.124	0.089	0.137	0.265	0.156	0.167

Table 3
Determinants of Active Management

This table presents estimates of panel regressions where the dependent variable is a fund's active share at year-end, defined as the percentage of a fund's portfolio holdings that differs from the fund's benchmark. The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In columns (1) and (2) the unit of observation is a fund's primary share class i domiciled in country j in year t . In columns (3) and (4) the unit of observation is a fund share class s offered for sale in country k in year t . Regressions include year and benchmark dummies. Refer to Appendix A for variable definitions. Robust t -statistics clustered by country of domicile-year (columns (1) and (2)) or country of sale-year (columns (3) and (4)) are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

	by Country of Domicile		by Country of Sale	
	(1)	(2)	(3)	(4)
Explicit indexing (% TNA)	0.0075 (0.47)		0.0171** (2.38)	
Explicit indexing (TSC)		-0.0290*** (-4.90)		-0.0128*** (-4.33)
Tracking error	1.6678*** (7.47)	1.6470*** (7.16)	1.6039*** (14.09)	1.6056*** (13.81)
Total shareholder cost	0.0266*** (15.43)	0.0285*** (15.71)	0.0153*** (21.00)	0.0153*** (20.52)
Total net assets (log)	-0.0057*** (-10.87)	-0.0053*** (-10.16)	0.0003** (2.37)	0.0003** (2.38)
Family total net assets (log)	-0.0039*** (-5.06)	-0.0044*** (-5.55)	-0.0067*** (-18.84)	-0.0068*** (-18.90)
Fund age	-0.0008*** (-5.55)	-0.0008*** (-5.38)	-0.0010*** (-8.93)	-0.0010*** (-8.87)
Flows	0.0079*** (6.69)	0.0083*** (7.05)	0.0003*** (8.19)	0.0003*** (8.22)
Benchmark-adjusted return	0.1414*** (5.87)	0.1386*** (5.64)	0.1645*** (11.69)	0.1643*** (11.52)
International fund dummy	-0.0201*** (-4.02)	-0.0166*** (-3.18)	-0.0354*** (-5.18)	-0.0349*** (-5.20)
Fund of fund dummy	0.0399*** (4.58)	0.0451*** (5.01)	0.0409*** (7.97)	0.0412*** (8.02)
Off-shore fund dummy	0.0342*** (2.86)	0.0620*** (4.26)	0.0120*** (6.31)	0.0120*** (6.35)
Approval	0.0087** (1.98)	0.0151*** (3.14)	-0.0025** (-2.05)	-0.0026** (-2.08)
Judicial	0.0026*** (4.70)	0.0024*** (3.92)	0.0006*** (4.89)	0.0004** (2.48)
Fund industry size (log)	0.0081*** (5.20)	0.0046** (2.50)	0.0024*** (3.74)	0.0020*** (3.23)
Fund industry Herfindahl	-0.2466*** (-6.31)	-0.2122*** (-6.00)	-0.0030 (-0.36)	0.0106 (0.96)
GDP per capita (log)	-0.0352*** (-7.80)	-0.0388*** (-8.56)	-0.0152*** (-7.10)	-0.0165*** (-6.73)
Observations	58,487	56,554	423,103	415,797
R-squared	0.622	0.623	0.617	0.616

Table 4
Determinants of the Total Shareholder Costs of Active Funds

This table presents estimates of panel regressions where the dependent variable is a fund's yearly total shareholder cost, defined as total expense ratio plus one-fifth of the front-end load. The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In columns (1)-(3) the unit of observation is a fund's primary share class i domiciled in country j in year t . In columns (4)-(6) the unit of observation is a fund share class s offered for sale in country k in year t . Regressions include year and benchmark dummies. Refer to Appendix A for variable definitions. Robust t -statistics clustered by country of domicile-year (columns (1)-(3)) or country of sale-year (columns (4)-(6)) are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

	by Country of Domicile			by Country of Sale		
	(1)	(2)	(3)	(4)	(5)	(6)
Explicit indexing (% TNA)	-0.0444 (-0.36)			-0.4118*** (-4.18)		
Explicit indexing (TSC)		0.3275*** (7.44)			0.1239*** (5.84)	
Closet indexing (% TNA)			0.2863** (2.44)			0.3035** (2.29)
Active share	0.6080*** (13.96)	0.6382*** (14.29)	0.6192*** (13.93)	0.5867*** (23.96)	0.5857*** (23.56)	0.5892*** (23.57)
Tracking error	0.9326*** (6.31)	1.0024*** (6.61)	0.9722*** (6.59)	1.3308*** (9.87)	1.3261*** (10.07)	1.3402*** (10.35)
Total net assets (log)	-0.0719*** (-20.27)	-0.0752*** (-22.74)	-0.0718*** (-20.53)	-0.0324*** (-18.01)	-0.0327*** (-17.83)	-0.0325*** (-17.78)
Family total net assets (log)	0.0146*** (2.82)	0.0176*** (3.40)	0.0146*** (2.87)	-0.0106*** (-5.06)	-0.0098*** (-4.62)	-0.0096*** (-4.64)
Fund age	0.0058*** (6.89)	0.0052*** (6.30)	0.0057*** (6.80)	0.0131*** (13.18)	0.0130*** (12.99)	0.0131*** (13.02)
Flows	0.0055 (0.90)	0.0032 (0.52)	0.0044 (0.72)	-0.0019*** (-6.59)	-0.0019*** (-6.51)	-0.0019*** (-6.51)
Benchmark-adjusted return	-0.2542*** (-4.04)	-0.2173*** (-3.55)	-0.2480*** (-3.97)	-0.5942*** (-14.02)	-0.5896*** (-13.87)	-0.5969*** (-14.09)
International fund dummy	0.3634*** (14.99)	0.2973*** (10.13)	0.3359*** (13.60)	0.5105*** (17.25)	0.5256*** (19.34)	0.5258*** (16.68)
Fund of fund dummy	-0.2490*** (-6.90)	-0.2402*** (-6.78)	-0.2546*** (-7.04)	-0.3911*** (-13.99)	-0.3934*** (-13.89)	-0.3912*** (-13.98)
Off-shore fund dummy	-0.0404 (-0.43)	-0.3208*** (-3.09)	-0.0319 (-0.36)	0.2604*** (22.04)	0.2611*** (21.67)	0.2620*** (22.07)
Approval	-0.3734*** (-8.55)	-0.4667*** (-11.81)	-0.3727*** (-8.63)	-0.0010 (-0.11)	-0.0046 (-0.51)	-0.0056 (-0.61)
Judicial	-0.0088 (-1.59)	-0.0037 (-0.68)	-0.0082 (-1.50)	-0.0010 (-1.16)	0.0006 (0.49)	-0.0016** (-2.05)
Fund industry size (log)	-0.0537*** (-3.39)	0.0027 (0.16)	-0.0494*** (-2.96)	-0.0270*** (-5.59)	-0.0254*** (-5.29)	-0.0297*** (-6.05)
Fund industry Herfindahl	-1.5938*** (-4.27)	-1.6571*** (-4.27)	-1.6930*** (-4.58)	-0.0375 (-0.40)	-0.1661 (-1.18)	0.0310 (0.32)
GDP per capita (log)	0.0962** (2.24)	0.1348*** (3.14)	0.1140*** (2.73)	0.0500*** (2.80)	0.0549*** (2.65)	0.0469*** (2.61)
Observations	58,487	56,554	58,487	423,103	415,797	423,103
R-squared	0.390	0.393	0.391	0.198	0.199	0.198

Table 5
Instrumental Variables Regressions of Active Management

This table presents estimates of instrumental variables regressions of a fund's active share at year-end. The first-stage dependent variables are the percentage that explicitly indexed funds represent of the TNA in a country (Explicit Indexing (% TNA)) and the TNA-weighted average total shareholder cost of explicitly indexed funds in a country (Explicit Indexing (TSC)). The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In Panel A the unit of observation is a fund's primary share class i domiciled in country j in year t . In Panel B the unit of observation is a fund share class s offered for sale in country k in year t . Regressions include the fund and country control variables used in Table 3 as well as year and benchmark dummies. Refer to Appendix A for variable definitions. Robust t -statistics clustered by country of domicile-year (Panel A) or country of sale-year (Panel B) are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

Panel A: by Country of Domicile				
	First Stage Regression		Second Stage Regression	
	Explicit indexing (% TNA)	Explicit indexing (TSC)	Active Share	
	(1)	(2)	(3)	(4)
Explicit indexing (% TNA)			0.7392** (2.35)	
Explicit indexing (TSC)				-0.2174* (-1.82)
Financial sophistication	0.0340** (2.44)	-0.0959* (-1.70)		
DC pensions dummy	0.0376*** (3.23)	-0.1321* (-1.87)		
Observations	56,148	54,227	56,148	54,227
R-squared	0.658	0.771	0.239	0.247
Panel B: by Country of Sale				
	First Stage Regression		Second Stage Regression	
	Explicit indexing (% TNA)	Explicit indexing (TSC)	Active Share	
	(1)	(2)	(3)	(4)
Explicit indexing (% TNA)			0.7203*** (5.76)	
Explicit indexing (TSC)				-0.0841*** (-3.72)
Financial sophistication	0.0258*** (4.27)	-0.1952*** (-6.40)		
DC pensions dummy	0.0665*** (6.36)	-0.1338*** (-4.27)		
Observations	419,820	412,514	419,820	412,514
R-squared	0.574	0.696	0.103	0.121

Table 6**Instrumental Variables Regression of the Total Shareholder Costs of Active Funds**

This table presents estimates of instrumental variables regressions of a fund's yearly total shareholder cost, defined as total expense ratio plus one-fifth of the front-end load. The first-stage dependent variables are the percentage that explicitly indexed funds represent of the TNA in a country (Explicit Indexing (% TNA)), TNA-weighted average total shareholder cost of explicitly indexed funds in a country (Explicit Indexing (TSC)), or percentage that active funds with active share measure below 0.6 represent of the TNA in a country (Closet Indexing (% TNA)). The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In Panel A the unit of observation is a fund's primary share class i domiciled in country j in year t . In Panel B the unit of observation is a fund share class s offered for sale in country k in year t . Regressions include the fund and country control variables used in Table 4 as well as year and benchmark dummies. Refer to Appendix B for variable definitions. Robust t -statistics clustered by country of domicile-year (Panel A) or country of sale-year (Panel B) are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

