The Global Rise of Index-Based Ownership of Firms

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Abstract

We develop a simple and replicable four-variable model that identifies index-based investors with 97% accuracy. Our analysis shows that index ownership grew from 3.5% of global market capitalization in 2004 to 16.9% by 2023, driven by growth in explicit indexing. By end of 2023, index funds own 10 percent or more of 5,300 firms globally. In the U.S., mid-caps have more index ownership than large-caps. In Asia and Europe, index ownership is increasing in size, and only the largest firms experience significant index ownership. Differences in free float and indexing growth help explain regional variations in index ownership.
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Disclosure Statement

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I serve on the board of directors of Lysa Group AB, an asset manager. The firm has no direct interest in the research in this paper.

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I have nothing to disclose.

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I have nothing to disclose.

1. Introduction

Index-based investment strategies have become a defining feature of modern equity markets. Their rapid and persistent expansion has given indexing a substantial footprint in the United States. As of year-end 2023, explicitly index-based domestic mutual funds and ETFs accounted for 18% of total U.S. stock market capitalization. Using trading patterns around index deletions and additions, Chinco and Sammon (2024) suggest that the true number is twice as high once closet indexers and non-retail funds are included.

While aggregate holdings by index-based investors can be estimated with some confidence, identifying their ownership stakes in *individual* firms is much more challenging because implicit indexers are hard to match to firms. Outside the United States, the measurement challenge becomes even greater. First, a large share of non-U.S. index investment is cross-border, so estimates based solely on domestic asset managers provide a poor approximation of total index ownership.[1] Second, asset management industries abroad are often less concentrated and less specialized, making it difficult to rely on a small set of large, index-focused firms such as BlackRock and Vanguard to infer investment styles. Third, the proliferation of national and regional indexes complicates efforts to classify indexers by matching portfolio holdings to benchmark compositions (Cremers and Petajisto, 2009). Finally, data availability outside the United States is typically more limited.

Before we can assess the drivers and impact of indexing at the global level, we need to overcome the above challenges and be able to correctly measure index ownership at the individual firm level in many different countries. We introduce a new procedure that does this. We first classify a broad set of mutual funds, exchange traded funds (ETFs), and other investors as index or non-index investors, using quarterly holdings data. We then aggregate index investor holdings at the portfolio firm level to produce a quarterly

[1] As an illustration, Cremers et al. (2016) convincingly demonstrate rising indexing in many mutual fund markets, but the ownership implications for individual firms are difficult to assess without knowing where index investment flows.

panel data of index ownership for public firms. Our procedure relies on portfolio data alone, and sidesteps any need for data such as mandate texts or third-party classifications of styles, maximizing the breadth and depth of our resulting data set.

We use our method on a sample of thousands of public firms, spanning the period 2004-2023. Index ownership has increased from 3.5% of global market value in 2004Q1 to 16.9% of global market value by 2023Q4. Figure 1 shows the evolution over time. Several stylized facts are apparent. Index-based investors' ownership has grown rapidly and consistently. This expansion has substantially increased the number of firms for which index ownership is significant – shifting from a rarity twenty years ago to commonplace today. In 2004, 224 firms had index-based ownership of 10% or more. Only 18 of these firms were non-U.S. (not visible in the graph). Mid-sample (2014), the number of firms had risen to 1,883 (20% outside U.S.). And at the end of our sample, over 5,000 firms were above the 10% threshold, half of which were outside the U.S. These are the firms most likely to be affected by the governance, pricing, and liquidity consequences associated with high index ownership.

The growth in indexing has been uneven across countries. In Europe, both Switzerland and the UK have passed 10% of market value, whereas other Western European countries have only passed 5% in the last few years, and in several cases experienced a plateau after Covid. In Asia, Japan has experienced a notably fast rise in index ownership, and Taiwan is approaching 10%, while other markets remain around or below 5%.

Second, there are important cross-sectional patterns. A strong positive relationship between firm market capitalization and index ownership exists everywhere, reflecting how indexes are designed. There are important regional differences in the index ownership-size relationship. In the U.S., the relationship is concave: medium-sized firms have considerable index ownership. In Europe and elsewhere, the relationship is instead convex: only the largest firms experience high index ownership. These patterns are not new phe-

