Demand Shocks in Equity Markets and Firm Responses*

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Abstract

This paper examines how shifts in investor demand influence firm financing and investment decisions. For identification, the paper exploits a large-scale MSCI methodological reform that mechanically redefined the stock weights in major international equity benchmark indexes, changing the portfolio allocation of 2,508 firms across 49 countries. Because benchmark-tracking investors closely follow these indexes, the rebalancing constituted a clean shock to equity demand. The results show that portfolio rebalancing by benchmark-tracking investors generated significant capital inflows and outflows at the firm level. Firms experiencing larger inflows increased equity issuance, even more so debt financing, and real investment. The paper complements the empirical analysis with a simple model of firm financing in which a decline in the cost of equity increases the value of equity and relaxes borrowing constraints. Higher equity valuations allow firms to expand borrowing even without issuing substantial new equity, so debt financing responds more strongly than equity issuance.

Keywords: asset managers; benchmark indexes; corporate debt; equity; investment; institutional investors; issuance activity

JEL Codes: F33; G00; G01; G15; G21; G23; G31

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1 Introduction

The amount of assets managed by institutional investors worldwide has expanded rapidly over the past few decades. By 2020, this amount had risen to 132 percent of global gross domestic product (GDP), up from 84 percent in 2004 (PwC, 2021). This expansion has made institutional investors central actors in global capital allocation. Because many of these investors follow strict investment mandates, their demand for certain assets tends to be highly inelastic, limiting arbitrage capacity in financial markets. As a result, their flows into and out of those assets can lead to large price responses (The Economist, 2024), with potential implications for corporate behavior.[1]

Theoretical work shows that increased institutional investor demand for equities can lower firms' cost of equity capital, potentially expanding their investment capacity (Kashyap et al., 2021). In practice, however, firms can translate valuation gains into different financing responses, with distinct implications for real investment. One possibility is that firms respond by adjusting financing—such as issuing equity while substituting away from debt—without substantially changing the total external funding or investment.[2] Alternatively, valuation changes driven by inelastic investor demand can strengthen firms' balance sheets, relax leverage constraints, and enable real expansion. In this case, increased access to equity and/or debt markets can finance the expansion (Kiyotaki and Moore, 1997; Gao and Lou, 2013; Ai et al., 2020; Lian and Ma, 2021), or, for firms with sufficient internal resources, retained earnings rather than new external issuance could do so (Bena et al., 2017). Distinguishing between these channels requires systematic evidence on how institutional investor demand

[1] A large body of research documents how changes in investor flows can affect asset prices when demand is inelastic (Shleifer, 1986; Chen et al., 2004; Chakrabarti et al., 2005; Brennan and Li, 2008; Baker, 2009; Gromb and Vayanos, 2010; Koijen and Yogo, 2019; Gabaix and Koijen, 2021; Escobar et al., 2021; Buffa and Hodor, 2023).

[2] Several studies document equity issuance in response to favorable valuation conditions (Stein, 1996; Baker et al., 2003; Khan et al., 2012), often accompanied by substitution away from debt (Warusawitharana and Whited, 2016; Ma, 2019). Such responses primarily reflect arbitrage within the firm and need not translate into higher investment.

affects firms' financing choices and investment.

Our contribution is to exploit a quasi-natural experiment to investigate the impact of institutional demand shocks on firm financing and investment decisions. The episode we study is appealing for identification because it involves an unanticipated change in the weights of all stocks in major global benchmark indexes. As a result, investors tracking these indexes had to rebalance their portfolios, leading to changes in the demand for individual stocks, unrelated to the firms' prior performance. We use this setting to examine how firms adjust their total external financing through new issuances of equity and debt, and how these changes translate into subsequent investment activity.

We focus on a major methodological reform of the Morgan Stanley Capital International (MSCI) equity indexes, which serve as key benchmarks for institutional investors worldwide. Between 2000 and 2002, MSCI reweighted every stock in its global and regional indexes, affecting 2,508 firms across 49 countries. The reform shifted index weights from total to free-float market capitalization, giving greater representation to stocks that are more widely available for trading. Because the reform reflected a change in index construction rather than firms' financing or investment decisions, it generated significant, benchmark-induced shifts in investor demand across firms. The resulting portfolio reallocations by index-tracking investors had sizable effects on equity prices (Hau et al., 2010), consistent with earlier evidence on the price impact of index redefinitions.[3] Our paper builds on this global redefinition to explore how large, benchmark-induced shifts in investor demand affect firms' financing and investment decisions.

The reform generated variation in predicted portfolio investment flows unrelated to firm performance, allowing us to implement a difference-in-difference strategy to identify their

[3]See, for example, Kaul et al. (2000) and Greenwood (2005), who study similar reweighting episodes in single-country indexes. Compared with these earlier cases, the MSCI reform was global in scope, affected a far larger set of firms, and involved substantially greater benchmark-tracking capital, making it a uniquely powerful setting to study the firm-level consequences of inelastic investor demand.

impact on firms. We focus on companies that remained in the MSCI indexes before and after the reform, thereby avoiding potential endogeneity concerns from firms entering or exiting the benchmark.[4] To capture firms' responses, we combine data on MSCI constituents with transaction-level information on equity and debt issuances, merged with firm-level balance sheet and income statement data.

Our main finding is that firms experiencing larger predicted inflows induced by the rebalancing raised significantly more external financing following the MSCI reform. Firms increased both their equity and debt issuance activity in the quarters after the reweighting. A one-percentage-point increase in predicted inflows is associated with a 0.45 (1.21) percentage-point increase in equity (debt) raised. The relation between predicted inflows and capital raising is statistically indistinguishable from zero in the quarters before the announcement of the new MSCI methodology, but turns positive and significant afterward.

Building on these results, we use an instrumental variable approach to quantify the association between price changes driven by benchmark-induced investor demand and firms' financing activity. We find that a 1 percent increase in equity prices leads to a 0.08 (0.15) percentage-point increase in equity (debt) issuance, measured relative to firms' market capitalization. This indicates that firms issue more securities when equity prices are higher, but that the issuance response is modest in absolute terms, consistent with an upward-sloping, yet relatively inelastic, supply of financing instruments. At the same time, because baseline issuance levels are small, even modest absolute changes can be meaningful for firms' financing activity. Furthermore, firms with larger predicted inflows also expanded their real investment, with capital market issuances primarily financing mergers and acquisitions in the subsequent two years.[5]

[4]Firms that issued more equity or experienced favorable shocks before the rebalancing became more likely to qualify for inclusion, making their subsequent flows mechanically correlated with pre-treatment behavior. Exits pose a related challenge, as firms leaving the index typically do so following deteriorations in fundamentals that can independently affect their financing activity.

[5]The prominence of mergers and acquisitions in the investment response is consistent with the predictions of Kashyap et al. (2021).

To rationalize these patterns, we build a simple model of firm financing and investment. In the model, the amount of debt financing is limited to a fraction of their equity market value. When benchmark-driven inflows lower the cost of equity, the value of equity increases. This relaxes borrowing constraints and increases debt financing. Equity issuance is also likely to occur if the reduction in the overall financing cost leads to a large enough increase in real investment.[6] The model thus explains why, if the debt-equity ratio is stable, debt financing responds more strongly than equity issuance.

Our results provide evidence that institutional investor demand shocks in equity markets play an important role in shaping corporate financing and investment decisions. Such demand not only affects asset prices but also influences how firms fund and expand their operations. In particular, benchmark-induced inflows amplify the financing capacity of the largest publicly listed firms, effectively lowering their cost of capital and supporting both equity and debt issuance. Taken together, these findings suggest that the growing presence of institutional investors has implications for corporate behavior that extend beyond asset pricing effects alone. As global assets under management have expanded to levels comparable to, and in some markets exceeding, those of the banking sector, understanding how institutional demand shapes firms' financing and investment decisions has become increasingly important for assessing its macro-financial implications.

Our paper contributes to the empirical literature on how shifts in institutional investor demand influence corporate financing and investment decisions. Benchmark index redefinitions are among the few settings in which such demand shocks can be inferred. Prior studies have mainly focused on index additions, providing mixed evidence on whether benchmark inclusion influences firms' external financing. Some find that inclusion primarily affects internal rather than external funding (Bena et al., 2017), while others report heterogeneous equity issuance responses following inclusion in the S&P 500 index (Chen et al., 2004; Massa et al., 2005).

[6]This effect happens as long as diminishing returns to investment are not too strong.

Related work shows that firms often increase debt rather than equity issuance after joining an index (Hong et al., 2021; Goyal et al., 2023). In contrast, smaller firms added to the Russell 2000 index tend to issue more equity and reduce debt (Cao et al., 2019). Some of these studies also document higher investment following index inclusions.

While this evidence has advanced our understanding of benchmark-driven corporate behavior, index additions are less suitable for identifying financing responses. Inclusion is typically correlated with prior performance and financing activity: firms that issue equity and expand are more likely to enter an index. Moreover, firms could strategically adjust their capital structure in anticipation of an inclusion, for instance by lowering leverage or issuing index-eligible securities (Hong et al., 2021; Calomiris et al., 2022; Dathan and Davydenko, 2025). Because financing occurs infrequently, such anticipatory behavior can mechanically dampen post-inclusion responses.[7]

The MSCI reform we study offers a clean setting to assess how inelastic investor demand shapes firm behavior. The methodological change reweighted all constituent firms simultaneously and differentially for reasons unrelated to prior performance or issuance decisions. This design enables comparisons across firms exposed to varying benchmark-induced demand shocks, while holding constant their index membership. By focusing on reweighted incumbents rather than new additions, our approach avoids the selection and anticipation issues inherent in index additions. Consistent with this interpretation, we find that firms newly added to the MSCI indexes during the reform had issued substantially more equity before the event, rather than after.

Our paper also relates to the growing literature examining how investor demand in inelastic financial markets affects asset prices at both the firm and aggregate levels (Koijen and Yogo, 2019; Gabaix and Koijen, 2021). These frameworks estimate asset demand elasticities

[7]Unlike the financing and investment adjustments, which manifest at relatively low frequencies, stock prices can react immediately. Thus, the index-addition literature is better positioned to identify those high-frequency changes, as it effectively does.

using investor holdings data and are well-suited for studying rich counterfactuals. A common simplifying assumption, however, is that firms' equity supply is fixed.[8] Recent work connects these same market forces to the growing dominance of large firms in equity markets, as passive investment inflows concentrate in benchmark constituents and compress their cost of capital relative to smaller firms (Jiang et al., 2025).