Panel A: by Country of Domicile						
	First Stage Regression			Second Stage Regression		
	Explicit indexing (% TNA)	Explicit indexing (TSC)	Closet indexing (% TNA)	Total Shareholder Cost		
	(1)	(2)	(3)	(4)	(5)	(6)
Explicit indexing (% TNA)				-5.8556*** (-3.03)		
Explicit indexing (TSC)					1.4935** (2.33)	
Closet indexing (% TNA)						2.0295*** (3.08)
Financial sophistication	0.0386*** (3.33)	-0.1444** (-1.99)	-0.1128*** (-5.63)			
DC pensions dummy	0.0346** (2.50)	-0.1022* (-1.81)	-0.0364* (-1.95)			
Observations	56,148	54,227	56,148	56,148	54,227	56,148
R-squared	0.659	0.766	0.653	0.167	0.226	0.298
Panel B: by Country of Sale						
	First Stage Regression			Second Stage Regression		
	Explicit indexing (% TNA)	Explicit indexing (TSC)	Closet indexing (% TNA)	Total Shareholder Cost		
	(1)	(2)	(3)	(4)	(5)	(6)
Explicit indexing (% TNA)				-3.9640*** (-6.84)		
Explicit indexing (TSC)					0.4498*** (4.93)	
Closet indexing (% TNA)						3.2163*** (8.16)
Financial sophistication	0.0666*** (6.36)	-0.1337*** (-4.29)	-0.0965*** (-8.54)			
DC pensions dummy	0.0258*** (4.27)	-0.1952*** (-6.40)	-0.0274*** (-4.36)			
Observations	419,820	412,514	419,820	419,820	412,514	419,820
R-squared	0.574	0.696	0.592	0.133	0.164	0.151

Table 7
Determinants of the Performance of Active Funds

This table presents estimates of panel regressions where the dependent variable is a fund's yearly benchmark-adjusted return four-factor alpha. Benchmark-adjusted return is the difference between the fund net return and its benchmark return. Four-factor alphas are estimated using three years of past monthly benchmark-adjusted fund returns in U.S. dollars with regional factors (Asia, Europe, North America or Emerging Markets) or world factors in the case of world funds. The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In Panel A the unit of observation is a fund's primary share class i domiciled in country j in year t . In Panel B the unit of observation is a fund share class s offered for sale in country k in year t . All explanatory variables are lagged by one period. Regressions include year and benchmark dummies. Refer to Appendix A for variable definitions. Robust t -statistics clustered by country of domicile-year (Panel A) or country of sale-year (Panel B) are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

Panel A: by Country of Domicile				
	(1)	(2)	(3)	(4)
Active share	0.0319*** (6.19)	0.0362*** (5.29)	0.0171* (1.73)	0.0230*** (1.98)
Explicit indexing (% TNA)		0.0106 (0.43)		
Active share x Explicit indexing (% TNA)		-0.0351 (-0.95)		
Explicit indexing (TSC)			-0.0166** (-2.34)	
Active share x Explicit indexing (TSC)			0.0163* (1.75)	
Closet indexing (% TNA)				-0.0105 (-0.41)
Active share x Closet indexing (% TNA)				0.0255 (0.75)
Tracking error	-0.0792*** (-3.28)	-0.0793*** (-3.31)	-0.0807*** (-3.27)	-0.0781*** (-3.22)
Total shareholder cost	-0.0037*** (-4.60)	-0.0037*** (-4.63)	-0.0033*** (-4.09)	-0.0037*** (-4.70)
Total net assets (log)	-0.0011*** (-2.62)	-0.0011*** (-2.74)	-0.0011** (-2.55)	-0.0011*** (-2.61)
Family total net assets (log)	0.0016*** (5.53)	0.0016*** (5.38)	0.0016*** (5.26)	0.0016*** (5.55)
Fund age	-0.0000 (-0.26)	-0.0000 (-0.29)	-0.0000 (-0.31)	-0.0000 (-0.30)
Flows	0.0022*** (2.63)	0.0021** (2.56)	0.0020** (2.39)	0.0022*** (2.61)
International fund dummy	-0.0038 (-0.80)	-0.0045 (-0.95)	-0.0027 (-0.56)	-0.0047 (-1.02)
Fund of fund dummy	-0.0116*** (-2.69)	-0.0118*** (-2.72)	-0.0120*** (-2.64)	-0.0118*** (-2.74)
Off-shore fund dummy	0.0019 (0.35)	-0.0022 (-0.30)	0.0080 (1.07)	0.0016 (0.29)
Approval	-0.0047 (-1.43)	-0.0042 (-1.28)	-0.0035 (-0.95)	-0.0045 (-1.36)
Judicial	0.0006** (2.33)	0.0005 (1.53)	0.0007** (2.47)	0.0006** (2.32)
Fund industry size (log)	0.0003 (0.26)	0.0008 (0.62)	-0.0004 (-0.28)	0.0005 (0.41)
Fund industry Herfindahl	-0.0105 (-0.44)	-0.0012 (-0.05)	-0.0091 (-0.36)	-0.0108 (-0.44)
GDP per capita (log)	0.0001 (0.03)	0.0012 (0.29)	-0.0006 (-0.16)	0.0007 (0.17)
Observations	51,570	51,570	50,007	51,570
R-squared	0.074	0.074	0.075	0.074

Table 7 (continued)

	Panel B: by Country of Sale			
	(1)	(2)	(3)	(4)
Active share	0.0549*** (12.91)	0.0722*** (11.21)	0.0350*** (3.65)	-0.0133 (-1.03)
Explicit indexing (% TNA)		0.1196*** (4.16)		
Active share x Explicit indexing (% TNA)		-0.1753*** (-4.21)		
Explicit indexing (TSC)			-0.0158** (-2.17)	
Active share x Explicit indexing (TSC)			0.0233** (2.18)	
Closet indexing (% TNA)				-0.1391*** (-3.81)
Active share x Closet indexing (% TNA)				0.2311*** (4.67)
Tracking error	-0.1176*** (-5.14)	-0.1178*** (-5.19)	-0.1191*** (-5.17)	-0.1196*** (-5.32)
Total shareholder cost	-0.0051*** (-15.39)	-0.0052*** (-15.48)	-0.0051*** (-15.24)	-0.0052*** (-15.34)
Total net assets (log)	-0.0005*** (-6.40)	-0.0005*** (-6.42)	-0.0005*** (-6.32)	-0.0005*** (-6.36)
Family total net assets (log)	0.0013*** (5.63)	0.0013*** (5.29)	0.0013*** (5.48)	0.0013*** (5.97)
Fund age	0.0001*** (4.92)	0.0001*** (4.77)	0.0001*** (4.87)	0.0001*** (4.59)
Flows	0.0000 (0.36)	0.0000 (0.30)	0.0000 (0.43)	0.0000 (0.49)
International fund dummy	0.0019 (0.60)	0.0014 (0.44)	0.0018 (0.58)	-0.0002 (-0.06)
Fund of fund dummy	-0.0023 (-1.03)	-0.0027 (-1.20)	-0.0026 (-1.14)	-0.0033 (-1.45)
Off-shore fund dummy	-0.0042*** (-5.16)	-0.0043*** (-5.27)	-0.0043*** (-5.31)	-0.0042*** (-5.27)
Approval	-0.0010 (-1.65)	-0.0008 (-1.47)	-0.0009 (-1.44)	-0.0007 (-1.20)
Judicial	0.0001** (2.17)	0.0001** (2.15)	0.0001 (1.47)	0.0001** (2.49)
Fund industry size (log)	-0.0004 (-1.21)	-0.0004 (-1.07)	-0.0003 (-0.97)	-0.0004 (-1.10)
Fund industry Herfindahl	-0.0079* (-1.71)	-0.0080 (-1.55)	-0.0055 (-0.89)	-0.0092** (-2.03)
GDP per capita (log)	0.0010 (0.78)	0.0010 (0.81)	0.0011 (0.72)	0.0011 (0.90)
Observations	346,711	346,711	340,940	346,711
R-squared	0.101	0.102	0.101	0.103

Figure 1
Explicit and Closet Indexing by Country of Domicile

This figure shows the percentage that explicitly indexed funds represent of the TNA in a country (Explicit Indexing), the percentage that active funds with active share measure below 0.6 represent of the TNA in a country (Closet Indexing), and the percentage that active funds with active share measure above 0.6 represent of the TNA in a country (Truly Active), as of December 2010. The sample includes open-end equity mutual funds from Lipper for which holdings are available in LionShares.