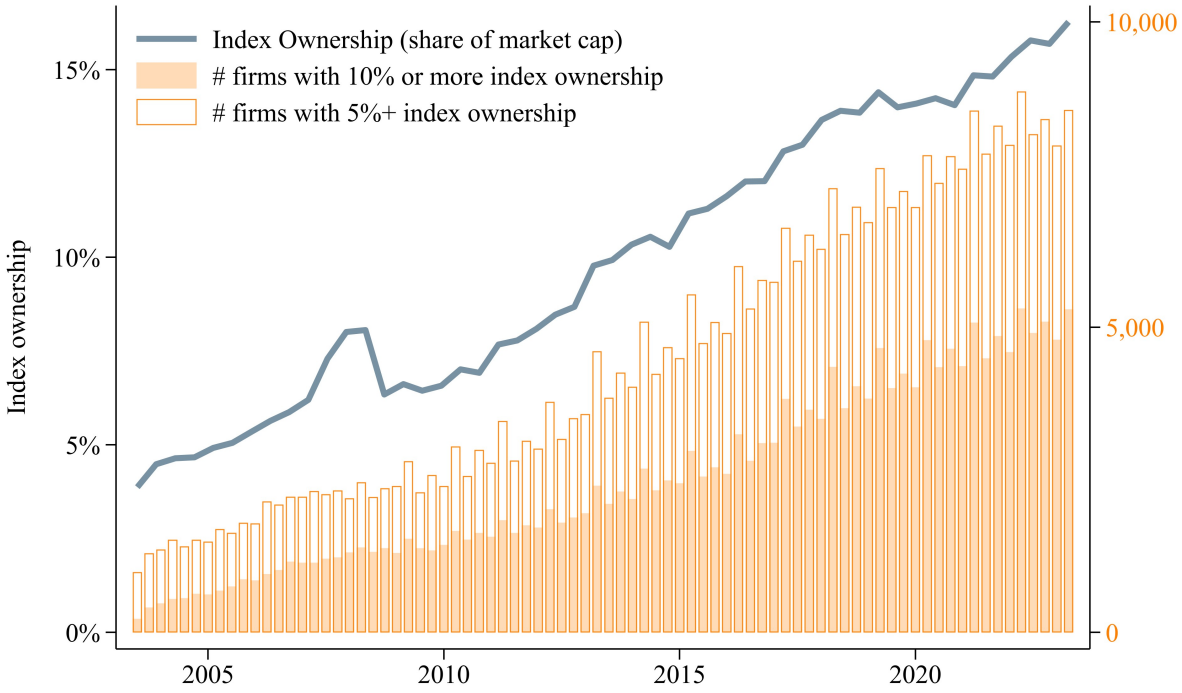

Figure 1: Index ownership. The number of firms globally with 5% or more (10% or more) index ownership is shown with orange bars (solid orange bars), against the right hand side axis. The blue line plots the quarterly time series of index ownership against the left hand side axis. This is aggregate (or, equivalently value-weighted.)

nomena, and are easily visible in earlier years, so they are not simply a question of market maturity. Rather, they may reflect underlying factors such as liquidity and family control, which limits the set of index-suitable firms. In general, which firms have extensive index ownership is important for understanding the consequences for e.g. governance (Aghion et al., 2013, Appel et al., 2016 and Schmidt and Fahlenbrach, 2017) as well as price formation and market efficiency (Bjerksund et al., 2025, Chen et al., 2004, Haddad et al., 2025, and Kontz and Hanson, 2025). To the extent that indexing impacts prices, our findings may offer one explanation for why the U.S. attracts foreign IPOs: In the U.S., it is feasible to be held by index-based investors much earlier in the life of a company.

A growing body of work measures passive or index ownership using fund-level hold-

ings data, but typically either in aggregate form or within single-country settings. Ferreira and Matos (2008) construct firm-level institutional ownership worldwide using Thomson Reuters data, showing that comprehensive cross-country holdings can be assembled but without distinguishing passive from active mandates. Cremers et al. (2016) use Morningstar fund-level data across 32 countries to classify funds as active, closet-indexed, or explicitly indexed, documenting large cross-country variation in the prevalence of index funds. They use the active share of Cremers and Petajisto (2009) to identify closet indexing (which requires selecting an index to measure each fund against – a step our method avoids). More recently, Anton et al. (2021) aggregate Thomson Reuters and FactSet holdings to estimate firm-level and sector-level common ownership in 46 countries, demonstrating the feasibility—but also the complexity—of harmonizing international ownership data. They focus on overlapping ownership, not on whether the investment style is based on indexing or not.

U.S.-focused work by Chinco and Sammon (2024) goes further, by inferring implicit indexing from confidential fund-level regulatory data and reconstitution-day trading patterns, highlighting that benchmark-tracking ownership is underestimated in public filings. Collectively, these studies confirm that large-scale fund and ownership databases exist, yet they also reveal that accurately identifying *index* ownership at the firm level across countries remains challenging due to inconsistent fund classifications, varying disclosure regimes, and internal index mandates. Industry sources such as the *Investment Company Institute Fact Book* (Investment Company Institute, 2024) and *the European Fund and Asset Management Association Fact Book* (European Fund and Asset Management Association, 2024) provide external validation that the global scale of indexed assets we infer is broadly consistent with industry aggregates, even though these practitioner datasets lack firm-level granularity, and may use different definitions of index-based investing. Consequently, while prior work demonstrates data feasibility, no study to date provides

a harmonized, replicable, firm-level measure of index ownership across countries of the kind we construct.

The rest of the paper is organized as follows: we introduce the data and measurement algorithm. We then present empirical findings. In the next section, we discuss further uses of our method and data set. Finally, we draw some conclusions for the likely impact of indexing going forward.

2. Data and measurement

2.1 Data sets used

We use a large data set of portfolio holdings of ETFs, mutual funds and other investors, from S&P Global Market Intelligence, who claim to cover ownership data for 99.7% of public companies globally. The data is called "Ownership, Transactions and Key Dev" and is based on processing primary sources such as regulatory filings (e.g., in the U.S., forms 13F, 13D, 13G, 3, 4, and 5 at the SEC; in Canada, SEDAR filings with the CSA); company reports (Annual reports, proxy statements such as DEF 14A and press releases); open- and closed-end fund and ETF reports on holdings. The data covers more than 36,000 institutional investment firms for the period 2004-2023. We combine the portfolio data with variables describing firm characteristics, such as market capitalization, from CapitalIQ. We use Morningstar's classification of fund strategies to calibrate our model for identifying index investors.

