Capital Market Financing and Misallocation: Evidence from Global Firm-level Issuances

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Abstract

We quantify the implications of expanded firm access to capital market financing for investment and misallocation at both the micro and macro levels. Using a novel panel that links bond and equity issuances to firm-level balance sheets in 100 countries, we show that most of the growth in financing since the 2000s has come from *new participants*—firms absent from capital markets in the 1990s. New participants are smaller, younger, and exhibit higher marginal revenue products of capital (MRPK), especially in low- and middle-income countries (LMICs). Following an issuance, these firms expand investment and experience a 15% decline in MRPK, consistent with a relaxation of financial constraints. Effects for incumbents are limited. Evidence from China's staggered equity-market liberalization supports these findings. Aggregating firm-level responses, we estimate that expanded market access reduced misallocation in LMICs by 3.6%, with new participants accounting for most of the gain.

Keywords: capital markets, financial frictions, investment, misallocation, productivity
JEL Codes: F61, F65, G10, O11, O12, O16, O40

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1 Introduction

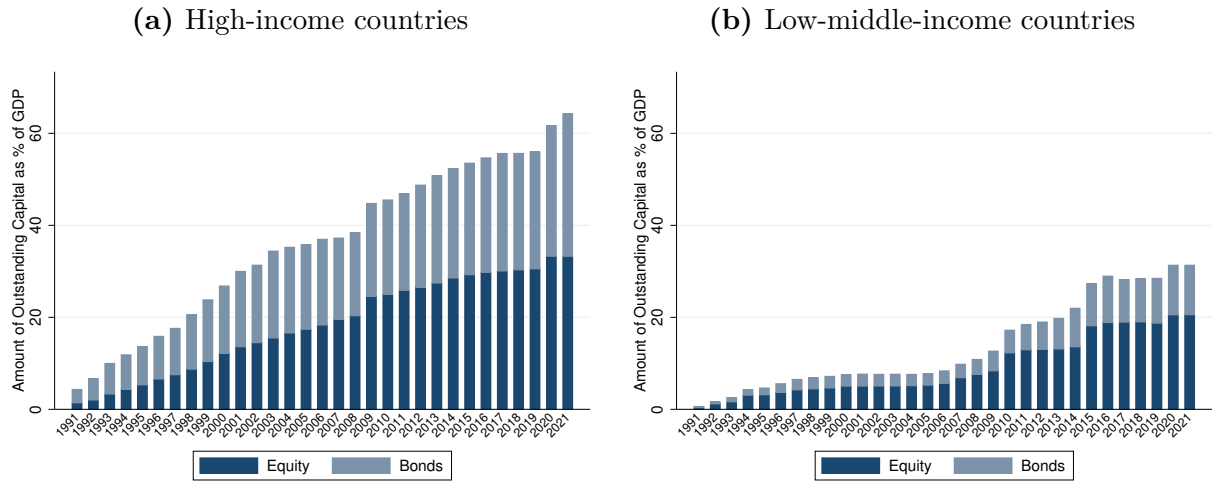
The scale and reach of capital markets have grown significantly over the past three decades. Measured at issuance values, the outstanding stock of bonds and equity for non-financial firms rose from roughly $10 trillion in the late 1990s to $34 trillion in 2022, a threefold increase. While high-income countries (HICs) account for the largest absolute volumes, the relative ascent of low- and middle-income countries (LMICs) has been striking. In LMICs, capital market size rose from less than 5 percent of GDP in the 1990s to over 30 percent in 2022, narrowing the gap with HICs (Figure 1).

This expansion raises several questions at the core of the finance-and-development debate. Has the growth in bond and equity financing been captured primarily by large, well-established firms? Or has it reached smaller, younger, and potentially more constrained firms? Conditional on gaining access, how do these firms use the proceeds? Do they simply substitute other forms of finance—such as bank loans—or can capital markets help ease financial frictions and improve productive efficiency?