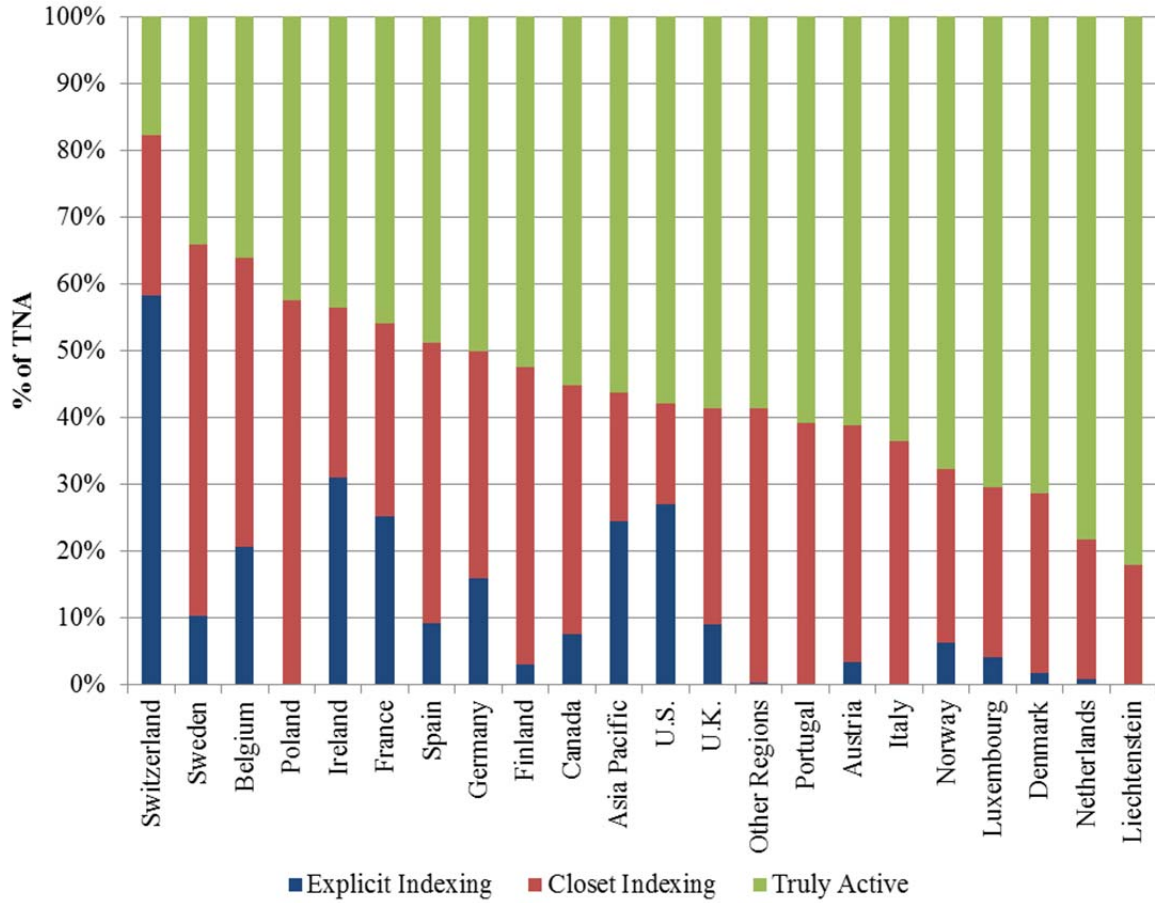
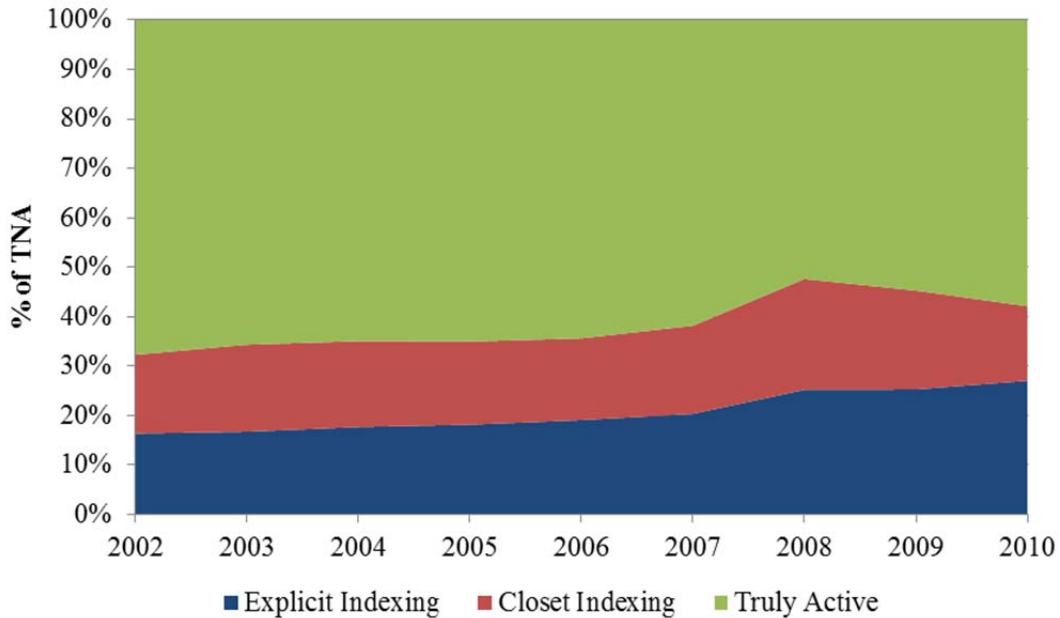


Figure 2
Explicit and Closet Indexing by Year

This figure shows the yearly percentage that explicitly indexed funds represent of the total TNA (Explicit Indexing), the percentage that active funds with active share measure below 0.6 represent of the total TNA (Closet Indexing), and the percentage that active funds with active share measure above 0.6 represent of the total TNA (Truly Active). The sample includes open-end equity mutual funds from Lipper for which holdings are available in LionShares from 2002 to 2010. Panel A uses the sample of U.S. funds and Panel B uses the sample of non-U.S. funds.

Panel A: U.S. Funds



Panel B: Non-U.S. Funds

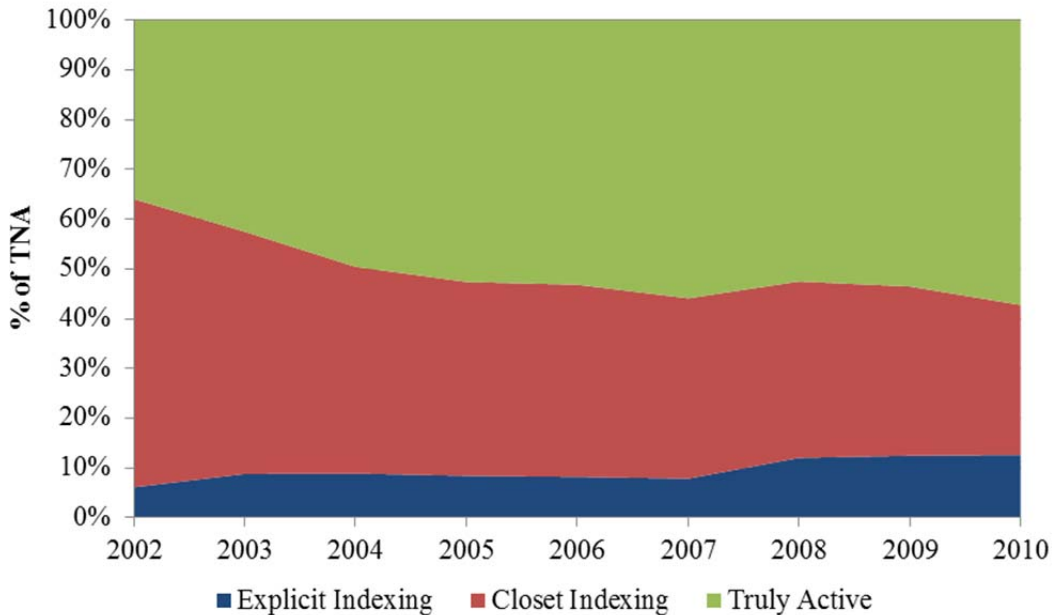


Figure 3

Average Total Shareholder Cost by Country of Domicile

This figure shows the TNA-weighted average total shareholder cost of funds, defined as total expense ratio plus one-fifth of the front-end load, as of December 2010. The sample includes open-end equity mutual funds from Lipper for which holdings are available in LionShares. Explicit indexing includes index funds and exchange-traded funds. Closet indexing includes active funds with active share below 0.6. Truly active includes active funds with active share above 0.6.

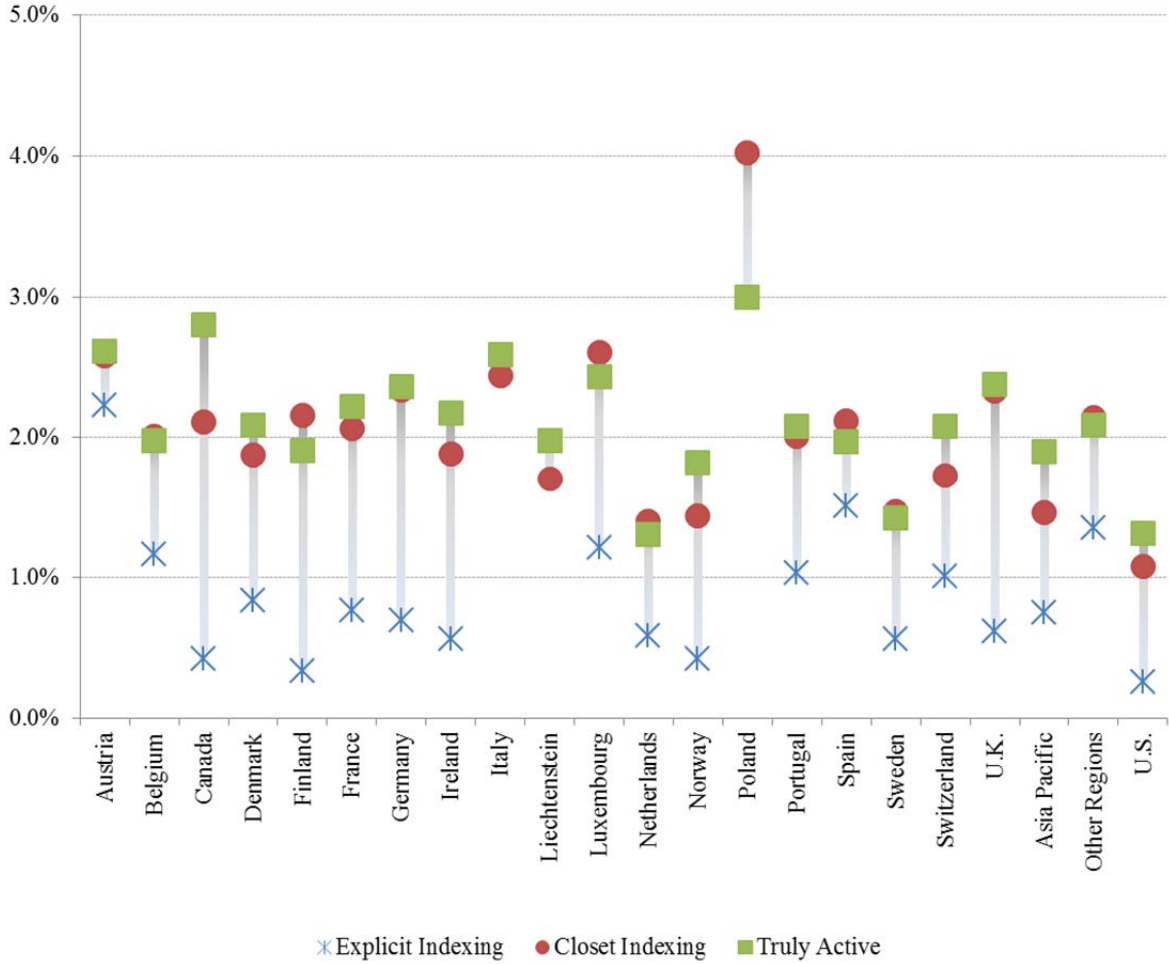
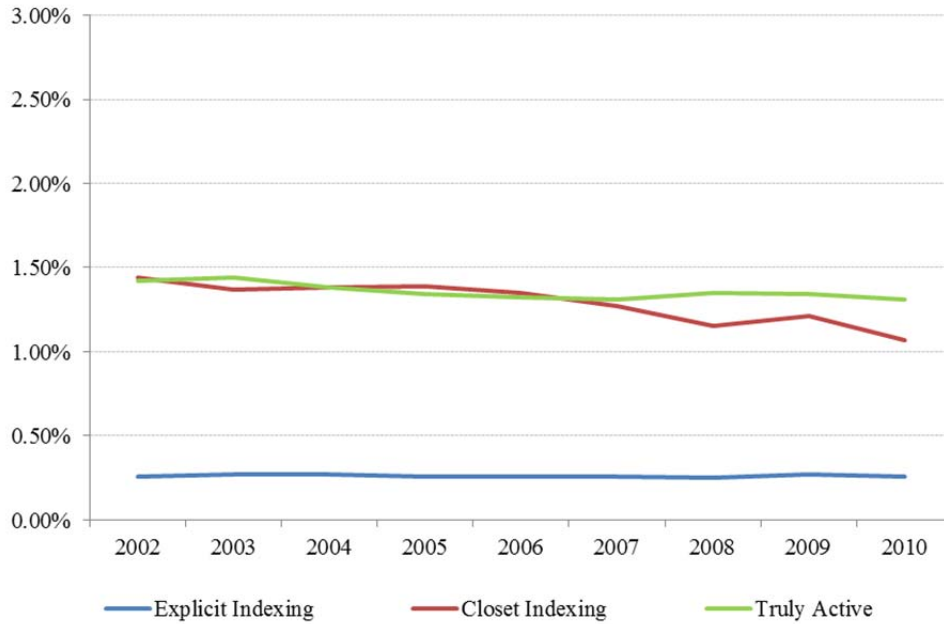