2.2 Classification method

Index-based investors seek to hold a portfolio whose performance closely tracks that of a third-party index. In practice, however, the degree and form of replication vary sub-

stantially across investment vehicles. Some investors pursue full replication, holding every constituent in the index in its exact weight. Others use sampling or partial replication, omitting illiquid or low-weight securities while targeting acceptable tracking error. The acceptable level of deviation from the index, whether measured by tracking error, holdings-based differences, or time-varying replication, depends on the fund's mandate, regulatory constraints, and operational considerations. Moreover, some investors track an index without explicitly committing to it in their mandate ("closet indexers"), making classification based solely on stated objectives unreliable. There is therefore no single, universally valid definition of index investors. For many important questions, the typical investment behavior is more important than mandate requirements. In other words, a broad definition of indexers should include closet indexers and other undeclared index-followers (Bjerksund et al., 2025 and Chinco and Sammon, 2024).

Given these measurement complications, we follow a well-established idea (mainly used in the U.S. context) of basing our categorization on portfolio holdings rather than mandates, third party classifications, or regulatory filings. We do use Morningstar's classifications of fund types to calibrate our methodology.[2] When we have more than one portfolio snapshot in a quarter for a given fund, we use the one with the last date. We start by calculating, for each portfolio date, the number of positions, the share of the portfolio invested in each security, the ownership share of each portfolio component (i.e., what fraction of outstanding shares the portfolio owns for the security) and changes in portfolio shares from the previous period.

Our classification relies on four different characteristics, each measured by one variable. The first variable is **Turnover** – the ratio of sale value plus buy value to portfolio value. We expect index-based investors to have low turnover. The second variable is **Portfolio Holdings** – the number of securities in the portfolio. We expected index-based

[2]We can also calculate index ownership simply using Morningstar's classification, but that would leave out many funds who are not classified, as well as closet indexers.

investors to have a large number of positions.[3] The third variable is **Variance** – the within-portfolio dispersion of ownership shares across the portfolio. We start from the free-float adjusted ownership share, divide by the average share for the whole portfolio, truncate the resulting measure at 10% and 90%, and then calculate the variance across positions. Many index-based strategies have identical ownership shares of all securities held, either as a share of market capitalization (e.g., the DAX index), or as a share of free float (e.g., the CAC 40 index). We use the free float-adjusted version of Variance (i.e., using shares owned divided by free float shares outstanding), but get very similar results using market capitalization (i.e., using shares owned divided by total share outstanding).

The fourth and final variable we use to classify funds is **Position Changes** – we form this variable by first measuring the percentage change in the fund's free-float-adjusted ownership share for each security held in a given period relative to the previous period, and then taking the standard deviation of these percentage changes divided by their mean absolute value. If a fund increases or decreases its positions in all securities in proportion, the variable will be zero, and if changes vary considerably across positions, it will have a high value. We expect index funds to have low values. Finally, we use an indicator variable equal to one if the fund's name includes the name of an index, and zero otherwise.[4] Detailed definitions of all variables are provided in Appendix Table 2.

Each of the four quantitative variables has a significantly different distribution across funds classified as index or not by Morningstar. We normalize the distribution of values by the subtracting mean and dividing by the standard deviation of the subset of funds classified as non-index. Figure 2 shows the normalized distribution for index funds.

[3]Portfolio holdings work imperfectly for the classification of index funds tracking national indexes outside the U.S. For example, the Swiss market index SMI features 20 stocks, and the German DAX or French CAC 40 have forty constituents in 2023.

[4]We use the following list of terms: Index, CAC, DAX, OMX, FTSE, S&P, S&P 500, SP500, MSCI, Nasdaq, Russell, Total Market, QQQ, SPY, IVV, VOO, VTI, IWM, Set 50, Jumbo 50, Jumbo 25, Select Sector SPDR, Euro Stoxx, EURO STOXX, Topix, Nikkei, JASDAQ, IBEX, TSX, ASX, Bovespa, KOSPI, Hang Seng, HSI, Lyxor Index, Dow, iShares Core, Vanguard Index, Vanguard 500, Vanguard Total Stock, Xtrackers, Schwab 1000, Fidelity 500.