Our findings complement and extend this literature by showing that firms actively respond to inelastic investor demand shocks, rather than remaining fully passive. We document economically meaningful adjustments in both equity and debt issuance following benchmark-induced changes in investor demand. However, these quantity responses are limited in relation to the associated price movements, implying an upward-sloping but relatively inelastic supply of external finance. In this sense, our estimates are consistent with the significant price effects emphasized in the asset-pricing literature: firms adjust quantities in response to demand, but the adjustment is sufficiently muted that investor demand continues to impact valuations.

The rest of the paper is organized as follows. Section 2 describes the institutional setting and the MSCI global rebalancing. Section 3 describes our data and empirical strategy. Section 4 reports our main results on issuance activity. Section 5 shows our findings for capital expenditures and other firm attributes. Section 6 presents a model of firm responses. Section 7 concludes.

2 Institutional Setting

The MSCI indexes are the most popular global equity indexes that international investors follow to allocate their portfolios, often replicating or benchmarking against them (Hau, 2011; Cremers et al., 2016). Their influence has increased markedly over time: the value of financial assets managed by institutions that actively or passively follow MSCI indexes rose more than

[8]There have been recent efforts to study how to estimate demand elasticities when issuers might endogenously respond to inelastic investors, such as Moretti et al. (2025).

10-fold between 1991 and 2015 (Figure 1).

The growing scale of assets managed by MSCI-tracking institutions has amplified the demand for firms included in these benchmarks. Over time, these MSCI firms have also become dominant issuers in global capital markets. Although they represent only about 9 percent of all publicly listed firms worldwide, they accounted for roughly 50 percent of total capital raised in equity and debt markets between 2010 and 2015, up from about 30 percent in the 1990s (Figure 1).[9]

The 2000-2002 Rebalancing

We exploit the 2000-2002 MSCI rebalancing as a quasi-natural experiment to identify how shifts in inelastic institutional investors' demand—driven by changes in benchmark index weights—can affect corporate decisions. The methodological reform was first announced in February 2000, when MSCI communicated its intention to revise its index weighting methodology. A consultative paper outlining potential changes was issued in September 2000, and the final redefinition of MSCI's international equity indexes was formally announced in December 2000.

The new methodology introduced two major modifications. First, index composition and weights shifted from a total market capitalization basis to a free-float market capitalization basis, leading to substantial reweighting across constituent stocks.[10] Second, MSCI aimed to improve the representativeness of its indexes by targeting a free-float-adjusted market coverage of 85 percent within each industry and country, up from the previous target of 60 percent of total market capitalization. Both changes entailed rule-based weight adjustments, without any discretionary assessment of firms' growth prospects or performance.

[9]Total funds raised in capital markets are defined as the sum of proceeds from equity, corporate bond, and syndicated loan issuances.

[10]Whereas total market capitalization includes all outstanding shares of a company, the free float captures only the shares that are publicly traded and available for purchase by domestic and international investors. Free-float securities are typically held by households, investment funds, mutual funds, pension funds, insurance funds, social security funds, and securities brokers. Non-free-floating shares are those owned by company insiders (such as board members and executives), banks (excluding trusts), or governments. Foreign ownership restrictions can also affect whether shares qualify as part of the free float.

The implementation occurred in two stages. On November 30, 2001, MSCI applied half of the change resulting from the free-float adjustment to all existing index constituents. It also included the new components resulting from the expanded 85 percent coverage, each at half of its free-float-adjusted market capitalization. The second phase was completed on May 31, 2002, when the remaining adjustments were implemented to fully reflect the new methodology.

Weight changes across index stocks imply mechanical reallocations in the portfolios of institutional investors that follow MSCI benchmarks. Consistent with this reweighing effect on investor flows, as well as with the evidence in Hau et al. (2010), the reform-induced reweighting correlates with changes in stock prices during the reform (Appendix Figure 1). The benchmark effect on stock prices is consistent with the notion that the news of the MSCI redefinition was unanticipated and orthogonal to firms' fundamentals at the time of the event. It also aligns with the idea that benchmark stocks have limited substitutes for investors, so that any change in investor demand can translate into price movements due to limited arbitrage (Kashyap et al., 2021).

Because data on the actual portfolio reallocations of benchmark-tracking investors are unavailable, we construct a proxy for the predicted change in portfolio investment flows for each firm affected by the reform.[11] To estimate the predicted investment flows induced by the rebalancing, we compute the *flows implied by rebalancing* (FIR) measure following (Pandolfi and Williams, 2019). Formally,

$$FIR_i = \frac{\sum_j \Delta w_{ij} A^j_{t-1}}{MCAP_i - \sum_j w_{ijt-1} A^j_{t-1}}, \tag{1}$$

where FIR_i denotes the flow amount implied by the rebalancing for security i, Δw_{ij} represents the reform-induced change in the benchmark weight of security i in benchmark index j, A^j_{t-1}

[11] As a robustness check, we also use the actual change in benchmark weights instead of the flow-based measure and obtain similar results. However, interpreting the effects in terms of investor flows provides a more intuitive link to the inelastic-demand mechanism emphasized in this paper.

is the total value of assets under management tracking index j prior to the reform, and $MCAP_i$ is the market capitalization of firm i. The term $\sum_j w_{ijt-1} A^j_{t-1}$ in the denominator captures the holdings of passive funds in stock i before the reform. Intuitively, FIR_i measures the amount of investment (relative to firm size) predicted to flow into or out of the equity shares of a firm, as a mechanical consequence of the reweighting.

The MSCI reform applied to all major international MSCI equity indexes. To compute A^j_{t-1}, we consider the five largest MSCI indexes in 1999, which together accounted for 83.5% of the total market capitalization covered by all MSCI indexes.[12] Using data we obtained directly from MSCI, we compute for each constituent stock the reform-induced change in index weights relative to the weights announced in May 2001.

MSCI reports total assets under management tracking their indexes, regardless of whether the assets are from passive or active funds. Existing evidence suggests that many active investors also closely follow benchmark indexes (Raddatz et al., 2017; Pavlova and Sikorskaya, 2023), even as some funds remain highly active. To account for this, we adjust A^j_{t-1} by the share of benchmark-oriented equity funds—38% according to Cremers et al. (2016). Lastly, we divide the resulting implied flow for each stock by its 1999 market capitalization to obtain the final FIR_i measure.

3 Data and Empirical Design

3.1 Data

Our analysis combines several firm-level datasets capturing benchmark weights, issuance activity, and financial characteristics. We obtained data directly from MSCI through a special request, including each firm's International Securities Identification Number (ISIN) and its

[12]The index with the most extensive international coverage was the MSCI All Country World (ACWI) Index, with assets under management (AUM) of 774 billion U.S. dollars, followed by the MSCI ACWI ex USA Index (503 billion), MSCI EAFE Index (460 billion), MSCI Emerging Markets Index (387 billion), and MSCI World Index (366 billion).

index weight across different dates before and after the 2000–2002 methodology reform. This information enables us to calculate the change in benchmark weights resulting from the redefinition. The MSCI dataset covers 2,508 MSCI constituents across 49 countries.

We merge the MSCI dataset with transaction-level data on firms' capital raising in domestic and international markets from the Securities Data Company (SDC) Platinum database, provided by the London Stock Exchange Group (LSEG). This database contains global coverage of firms' equity issuances and debt issuances in the form of bonds and syndicated loans.[13] In addition, we merge firm-level market price information from LSEG's Datastream and financial statement data from LSEG's Worldscope. The resulting unified panel contains benchmark weights, issuance activity, market prices, and balance-sheet variables for each firm. We construct a fully balanced panel dataset by aggregating issuances at the quarterly level and assigning zeros to firm-quarter observations without issuance activity. All monetary figures are expressed in constant 2011 U.S. dollars.

Our final dataset covers 2,029 MSCI constituents (81 percent of the total MSCI sample).[14] Among them, 236 firms experienced positive reweighting and 903 negative reweighting. We focus the main analysis on the 1,139 non-financial corporations whose stocks were reweighted by the index revision using data around the event, from 1997 to 2002. These firms account for 7,392 issuance events over the sample period: 1,259 in equity and 6,838 in debt (Table 1). The average issuance size relative to firm market capitalization is about 14 percent, while the mean FIR is -0.1 percent.[15]

We focus on reweighted firms because entry into and exit from the index around the

[13]In the analysis, debt issuances comprise bonds and syndicated loans. Both are similar channels through which large corporations raise substantial amounts of arm's-length debt, from bondholders in public markets and multiple financial institutions and institutional investors in syndicated lending. Syndicated loans share other key features with public bonds, including syndication to non-bank investors, risk tranching, off-balance-sheet distribution, and active secondary market trading (Gatev and Strahan, 2009; Ivashina and Scharfstein, 2010; Aldasoro et al., 2022).

[14]We exclude financial firms, defined as those with a Standard Industrial Classification (SIC) code between 6000 and 6800.

[15]Appendix Table 1 reports country-level summary statistics for this event. Appendix Figure 2 shows the full FIR distribution for reweighted firms. Because many new firms were added to the index and are purposefully excluded from our sample, the FIR distribution is skewed toward negative values.

reform can reflect pre-reform developments that are correlated with firms' financing behavior. For entrant firms, inclusion could partly reflect pre-reform increases in market capitalization that are themselves influenced by past issuance decisions: firms that issued more equity before the reform would have raised their market capitalization and thus increased their likelihood of entering the index. This dynamic could generate a spurious negative correlation between time and issuance activity among newly included firms. Consistent with this concern, entrant firms in our data exhibit greater equity issuance activity before the reform than after the official announcement (Appendix Figure 3). For exit firms, removal from the index might similarly reflect pre-reform developments, such as declining size or lower market activity, which could independently shape their financing behavior. Including such firms could therefore introduce heterogeneity unrelated to the reweighting mechanism at the core of our design. Empirically, exit firms in our sample issued less equity than entrants prior to the reform and further reduced their issuance in the post-reform period (Appendix Figure 3).

3.2 Empirical Design

Our baseline empirical framework is a difference-in-difference approach that exploits cross-firm heterogeneity in exposure to the MSCI reform. We estimate specifications of the following form:

$$y_{it} = \sigma + D^{\text{Post}} + \beta \times FIR_i D^{\text{Post}} + \theta_i + \theta_{ct} + \varepsilon_{ict}, \tag{2}$$

where y_{it} denotes firm i's outcome variable (capital raising amounts and investment variables) at time t. Each variable of interest is normalized by the firm's total market capitalization in 1999, before the MSCI reform. The term FIR_i captures the firm's treatment intensity. We use two alternative measures. First, a binary indicator equal to one for firms with positive FIR_i and zero otherwise. Second, a continuous measure defined as the predicted benchmark-induced investment inflows or outflows relative to firm size (as described in Equation 1).