The contribution of this paper is to provide systematic, global evidence on these issues. We construct a new panel that links primary corporate bond and equity offerings to firm-level balance-sheet data for publicly listed non-financial firms across 100 countries. To this end, we combine transaction-level issuance data over 1990–2022 from *SDC Platinum* with financial data from Worldscope. Our dataset covers more than 400,000 issuances by 80,000 firms. Because the analysis focuses on publicly listed firms, our sample is tilted toward relatively large companies: the median firm is 43 years old and employs roughly 500 workers. Despite this, many firms rarely tap capital markets. When they do, the amounts raised are substantial—the median bond issuance exceeds US$100 million. This scale suggests that capital market financing provides an alternative to regular loans from banks, which are unlikely to accommodate such large funding needs.

We find that much of the growth in capital market financing has been driven by *new participants* (firms that issued post 2000) instead of *incumbents* (firms that issued in the 1990s). This is especially true in LMICs, where newcomers account for over three-quarters of the increase in capital market financing, compared to around 40 percent in HICs. New

Figure 1. Growth of Capital Markets



Note: This figure shows the evolution of outstanding bond and seasoned equity amounts as a percentage of GDP.

participants are smaller, younger, and more financially constrained. Relative to incumbent issuers in the same country and industry, they are on average more than ten years younger, half the size, and exhibit higher marginal revenue products of capital (MRPK). These patterns suggest that financial frictions may have previously excluded such firms from capital markets, and that their inclusion improved capital allocation.

We then examine how firms use the proceeds from bond and equity issuances. We begin by estimating a standard local projection à la Jordà (2005) that traces the dynamic response of firm outcomes following an issuance event. The analysis focuses on investment, sales, and MRPK. On average, issuers experience a 10 percent increase in sales and a 16 percent increase in physical capital within three years, relative to non-issuers in the same country and industry. MRPK declines by approximately 5 percent, consistent with a relaxation of financial constraints.

Because issuance decisions are endogenous and may reflect firm fundamentals, we re-estimate these dynamics using the LP-DiD estimator of Dube, Girardi, Jordà, and Taylor (2023), which constructs cleaner counterfactuals by excluding firms with recent or forthcoming issuance activity from the control group. Given that the characteristics of new participants differ from those of incumbents, we also partition the sample and estimate ef-

fects separately by firm type. Among top active participants, the impact of issuance on sales and physical capital is modest—around 5 percentage points—and not statistically significant. In contrast, the effects for new participants are markedly stronger: sales increase by 20 percentage points, and physical capital rises by 30 percentage points. MRPK remains largely unchanged for active firms, but declines persistently by approximately 15 percentage points for new participants, consistent with a relaxation of financial constraints. We find no evidence of pre-trends in MRPK—neither among incumbents nor new entrants—suggesting that issuers were not systematically more financially constrained than their peers. While we detect modest pre-trends in sales and capital for new participants, the MRPK dynamics support the interpretation that issuance eased financing constraints.

To further address endogeneity and test whether these patterns hold under plausibly exogenous variation in market access, we turn to China's staggered equity-market liberalization. Beginning in the early 2010s, a sequence of reforms—starting with the 2011 RQFII program and followed by the 2014–2016 Stock Connect programs—opened domestic equity markets to foreign investors. Crucially for identification, eligibility for Stock Connect was determined by listing venue and board rather than firm fundamentals, generating quasi-experimental variation in access to global markets. In preliminary results comparing firms eligible and ineligible for connection around the reform, we find that newly connected firms experienced sizable increases in issuance and investment—reinforcing our main findings and supporting the view that capital market access eases financial frictions and improves resource allocation.

In the final part of the paper, we quantify how firm-level responses to capital market access translate into aggregate investment and productivity. For investment, we estimate that issuance activity contributed an average annual increase of 6.2% in capital stock in LMICs and 4.9% in HICs over 2001–2022, with new participants accounting for the majority of the increase in LMICs.

To assess the impact on productivity, we adapt the framework of Baqaee and Farhi (2019), which links firm-level capital wedges and investment to aggregate changes in productivity. In particular, we follow the *lower-bound* approach of Bau and Matray (2023), which infers a firm's initial capital wedge—the gap between its MRPK and the market return—from the observed decline in MRPK after an issuance. The key assumption is that the issuance fully

relaxes the firm's financial constraint, so that the post-issuance MRPK reflects an unconstrained level. As a result, the method provides a conservative lower bound: if constraints are only partially relaxed, the observed MRPK decline will understate the true wedge and the associated gains from reduced misallocation.