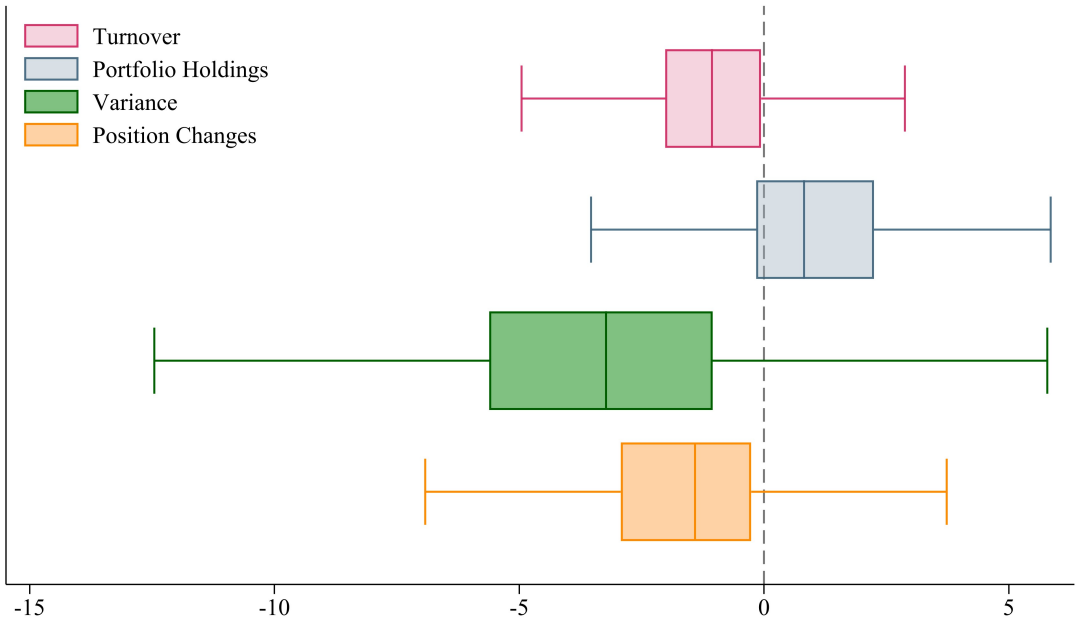

Figure 2: Index and non-index funds. The figure shows the distribution of four variables in the sub-sample of funds classified as index funds by Morningstar. The distribution of each variable has been normalized by the mean and standard deviation of the distribution for *non-index* funds (therefore, units on the x axis are standard deviations, based on the non-index population of funds). For each variable, the boxes show the median, 25th and 75th percentile of the normalized distribution, and the whiskers show 1.5 times the inter-quartile range on each side.

These variables each exhibit very different distributions for index and non-index funds, as shown by the fact that the interquartile range never overlaps with the mean value for non-index funds (which corresponds to the zero line).

To generate our identification of index funds, we first estimate a model for the set of funds that are classified by Morningstar. The regression combines the four quantitative variables in a single probit regression:

$$I_{it}^{\text{Index Fund, Morningstar}} = \Phi\Big(\theta\,\text{Turnover}_{it} + \gamma\,\text{Portfolio Holdings}_{it} + \mu\,\text{Variance}_{it} + \lambda\,\text{Position Changes}_{it}\Big) \quad (1)$$

The dependent variable is an indicator equal to one if the fund is classified as an index fund by Morningstar, and Φ denotes the standard normal CDF. We can then use the estimated coefficients to predict index status also for funds that are not assessed by Morningstar (about two thirds of the underlying fund-quarter data):

$$I^{\text{Index Fund Probit}} = \begin{cases} 1 & \text{if } -0.16 \times \text{Turnover} + 0.28 \times \text{Portfolio Holdings} \\ & \quad - 0.93 \times \text{Variance} - 0.30 \times \text{Position Changes} \geq 2.66, \\ 0 & \text{otherwise} \end{cases}$$

The estimate is based only on features of the portfolio, but still works very well: the model replicates the Morningstar classification for 75% of fund-quarters, and 91% of AUM. We can improve the fit by using fund names. To incorporate that information, we combine the predicted probit variable with the fund name indicator as follows: $I^{\text{Index Fund}} = \max\{I^{\text{Index Fund Probit}}, I^{\text{Index Name}}\}$. If only one of the arguments is defined, we use that element. This classification is available for each fund and quarter.[5] The advantage of using a max procedure, rather than simply including the name indicator variable in the probit model, is that we might better capture closet indexers (those funds that exhibit a portfolio close to an index, without indicating it in the fund name). Our broader model agrees with Morningstar's classification for 93% of fund-quarters and 97% of AUM. Disagreements are about equally common in either direction.[6] The excellent fit means that

[5]There is little variation within funds across periods. We have alternatively used a max operator across all periods for each fund - if a fund is ever classified as an index investor, we classify it as index at all times. Results using this alternative approach are very similar (few funds change status). Since there is nothing in theory that would stop funds from changing between tracking an index and not tracking an index, we prefer the period-by-period approach.

[6]Two examples of funds where our algorithm classifies the fund as an index fund, but Morningstar does not, include the "Horizon Defensive Core Investor" which is classified as "Large Blend" by Morningstar. This fund had 70-90 holdings in 2020 and 2021, but then gradually increased this to over 300 in late 2023. Another example is the "SEI Dynamic Asset Allocation" fund, whose largest holding in October 2025 was a 17.2% allocation to E-mini S&P500 futures. Plausibly, our algorithm provides a justifiable categorization in both cases.

we can accurately predict index status using the four portfolio characteristics.[7]

Based on the classification of funds as index or not and each fund's ownership share of publicly listed companies, we can calculate index ownership for each company and each quarter by aggregating the ownership across all index funds and index ETFs at the end of each quarter. The procedure leads to an unbalanced panel, with a quarterly observation for each quarter that a company is public, within the 2004-2023 period. There are 1.6 million observations, 80 quarters, and 45,795 firms in total. Of those, 7,000 firms are present during the whole sample period. In the last cross-section (2023Q4), there are 29,758 firms.

In the whole sample, average index ownership is 3.9%, and median is 0.7%. The average rises from 0.63% at the start of the sample to 2.9% at the end. We divide indexing into explicit indexing, defined as whatever has an index in the name, and closet indexing, all other observations classified as indexers. Average and median closet index ownership is 2.1% and 0.47%, and average and median explicit indexing is 1.8% and 0.03%.[8]

Finally, for benchmarking purposes, we also calculate insider ownership for each firm in each quarter, based on S&P's classification (insider ownership is the firm-quarter percentage of shares outstanding held by all individual holders that S&P Global Market Intelligence flags as corporate insiders, i.e. officers, directors, and other beneficial owners per regulatory filings; we aggregate across all such individuals). Average insider ownership is 12.3% of shares, and the median is 2.2%. Insider ownership is slightly lower in the U.S., higher in Europe and highest in Asia.