This continuous specification reflects the magnitude of the change in benchmark-driven demand faced by each firm. The term D_i^{Post} is a post-reform indicator equal to one after the rebalancing announcement and zero before, defined at the frequency of the outcome variable (quarters for issuance data and years for investment data). θ_i are firm fixed effects, θ_{ct} are region-time or country-time fixed effects (depending on the specification), ε_{it} is the error term, and σ is a constant. The coefficient β measures the differential change in the outcome variables for firms that are differentially exposed to the MSCI reweighting after the reform, relative to before.

We take several steps to mitigate potential confounding factors. At the macro level, regional- and country-specific shocks could influence firms' issuance activity and correlate with the reform's treatment intensity. To address this concern, we exclude the United States from some specifications, as the aftermath of the dot-com bubble affected part of the sample period and disproportionately influenced U.S. firms, which represented a large share of the MSCI indexes. We also include region- and country-time fixed effects to control for unobserved macroeconomic or financial shocks common to firms operating within the same geography and period. In addition, we perform a placebo exercise using publicly listed firms outside the MSCI benchmark indexes. For these non-index firms, we assign the average country-level FIR derived from the reweighting of MSCI constituents and re-estimate the baseline specification. This exercise helps determine whether observed issuance patterns are specific to firms directly affected by the reweighting or instead reflect broader country-level dynamics.

At the firm level, we assess the validity of our identifying assumption by examining pre-trends in issuance activity across firms with different FIR_i exposures. Parallel trajectories before the rebalancing support the interpretation that unobservable firm characteristics do not bias the estimated post-reform effects. We also apply a propensity score matching (PSM) procedure to construct a sample of firms with comparable pre-reform characteristics.

4 Changes in Investor Demand and Capital Raising Activity

We begin by examining the evolution of firms' capital raising activity around the MSCI rebalancing. Before the reform, firms with different exposure to the reweighting displayed similar issuance trends, but their behavior diverged markedly afterward (Figure 2). Following the announcement, firms with positive FIR roughly doubled their issuance volumes relative to firms with negative FIR, accumulating about 15 percentage points more capital raised by the end of 2002. This divergence reflects both higher issuance volumes among active firms and a broader participation margin: the share of positively reweighted firms that issued any security increased from 26 to 37 percent in equity markets and from 49 to 63 percent in debt markets (Table 2).

Baseline Results

To formally assess how shifts in institutional investor demand induced by the MSCI redefinition affected firms' capital raising behavior, we estimate the difference-in-differences model in Equation 2. The dependent variable y_{it} is the total amount of capital raised by firm i at time i, normalized by the pre-reform market capitalization (1999). The pre-reform period spans from the fourth quarter of 1997 to the first quarter of 2000, and the post-reform period from the second quarter of 2000 to the third quarter of 2002. In specifications using the binary treatment, β captures the average difference in issuance between firms with positive and negative FIR. In the continuous specification, β measures the change in issuance associated with a one-percentage-point increase in FIR.

The estimates indicate a significant divergence in issuance activity between firms with different exposure to the reform during the quarters following the MSCI reform announcement (Table 3, Panel A). Firms with a positive FIR raised, on average, 1.5 percentage points more capital over market capitalization than firms with a negative FIR. In the continuous

specification, a one-percentage-point higher FIR is associated with roughly a 1.8-percentage-point increase in total capital raised.[16]

Breaking down by financing instrument, the relative post-reform increase in issuance is evident in both equity and debt markets. Firms with positive FIR raised about 0.4 percentage points more equity and 0.8 percentage points more debt over market capitalization than firms with a negative FIR (Table 3, Panels B and C). In the continuous specification, a one-percentage-point higher FIR corresponds to an average differential of 0.45 percentage points in equity issuance and 1.21 percentage points in debt issuance. Overall, these results show that firms more exposed to benchmark-induced inflows raised relatively more external capital in both markets following the 2000–2002 MSCI reform.

Heterogeneous macroeconomic or financial trends across countries or regions do not drive the estimated effects. Including region- and country-time fixed effects or excluding the United States yields nearly identical coefficients (Table 3). Moreover, among publicly listed firms outside the MSCI indexes, issuance activity shows no correlation with country-level reweighting intensity, indicating that broader macro-financial shocks unrelated to the reform do not account for the observed patterns (Table 4). Lastly, the quarterly evolution of equity and debt issuance across firms with different FIR exposures reveals parallel pre-reform trajectories and a clear post-reform divergence (Figure 3), reinforcing that the estimated responses reflect benchmark-induced shifts in investor demand rather than firm performance.[17]

Elasticity of Supply

Having documented that benchmark-induced inflows were associated with firms' external financing behavior, we next examine how sensitive these financing responses are to demand-

[16]These magnitudes suggest that firms' issuance responses were large relative to the mechanical benchmark inflows implied by the 2000–2002 rebalancing. The magnitude of this effect can be expected because the reweighting represents a permanent—not transitory—shift in institutional demand. Firms gaining index weight typically benefit from a sustained increase in benchmark-related inflows and a persistently lower cost of capital, which together can generate issuance responses larger than the initial change in flows.
[17]Appendix Figure 4 shows the quarterly evolution of equity and debt issuance separately.

driven changes in valuations. This exercise quantifies the extent to which firms adjust their capital raising decisions to shifts in their cost of equity. To do so, we extend the analysis to an instrumental-variables version of the difference-in-differences specification. The approach links firms' issuance activity directly to changes in equity prices that capture the equilibrium effect of benchmark-induced investor demand. In this framework, changes in firms' log equity prices are treated as endogenous and instrumented with the interaction between the post-reform indicator and the firm-level benchmark-induced inflows (FIR). This approach isolates the exogenous component of price variation arising from index-tracking investors' portfolio rebalancing.[18]

The instrumental-variable estimates indicate that benchmark-induced price changes are strongly associated with firms' capital raising activity (Table 5). A 1 percent increase in equity prices (equivalent to a 0.01 change in log prices) corresponds to a 0.25 percentage point increase in total capital raised, measured as a share of market capitalization.[19] Decomposing this response, equity issuance rises by 0.08 percentage points and debt issuance by 0.15 percentage points. Accordingly, a 1 percent increase in equity prices raises equity issuance by about 0.08 percentage points.

The modest estimated response to price movements suggests that the supply of financing instruments is upward-sloping but relatively inelastic. As a result, demand shocks driven by benchmarks are absorbed primarily through price fluctuations rather than through significant changes in issuance volume. Nevertheless, from the firm's perspective, this inelasticity does not imply negligible changes in financing activity. Because typical issuance levels are small relative to market capitalization, even modest percentage-point changes can represent meaningful adjustments in a firm's capital market activity. For example, since the average equity issuance

[18]The data are collapsed into two periods (pre- and post-reform) to capture the medium-run adjustments and reduce the influence of quarters with no issuance activity.
[19]The instrument's relevance is supported by a Kleibergen–Paap Wald F-statistic of 14.7 in the first stage, which exceeds the conventional threshold of 10.

in the pre-reform period relative to market capitalization is about 10 percent, a coefficient of 0.08 corresponds to an adjustment of 0.8 percent for each 1 percent increase in equity prices. This rise relative to the baseline makes the effect economically relevant for corporate financing.

5 Investment Responses

In this section, we examine the extent to which the MSCI reform was followed by changes in firms' real investment activity, focusing on spending on physical assets (capital expenditures, or "capex"), mergers and acquisitions (M&A), and research and development (R&D).[20] We proceed in two steps that capture complementary margins of firms' investment responses.

The first approach provides a broad assessment of how benchmark-induced capital market shocks affect overall investment activity across firms. This specification includes both firms that use equity and debt markets during our sample period and those that do not, allowing investment to adjust through multiple financing channels, including equity, debt, bank credit, or internal funds. As such, this approach is designed to capture the overall investment response to benchmark-induced demand shocks, without conditioning on firms' capital market issuance decisions.

The second, complementary approach focuses on firms that experience positive benchmark-induced shocks and raise capital in equity or bond markets, building directly on the capital market issuance analysis in the previous section. Rather than asking whether firms invest more overall, this approach examines how funds raised in capital markets are translated into real investment uses by tracing the allocation of issuance proceeds across different balance sheet items. Together, the two approaches allow us to distinguish between overall investment responses and the allocation of capital market issuances.

[20]The link between capital raising and real investment is not necessarily direct. The additional funds raised after the reform could have been used to repay debt or accumulate cash rather than finance investments in the real sector (Erel et al., 2012; Bruno and Shin, 2017; Acharya et al., 2020).

Overall Investment Responses

Because investment data are reported annually, we collapse the panel to yearly observations and re-estimate Equation 2. The dependent variable y_{it} is defined as total investment—measured as the sum of capex, M&A, and R&D—scaled by firm market capitalization in 1999. The analysis compares the pre-reform period (1997–1999) with the post-reform period (2000–2002).

The estimates indicate that firms with a positive FIR increased their total investment by about 3 percentage points relative to firms with a negative FIR after the reform. In the continuous specification, a one-percentage-point increase in FIR is associated with 6-10 percentage points more investment, depending on the specification (Table 7).[21] The results are robust across alternative specifications and validation exercises. Including region- and country-time fixed effects, or excluding the United States, yields broadly similar coefficients. Investment trajectories exhibit parallel pre-reform trends across firms with different FIR exposures, followed by a clear divergence after the rebalancing (Figure 4). Re-estimating the model using propensity score matching to pair treated and control firms based on pre-reform characteristics (Table 6) produces comparable, though slightly smaller, coefficients (Table 7).

When decomposing total investment into capital expenditures, mergers and acquisitions, and research and development using the same difference-in-differences specification, we find statistically significant increases across all components. The estimated effects are largest for capital expenditures (6.5), followed by mergers and acquisitions (0.7) and research and development (0.4). In contrast, internal financing, measured by net income, does not exhibit a systematic change around the reform (Appendix Table 2).

Allocation of Funds Raised in Capital Markets

The second approach narrows the focus to how capital market issuance by positively shocked

[21]The results are robust to converting the balance sheet and income statement dollar values to local currency at constant prices, ensuring that cross-country differences in inflation or exchange rate movements do not drive the estimates. Because investment outcomes are measured annually, these coefficients reflect cumulative responses over the year rather than shorter-run adjustments, and are therefore not directly comparable to the quarterly issuance estimates.

firms is actually deployed across different uses. Rather than asking whether firms invest more overall, this analysis examines how funds raised in equity and debt markets are allocated to capex, M&A, R&D, inventories, and cash holdings.