Applying this method, we estimate that capital market financing reduced misallocation by 3.6% in LMICs and 1.7% in HICs over 2000–2022. In LMICs, more than half of the aggregate improvement is driven by new participants. These effects are in the ballpark of benchmark studies such as Hsieh and Klenow (2009) and Midrigan and Xu (2014), which is striking given that our sample consists of large, publicly listed firms—precisely those typically thought to face fewer financing constraints. In LMICs, these firms account for about 10–30% of aggregate output, suggesting that the macroeconomic implications of expanded capital market access are substantial. Moreover, our estimates may understate the total gains, as they omit potential spillovers from a reallocation of bank credit toward unlisted firms.

Overall, our findings underscore the macroeconomic relevance of relaxing financial frictions and highlight the central role of the extensive margin in linking capital markets to aggregate productivity.

Literature review. Our study speaks first to the large literature that links financial frictions, resource misallocation, and development. Dynamic general-equilibrium models in Buera, Kaboski, and Shin (2011) and Midrigan and Xu (2014), as well as their extensions in Buera, Kaboski, and Shin (2015) and Moll (2014), show that modest wedges between internal and external finance can generate sizable losses in aggregate output and TFP. We provide the first global, micro-based estimate of how the recent development of capital markets wave has changed those wedges. By documenting that high-MRPK entrants dominate the expansion—especially in LMICs—and by measuring how their MRPKs converge toward incumbent levels after issuance, we complement these theoretical contributions with direct evidence on the magnitude and aggregate importance of wedge reductions in the data.

Our measurement of firm-level wedges follows the production-function approach in Petrin and Levinsohn (2012), and we aggregate these into changes in aggregate TFP using the multi-sector framework in Baqaee and Farhi (2019). These tools, combined with our globally representative dataset, offer a consistent way to quantify how expanded firm access to capital

markets translate into changes in aggregate productivity and resource allocation.

Our paper contributes to a broad empirical literature on how foreign capital inflows affect the allocation of resources across firms. Country-level studies find that liberalizing foreign investment or a boom in capital inflows can reduce misallocation when funds reach smaller, financially constrained firms (Larrain and Stumpner, 2017; Varela, 2017; Cingano and Hassan, 2022; Saffie, Varela, and Yi, 2023). In a closely related analysis of India, Bau and Matray (2023) exploit an industry-level staggered liberalization episode and find sizable declines in aggregate misallocation. In contrast, Gopinath, Kalemli-Özcan, Karabarbounis, and Villegas-Sanchez (2017) use Spanish data to show that greater access to foreign debt can raise misallocation, as capital tends to flow disproportionately to large, collateral-rich borrowers. These contrasting findings suggest that the effects of financial integration—and, more broadly, capital market development—depend critically on a country's level of financial development. Our study helps reconcile these findings by leveraging a global dataset that spans both high- and low-middle-income countries. While we document an overall decline in misallocation, the effects are heterogeneous—and substantially smaller in high-income countries.

Recent work by Müller and Verner (2023) and Camêlo (2024) also adopts a global perspective, examining the effects of capital inflow booms on credit allocation and productivity across a broad set of countries. The key advantage of our approach lies in the granularity of the data. While these studies rely on aggregate or regional measures, we leverage transaction-level issuance records matched to detailed firm-level financial information, enabling a more precise assessment of how capital market access shapes firm outcomes and aggregate performance.