Figure 4
Average Total Shareholder Cost by Year

This figure shows the TNA-weighted average total shareholder cost of funds, defined as total expense ratio plus one-fifth of the front-end load, as of December 2010. The sample includes open-end equity mutual funds from Lipper for which holdings are available in LionShares. Explicit indexing includes index funds and exchange-traded funds. Closet indexing includes active funds with active share below 0.6. Truly active includes active funds with active share above 0.6. Panel A uses the sample of U.S. funds and Panel B uses the sample of non-U.S. funds.

Panel A: U.S. Funds



Panel B: Non-U.S. Funds

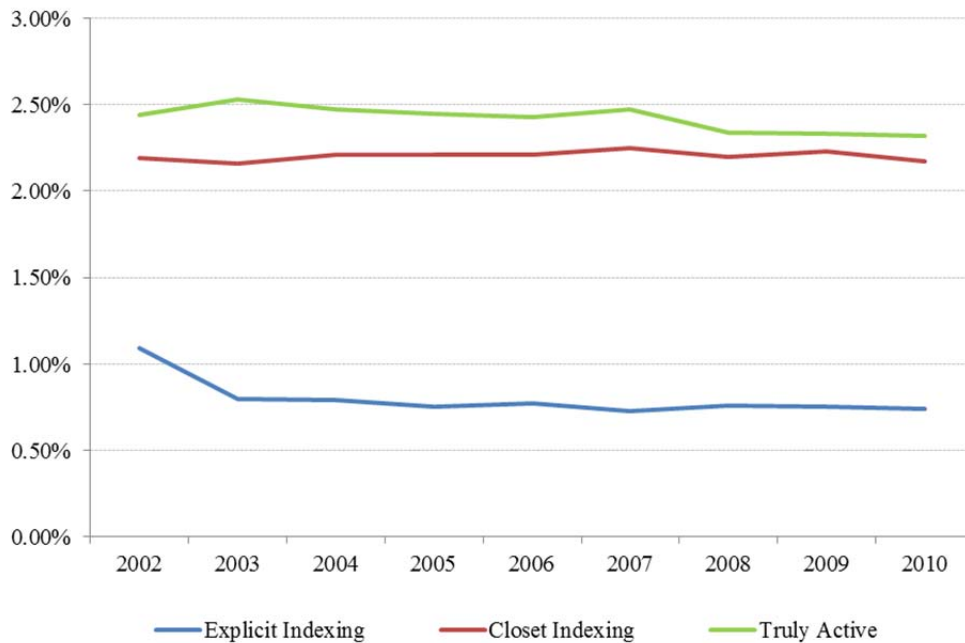
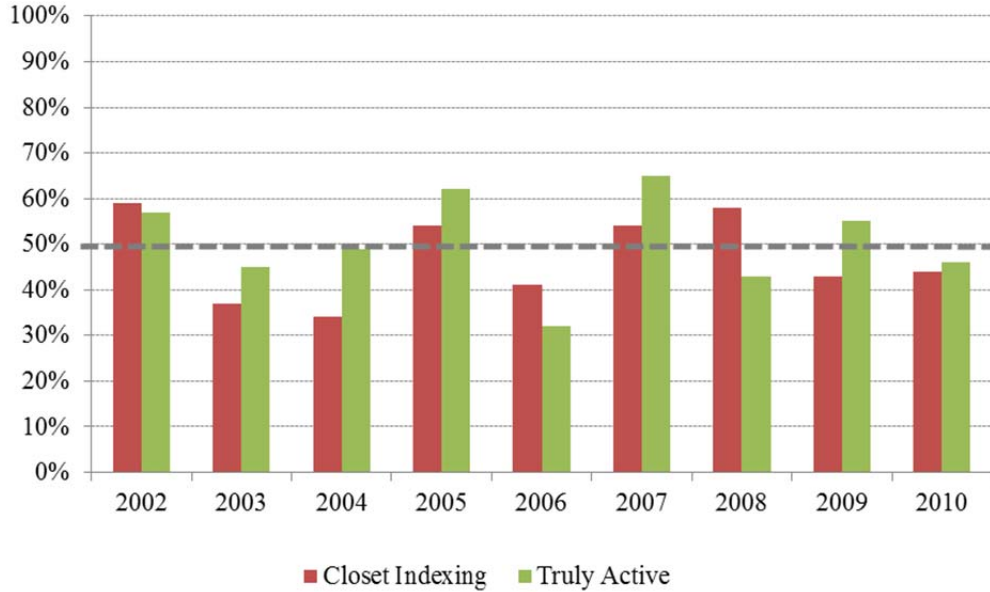


Figure 5

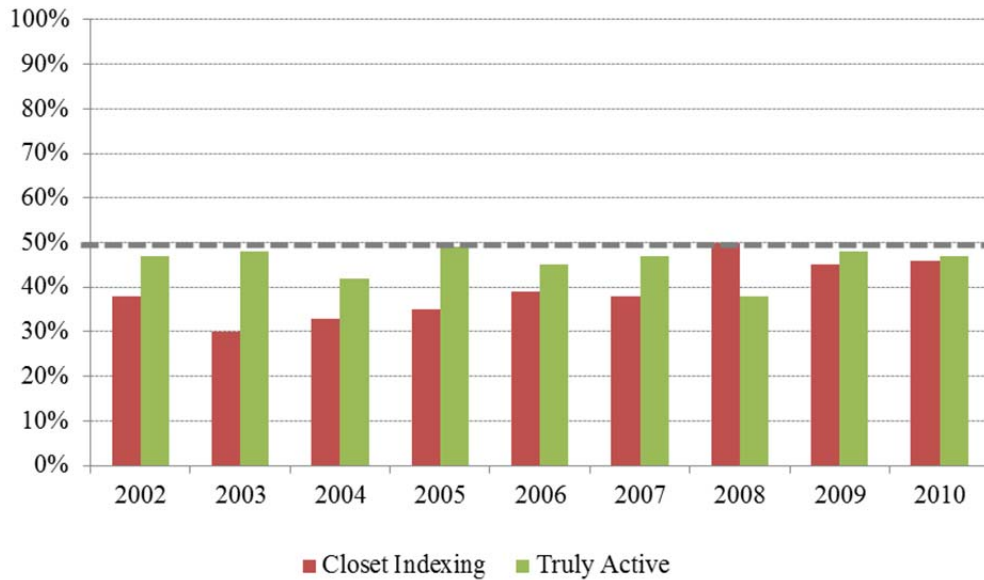
Batting Averages of Active Funds by Year

This figure shows the batting averages of active funds per year (i.e. the percentage of active funds with positive yearly benchmark-adjusted returns). Benchmark-adjusted return is the difference between the fund net return and its benchmark return. A percentage of 50% means that half of the active funds in that group outperformed their respective benchmarks in a given year. The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. Closet indexing includes active funds with active share below 0.6. Truly active includes active funds with active share above 0.6.