To implement this analysis, we follow the methodology of Kim and Weisbach (2008), which allows us to trace how proceeds from issuances are used while accounting for other internal and external funding sources. We restrict the sample to firms with a positive FIR and identify all firm-year observations with positive equity or debt issuance ($issuance\,value_{it} > 0$) during 2000–2002. For each issuance event in year t, we construct an event-time panel that includes the year prior to the issuance ($t-1$), which serves as the reference period, as well as the issuance year (t) and subsequent years ($t+k$). We then estimate the following regression model over the 2000-2002 window:

$$\begin{aligned} Y_{it+k} =& \beta_1 \ln\left[\left(\frac{issuance\,value_{it}}{assets_{it-1}}\right)+1\right] \\ &+ \beta_2 \ln\left[\sum_{j=t}^{t+k}\left(\frac{(total\,resources_{ij} - issuance\,value_{it})}{assets_{it-1}}\right)+1\right] \\ &+ \beta_3 \ln\left[assets_{it-1}\right] + \alpha_j + \gamma_t + \varepsilon_{it}, \end{aligned} \tag{3}$$

where $assets_{it-1}$ denotes firm i's total assets in the year preceding the issuance, $issuance\,value_{it}$ is the amount of funds raised during the issuance, $total\,resources_{ij}$ represents all the funds generated internally and externally between t and $t+k$, α_j captures industry fixed effects, and γ_t denotes year fixed effects. The dependent variable, Y_{it+k}, measures the allocation of funds across different balance sheet items:

$$Y_{it+k} = \begin{cases} \ln\left[\frac{V_{it}-V_{it-1}}{asset_{it-1}}+1\right] & \text{for} \quad V = \text{inventory and cash}, \\ \ln\left[\sum_{j=t}^{t+k}\frac{V_{ij}}{asset_{it-1}}+1\right] & \text{for} \quad V = \text{capex, M\&A, R\&D}. \end{cases} \tag{4}$$

We estimate separate regressions for $k = 0$ (issuance year), $k = 1$ (one year after issuance), and $k = 2$ (two years after issuance).[22] The coefficient of interest, β_1, captures

[22] Because the dataset is an unbalanced panel, firm-level variables in Equation (3) are defined only for observations with $issuance\,value_{it} > 0$. Otherwise, they appear as missing values.

the proportion of proceeds raised that is reflected in each type of balance sheet use: capex, M&A, R&D, inventories, and cash.

To interpret these estimates, we compute the corresponding elasticities and translate them into dollar effects for each post-issuance horizon.[23] The results indicate that most of the capital raised was used for acquisitions. For every dollar raised at time $t = 0$, the median firm with a positive FIR allocated approximately 62 cents to acquisitions and 30 cents to cash (Table 8). Two years after the issuance, investment in acquisitions rose further to 73 cents per dollar raised, while firms also significantly increased their R&D spending.

The ordering of investment magnitudes across categories differs from the aggregate difference-in-differences results. Whereas capital expenditures account for the largest share of the overall investment response in the difference-in-differences approach, acquisitions dominate in the issuance-based analysis. This difference reflects the conditioning of the second specification on the particular use of capital market issuances, which larger firms typically undertake. These events are well-suited for financing sizable, discrete investments, such as mergers and acquisitions. By contrast, the difference-in-differences specification captures investment responses across a broader set of firms and through different financing channels, where capital expenditures appear to respond more strongly.

6 Conceptual Framework

In this section, we present a simple analytical framework that rationalizes our empirical findings on firms' equity and debt financing responses to benchmark-induced shifts in inelastic investor demand. The model is intentionally parsimonious: it isolates the key mechanism—a persistent decline in the cost of equity financing—without adding unnecessary institutional

[23] To calculate the dollar effects, we first compute the predicted values of the dependent variable by plugging into Equation 2 the value of the issuance. We then recompute the predicted values of the dependent variable by adding one U.S. dollar to the issuance value. Next, we calculate the difference between the two predicted values to obtain the marginal change in the use of proceeds. Lastly, we compute the median difference across firms and report it in the table.

structure. This simplicity is appropriate for our setting, as the MSCI rebalancing represents a quasi-permanent, exogenous increase in investor demand for affected firms' equity, which mechanically lowers their cost of capital. The framework allows us to capture, in a transparent way, how such shocks influence the composition of external financing (equity versus debt) and investment.

Consider a firm that invests (i) at $t = 1$ and produces output (y) at $t = 2$, with production subject to diminishing returns:

$$k = i, \tag{5}$$

$$y = f(k), \tag{6}$$

where $f'(\cdot) > 0$ and $f''(\cdot) < 0$. The firm relies entirely on external capital (k), financed with a mix of equity and debt. The return on equity exceeds that on debt:

$$i = \frac{e}{R^e} + \frac{d}{R^d}, \tag{7}$$

$$R^e > R^d, \tag{8}$$

where e and d denote payments to equity and debt holders at $t = 2$ (which can be interpreted as equity and debt issuance at $t = 1$) and R^e and R^d are the respective required returns. Note that e/R^e is the market value of equity or equity financing and d/R^d is the market value of debt or debt financing at $t = 1$.

The firm faces a borrowing constraint that limits debt financing to a fraction of its equity market value.

$$\frac{d}{R^d} \leq \phi \cdot \frac{e}{R^e}. \tag{9}$$

Given Equation 8, the borrowing constraint in Equation 9 always binds, implying a constant debt-equity ratio. Thus,

$$i = \frac{e}{R^e} + \phi \cdot \frac{e}{R^e}. \tag{10}$$

The firm's problem is to maximize profits,

$$\max_{e} f\left[\frac{e}{R^e}\cdot(1+\phi)\right]-e-\phi\cdot\frac{R^d}{R^e}\cdot e. \tag{11}$$

The first order condition can be written as

$$f'(k)=\frac{R^e+\phi\cdot R^d}{1+\phi}, \tag{12}$$

where the right-hand side represents the average cost of financing.

To understand how changes in the cost of equity affect financing decisions, we take the derivative of e and d with respect to R^e. Then, rewrite Equation 12 in terms of e,

$$f'\left[\frac{e}{R^e}\cdot(1+\phi)\right]=\frac{R^e+\phi\cdot R^d}{1+\phi}. \tag{13}$$

Take the derivative with respect to R^e on both sides:

$$f''\left[\frac{e}{R^e}\cdot(1+\phi)\right]\cdot\left[\frac{1+\phi}{R^e}\cdot\frac{\partial e}{\partial R^e}-\frac{1+\phi}{(R^e)^2}\cdot e\right]=\frac{1}{1+\phi}. \tag{14}$$

Solve for $\partial e/\partial R^e$,

$$\frac{\partial e}{\partial R^e}=\frac{e}{R^e}-\frac{R^e}{(1+\phi)^2\cdot|f''(k)|}, \tag{15}$$

where we used the fact that $f''(\cdot)<0$. Thus,

$$\frac{\partial e}{\partial R^e}<0\iff|f''(k)|\cdot k<\frac{R^e}{1+\phi}. \tag{16}$$

If diminishing returns are not too strong, a reduction in the cost of equity increases equity issuance; otherwise, equity issuance might not rise.

Debt issuance is given by:

$$d=\phi\cdot\frac{R^d}{R^e}\cdot e. \tag{17}$$

Take the derivative with respect to R^e, accounting for $\partial e/\partial R^e$:

$$\frac{\partial d}{\partial R^e}=-\frac{\phi\cdot R^d}{(1+\phi)^2\cdot|f''(k)|}. \tag{18}$$

Equation 18 implies that a reduction in the cost of equity always increases debt issuance.

Intuitively, a fall in R^e lowers the overall cost of financing shown in Equation 12. This tends to increase both equity and debt issuances. In addition, the increase in equity prices reduces the debt-equity ratio. To the extent that this ratio remains unchanged, increases

in equity prices tend to reduce equity issuance and increase debt issuance. The net effect is greater and unambiguously positive for debt issuance. But it is smaller and possibly negative for equity issuance. In other words, while the market value of equity always increases, actual equity issuance only rises if investment and financing expand proportionally more than the equity revaluation—something that only occurs if diminishing returns are not too strong.

To analyze the effect on investment, differentiate (13) with respect to R^e:

$$f''(k) \cdot \frac{\partial k}{\partial R^e} = \frac{1}{1+\phi}. \tag{19}$$

Solve for $\partial k / \partial R^e$,

$$\frac{\partial k}{\partial R^e} = -\frac{1}{(1+\phi) \cdot |f''(k)|}, \tag{20}$$

where we use the fact that $f''(\cdot) < 0$. Thus, a reduction in the return on equity unambiguously increases investment.

This simple framework, combining a standard production technology with a binding borrowing constraint, captures the core intuition behind our empirical findings: when inelastic investor demand raises equity prices and lowers the cost of capital, firms expand both equity and especially debt financing, channeling these additional funds into greater investment.

7 Conclusion

This paper examines how shifts in inelastic investor demand influence firm financing and investment decisions. We exploit the 2000-2002 MSCI index redefinition as a quasi-natural experiment that mechanically altered firms' exposure to institutional investor flows through benchmark reweighting. Unlike most prior work, which focuses primarily on asset price reactions to benchmark adjustments, we analyze how these demand shocks affect firms' external financing—both equity and debt—and how these financing responses translate into real investment outcomes.

We find that firms facing larger benchmark-induced inflows raised significantly more

external financing in the quarters following the reform. The effects are economically meaningful: firms with higher inflows raised more equity and debt, with a particularly strong reaction in debt markets. This pattern suggests that equity valuation gains relaxed collateral constraints and expanded firms' borrowing capacity, which we rationalize through a simple model of firm financing across multiple financial markets. On the real side, firms also increased their investment activity. Together, these results indicate that demand-driven valuation effects extend beyond stock prices, shaping firms' financing structures and real activity.

Although the MSCI reform provides a rare natural experiment to identify these mechanisms, the implications extend far beyond this episode. Since the early 2000s, the scale and influence of institutional investors have expanded substantially, with assets under management now comparable to those of the global banking sector. As asset managers allocate an increasing share of global savings through index-linked and benchmark-oriented strategies, inelastic investor demand for large publicly listed firms has intensified, further lowering their cost of capital and expanding their financing capacity (Kashyap et al., 2021; Pavlova and Sikorskaya, 2023; Jiang et al., 2025). Understanding this channel is crucial for evaluating how the rise of asset management and the structure of modern financial intermediation shape corporate behavior and investment allocation in the global economy.