Our event-study based on China's equity market liberalization contributes to a broader literature on the country's gradual integration into global capital markets. Recent work by Clayton, Santos, Maggiori, and Schreger (2025) analyzes China's sequencing of bond market access—beginning with central banks and later expanding to private investors—as a strategy to manage capital flows while building credibility.[1] Brunnermeier, Sockin, and Xiong (2022) provide a theoretical foundation for this gradualism, emphasizing the government's role in

[1]See also Cerutti and Obstfeld (2019) and Mo and Subrahmanyam (2020) on bond market integration.

shaping expectations. Closer to our focus, studies of China's 2010s equity liberalization episodes have documented effects on asset prices, investment, and foreign participation (e.g., Cortina, Peria, Schmukler, and Xiao, 2024; Bai and Chow, 2017; Chan and Kwok, 2017; Li, Liu, Ni, and Pang, 2024; Ma, Rogers, and Zhou, 2020; Wang, 2021).[2] Our study complements this literature by embedding China's liberalization into a global framework and quantifying its effects on firm-level productivity and misallocation.

The rest of the paper proceeds as follows. Section 2 describes the construction of the global issue–balance-sheet panel. Section 3 documents the rise of new participants, their ex-ante characteristics, and presents the firm-level local-projection estimates. Section 4 examines China's liberalization episode. Section 5 maps the micro estimates into changes in aggregate capital and misallocation. Section 6 concludes.

2 Data

Our empirical analysis draws on two primary datasets. We use firm issuance data from the Securities Data Corporation (SDC) Platinum database, which provides comprehensive coverage of equity and bond offerings by both publicly listed and private firms over the period 1990–2022. We combine this with firm-level balance sheet information from the Worldscope database, a global panel covering publicly listed companies. This section describes the construction of the merged dataset.

The SDC Platinum database, maintained by LSEG (formerly Refinitiv/Thomson Reuters), provides detailed data on bond and equity issuances, mergers and acquisitions, and syndicated loans. The information is compiled from stock exchanges, regulatory filings, press releases, media sources, and third-party providers. Our raw data include 1,506,759 equity and bond issuances by 182,731 distinct firms across 196 countries and territories. We exclude transactions smaller than one million 2011 U.S. dollars due to frequent data quality issues at the lower end of the size distribution, such as incomplete issuer information or misclassified deal types. Dropping these observations reduces the number of issuances by 8% but leaves the aggregate issuance volume virtually unchanged (a 0.1% decline in total value). We

[2] Lane and Schmukler (2007); Chiang, Nelling, and Tan (2008); Huang and Zhu (2015) examine earlier reforms targeting investor access and exchange-rate liberalization.

also exclude transactions involving public sector entities and firms in the financial industry. These filters yield a final sample of 458,835 bond and equity issuances by 93,376 firms from 175 countries, accounting for approximately 34% of the total value of all issuance activity reported in SDC.

We aggregate the transaction data at the firm-year level using the harmonized permanent identifier provided by SDC Platinum, which links issuers over time. This results in 241,741 firm-year observations with bond or equity issuance activity.

To complement these data, we use the Worldscope database, which offers standardized cross-country financial statement information for publicly listed firms. Also maintained by LSEG, Worldscope sources its data primarily from company filings submitted to national regulators and stock exchanges, supplemented by press releases and other public disclosures. Its harmonized structure allows for consistent comparisons across firms, countries, and time. We apply similar exclusions as in the SDC sample, removing firms in the financial and public sectors. The resulting panel includes more than 75,000 firms from 118 countries.

We merge the two datasets by linking firms across SDC Platinum and Worldscope using a combination of identifiers. The primary matching variable is the permanent SDC company identifier, which is available for a subset of Worldscope firms. For unmatched cases, we apply a sequential matching algorithm using other standard identifiers: first CUSIP codes, followed by SEDOLs, and finally ISINs.

Our matched sample consists of firm-level equity and bond issuance activity for 49,283 publicly-listed companies between 1990–2022.[3] Table 1 presents descriptive statistics for the final sample. Since the analysis focuses on publicly listed firms, the sample is tilted toward relatively large companies: the median firm is 43 years old and employs roughly 500 workers. Median revenues and fixed assets amount to approximately 66 and 20 million U.S. dollars, respectively. The substantial gap between mean and median values across these variables highlights the right-skewed nature of the sample—with a small number of very large firms pulling the means well above the medians. As we show in the next sections, it is firms in the lower end of the size distribution—those in the left tail—that played a central role in the

[3]While our matched dataset does not cover private firms, the total volume of issuances excluded for this reason is relatively small—see Appendix Figure A1.

expansion of capital markets and in shaping their effects on aggregate productivity.