Panel A: U.S. Funds



Panel B: Non-U.S. Funds



Appendix A: Variable Definitions

Panel A: Fund-Level Variables	
Active share	Percentage of a fund's portfolio holdings that differ from its benchmark index holdings.
Tracking error	Standard deviation (annualized) estimated with three-year of past monthly benchmark adjusted return in U.S. dollars.
Total shareholder cost	Annual total expense ratio plus one-fifth of the front-end load assuming a five-year holding period.
Total net assets	Total net assets in millions of U.S. dollars.
Family total net assets	Total net assets in millions of U.S. dollars of equity funds in the same management company excluding the own fund's TNA.
Fund age	Number of years since the fund launch date.
Flows	Percentage growth in TNA, net of internal growth (assuming reinvestment of dividends and distributions).
International fund dummy	Dummy that takes the value of one if a fund's geographic focus is different from the fund's country of domicile.
Fund of fund dummy	Dummy that takes the value of one if fund of fund.
Off-shore fund dummy	Dummy that takes the value of one if fund is located in an off-shore domicile.
Benchmark-adjusted return	Difference between the fund net return and its benchmark return (percentage per year).
Benchmark-adjusted return four-factor alpha	Four-factor alpha (percentage per year) estimated with three years of past monthly fund benchmark-adjusted returns in U.S. dollars and regional factors (Asia, Europe, North America or Emerging Markets) or world factors in the case of world funds.
Panel B: Country-Level Variables	
Explicit indexing (% TNA)	Percentage that explicitly indexed funds represent of the TNA of open-end equity mutual funds in the fund's country.
Explicit indexing (TSC)	TNA-weighted average total shareholder cost of explicitly indexed funds in the fund's country.
Closet indexing (% TNA)	Percentage that active funds with active share below 0.6 represent of the TNA of open-end equity mutual funds in the fund's country.
Approval	Sum of two dummy variables that take value of one if (1) the fund startup requires regulatory approval and (2) the prospectus requires regulatory approval (Khorana, Servaes, and Tufano (2005)).
Judicial	Judicial system quality defined as the sum of five variables (all variables are scaled between 0 and 10): the efficiency of the judicial system, rule of law, corruption, risk of expropriation and risk of contract repudiation (La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998)).
Fund industry size	Sum of total net assets (in millions of U.S. dollar) for open-end equity mutual funds in the fund's country.
Fund industry Herfindahl	Sum of squared market shares of fund management companies for open-end equity mutual funds in the fund's country.
GDP per capita	Gross domestic product per capita in U.S. dollars in the fund's country (World Development Indicators).
Financial sophistication	Financial market sophistication assessed yearly by the Global Competitiveness Report question "The level of sophistication of financial markets is higher than international norms." (World Economic Forum).
DC pensions dummy	Dummy that takes the value of one if the prevailing country's pension scheme is based on defined contributions (OECD Pensions at a Glance 2011, Pensions Fund Online website).

Internet Appendix to
“The Mutual Fund Industry Worldwide:
Explicit and Closet Indexing, Fees, and Performance”

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Abstract

This internet appendix provides additional results and robustness analyses that are mentioned in the main text.

1. Explicit and Closet Indexing by Country and Benchmark Type

A fund's active share may depend on the opportunities and constraints in the investment opportunity set of the fund manager, which differ across benchmarks. Table IA.4 groups the 88 benchmarks in our analysis into benchmark types: world, regional and country. We further separate funds with a country benchmark into country - domestic (funds that invest in stocks of the same country where they are domiciled) and country - foreign (funds that invest in stocks of a country different from the one where they are domiciled). Table IA.5 shows the total net assets (TNA) and the market shares of explicit and closet indexing per country as of December 2010 in the three different benchmark types: world, regional, and country funds.

Panel A of Table IA.5 shows that the majority of equity mutual fund assets are invested domestically (\$4.4 trillion). The next most prevalent type of fund is regional funds (\$1.8 trillion), followed by world funds (\$1.2 trillion), and foreign country funds (\$0.4 trillion). However, the proportions are not universal across countries. For example, domestic funds are predominant in the U.S, but world and regional funds are relatively more important in European countries.

Panel A of Table IA.5 also shows the amount of explicit indexing per country of domicile according to fund benchmark type. The level of explicit indexing is highest for domestic country funds, where 27% of the fund assets are indexed. Explicit indexing is used less frequently in world funds (12%), regional funds (18%), and foreign country funds (18%). In addition, closet indexing is less common for funds pursuing global investment strategies (11%) than for regional funds (24%), domestic country funds (21%), and foreign country funds (27%). Panel B of Table IA.5 presents similar statistics by country of sale.

The diversity in the universe of stocks tracked by each benchmark has implications for the measurement of active share. For example, the SSgA World Index Equity Fund that tracks the

MSCI World index (the most popular world index) holds over 1,600 stocks in its portfolio at the end of 2010, while the SPDR S&P 500 ETF Trust tracking the S&P 500 index (the most popular country index) holds 500 stocks. Many explicitly indexed funds do not engage in full physical replication. The average index or ETF fund tracking the S&P 500 has an average of 334 stocks. The number of stock positions a fund needs to replicate its benchmark may matter for the measurement of active share.

To take into account benchmark characteristics, we analyze the prevalence of indexing (as in Table 2) but now at the country and benchmark type level (world, regional, country-domestic, and country-foreign). Table IA.6 presents the results by country of domicile (Panel A) and country of sale (Panel B). We conclude that a strong regulatory environment and a large fund industry is positively correlated with the prevalence of explicit indexing (and negatively with close indexing), which is consistent with the results in Table 2.

2. Robustness of Active Share, Total Shareholder Costs and Performance Regressions

We conduct several robustness checks to the results of Table 3 (active share) in Table IA.7, Table 4 (TSC) in Table IA.8, and Table 7 (performance) in Table IA.9. In each table, Panel A shows results by country of domicile and Panel B shows results by country of sale.

The first robustness check we conduct is to estimate the results using only the non-U.S. fund sample in order to alleviate the concern that funds domiciled or sold in the United States represent a large fraction of the observations and may distort our conclusions.

The second robustness check is to use two alternative methods to calculate active share. First, we construct the index weights alternatively based only on ETFs that undertake full physical replication of the indices. For the majority of the 88 benchmarks (see Table IA.4), we can identify a SPDR or iShares ETF that tracks these benchmarks. We call the active share measured

against the ETF weights the *Pure-ETF Active Share*. Second, to address any potential issues with Lipper's assignment of the Technical Indicator Benchmark to each fund, we construct an alternative active share against all possible 88 benchmarks. Following Cremers and Petajisto (2009), we take the most representative benchmark for a fund in each year as the one with the lowest active share. We call this alternative measure the *Minimum Active Share*. We find that in our sample both of these alternative measures are highly correlated with the active share we employ in our main tests (correlation coefficients of 0.97 with the pure-ETF active share and 0.94 with the minimum active share). For active funds, the average (TNA-weighted) pure-ETF active share is 70% and the minimum active share is 65% which are similar to the levels of our main measure of active share.

The third robustness check considers alternative econometric specifications. First, we estimate the regression model using weighted least squares, where the total net assets of the fund are employed as the weights. Second, we estimate regressions using country fixed effects.

The fourth robustness check looks at specific types of funds. First, we use the sample of domestic funds, which is more commonly used in single-country studies as in the majority of the literature on U.S. equity mutual funds. We also present the analysis by measuring explicit and closet indexing separately by benchmark type (world, regional, country-domestic, and country-foreign) in each country. The results are robust to both these checks.

Finally, we perform several other robustness checks of the fund performance regressions in Table IA.9. First, we show that results are robust when we use benchmark-adjusted returns and several alternative risk-adjusted performance measures in alternative to the benchmark-adjusted return four-factor alpha. We use excess return (over U.S. T-bills) four-factor alphas and the information ratio (ratio of four-factor benchmark-adjusted return alpha by the standard deviation

of residuals). Second, we further include Amihud and Goyenko (2012) R-squared measure as explanatory variable. We use a logistic transformation of R-squared, $TR^2 = \log[\sqrt{R\text{-squared}}/(1 - \sqrt{R\text{-squared}})]$ where R-squared is estimated using the benchmark-adjusted return four-factor model. A lower R-squared is indicative of more active management. We find that TR^2 is insignificantly related to future fund performance in a regression that also includes active share and tracking error. Only active share is a statistically significant predictor of future fund performance. The coefficients on tracking error and TR^2 are also insignificant in regressions that do not include active share.

Table IA.1
Summary Statistics

This table presents mean, median, standard deviation, minimum, maximum and number of observations of variables. The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010.

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Observations
Active share	0.7050	0.7437	0.2190	0.0000	1.0000	67,195
Pure-ETF active share	0.7047	0.7430	0.2240	0.0000	1.0000	52,984
Minimum active share	0.6687	0.7009	0.2069	0.0000	1.0000	66,893
TR ²	0.1096	0.1008	0.7621	-3.8332	4.6313	62,078
Tracking error	0.0705	0.0594	0.0467	0.0027	1.7320	62,096
Total shareholder cost	2.12	2.19	0.83	0.13	4.46	67,146
Total net assets (\$ million)	634	115	3,128	0	193,453	67,195
Family total net assets (\$ million)	20,824	4,228	72,265	0	832,483	67,184
Fund age	10.70	8.50	9.44	0.00	86.42	67,195
Flows	0.1402	-0.0357	0.7287	-0.8563	4.7889	60,461
International fund dummy	0.5899	1.0000	0.4919	0.0000	1.0000	67,177
Fund of fund dummy	0.0135	0.0000	0.1156	0.0000	1.0000	67,195
Off-shore fund dummy	0.1782	0.0000	0.3827	0.0000	1.0000	67,195
Benchmark-adjusted return	0.0004	-0.0061	0.0838	-0.2818	0.3309	66,104
Benchmark-adjusted four-factor alphas	-0.0014	-0.0049	0.0793	-0.2602	0.2819	56,991
Excess return four-factor alphas	-0.0019	-0.0164	0.1223	-0.3170	0.4967	57,460
Information ratio	-0.0545	-0.1025	1.2898	-3.4331	3.2447	56,991
Explicit indexing (% by country)	0.1280	0.0870	0.1109	0.0000	0.9574	67,195
Explicit indexing (TSC by country)	0.7696	0.6499	0.5271	0.1546	2.9700	64,558
Closet indexing (% by country)	0.3312	0.3233	0.1484	0.0000	1.0000	67,195
Approval	1.49	1.00	0.50	1.00	2.00	67,195
Judicial	42.96	47.01	7.01	29.67	49.96	67,195
Fund industry size (\$ million)	1,523,089	436,414	2,037,732	652	6,219,298	67,195
Fund industry Herfindahl	0.0697	0.0476	0.0564	0.0230	0.3482	67,195
GDP per capita (\$)	49,033	44,117	25,301	563	118,841	66,663
Financial sophistication	6.10	6.30	0.59	3.20	6.80	66,005
DC pensions dummy	0.4695	0.0000	0.4991	0.0000	1.0000	64,678

Table IA.2
Time Series Averages of Country Variables

This table presents time-series average of country variables in the 2002-2010 period.