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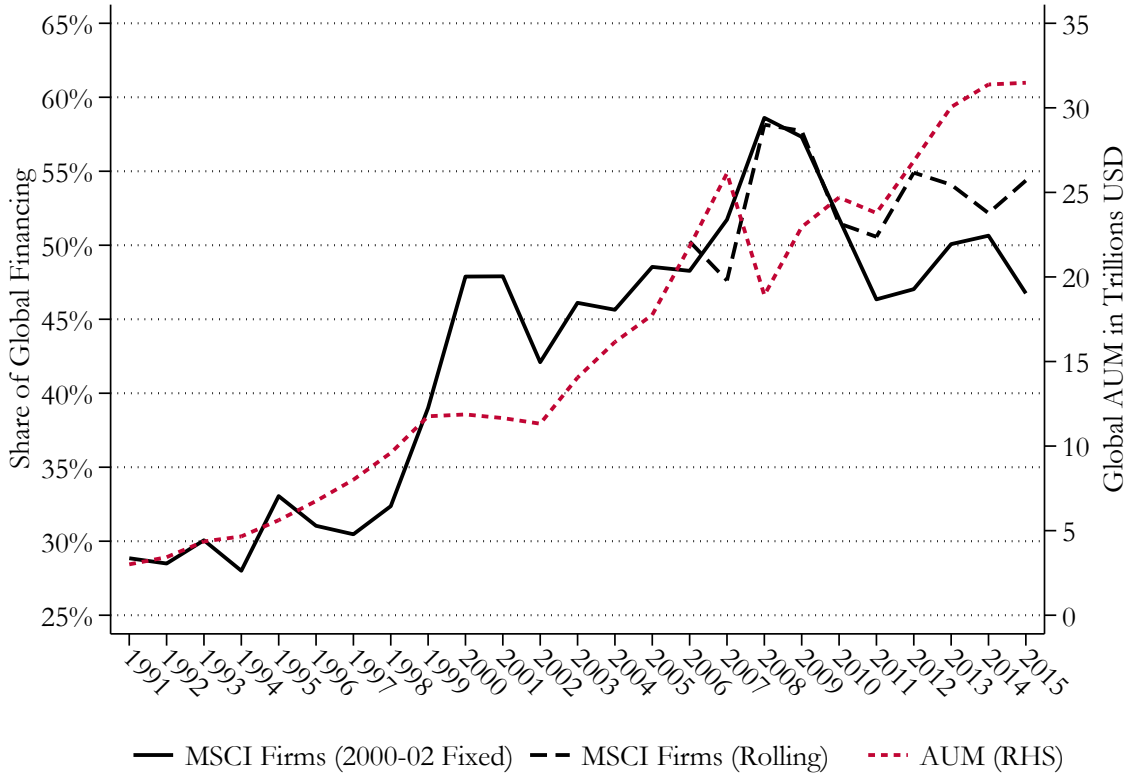
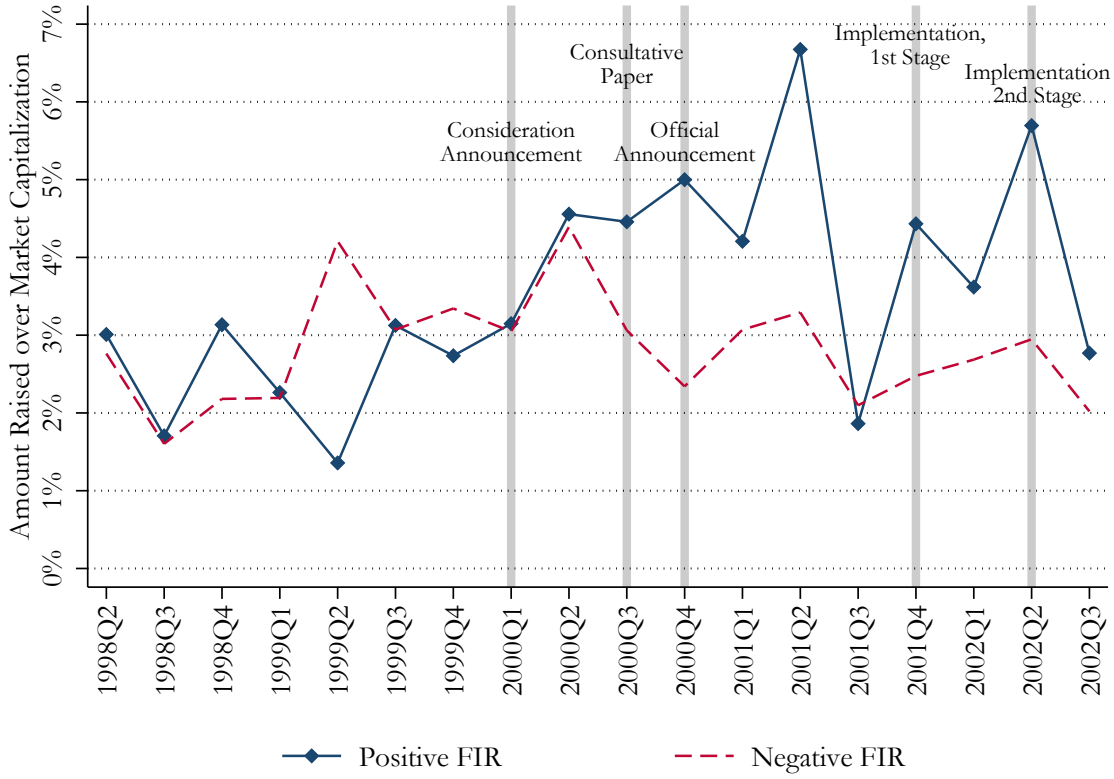
Figure 1. Share of Global Financing Captured by MSCI Firms



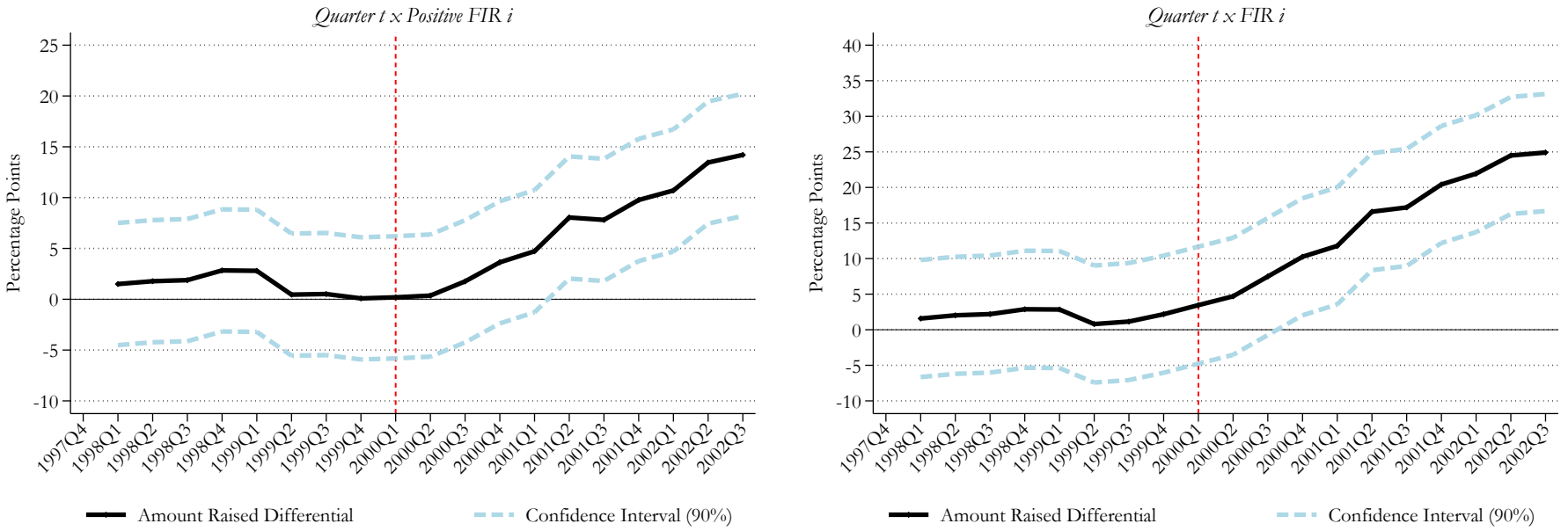
This figure shows the share of global financing raised by firms included in the Morgan Stanley Capital International (MSCI) indexes. Total financing refers to the worldwide amount of funds raised in equity and debt markets. Two definitions of MSCI firms are reported: (i) firms that were constituents of the MSCI indexes during the 2000–2002 period, and (ii) firms that are constituents of the MSCI indexes in each year. The figure also displays the total assets under management (AUM) of institutional investors tracking MSCI indexes. RHS denotes the right-hand side axis.

Figure 2. Capital Raising by MSCI Firms Around the Index Redefinition



This figure shows the average amount of capital raised by MSCI constituents per quarter scaled by their 1999 market capitalization. Firms are grouped according to the sign of the Flows Implied by the Rebalancing (FIR): positive versus negative FIR.

Figure 3. Difference-in-Differences Estimates of Capital Raising



This figure plots the difference-in-differences coefficients tracing the dynamics of firms' capital raising activity around the 2000–2002 Morgan Stanley Capital International (MSCI) reweighting. Each point represents the estimated quarterly coefficient from Equation (2). The dependent variable is total capital raised in equity and debt markets, scaled by firms' 1999 market capitalization. Dashed lines indicate 90% confidence intervals.

Figure 4. Difference-in-Differences Estimates of Investment

This figure plots the difference-in-differences coefficients tracing the dynamics of firms' investment activity around the 2000–2002 Morgan Stanley Capital International (MSCI) reweighting. Each point represents the estimated annual coefficient from Equation (2). The dependent variable is total investment, scaled by firms' 1999 market capitalization. Dashed lines indicate 90% confidence intervals.

Table 1. Summary Statistics: MSCI Firms Around the Index Redefinition

Type of Firm	No. of Firms	No. of Issuances		Firm Size and Issuance Size			FIR (%)				
		Equity	Debt	Firm Size	Issuance Size	Issuance over Firm Size (%)	Min	Median	Mean	Max	Standard Deviation
All Firms	1,139	1,259	6,838	2,820	389	13.8	-1.2	-0.1	-0.1	0.7	0.3
- Positive FIR	903	905	5,713	3,017	390	12.9	-1.2	-0.2	-0.2	-0.0	0.3
- Negative FIR	236	354	1,125	2,413	384	15.9	0.0	0.0	0.2	0.7	0.2

This table reports summary statistics for firms included in the Morgan Stanley Capital International (MSCI) indexes that experienced reweighting following the 2000–2002 index redefinition. It reports the number of affected firms, the number of equity and debt issuances, average firm size (measured by 1999 market capitalization), and average issuance size. Firm size and issuance values are expressed in millions of constant 2011 U.S. dollars. The right-hand panel displays the distribution of Flows Implied by the Rebalancing (FIR). Firms are grouped according to the sign of the FIR: positive and negative.