[7] In an alternative procedure, available for a larger set of funds, we have classified funds based on an indicator for whether the words "index" or "ETF" appear in the fund the name. We can also match this categorization well. This classification likely includes some actively managed ETFs.

[8] Index ownership is strongly increasing in market capitalization, so value weighted numbers are considerably higher than equal weighted. For example, the value weighted average index ownership in the whole sample is 11.8%, three times the equal weighted average.

3. Empirical patterns in index ownership

Our firm level panel data set allows for a range of cross-sectional and time-series analyses, including estimations of the relationship between index ownership and firm characteristics, the interaction between different categories of owners, as well as comparisons across countries. Below, we focus on three key topics: cross-country differences in index ownership of firms, the relation between market capitalization and index ownership, and the role of insider ownership and free float. We leave several questions for future work, including a comprehensive analysis of the firm-level consequences of indexing.

Cross-country patterns. The overall growth in index investing, as seen in Figure 1 is rapid and smooth, but Figure 1 also hides considerable variation across firms and countries. Figure 3 compares the growth in indexing in the U.S. to that in other markets. In Panel A, we compare selected Asian countries to the U.S.: whereas China has seen little or no growth in indexing since around 2010, India, South Korea and Singapore show steady growth from low levels, Taiwan experienced somewhat faster growth, and Japan shows accelerating growth, narrowing the gap with the U.S. Japanese firms have the second most index ownership after U.S. firms.

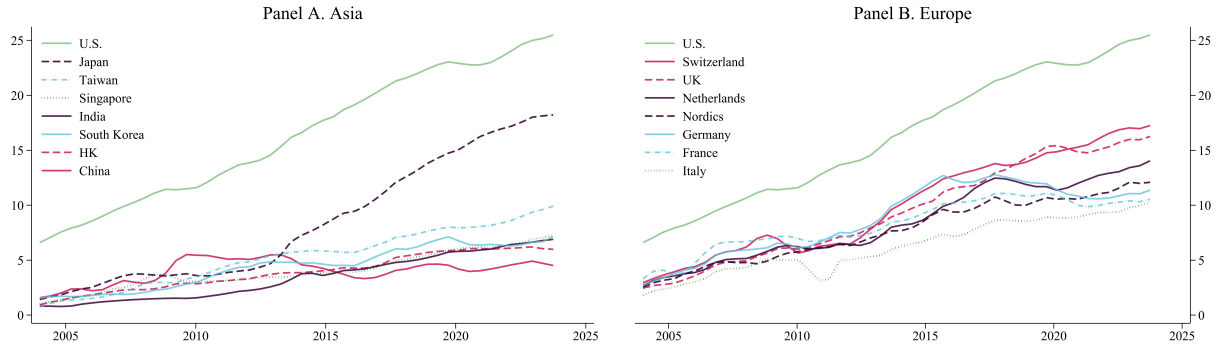

Figure 3: Index ownership in selected markets. This figure plots the value-weighted index ownership for the U.S. and selected Asian (Panel A) and European (Panel B) countries, 2004-2023.

Panel B compares European countries to the U.S.: Both Switzerland and the U.K. have seen rapid growth, trailing the levels of U.S. index ownership by around ten years. The Netherlands and the Nordics have experienced somewhat slower index ownership growth, and Germany, France and Italy have seen the slowest growth. Note that the lines correspond to the index ownership shares of *firms* in each country, and that for many European firms, much of the index ownership appears to be through indexes at the European or regional level, and largely sourced from abroad (e.g., U.S. or other European investors). Because of the large cross-country differences, we expect index ownership to have different implications for liquidity, market efficiency or corporate governance in different European countries.

Cross-firm patterns. There is considerable heterogeneity within markets, too. Different public firms experience very different levels of index ownership. The U.S., with many indexes such as the Russell 3000 comprising thousands of firms including small-caps, and even dedicated indexes for mid-caps and small-caps (such as the S&P SmallCap 600 Index) is internationally an outlier. Long-standing national indexes in many countries focus on a small set of the largest domestic firms (e.g., the DAX which includes forty large German firms (thirty until September 2021), the CAC40 which includes the largest forty French firms, or Singapore's Straits Times Index (STI) which includes the largest 30 firms). Broader non-U.S. indices with more stocks tend to be cross-country but still focus on large-cap and mid-cap stocks (e.g., the MSCI Europe has around four hundred constituents from fifteen countries). It is likely that liquidity and free-float considerations play a role in explaining the absence of small-cap stocks from non-U.S. indexes. Most (but not all) indexes are value-weighted. Some indexes consider free float when weighting, others do not. In our data, as might be suspected, there is a strong positive correlation between firm market capitalization and index ownership.