Table 1. Descriptive Statistics

	P10	**P25**	**P50**	**P75**	**Mean**
Age (years)	22	28	43	69	53
Employment	21	110	473	1,862	3,630
Revenue ($M)	0.4	10.5	65.9	301.4	822.4
Fixed Assets ($M)	0.3	2.9	19.7	107.8	424.5
Issuance years	0.0	0.0	1.0	3.0	2.08
Bond issuance value $\|> 0$ ($M)	5.3	36.4	130.7	317.9	239.8
Equity issuance value $\|> 0$ ($M)	2.9	7.2	24.8	86.6	77.2

Notes: Table 1 reports summary statistics for firm-level averages between 1990 and 2022. Revenue and fixed assets are expressed in 2011 US million dollars. Issuance years refers to the number of years in which a firm issued bonds or equity. Bond and equity values refer to the average issuance amount (in years with positive issuance).

Table 1 also highlights substantial heterogeneity in firms' use of capital markets. The median firm in the sample issues bonds or equity only once over the entire period, and roughly 35% of Worldscope firms do not issue any securities between 1990–2022. At the same time, firms that access capital markets tend to raise sizable amounts. The median bond issuance amounts to approximately twice the median annual revenues and nearly six times the median value of fixed assets. Although seasoned equity issuances are smaller in size, they still represent a significant inflow of capital: on average, the median equity issuance is equivalent to the median value of fixed assets.

New participants. For the remainder of the paper, we define a "new participant" as a firm whose first observed bond or equity issuance occurs after 2000. Since our dataset includes only publicly listed firms, any company that was already operating before the 2000s must have accessed capital markets at least once in the past—typically at the time of its IPO. Nevertheless, we use this group as a proxy for firms with historically limited access to market-based financing. We argue that, despite their public status, these firms exhibit delayed entry into bond or equity issuance and are thus more representative of the extensive margin of capital market participation. All other firms are referred to as *active participants*

or *incumbents*.

3 Firm-Level Evidence on Market Access and Financing

In this section, we examine the evolution of capital markets and its implications for firm financing along three dimensions. First, we document the contribution of new participants to the expansion of capital markets in both HICs and LMICs. Second, we compare new entrants to incumbent issuers in terms of firm characteristics and exposure to financial frictions. Third, we analyze how firms use the proceeds from bond and equity issuances, focusing on whether market access alleviates financing constraints.

Our analysis yields three main findings:

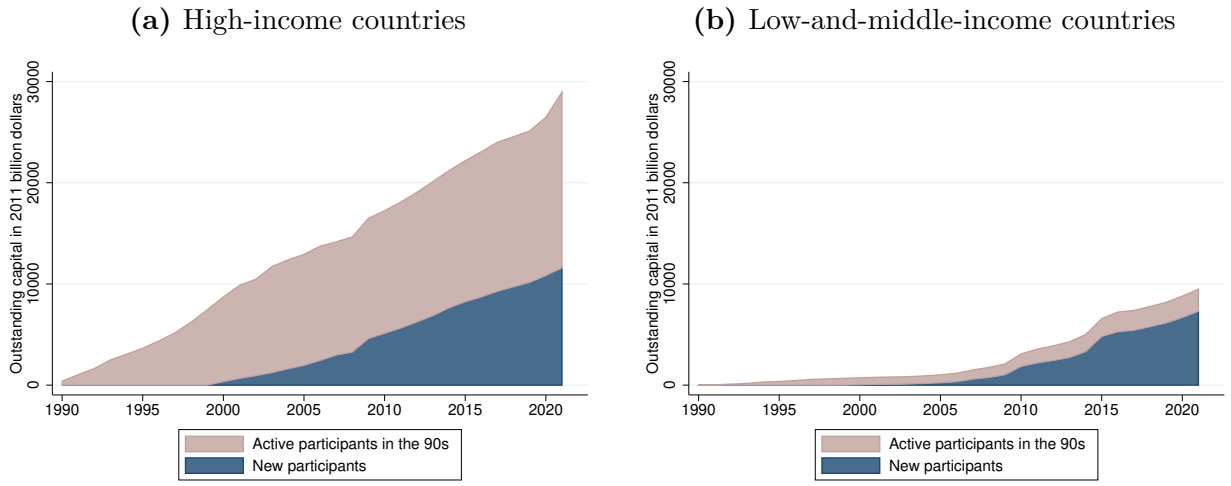
1. *New participants account for more than three-quarters of the expansion in capital markets in LMICs, and just over one-third in HICs.*
2. *New participants are younger and smaller than incumbent issuers. In LMICs, they also display greater signs of financial constraints.*
3. *Heterogeneity in the use of proceeds: among new participants, issuance leads to sustained increases in investment and a significant decline in MRPK, consistent with easing financial constraints. For incumbents, the effects are small and not statistically significant.*