Table 2. Changes in Issuance Activity Around the MSCI Redefinition

A. Firms with Negative FIR, % of Total Firms				
Period	All Issuers	Equity Issuers	Debt Issuers	Equity and Debt Issuers
Pre-reform	65.01%	23.03%	55.81%	13.84%
Post-reform	65.67%	17.50%	59.91%	11.74%
Change (p.p.)	0.66	-5.54	4.10	-2.10
B. Firms with Positive FIR, % of Total Firms				
Period	All Issuers	Equity Issuers	Debt Issuers	Equity and Debt Issuers
Pre-reform	57.63%	26.27%	48.73%	17.37%
Post-reform	72.88%	37.29%	62.71%	27.12%
Change (p.p.)	15.25	11.02	13.98	9.75

This table summarizes changes in issuance activity among firms included in the Morgan Stanley Capital International (MSCI) indexes around the 2000–2002 index redefinition. Panel A reports statistics for firms with negative Flows Implied by the Rebalancing (FIR), while Panel B reports statistics for firms with positive FIR. Within each panel, columns report the share of firms issuing any security, equity, debt, or both equity and debt in each period, expressed as a percentage of total firms. The change in the last row is expressed in percentage points (p.p.).

Table 3. Difference-in-Differences Capital Raising Estimates

A. Total Capital								
Dependent Variable:	Total Capital Raised over Market Capitalization by Firm (i) in Quarter (t)							
Sample:	All Firms	Excl. U.S.	All Firms	All Firms	All Firms	Excl. U.S.	All Firms	All Firms
$Post_t$	0.000	-0.003*			0.006***	0.004**		
	(0.002)	(0.002)			(0.002)	(0.002)		
$Post_t$ x (Positive FIR_i)	0.015***	0.018***	0.014***	0.021***				
	(0.004)	(0.003)	(0.004)	(0.005)				
$Post_t$ x (FIR_i)					1.776***	1.603***	1.401***	1.793***
					(0.353)	(0.350)	(0.337)	(0.461)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-time FE	No	No	Yes	No	No	No	Yes	No
Country-time FE	No	No	No	Yes	No	No	No	Yes
No. of Observations	22,540	18,260	22,540	22,540	22,540	18,260	22,540	22,540
R-squared	0.13	0.13	0.13	0.14	0.13	0.13	0.13	0.14
No. of Clusters	90	88	90	90	90	88	90	90
B. Equity								
Dependent Variable:	Equity Raised over Market Capitalization by Firm (i) in Quarter (t)							
Sample:	All Firms	Excl. U.S.	All Firms	All Firms	All Firms	Excl. U.S.	All Firms	All Firms
$Post_t$	-0.003***	-0.003***			-0.001**	-0.001*		
	(0.001)	(0.001)			(0.001)	(0.001)		
$Post_t$ x (Positive FIR_i)	0.004**	0.004**	0.004**	0.004*				
	(0.002)	(0.002)	(0.002)	(0.002)				
$Post_t$ x (FIR_i)					0.454***	0.447***	0.540***	0.448*
					(0.142)	(0.152)	(0.150)	(0.230)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-time FE	No	No	Yes	No	No	No	Yes	No
Country-time FE	No	No	No	Yes	No	No	No	Yes
No. of Observations	22,540	18,260	22,540	22,540	22,540	18,260	22,540	22,540
R-squared	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
No. of Clusters	90	88	90	90	90	88	90	90
C. Debt								
Dependent Variable:	Debt Raised over Market Capitalization by Firm (i) in Quarter (t)							
Sample:	All Firms	Excl. U.S.	All Firms	All Firms	All Firms	Excl. U.S.	All Firms	All Firms
$Post_t$	0.003*	0.001			0.007***	0.006***		
	(0.002)	(0.002)			(0.002)	(0.002)		
$Post_t$ x (Positive FIR_i)	0.008***	0.010***	0.008**	0.011**				
	(0.003)	(0.003)	(0.003)	(0.005)				
$Post_t$ x (FIR_i)					1.213***	1.049***	0.811**	1.087***
					(0.296)	(0.289)	(0.311)	(0.394)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-time FE	No	No	Yes	No	No	No	Yes	No
Country-time FE	No	No	No	Yes	No	No	No	Yes
No. of Observations	22,540	18,260	22,540	22,540	22,540	18,260	22,540	22,540
R-squared	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
No. of Clusters	90	88	90	90	90	88	90	90

This table reports the results of the difference-in-differences regressions examining changes in firms' issuance activity around the 2000–2002 Morgan Stanley Capital International (MSCI) index redefinition. The dependent variable is the amount of capital raised, scaled by 1999 market capitalization, using total issuance (Panel A), equity issuance (Panel B), and debt issuance (Panel C). The key independent variable is the interaction between a post-reform indicator and the Flows Implied by the Rebalancing (FIR). The left-hand panels use a binary FIR indicator equal to one for positive FIR (zero otherwise), while the right-hand panels use the continuous FIR measure defined as benchmark-induced flows over market capitalization. Standard errors are clustered at the country-time level. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Table 4. Difference-in-Differences Capital Raising Estimates for Non-index Firms

Dependent Variable:	Capital Raised over Market Capitalization by Firm (i) in Quarter (t)		Equity Raised over Market Capitalization by Firm (i) in Quarter (t)		Debt Raised over Market Capitalization by Firm (i) in Quarter (t)	
Sample:	All Firms	Excl. U.S.	All Firms	Excl. U.S.	All Firms	Excl. U.S.
$Post_t$	-0.004***	-0.002	-0.003***	-0.002***	-0.001	0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
$Post_t \times (FIR_i)$	-0.318*	0.013	-0.071	-0.031	-0.322***	-0.120
	(0.189)	(0.180)	(0.089)	(0.109)	(0.101)	(0.122)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	260,580	167,540	260,580	163,560	260,580	168,740
R-squared	0.10	0.08	0.07	0.07	0.12	0.10

This table reports the results of placebo regressions for non-index firms located in countries tracked by Morgan Stanley Capital International (MSCI) indexes. The dependent variable is the amount of capital raised, scaled by 1999 market capitalization, using total issuance, equity issuance, and debt issuance as alternative outcomes. The key independent variable is the interaction between a post-reform indicator and the average country-level Flows Implied by the Rebalancing (FIR) computed for MSCI constituent firms. All regressions include firm fixed effects, and standard errors are clustered at the country-time level. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Table 5. Instrumental-Variables Estimates of Capital Raising

Dependent Variable:	Total Capital Raised over Market Capitalization		Equity Raised over Market Capitalization		Debt Raised over Market Capitalization	
Sample:	All Firms	Excl. U.S.	All Firms	Excl. U.S.	All Firms	Excl. U.S.
$Post_t$	-0.151*	-0.151*	-0.0766***	-0.0773**	-0.057	-0.053
	(0.079)	(0.080)	(0.028)	(0.030)	(0.054)	(0.053)
$Post_t \times Price_i$	0.261***	0.252**	0.0784**	0.0809*	0.148**	0.136**
(IV: $Post_t \times FIR_i$)	(0.091)	(0.101)	(0.037)	(0.044)	(0.059)	(0.061)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	2,254	1,828	2,254	1,828	2,254	1,826
No. of Clusters	90	88	90	88	90	88

This table reports instrumental-variable difference-in-differences estimates relating firms' issuance activity to equity price changes around the 2000–2002 Morgan Stanley Capital International (MSCI) index redefinition. The endogenous variable is the interaction between the post-reform indicator and firms' log equity prices, instrumented with the interaction of the post-reform indicator and firm-level Flows Implied by the Rebalancing (FIR). All dependent variables are expressed as the amount of capital (total, equity, or debt) raised by each firm over its 1999 market capitalization. Standard errors are clustered at the country-time level and reported in brackets. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Table 6. Differences in Firm Characteristics

A. Full Sample			
Variables	Negative FIR	Positive FIR	Difference
Assets (Logs)	22.44	22.06	0.38**
Market Capitalization (Logs)	22.00	21.75	0.25
Total Debt (Logs)	20.89	20.45	0.44*
Leverage	0.28	0.25	0.03*
Income over Market Capitalization	0.13	0.15	−0.02
Investment over Market Capitalization	0.22	0.26	−0.04
Number of Firms	636	166	
B. PSM Sample			
Variables	Negative FIR	Positive FIR	Difference
Assets (Logs)	22.13	22.13	0.00
Market Capitalization (Logs)	21.63	21.74	−0.11
Total Debt (Logs)	20.36	20.45	−0.09
Leverage	0.26	0.25	0.01
Income over Market Capitalization	0.15	0.16	0.00
Investment over Market Capitalization	0.26	0.27	−0.01
Number of Firms	162	162	

This table reports average firm characteristics during 1998-99 and compares means across MSCI firms with different exposure to the 2000–2002 rebalancing. Firms are divided into two groups based on the Flows Implied by Rebalancing (FIR): Positive and negative FIR. Panel A compares the full sample of MSCI firms, while Panel B compares the propensity score matched (PSM) sample of firms with positive and negative FIR. Statistical significance of mean differences is denoted by *, **, and ***, corresponding to the 10%, 5%, and 1% levels, respectively.