Interestingly, the relationship between size and index ownership is very different

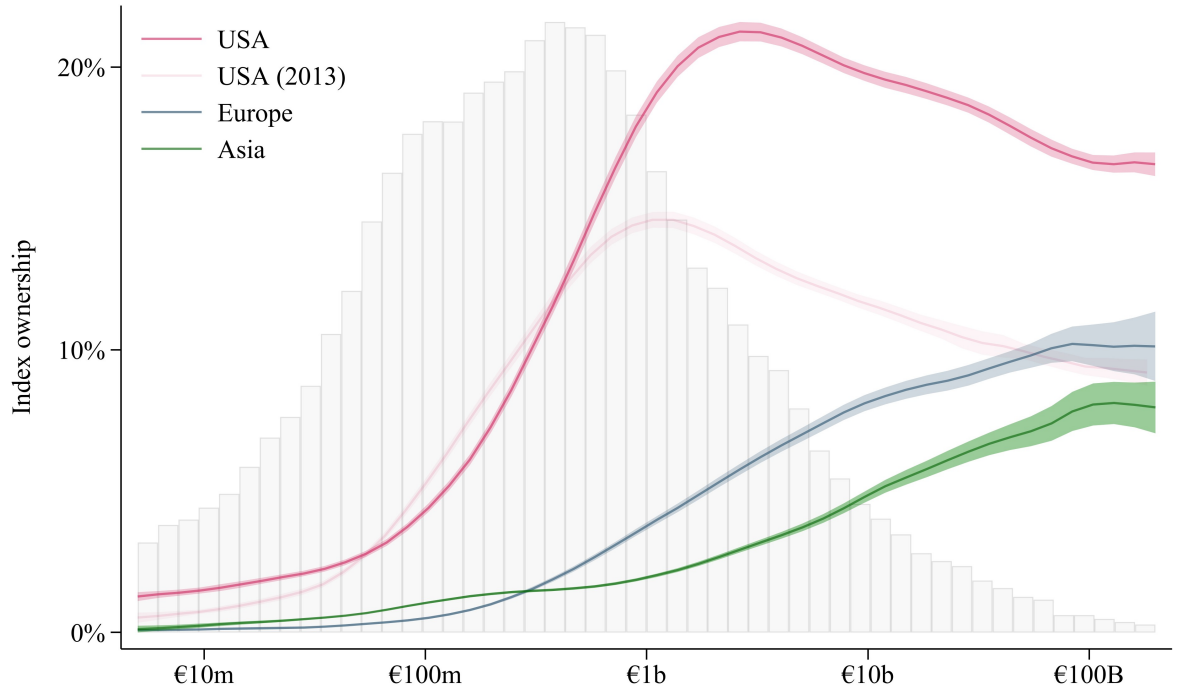

Figure 4: Index ownership and firm size. The figure plots the cross-sectional relationship between firm market capitalization and index ownership in the U.S., Asia and Europe in 2023, as well as for the U.S. in 2013. Market capitalization is in real values (2023 Euros). The distribution of market capitalization is indicated in the background, based on the 2023 subsample.

across countries. We summarize the differences in Figure 4. We focus on 2023, but as a benchmark, the figure also shows the U.S. relationship for 2013 (the regional patterns persist in earlier years, at lower levels). In the U.S., index ownership is low for small-caps, and rises rapidly for mid-caps (around a market capitalization exceeding a few hundred million euro).[9] Index ownership peaks at around 20% for firms worth a few billion. Beyond that point there is a decline, and the largest firms have *less index ownership* than mid-caps.

Outside the U.S., on the other hand, the relationship between market capitalization and index ownership is monotonically positive. Small-caps have low or no index own-

[9] At the end of 2023, one Euro was worth 1.17 U.S. dollars.

ership. Mid-caps have more, but much less than U.S. firms (about a quarter in Europe, less in Asia). Index ownership then increases in the large-cap segment (about half of the U.S. level in Europe, slightly less in Asia). It is likely that in the U.S., index ownership extends further down the market-cap spectrum than in Europe or Asia because U.S. capital markets are deeper, more liquid, and more standardized, with well-established index families (such as S&P or Russell) that cover mid- and small-cap segments extensively. The dominance of large passive managers like Vanguard, BlackRock, and State Street, combined with widespread use of index products in retirement savings, further reinforces this trend. As a result, U.S. mid-caps tend to exhibit higher index ownership than both large caps—owing to less active stock picking—and small caps, which remain less liquid and more costly to replicate also in the U.S.

The patterns we show in Figure 4 have several implications. For example, the total capacity of indexing may be lower in non-U.S. markets, if mid-caps are not suitable for the strategy. Also, to the extent that index ownership is beneficial, the U.S. might be a better target market for firms listing with valuations of €500m and up (since index ownership is high in the U.S., but low (large-caps) or minimal (small- and mid-caps) outside the U.S.).

Closet indexing. Closet index funds, i.e. funds whose portfolios exhibit characteristics of index investing without explicitly reporting it, "charge higher fees and under-perform" (Cremers et al., 2016). We estimate closet indexing as the difference between total index ownership (identified by our algorithm) and ownership by explicit indexers (those fund names that refer to indexing or include an index name). In Figure 5 we plot the long-term, value-weighted average of explicit and closet indexing, for the world and for large regions. Several patterns are noteworthy. First, closet indexing is stable, or falling slightly, everywhere. It has been smaller than explicit indexing in the U.S. since 2005 at least, and in Asia and Europe since 2020/2021. The rise in indexing is driven by explicit indexing everywhere, and the difference between explicit and closet indexing is largest by far in the

U.S.