3.1 Who Are the New Participants?

Figure 2 shows the evolution of outstanding equity and bond amounts between 1990 and 2022, distinguishing between active and new participants. The left panel presents results for high-income countries (HICs), while the right panel shows the corresponding patterns for low- and middle-income countries (LMICs). The figure illustrates that the expansion of capital markets has been largely driven by new participants, particularly in emerging economies. By 2020, new entrants accounted for approximately 40% of outstanding capital market financing in HICs and nearly 80% in LMICs.

We now characterize the new participants and show how they differ from active participants. Table 2 summarizes differences in observable firm characteristics—age, sales, and

Figure 2. Capital Market Expansion by Issuer Type



Notes. The figure shows the outstanding amounts of bonds and equity in capital markets, distinguishing between securities issued by active participants (in red) and new participants (in blue). Outstanding amounts are constructed by summing all issuances and removing instruments that have already matured, assuming no buybacks. All values are expressed in billions of constant 2011 U.S. dollars.

physical assets—based on firm-level averages during the 1990s. For each characteristic, we regress the firm-level average on a dummy indicating new participant status, controlling for 4-digit industry and country fixed effects. That is, for each variable of interest y, for firm i in industry s and country c:

$$y_i = \phi_{s(i)c(i)} + \lambda \,\text{New Participant}_i + \varepsilon_i, \tag{1}$$

where $\phi_{s(i)c(i)}$ denotes industry-country fixed effects, and New Participant_i is a dummy equal to one if firm i is a new participant.

The estimated λ coefficients are interpreted as deviations from the average firm within the same industry and country—they are not affected by differences in industry composition. In addition to comparing new participants to the full set of active firms, we also contrast them with the subset of firms in the top quartile of issuance activity within each country, based on their total number of issuances in the 1990s.

We find that new participants are significantly younger than the average firm in their industry and country: 9 years younger in LMICs and 14 years younger in HICs. Their median sales are 43% and 95% lower, respectively, with a similar pattern for physical assets.

Table 2. Differences in Firm Characteristics Between New and Active Participants

	LMICs		HICs	
	versus all 1990 participants	versus top 25% 1990s participants	versus all 1990s participants	versus top 25% 1990s participants
Age	-9.42	-12.60	-14.35	-22.73
	(1.10)	(1.64)	(0.59)	(0.89)
log Sales	-0.43	-1.08	-0.95	-2.75
	(0.05)	(0.08)	(0.04)	(0.06)
log Physical assets	-0.63	-1.36	-1.03	-2.75
	(0.06)	(0.09)	(0.04)	(0.06)
log MRPK	0.16	0.26	-0.01	0.11
	(0.04)	(0.06)	(0.02)	(0.03)

Notes. The table reports coefficients from regressions of firm-level averages during the 1990s for the variables listed in the rows on a dummy indicating whether a firm is a new participant, as specified in Equation (1). Columns (1) and (3) use all active participants in the 1990s as the comparison group for LMICs and HICs, respectively, while Columns (2) and (4) restrict the comparison group to firms in the top quartile of issuance activity within each country. All regressions include country and 4-digit industry fixed effects. Robust t-statistics are reported in parentheses.

These differences are even more pronounced when the comparison group is restricted to top-quartile issuers.