Table 7. Difference-in-Differences Investment Estimates

Sample:	All Firms	Excl. U.S.	All Firms	All Firms	PSM Firms	All Firms	Excl. U.S.	All Firms	All Firms	PSM Firms
$Post_t$	-0.02**	-0.03***				0.00	0.00			
	(0.01)	(0.01)				(0.00)	(0.00)			
$Post_t \times$ (Positive FIR_i)	0.03***	0.04***	0.03***	0.04***	0.02*					
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)					
$Post_t \times (FIR_i)$						10.33***	9.94***	7.46***	6.08***	4.53***
						(1.45)	(1.47)	(1.54)	(1.73)	(1.71)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-time FE	No	No	Yes	No	No	No	No	Yes	No	No
Country-time FE	No	No	No	Yes	Yes	No	No	No	Yes	Yes
No. of Observations	4,332	3,564	4,332	4,332	1,762	4,332	3,564	4,332	4,332	1,762
R-squared	0.62	0.62	0.63	0.64	0.64	0.63	0.63	0.63	0.64	0.64
No. of Clusters	78	76	78	78	74	78	76	78	78	74

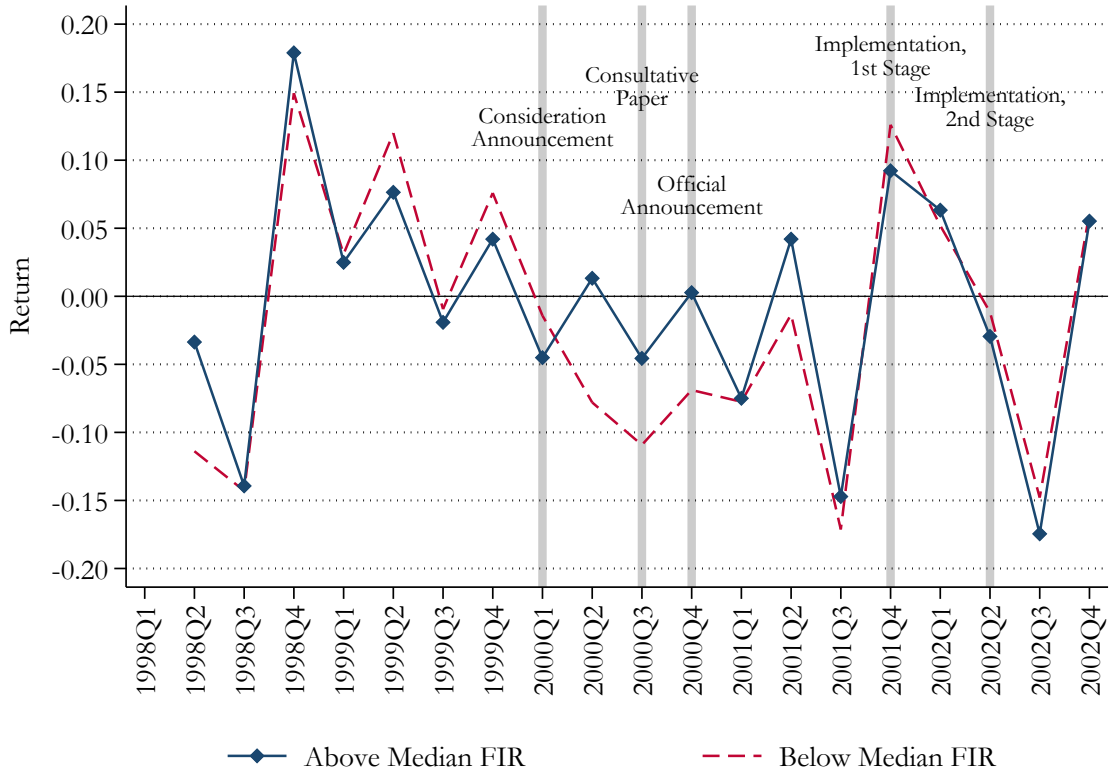
This table reports the results of difference-in-differences regressions examining firms' investment activity around the 2000–2002 Morgan Stanley Capital International (MSCI) index redefinition. The dependent variable is total investment, defined as the sum of capital expenditures, research and development spending, and mergers and acquisitions, scaled by firms' 1999 market capitalization. The key independent variable is the interaction between a post-reform indicator and the Flows Implied by the Rebalancing (FIR). The left-side panels use a binary FIR variable equal to one for positive FIR (zero otherwise), while the right-side panels use the continuous FIR measure defined as benchmark-induced flows over market capitalization. The first four columns in each panel use the full sample of MSCI firms, while the last column uses the propensity score matched (PSM) sample of firms with positive and negative FIR. Standard errors are clustered at the country-time level and reported in brackets. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Table 8. Allocation of Funds Raised in Capital Markets

Dependent Variable	Years Relative to Issuance	Independent Variable: Issuance Value		
		N	$\beta 1$	Dollar Effect
$\sum$ Capex	0	222	0.07	0.06
	1	227	0.08	0.09
	2	222	0.13	0.13
$\sum$ M&A	0	214	0.62**	0.45
	1	214	0.71***	0.71
	2	206	0.73***	0.77
$\sum$ R&D	0	155	0.17	0.13
	1	151	0.27**	0.23
	2	145	0.40**	0.34
Δ Inventory	0	220	−0.01	0.18
	1	224	0.03	0.06
	2	219	0.06	0.05
Δ Cash	0	222	0.30**	0.33
	1	227	0.02	0.03
	2	222	0.09	0.07

This table reports the results of the analysis examining how firms with positive Flows Implied by the Rebalancing (FIR) during 2000–2002 allocated the funds raised through equity and debt issuances. The estimation follows the specification in Equation (3) based on Kim and Weisbach (2008). The dependent variables are five balance-sheet items capturing different uses of funds: capital expenditures (Capex), mergers and acquisitions (M&A), research and development (R&D), inventory changes, and cash holdings. Each row represents a separate regression estimated for three periods: the issuance year ($t = 0$), post-issuance year 1 ($t + 1$), and post-issuance year 2 ($t + 2$). The key independent variable is the log of issuance value over total assets (measured in the year before issuance). Other controls include the log of other sources of funds over total assets and the log of total assets; their coefficients are omitted for brevity. The reported coefficient β_1 captures the elasticity of each dependent variable with respect to issuance value. The corresponding "dollar effect" column shows the estimated change in the dependent variable resulting from a one-dollar increase in capital raised. All regressions include country-time fixed effects, and standard errors are clustered at the country-time level. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Appendix Figure 1. Equity Returns of MSCI Firms

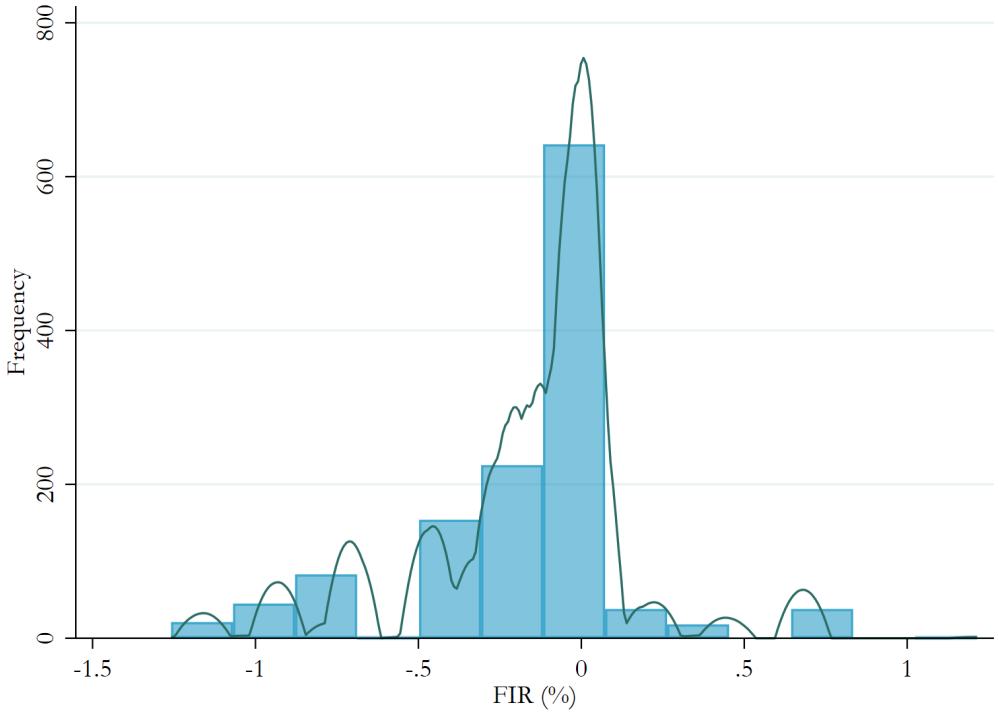


This figure shows the average quarterly equity returns of MSCI constituent firms around the 2000–2002 rebalancing. Firms are divided into two groups based on their Flows Implied by the Rebalancing (FIR): those above and those below the median.

Appendix Figure 2. Flows Implied by the MSCI Rebalancing

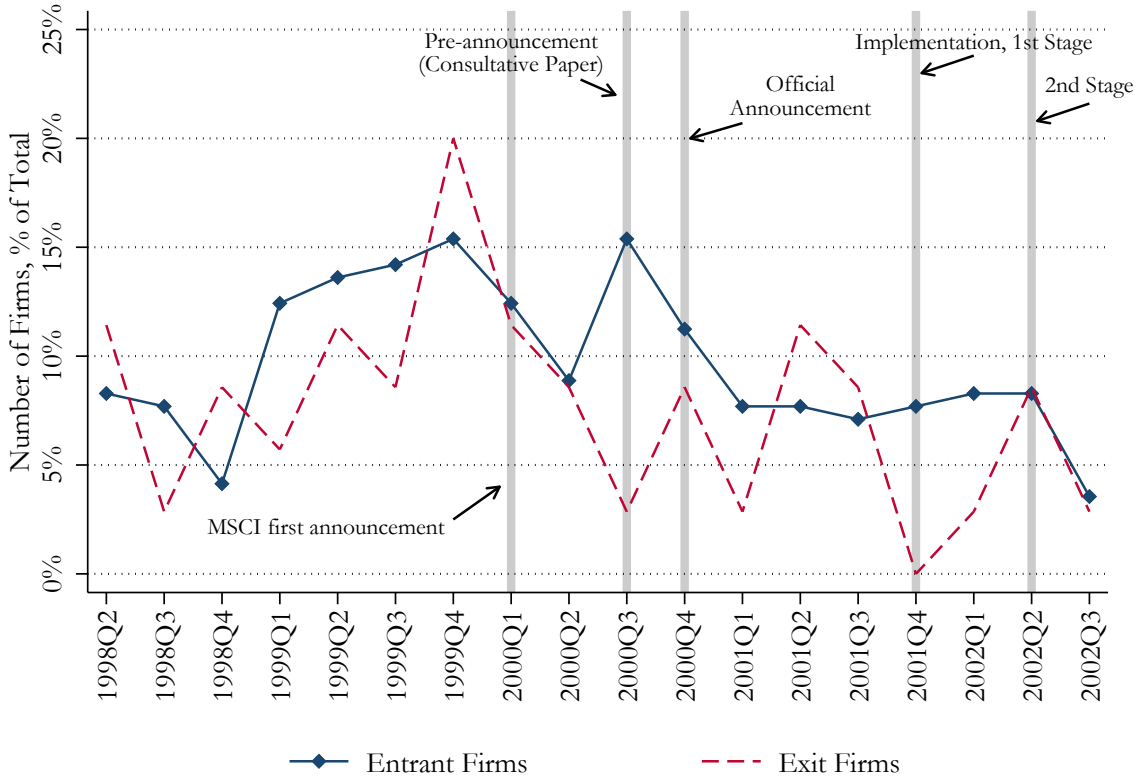
A. FIR and Pre-Rebalancing Index Weights

B. Distribution of FIR



This figure plots the distribution of Flows Implied by the Rebalancing (FIR) resulting from the Morgan Stanley Capital International (MSCI) methodological redefinition in 2000-2002. Panel A shows the relation between each firm's FIR and its logarithmic index weight prior to the redefinition. Panel B presents the distribution of FIR values across MSCI constituent firms.