Country	Approval	Judicial	Fund industry size (\$ million)	Fund industry Herfindahl	GDP per capita (\$)	Financial sophistication	DC pensions dummy
Australia	2	47	207,996	0.0468	40,831	6.21	1
Austria	2	47	18,380	0.1288	40,953	5.32	0
Belgium	2	47	34,468	0.3066	38,895	5.71	0
Brazil	2	32	90,809	0.1114	9,744	5.40	0
Canada	1	48	333,830	0.0468	39,104	6.20	0
China	1	31	167,406	0.0396	3,838	3.20	1
Denmark	1	49	25,568	0.1055	51,775	5.85	1
Finland	1	49	22,705	0.1590	42,183	5.93	0
France	2	45	266,107	0.0502	37,363	5.81	1
Germany	1	47	136,732	0.1563	36,697	5.97	0
Hong Kong	2	44	29,087	0.1902	29,518	6.43	1
India	2	31	31,028	0.0929	1,095	5.01	1
Ireland	1	35	205,832	0.0472	50,147	5.94	0
Israel	2	40	3,719	0.0830	27,313	5.90	1
Italy	2	40	67,003	0.0966	31,789	4.38	1
Japan	2	47	152,159	0.0988	37,550	5.21	
Liechtenstein	1	31	6,520	0.1780			
Luxembourg	1	31	679,193	0.0310	95,617	6.20	0
Malaysia	2	39	10,381	0.2407	7,037	5.25	1
Netherlands	2	49	41,967	0.1336	43,256	6.08	0
Norway	1	50	25,407	0.1716	71,472	5.48	1
Poland	1	31	7,933	0.1082	10,585	4.01	1
Portugal	1	39	2,798	0.1846	19,557	5.22	0
Singapore	1	45	15,137	0.0656	34,350	6.01	1
South Africa	1	32	21,763	0.0963	6,076	5.92	1
Spain	2	39	26,100	0.0957	28,049	5.40	1
Sweden	2	49	88,017	0.1637	43,446	6.08	0
Switzerland	1	50	74,268	0.2100	56,964	6.60	0
Taiwan	1	40	23,140	0.0633	17,472	4.79	1
Thailand	2	30	4,667	0.1177	3,845	4.71	1
U.K.	1	47	562,228	0.0257	37,855	6.73	0
U.S.	2	48	4,617,651	0.0470	43,806	6.44	1
Total	1.49	42.96	1,523,089	0.0697	49,033	6.10	0.4695

Table IA.3
Number of Fund Share Classes by Country of Domicile and Country of Sale

This table presents the number of fund share classes offered by country of domicile and country of sale for the sample of open-end equity mutual funds taken from Lipper for which holdings are available in LionShares as of December 2010. Rows correspond to the fund legal country of domicile. Columns correspond to countries where fund share classes are approved for sale. A fund share class is counted multiple times based on how many countries it is approved for sale according to Lipper.

Country of Domicile	Country of Sale																				Total			
	Aus.	Bel.	Can.	Den.	Finl.	Fran.	Ger.	Irel.	Italy	Liech.	Lux.	Neth.	Nor.	Pol.	Port.	Spain	Swe.	Switz.	U.K.	U.S.		Asia Pac.	Other Reg.	Other Count.
Austria	324					20	195		39					31		27		24	9				263	935
Belgium	76	273			6	110	105		4		131	104				26	7	39	1				142	1,024
Canada			2,083																		1		1	2,085
Denmark				203	1	9	20				17	19	16				24	19	17				2	347
Finland					155	2	2				2	2	20				54						14	251
France	36	54				772	130	39	117		87	75				114	42	137	65		14		9	1,691
Germany	173	6				34	411		11		31	20			2	9		59	1		16		42	815
Ireland	463	236		151	300	538	697	923	296		433	503	256	105	82	434	511	615	818		769	41	691	8,862
Italy						4			136															140
Liechtenstein	26						37											57	3		3		112	238
Luxembourg	4,627	2,660	31	2,334	3,451	4,628	5,571	1,754	3,719	60	6,663	4,269	2,852	1,572	3,223	4,422	4,307	5,333	4,629		6,095	320	18,832	91,352
Netherlands	1	3				2	2		1			75				1		2	2		1		3	93
Norway				3	13						3	12	117				29	3	13				2	195
Poland														46										46
Portugal															53								5	58
Spain									2						2	269								273
Sweden	4				16	5	1				12	5	38				266				2		26	375
Switzerland	6					4	7				15							369			7		30	438
U.K.	124	63		50	31	139	175	129	34		91	100	25	1	28	57	47	152	1,366		85	13	224	2,934
U.S.	1	6				2	7					7					24			8,976	32		615	9,670
Asia Pacific								1													1,650		224	1,875
Other Regions																						168	57	225
Total	5,861	3,301	2,114	2,741	3,973	6,269	7,360	2,846	4,359	60	7,485	5,194	3,324	1,755	3,390	5,359	5,311	6,809	6,924	8,976	8,675	542	21,294	123,922

Table IA.4
List of Benchmark Indices

This table lists the 88 benchmarks (Technical Indicator Benchmarks) for the sample of open-end active equity mutual funds taken from Lipper with portfolio holdings in LionShares as of December 2010. The sum of total net assets (in billions of U.S. dollars) of the equity mutual funds tracking each benchmark is presented in brackets.

World	Regional	Country
MSCI World [\$456]	MSCI EM (Emerging Markets) [\$549]	Australia ASX All Ordinaries [\$20]
MSCI World ex USA [\$320]	MSCI EU Growth [\$195]	Austria ATX Prime [\$2]
MSCI AC World [\$96]	STOXX Europe 50 [\$192]	Belgium Brussels SE [\$2]
FTSE AW/Oil & Gas [\$62]	MSCI AC Asia Pacific ex Japan [\$177]	Canada S&P/TSX Composite [\$180]
MSCI World Growth [\$53]	MSCI Europe Australia & Far East ex-Japan [\$158]	MSCI Canada Small Cap [\$16]
MSCI World ex USA Small Cap [\$46]	MSCI EAFE [\$119]	FTSE Canada/Oil & Gas [\$11]
FTSE Gold Mines [\$39]	EURO STOXX 50 [\$92]	Denmark OMX Copenhagen All Share [\$3]
FTSE AW/Mining [\$26]	MSCI EM Latin America [\$76]	Finland OMX Helsinki [\$6]
Dow Jones Wilshire Global Ex-US [\$19]	S&P North American Natural Resources [\$59]	France CAC 40 [\$25]
FTSE AW (Dev)/Real Estate Inv. [\$16]	MSCI Europe ex UK [\$57]	Germany DAX 30 [\$48]
FTSE AW/Utilities [\$15]	MSCI AC Asia Pacific [\$44]	Italy MSCI Italy [\$7]
FTSE EPRA/NAREIT Developed [\$15]	MSCI EM Eastern Europe [\$33]	Netherlands AEX [\$8]
MSCI World Small Cap [\$14]	MSCI Europe Small Cap [\$28]	Norway MSCI Norway [\$15]
MSCI World Value [\$12]	MSCI Golden Dragon [\$25]	Poland Poland WIG [\$6]
MSCI World ex Australia [\$8]	MSCI BRIC [\$24]	Portugal Portugal PSI General [\$1]
LCI UK & World Equity (50:50) [\$5]	MSCI Nordic Countries [\$17]	Spain Madrid SE [\$4]
Dow Jones Commodity [\$1]	EURO STOXX [\$5]	Sweden OMX Stockholm All Share [\$54]
		Switzerland Swiss Performance Index [\$40]
		U.K. FTSE 100 [\$157]
		FTSE All-Share [\$79]
		Hoare Govett Small Cap Extended [\$20]
		U.S. S&P 500 [\$979]
		Russell 1000 Growth [\$636]
		Russell 3000 [\$400]
		Russell MidCap [\$275]
		Russell MidCap Growth [\$252]
		Russell 1000 [\$206]
		Russell 2000 [\$184]
		Russell 1000 Value [\$139]
		Russell 2000 Growth [\$100]
		S&P 500 Growth [\$92]
		S&P MidCap 400 [\$92]
		S&P 500 Value [\$73]
		S&P 100 [\$72]
		S&P U.S. Real Estate Investment Trust [\$63]
		S&P 400 Value [\$61]
		Russell MidCap Value [\$51]
		Dow Jones US Healthcare [\$43]
		Russell 2000 Value [\$42]
		S&P 600 Small Cap [\$27]
		NASDAQ Composite [\$13]
		Asia Pacific Topix [\$82]
		CSI 300 [\$75]
		BSE 100 [\$72]
		MSCI China [\$47]
		Hang Seng [\$14]
		Taiwan Weighted Price [\$12]
		Thailand SET [\$6]
		FTSE Bursa Malaysia KLCI [\$3]
		Singapore Straits Time [\$3]
		Other Russia Moscow Times [\$19]
		Regions FTSE South Africa [\$18]
		BOVESPA (Ibovespa) [\$17]
		TASE 25 [\$1]

Table IA.5

Explicit and Closet Indexing by Country and Benchmark Type

This table presents total net assets (TNA) and market shares of explicit and closet indexing per country and benchmark type. The sample consists of open-end equity mutual funds taken from Lipper with portfolio holdings in LionShares as of December 2010. Explicit indexing is the percentage that explicitly indexed funds represent of the TNA in a country. Closet indexing is the percentage of the TNA by active funds with active share measure below 0.6. Funds are classified based on their benchmark as world funds, regional funds, country - domestic funds (funds investing in their country of domicile) and country - foreign funds (funds investing in a country different from their domicile). Panel A presents statistics based on the primary fund country of domicile and Panel B presents statistics based on the fund share class country of sale.