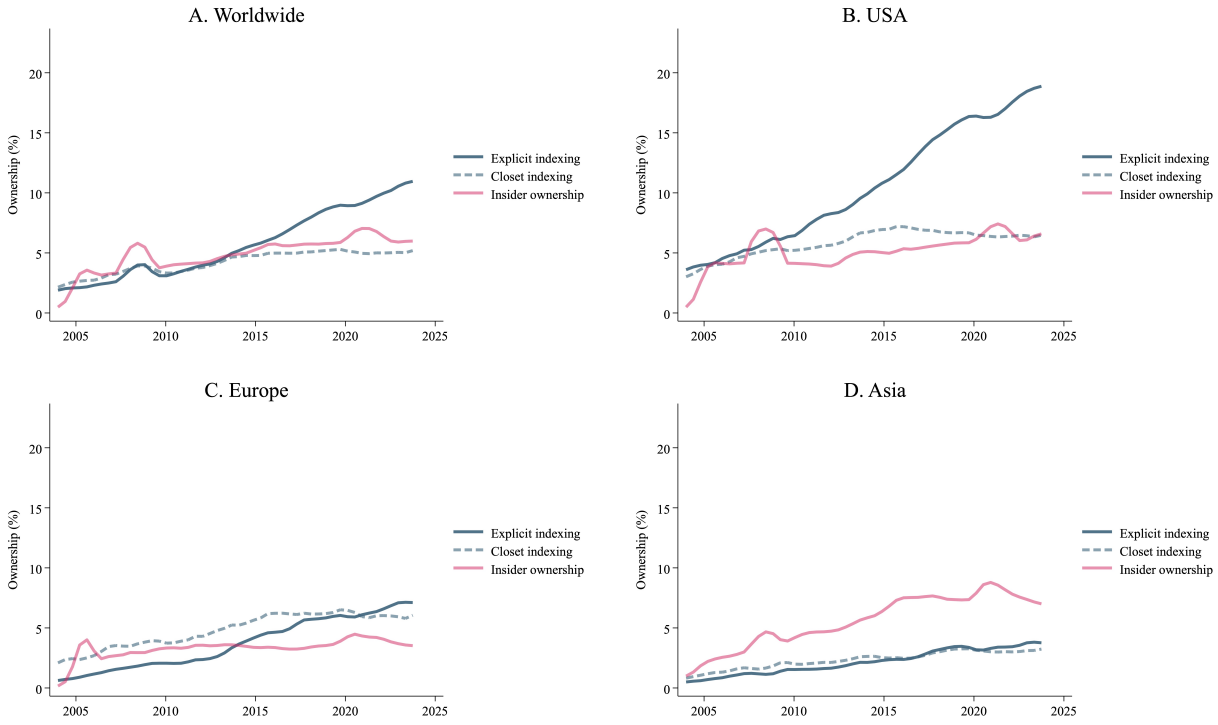

Figure 5: Explicit indexing, closet indexing, and insider ownership. This figure plots the evolution of explicit indexing, closet indexing, and insider ownership. Panel A shows data for the world, Panel B U.S., Panel C Europe, and Panel D Asia.

Insider ownership and free float. Figure 5 also includes the level of insider ownership, which is stable in the U.S. and Europe, rising slightly in Asia. These changes are dwarfed by the increase in indexing in the U.S. and Europe, and extrapolating for Asia, index ownership is on par with insiders (and if China is excluded, indexing exceeds insider ownership already). Insiders and other long-term shareholders are sometimes excluded from market capitalization weights for indexes – e.g. for MSCI indexes, holdings that are not likely to be available in the market are dropped before calculating market capitalization weights. These findings underline the central role played by indexing in stock markets around the world. Since free float varies considerably – due to insider ownership but also

	(1)	(2)	(3)
		Index Ownership	
Free float	**0.137****	**0.101*****	**0.079*****
	(0.052)	*(0.035)*	*(0.023)*
Market Cap (log)			**1.359*****
			(0.310)
R-squared	0.216	0.444	0.572
Observations	1.47m	1.47m	1.44m
Country FE	No	Yes	Yes
Time FE	No	Yes	Yes
Error clusters	Country, Firm	Country, Firm	Country, Firm

Table 1: Free float and index ownership. The table reports results from a regression of index ownership on a free float measure, the logarithm of market capitalization (measured in 2023 Euros), and fixed effects. The letter m refers to millions. Coefficients are reported in bold font, and robust standard errors clustered by country and firm are reported below. *, **, and *** denote statistical significance at the ten, five, and one percent levels, respectively.

to other long-term investors such as corporations and strategic institutions – the relative prevalence of index ownership may reflect firm variation in these factors. There is indeed a negative correlation between index ownership and ownership by long-term investors. We show this in linear regressions of index ownership on free float, reported in Table 1. We run regressions with and without country and period fixed effects, and with and without a control for market capitalization, both of which contribute explanatory power. In all three specifications, index ownership is increasing in free float, with an elasticity in the vicinity of 0.1 (i.e., one dollar of free float increases index ownership by around 10 cents). These results suggest that low free float contributes to lower index ownership (modestly).

Conclusions

Index-based asset management is an important financial innovation – with impact on retail investor risk levels and fees, market efficiency, and corporate governance. Benefits

of index investing for investors include diversification, low fees due to scale economies, good liquidity, and often tax efficiency (Chen et al., 2004, French, 2008, and Sharpe, 1991). Benefits for publicly listed firms may include professional governance (Aghion et al., 2013, Appel et al., 2016). There are, however, important concerns about negative effects of passive investing, including low engagement with portfolio firm governance, poor incentives for owners to engage with governance, and impaired price discovery in financial markets (Schmidt and Fahlenbrach, 2017, Azar et al., 2018, and Haddad et al., 2025).