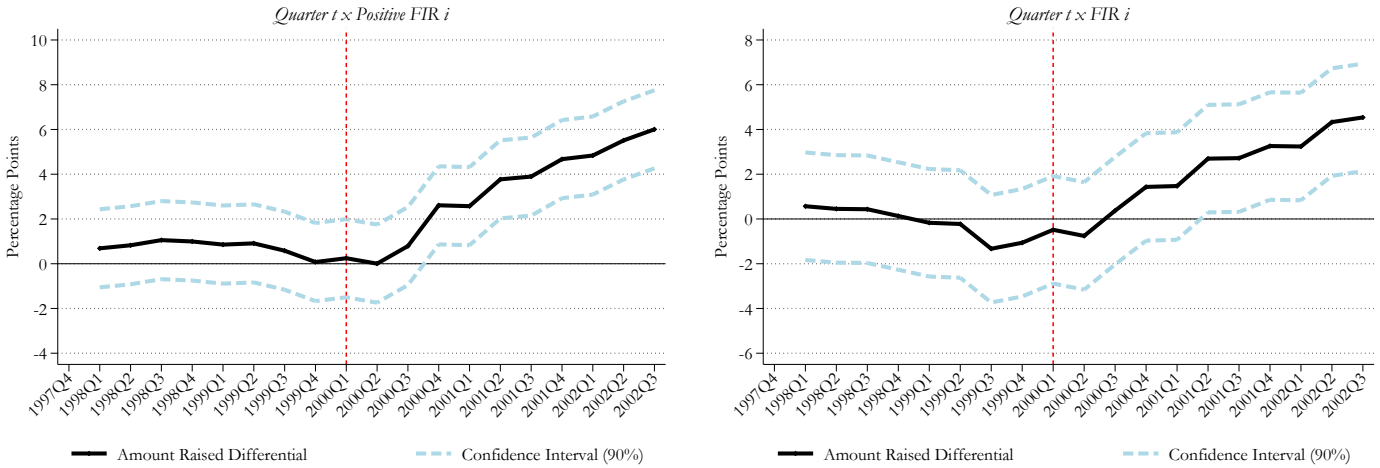
Appendix Figure 3. Equity Issuance Activity by Entrant and Exit Firms



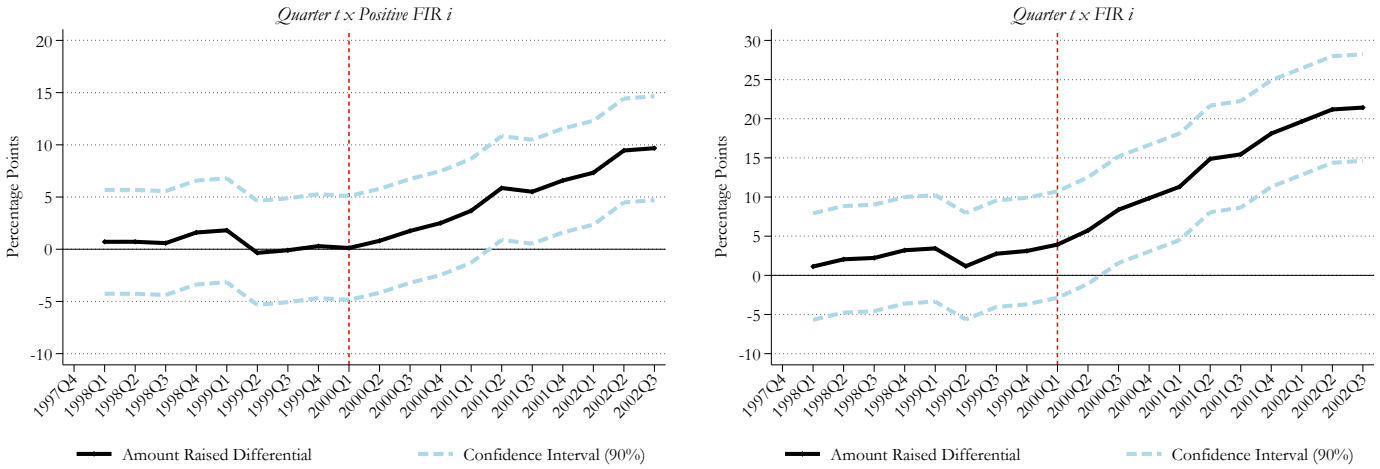
The figure shows equity issuance activity for firms entering and exiting the Morgan Stanley Capital International (MSCI) indexes around the 2000-2002 methodological redefinition. The figure plots, by quarter, the share of firms issuing equity. Entrant firms are those added to the MSCI indexes during the redefinition period, while exit firms are those removed during the same period.

Appendix Figure 4. Difference-in-Differences Estimates of Equity and Debt Issuances

A. Equity



B. Debt



This figure plots the difference-in-differences coefficients tracing the dynamics of firms' capital raising activity around the 2000–2002 Morgan Stanley Capital International (MSCI) reweighting. Each point represents the estimated quarterly coefficient from Equation (2), with dashed lines indicating 90% confidence intervals. Panel A reports results for equity issuance and Panel B for debt issuance, both scaled by firms' 1999 market capitalization.

Appendix Table 1. MSCI Constituents by Country

Country	MSCI Constituents	FIR (%)			
		P25	Median	P75	Standard Deviation
Argentina	10	-0.70	-0.47	-0.24	0.28
Australia	33	-0.02	0.05	0.05	0.13
Austria	9	-0.31	-0.17	-0.10	0.14
Belgium	7	-0.31	-0.24	-0.12	0.13
Brazil	18	-0.47	-0.47	0.45	0.57
Canada	43	-0.02	0.03	0.03	0.08
Chile	12	-0.93	-0.70	-0.24	0.36
China	5	-0.01	-0.01	0.68	0.38
Czech Republic	3	-0.86	-0.70	-0.70	0.09
Denmark	13	-0.31	-0.17	0.05	0.18
Finland	16	-0.24	-0.13	0.05	0.14
France	40	-0.31	-0.10	-0.02	0.16
Germany	28	-0.31	-0.17	-0.06	0.15
Hong Kong SAR, China	18	-0.47	-0.36	-0.12	0.37
Hungary	2	-0.47	-0.24	-0.01	0.33
India	20	-0.93	-0.70	-0.36	0.36
Indonesia	7	-0.70	-0.47	-0.24	0.35
Ireland, Rep	9	-0.04	-0.02	0.05	0.06
Israel	15	-0.70	-0.24	0.45	0.54
Italy	18	-0.31	-0.31	-0.24	0.07
Japan	216	-0.17	-0.10	-0.10	0.09
Korea, Rep.	47	-0.24	0.22	0.22	0.42
Malaysia	33	-0.70	-0.70	-0.47	0.30
Mexico	16	-0.82	-0.24	-0.13	0.42
Morocco	4	0.68	0.68	0.68	0.00
Netherlands	15	-0.17	-0.02	0.05	0.12
New Zealand	9	-0.24	-0.03	0.05	0.14
Norway	16	-0.24	-0.03	0.01	0.12
Pakistan	7	-0.70	-0.47	-0.24	0.26
Peru	3	-1.16	-0.70	0.68	0.96
Philippines	5	-0.93	-0.93	-0.70	0.19
Poland	12	-0.50	-0.24	0.10	0.46
Portugal	5	-0.31	-0.31	-0.24	0.11
Russian Federation	3	-0.47	-0.24	-0.24	0.13
Singapore	16	-0.47	-0.36	-0.01	0.40
South Africa	11	0.22	0.45	0.68	0.48
Spain	15	-0.38	-0.10	-0.02	0.17
Sweden	23	-0.17	-0.10	0.05	0.11
Switzerland	19	-0.24	0.05	0.05	0.16
Taiwan, China	43	-0.47	-0.18	-0.18	0.28
Thailand	7	-0.93	-0.70	-0.47	0.37
Turkey	10	-1.02	-0.47	-0.47	0.37
United Kingdom	60	0.05	0.05	0.05	0.12
United States	216	0.00	0.00	0.00	0.03
Venezuela, RB	2	-1.16	-0.97	-0.77	0.27

This table reports the distribution of firms included in the Morgan Stanley Capital International (MSCI) indexes by country around the 2000–2002 methodological redefinition. It reports: (i) the total number of stocks affected by the MSCI rebalancing; (ii) estimated changes in investment flows experienced by each firm as a result of the redefinition, expressed as a share of pre-reform market capitalization; and (iii) the total number of firms identified in the SDC sample.

Appendix Table 2. Difference-in-Differences Investment and Internal Income Estimates

Dependent Variable:	Capex	M&A	R&D	Internal Income
$Post_t$	-0.01	0.00***	0.00***	-0.01
	(0.00)	(0.00)	(0.00)	(0.00)
$Post_t \times FIR_i$	6.49***	0.71**	0.39**	-1.16
	(1.46)	(0.34)	(0.17)	(1.09)
Firm FE	Yes	Yes	Yes	Yes
No. of Observations	4,332	4,572	4,572	4,324
R-squared	0.70	0.32	0.86	0.51
No. of Clusters	78	78	78	76

This table reports difference-in-differences estimates relating firms' internal income and investment outcomes to the 2000–2002 Morgan Stanley Capital International (MSCI) methodological redefinition. The dependent variables include capital expenditures (Capex), mergers and acquisitions (M&A), research and development (R&D), and annual profits (internal income), scaled by firms' 1999 market capitalization. The key independent variable is the interaction between a post-reform indicator and the Flows Implied by the Rebalancing (FIR). All specifications include firm fixed effects. Standard errors are clustered at the country level. Statistical significance is denoted by *, **, and ***, corresponding to the 10%, 5%, and 1% levels, respectively.