Panel A: by Country of Domicile												
Domicile	World Funds			Regional Funds			Country - Domestic Funds			Country - Foreign Funds		
	TNA (\$ billion)	Explicit Indexing (%)	Closet Indexing (%)	TNA (\$ billion)	Explicit Indexing (%)	Closet Indexing (%)	TNA (\$ billion)	Explicit Indexing (%)	Closet Indexing (%)	TNA (\$ billion)	Explicit Indexing (%)	Closet Indexing (%)
Austria	3.4	2	7	8.3	1	35	1.4	0	100	1.8	20	39
Belgium	3.2	5	9	9.1	22	49	1.7	6	91	4.0	37	37
Canada	77.1	4	3	15.4	4	13	204.9	10	56	29.1	3	9
Denmark	10.3	0	5	12.7	1	21	3.1	0	98	4.4	9	44
Finland	2.7	0	0	11.5	2	24	5.7	8	81	6.2	1	69
France	24.1	15	4	68.5	30	28	24.9	10	68	16.6	42	12
Germany	50.4	0	1	42.4	27	28	42.3	21	78	4.4	38	38
Ireland	42.8	25	15	97.7	28	37	0.0			82.0	37	17
Italy	6.5	0	0	17.5	0	37	4.2	0	100	3.1	0	24
Liechtenstein	3.1	0	2	1.7	0	18	0.0			1.2	0	58
Luxembourg	170.0	3	13	389.8	5	26	0.0			190.8	4	36
Netherlands	22.1	0	4	4.4	0	50	6.7	5	56	0.4	0	70
Norway	11.3	13	6	13.9	4	11	14.5	3	53	1.7	19	47
Poland	1.7	0	0	0.7	0	7	5.9	0	81	0.0		
Portugal	0.5	0	0	0.8	0	31	0.5	1	99	0.3	0	11
Spain	2.4	0	0	6.4	6	41	3.3	20	69	0.9	16	68
Sweden	25.6	1	13	25.8	7	55	52.2	17	73	10.0	10	76
Switzerland	11.7	33	13	11.6	48	11	34.4	63	35	11.9	79	14
U.K.	90.2	0	11	127.3	4	17	239.1	14	53	47.6	15	11
U.S.	613.5	18	12	960.7	25	21	3,576.2	29	14	0.0		
Asia Pacific	28.1	0	6	21.2	0	5	185.5	27	23	20.6	58	17
Other Regions	3.8	0	1	0.2	0	17	25.3	1	47	0.1	0	12
Total (Non-U.S.)	590.7	5	9	887.1	11	26	855.8	17	50	437.3	18	27
Total	1,204.2	12	11	1,847.8	18	24	4,431.9	27	21	437.3	18	27

Table IA.5 (continued)

Panel B: by Country of Sale												
Domicile	World Funds			Regional Funds			Country - Domestic Funds			Country - Foreign Funds		
	TNA (\$ billion)	Explicit Indexing (%)	Closet Indexing (%)	TNA (\$ billion)	Explicit Indexing (%)	Closet Indexing (%)	TNA (\$ billion)	Explicit Indexing (%)	Closet Indexing (%)	TNA (\$ billion)	Explicit Indexing (%)	Closet Indexing (%)
Austria	255.6	4	9	476.8	12	24	71.3	16	64	216.0	17	28
Belgium	115.1	1	15	269.1	5	26	17.1	1	83	117.7	6	31
Canada	75.7	4	3	17.1	4	16	204.0	10	56	29.7	3	9
Denmark	105.2	7	14	251.4	12	25	13.0	0	77	106.9	17	33
Finland	109.5	3	17	315.1	7	27	10.6	5	59	146.5	6	34
France	214.8	8	12	506.7	14	24	72.7	15	52	230.2	17	27
Germany	298.1	6	9	556.8	14	24	78.2	13	65	252.5	17	29
Ireland	128.1	10	15	293.0	13	25	21.7			152.4	22	24
Italy	167.7	4	14	363.4	7	27	26.2	26	56	148.7	8	36
Liechtenstein	0.0	0	0	0.6	1	56	0.0			0.8	5	10
Luxembourg	252.5	7	9	496.1	12	26	50.0			249.2	16	30
Netherlands	216.0	7	13	441.4	15	22	36.7	43	38	205.8	17	28
Norway	98.7	2	16	240.8	1	30	22.6	12	54	120.2	1	40
Poland	63.6	0	17	111.1	0	36	5.9	0	81	52.3		
Portugal	89.1	0	20	228.7	2	27	3.1	0	96	119.3	3	41
Spain	180.0	6	12	403.0	11	26	25.3	3	81	197.6	15	28
Sweden	189.0	9	14	410.6	11	24	61.4	15	67	195.1	14	31
Switzerland	255.6	8	9	524.8	15	21	79.1	29	44	246.1	20	26
U.K.	255.9	6	13	539.2	12	21	242.8	14	52	269.4	17	22
U.S.	605.6	18	12	936.3	26	20	3,536.8	29	14	0.0		
Asia Pacific	355.1	4	13	817.1	12	22	559.5	68	11	371.5	8	25
Other Regions	30.8	0	12	71.5	0	13	32.8	0	42	28.2	0	48
Other Countries	1,032.6	15	14	2,412.1	13	24	1,449.8	67	18	766.0	4	34
Total (Non-U.S.)	4,488.6	8	13	9,746.5	11	24	3,083.7	49	30	4,221.9	12	30
Total	5,094.2	9	13	10,682.9	13	24	6,620.5	38	21	4,221.9	12	30

Table IA.6
Determinants of Explicit and Closet Indexing:
Robustness by Country and Benchmark Type

This table presents estimates of yearly country-level regressions where the dependent variable is the percentage that explicitly indexed funds represent of the TNA in a country (Explicit Indexing (% TNA)), the TNA-weighted average total shareholder cost of explicitly indexed funds in a country (Explicit Indexing (TSC)), and the percentage that active funds with active share measure below 0.6 represent of the TNA in a country (Closet Indexing (% TNA)). The sample includes open-end equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In Panel A the unit of observation is a country of domicile j and benchmark type b in year t . In Panel B the unit of observation is a country of sale k and benchmark type b in year t . Benchmark types are world funds, regional funds, country - domestic funds (funds investing in their country of domicile) and country - foreign funds (funds investing in a country different from their domicile). Regressions include year dummies. Robust t -statistics are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

Panel A: by Country of Domicile and Benchmark Type						
	Explicit Indexing (% TNA)		Explicit Indexing (TSC)		Closet Indexing (% TNA)	
	(1)	(2)	(3)	(4)	(5)	(6)
Approval	0.0183 (1.49)		0.1308** (2.58)		0.0024 (0.10)	
Judicial	0.0021** (2.25)		-0.0218*** (-5.57)		-0.0030* (-1.75)	
Fund industry size (log)		0.0206*** (4.32)		-0.0766*** (-3.84)		-0.0166* (-1.91)
Fund industry Herfindahl		0.3905*** (3.81)		0.4524 (1.08)		0.2326 (1.23)
GDP per capita (log)		0.0003 (0.04)		-0.0366 (-1.18)		-0.0070 (-0.48)
Observations	491	473	409	409	490	472
R-squared	0.023	0.064	0.104	0.123	0.080	0.102
Panel B: by Country of Sale and Benchmark Type						
	Explicit Indexing (% TNA)		Explicit Indexing (TSC)		Closet Indexing (% TNA)	
	(1)	(2)	(3)	(4)	(5)	(6)
Approval	0.0943*** (6.83)		-0.1936*** (-5.04)		-0.0596*** (-2.68)	
Judicial	0.0053*** (5.20)		-0.0352*** (-11.82)		-0.0092*** (-5.60)	
Fund industry size (log)		0.0183*** (3.66)		-0.1004*** (-7.58)		-0.0281*** (-3.45)
Fund industry Herfindahl		-0.1856 (-1.46)		1.5400*** (4.81)		0.0230 (0.11)
GDP per capita (log)		0.0043 (0.55)		-0.0965*** (-4.82)		-0.0116 (-0.90)
Observations	491	491	471	471	490	490
R-squared	0.144	0.088	0.297	0.417	0.118	0.101

Table IA.7
Determinants of Active Management: Robustness

This table presents estimates of panel regressions where the dependent variable is a fund's active share at year-end, defined as the percentage of a fund's portfolio holdings that differ from the fund's benchmark. Columns (1) and (2) use the sample of non-U.S. domiciled mutual funds. In columns (3) and (4) the dependent variable is the active share measure calculated as the percentage of portfolio holdings that differ from pure-ETFs that track the benchmark. In columns (5) and (6) the dependent variable is the minimum active share calculated against all possible 88 benchmarks. Columns (7) and (8) present regressions estimates using weighted least squares where the weights are the fund's total net assets. Columns (9) and (10) present regressions estimates including country fixed effects. Columns (11) and (12) present estimates for the sample of domestic funds. Columns (13) and (14) measure explicit indexing at the country-benchmark type level. The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In Panel A the unit of observation is a fund's primary share class i domiciled in country j in year t . In Panel B the unit of observation is a fund share class s offered for sale in country k in year t . Regressions include the fund and country control variables used in Table 3 (coefficients not shown) as well as year and benchmark dummies. Robust t -statistics clustered by country of domicile-year (Panel A) or country of sale-year (Panel B) are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

	Panel A: by Country of Domicile							
	Non-U.S. Funds		Pure-ETF Active Share		Minimum Active Share		Weighted-Least Squares	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explicit indexing (% TNA)	0.0115 (0.74)		0.0414** (2.43)		0.0353** (2.16)		-0.0256 (-0.98)	
Explicit indexing (TSC)		-0.0210*** (-4.31)		-0.0255*** (-4.48)		-0.0275*** (-4.79)		-0.0325*** (-3.37)
Observations	41,155	39,222	46,712	45,667	58,255	56,324	58,487	56,554
R-squared	0.620	0.621	0.598	0.601	0.566	0.566	0.643	0.643
	Country Fixed Effects		Domestic Funds		By Country-Benchmark Type			
	(9)	(10)	(11)	(12)	(13)	(14)		
	(9)	(10)	(11)	(12)	(13)	(14)		
Explicit indexing (% TNA)	-0.0113 (-0.30)		0.0641* (1.74)		0.0175 (0.97)			
Explicit indexing (TSC)		-0.0383*** (-3.66)		-0.0469** (-2.64)		-0.0284*** (-4.42)		
Observations	58,931	56,554	24,825	24,156	58,487	56,554		
R-squared	0.329	0.323	0.695	0.692	0.622	0.622		

Table IA.7 (continued)