While indexing in U.S. markets has been extensively covered in the literature, we know much less about the magnitude and effects of index ownership for non-U.S. firms, at least partially because of a lack of data. With novel data and a simple algorithm for classifying index-based investors, we document that while indexing originated and is indeed most prominent in the U.S., it is now growing in most markets (China is a key exception), albeit at very different rates. By our measure, the value-weighted average ownership share of index-based investors in the U.S. is 26.2% at the end of 2023, in Europe 13.9% and in Asia 7.3%; up from 5.9%, 2.3% and 1.0% in 2004, respectively. Closet indexing is as important in Europe and Asia as explicit indexing, while explicit indexing is much higher in the U.S. The trend towards more index ownership affects large-caps everywhere, mid-caps in the U.S. but less in Europe and Asia, and small-caps nowhere but in the U.S. Such variation may be attributable to the frictions associated with implementing indexing in markets that differ in liquidity, transaction costs, and prevailing ownership structures.

A large global shift toward index-based asset management is underway. Its consequences, including the costs and benefits discussed above, will be felt increasingly widely as indexing outside the United States continues to expand. These effects are likely to vary across markets, given differences in legal regimes, corporate governance structures, and trading practices.

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A. Variable Definition

Variable	Description
$I_{it}^{\text{Index Fund, MorningStar}}$	Indicator equal to 1 if Morningstar classifies fund i as an *index* fund in quarter t.
Turnover_{it}	Gross trading relative to portfolio value: $$\text{Turnover}_{it} = \frac{\text{Buys}_{it} + \text{Sells}_{it}}{\text{AUM}_{it}},$$ where holdings are reported at the end of each quarter. Buys_{it} and Sells_{it} are defined as all increases and decreases in the fund's holdings between the end of quarter $t-1$ and the end of quarter t (including newly added and fully liquidated positions). AUM_{it} denotes the fund's *end-of-quarter* portfolio value at t.
$\text{Portfolio Holdings}_{it}$	Number of distinct securities held by fund i in quarter t: $$\text{Portfolio Holdings}_{it} = \left\lvert \mathcal{P}_{i,t} \right\rvert, \quad \mathcal{P}_{i,t} \equiv \{j : \text{SharesOwned}_{ijt} > 0\}.$$
Variance_{it}	Within–portfolio dispersion of free–float–adjusted ownership shares, computed after symmetric 10% truncation at the security cross–section. For $j \in \mathcal{P}_{i,t}$ define $$w_{ijt} = \frac{\text{SharesOwned}_{ijt}}{\text{FreeFloatShares}_{jt}}, \qquad \bar{w}_{it} = \text{mean}_{j \in \mathcal{P}_{i,t}}(w_{ijt}),$$ normalize $\tilde{w}_{ijt} = w_{ijt}/\bar{w}_{it}$, truncate $\tilde{w}_{ijt}$ at the 10th/90th percentiles across j to obtain $\tilde{w}_{ijt}^{W}$, then $$\text{Variance}_{it} = \frac{\text{sd}_{j \in \mathcal{P}_{i,t}}(\tilde{w}_{ijt}^{W})}{\text{mean}_{j \in \mathcal{P}_{i,t}}(\tilde{w}_{ijt}^{W})}.$$
$\text{Position Changes}_{it}$	Cross–sectional dispersion of proportional changes in w_{ijt} across the union of current and prior holdings $\mathcal{Q}_{i,t} = \mathcal{P}_{i,t} \cup \mathcal{P}_{i,t-1}$. Let $$\Delta w_{ijt} = w_{ijt} - w_{ij,t-1}, \qquad r_{ijt} = \frac{\Delta w_{ijt}}{w_{ij,t-1}}, \quad j \in \mathcal{Q}_{i,t} \text{ with } w_{ij,t-1} > 0.$$ Normalize by the cross–sectional mean magnitude of nonzero–prior positions and take a coefficient of variation: $$\text{Position Changes}_{it} = \frac{\text{sd}_{j:\, w_{ij,t-1}>0}(r_{ijt})}{\text{mean}_{j:\, w_{ij,t-1}>0}(\lvert r_{ijt} \rvert)}.$$ If $\text{mean}_{j:\, w_{ij,t-1}>0}(\lvert r_{ijt} \rvert) = 0$, set $\text{Position Changes}_{it} = 0$. Equals 0 if all nonzero prior positions are scaled proportionally between $t-1$ and t.
AUM_{it}	Portfolio market value of fund i in quarter t; used to scale Turnover_{it} and to compute position weights.
Index Name_{i}	Time–invariant indicator equal to 1 if the fund's description indicates an index fund; if description is unavailable, equals 1 when the fund name contains any of: *Index, CAC, DAX, OMX, FTSE, S&P, S&P 500, SP500, MSCI, Nasdaq, Russell, Total Market, QQQ, SPY, IVV, VOO, VTI, IWM, Set 50, Jumbo 50, Jumbo 25, Select Sector SPDR, Euro Stoxx, EURO STOXX, Topix, Nikkei, JASDAQ, IBEX, TSX, ASX, Bovespa, KOSPI, Hang Seng, HSI, Lyxor Index, Dow, iShares Core, Vanguard Index, Vanguard 500, Vanguard Total Stock, Xtrackers, Schwab 1000, Fidelity 500.*
FreeFloat_{jt}	Firm–level free float for security j in quarter t: the proportion of shares available for public trading, excluding shares held by strategic owners. Used to construct w_{ijt} in Variance_{it} and $\text{Position Changes}_{it}$.

Table 2: Variable definitions and construction. This table provides definitions for key variables used in the paper. Indices are i (fund), j (firm/security), and t (calendar quarter).