	Panel B: by Country of Sale							
	Non-U.S. Funds		Pure-ETF Active Share		Minimum Active Share		Weighted-Least Squares	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explicit indexing (% TNA)	0.0085 (1.22)		0.0300*** (4.02)		0.0192*** (2.78)		0.0332* (1.96)	
Explicit indexing (TSC)		-0.0087*** (-3.81)		-0.0100*** (-4.16)		-0.0140*** (-5.14)		-0.0087 (-1.64)
Observations	372,239	364,933	362,794	356,635	420,378	413,073	423,103	415,797
R-squared	0.623	0.623	0.594	0.593	0.568	0.567	0.641	0.640
	Country Fixed Effects		Domestic Funds		By Country-Benchmark Type			
	(9)	(10)	(11)	(12)	(13)	(14)		
Explicit indexing (% TNA)	-0.0028 (-0.21)		0.0229 (0.56)		-0.0109 (-0.98)			
Explicit indexing (TSC)		-0.0162*** (-4.57)		-0.0302*** (-2.90)		-0.0117*** (-3.28)		
Observations	423,103	415,797	56,202	55,963	423,103	415,797		
R-squared	0.158	0.159	0.664	0.664	0.617	0.616		

Table IA.8

Determinants of the Total Shareholder Costs of Active Funds: Robustness

This table presents estimates of panel regressions where the dependent variable is a fund's yearly total shareholder cost, defined as total expense ratio plus one-fifth of the front-end load. Columns (1)-(3) use the sample of non-U.S. domiciled mutual funds. In columns (4)-(6) the dependent variable is the active share measure calculated as the percentage of portfolio holdings that differ from pure-ETFs that track the benchmark. In columns (7)-(9) the dependent variable is the minimum active share calculated against all possible 88 benchmarks. Columns (10)-(12) present regressions estimates using weighted least squares where the weights are the fund's total net assets. Columns (13)-(15) present regressions estimates including country fixed effects. Columns (16)-(18) presents estimates for the sample of domestic funds. Columns (19)-(21) measure explicit at the country-benchmark type level. The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In Panel A the unit of observation is a fund's primary share class i domiciled in country j in year t . In Panel B the unit of observation is a fund share class s offered for sale in country k in year t . Regressions include the fund and country control variables used in Table 4 (coefficients not shown) as well as year and benchmark dummies. Robust t -statistics clustered by country of domicile-year (Panel A) or country of sale-year (Panel B) are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

	Panel A: by Country of Domicile											
	Non-U.S. Funds			Pure-ETF Active Share			Minimum Active Share			Weighted-Least Squares		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Explicit indexing (% TNA)	-0.0924 (-0.75)			0.0263 (0.24)			-0.0647 (-0.52)			-0.1276 (-0.67)		
Explicit indexing (TSC)		0.3276*** (6.73)			0.3138*** (6.23)			0.3257*** (7.43)			0.2755*** (5.07)	
Closet indexing (% TNA)			0.0024 (0.02)			0.1148 (1.01)			0.2866** (2.46)			0.3311** (2.25)
Active share	0.5970*** (11.93)	0.6189*** (11.85)	0.5968*** (11.87)	0.6156*** (11.95)	0.6327*** (11.86)	0.6191*** (11.99)	0.5895*** (13.83)	0.6127*** (14.21)	0.6015*** (13.90)	0.5032*** (6.42)	0.5103*** (6.29)	0.5126*** (6.43)
Observations	41,155	39,222	41,155	46,712	45,667	46,712	58,255	56,324	58,255	58,487	56,554	58,487
R-squared	0.287	0.289	0.287	0.372	0.381	0.372	0.389	0.391	0.390	0.513	0.513	0.513
	Country Fixed Effects			Domestic Funds			By Country-Benchmark Type					
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)			
Explicit indexing (% TNA)	-0.3483** (-2.21)			-0.1437 (-0.98)			0.0102 (0.10)					
Explicit indexing (TSC)		0.0920*** (2.70)			-0.0334 (-0.72)			0.4451*** (12.94)				
Closet indexing (% TNA)			0.2159*** (2.71)			0.1273* (1.83)			0.0222 (0.39)			
Active share	0.2561*** (8.45)	0.2560*** (8.10)	0.2590*** (8.52)	0.6249*** (14.55)	0.6398*** (14.59)	0.6264*** (14.59)	0.6078*** (13.94)	0.6378*** (14.21)	0.6095*** (14.17)			
Observations	58,931	56,554	58,931	24,825	24,156	24,825	58,487	56,554	58,487			
R-squared	0.415	0.403	0.415	0.426	0.387	0.426	0.390	0.399	0.390			

Table IA.8 (continued)

	Panel B: by Country of Sale											
	Non-U.S. Funds			Pure-ETF Active Share			Minimum Active Share			Weighted-Least Squares		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Explicit indexing (% TNA)	-0.3071*** (-3.55)			-0.4480*** (-5.23)			-0.4170*** (-4.27)			-0.6323*** (-4.03)		
Explicit indexing (TSC)		0.1003*** (5.00)			0.0874*** (4.80)			0.1261*** (6.00)			0.0829*** (3.74)	
Closet indexing (% TNA)			-0.1382 (-1.05)			0.5082*** (3.86)			0.3024** (2.31)			1.0300*** (7.11)
Active share	0.5830*** (24.36)	0.5808*** (24.00)	0.5818*** (24.18)	0.5739*** (22.03)	0.5728*** (21.73)	0.5749*** (21.89)	0.6005*** (24.22)	0.6026*** (24.05)	0.6021*** (23.99)	0.5367*** (14.01)	0.5324*** (13.77)	0.5572*** (14.80)
Observations	372,239	364,933	372,239	362,794	356,635	362,794	420,378	413,073	420,378	423,103	415,797	423,103
R-squared	0.102	0.102	0.102	0.182	0.184	0.182	0.198	0.198	0.197	0.493	0.493	0.494
	Country Fixed Effects			Domestic Funds			By Country-Benchmark Type					
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)			
Explicit indexing (% TNA)	-0.1062 (-1.53)			-0.3772** (-2.25)			-0.3041*** (-3.49)					
Explicit indexing (TSC)		0.0277** (2.04)			0.1173** (2.10)			0.1966*** (8.75)				
Closet indexing (% TNA)			0.0337 (0.52)			0.1417 (1.14)			0.0419 (0.72)			
Active share	0.2068*** (17.52)	0.2070*** (17.15)	0.2071*** (17.43)	0.5844*** (16.41)	0.5887*** (16.40)	0.5859*** (16.44)	0.5848*** (23.94)	0.5859*** (23.63)	0.5865*** (23.84)			
Observations	423,103	415,797	423,103	56,202	55,963	56,202	423,103	415,797	423,103			
R-squared	0.199	0.200	0.199	0.273	0.252	0.273	0.198	0.200	0.198			

Table IA.9
Determinants of the Performance of Active Funds: Robustness

This table provides presents estimates of panel regressions where the dependent variable is the yearly fund performance. Column (1) uses benchmark-adjusted return which is the difference between the fund return and its benchmark return. Column (2) uses four-factor alphas estimated using excess returns. Column (3) uses the information ratio. All other columns use benchmark-adjusted return four-factor alphas. Column (4) includes the R-squared measure of Amihud and Goyenko (2012). Column (5) uses the sample of non-U.S. domiciled mutual funds. In column (6) the active share measure is calculated as the percentage of portfolio holdings that differ from pure-ETFs that track the benchmark. In column (7) the minimum active share is calculated against all possible 88 benchmarks. Column (8) presents regressions estimates using weighted least squares where the weights are the fund's total net assets. Column (9) presents regression estimates including country fixed effects. Column (10) presents estimates for the sample of domestic funds. The sample includes open-end active equity mutual funds taken from Lipper for which holdings are available in LionShares from 2002 to 2010. In Panel A the unit of observation is a fund's primary share class i domiciled in country j in year t . In Panel B the unit of observation is a fund share class s offered for sale in country k in year t . All explanatory variables are lagged by one period. Regressions include the fund and country control variables used in Table 7 (coefficients not shown) as well as year and benchmark dummies. Robust t -statistics clustered by country of domicile-year (Panel A) or country of sale-year (Panel B) are reported in parentheses. *, **, *** reflects significance at the 10%, 5% and 1% levels.

Panel A: by Country of Domicile										
	Benchmark- Adjusted Returns	Excess Return Four-Factor Alphas	Information Ratio	R-Squared	Pure-ETF Active Share	Minimum Active Share	Weighted- Least Squares	Non-U.S. Funds	Country Fixed Effects	Domestic Funds
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Active share	0.0450*** (6.45)	0.0161** (2.46)	0.6138*** (7.50)	0.0318*** (6.21)	0.0342*** (7.08)	0.0330*** (5.50)	0.0246*** (2.72)	0.0330*** (5.36)	0.0141** (2.31)	0.0214** (2.31)
Tracking error	0.0184 (0.56)	-0.1073*** (-3.00)	0.2588 (0.83)	-0.0826*** (-3.22)	-0.1156*** (-5.05)	-0.0737*** (-3.05)	0.0176 (0.25)	-0.0818* (-1.96)	-0.1069*** (-4.96)	-0.0944*** (-3.24)
TR ²				0.0008 (0.62)						
Observations	50,925	51,570	51,570	51,570	51,570	51,351	35,310	40,365	51,919	22,099
R-squared	0.056	0.167	0.087	0.074	0.089	0.074	0.093	0.083	0.019	0.084
Panel B: by Country of Sale										
	Benchmark- Adjusted Returns	Excess Return Four-Factor Alphas	Information Ratio	R-Squared	Pure-ETF Active Share	Minimum Active Share	Weighted- Least Squares	Non-U.S. Funds	Country Fixed Effects	Domestic Funds
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Active share	0.0572*** (13.76)	0.0362*** (7.22)	1.1120*** (22.06)	0.0548*** (12.96)	0.0669*** (13.52)	0.0544*** (12.01)	0.0216*** (3.75)	0.0591*** (12.12)	0.0113** (2.53)	0.0265*** (3.22)
Tracking error	0.0126 (0.53)	-0.1230*** (-4.79)	0.2701 (1.11)	-0.1221*** (-4.99)	-0.1863*** (-6.63)	-0.1020*** (-4.50)	0.1306*** (3.12)	-0.1264*** (-4.03)	-0.0455*** (-3.07)	-0.1097*** (-10.10)
TR ²				0.0008 (1.26)						
Observations	342,251	346,711	346,711	346,711	288,823	344,446	346,711	300,604	346,711	49,413
R-squared	0.058	0.187	0.131	0.101	0.135	0.101	0.112	0.107	0.017	0.084