We use a firm's MRPK as a proxy for financial frictions. Following Hsieh and Klenow (2009), and assuming a Cobb–Douglas production function, the firm-level MRPK for firm i at time t is given by:

$$\text{MRPK}_{it} \equiv \alpha^k_{s(i)} \left(\frac{\sigma - 1}{\sigma} \right) \frac{P_{it} Y_{it}}{K_{it}}, \tag{2}$$

where $\alpha^k_{s(i)}$ is the capital share (common across firms in industry s), σ is the elasticity of substitution across varieties, $P_{it}Y_{it}$ denotes firm sales, and K_{it} is the firm's capital stock. We estimate α^k_s at the 4-digit SIC level using revenue production functions and fix $\sigma = 3$, a standard value in the literature. We then compute the average MRPK for each firm during the 1990s and compare new participants to active firms using Equation (1).

The results show that MRPK is significantly higher for new participants, particularly in LMICs. In these economies, MRPK is 16% higher for new entrants relative to incumbents. In HICs, the difference is close to zero and statistically insignificant. However, when restricting the comparison group to the top quartile of issuers, new participants in HICs

also display higher MRPKs, suggesting that differences in capital misallocation persist even among publicly listed firms.

Two main conclusions emerge from this exercise: (i) new participants were relatively more financially constrained firms, and (ii) these differences were particularly pronounced in LMICs. Given that new participants accounted for the bulk of new capital raised in capital markets—and did so more rapidly in LMICs—these patterns suggest that the inclusion process likely improved the allocation of capital across countries and firms. However, to assess whether this translated into tangible gains in productive capacity, we next examine how firms used the funds raised through bond and equity issuances.

3.2 Use of Proceeds

Greater access to capital markets does not necessarily translate into improved firm performance. For instance, newly raised funds may be used to repay maturing debt or substitute for bank financing, rather than to expand productive capacity. In this section, we assess how capital market participation affects firm outcomes, focusing on the use of proceeds and their impact on MRPK. While informative, the results presented here are not causal, as the decision to issue is endogenous and reflects firm-specific characteristics. We return to this issue in Section 4.

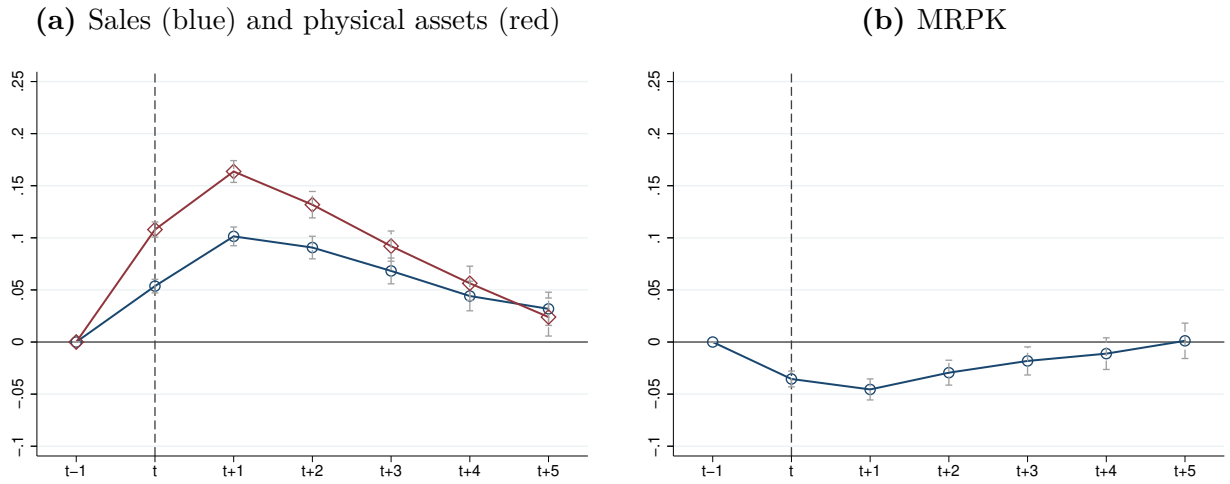
To motivate the analysis, we first consider a standard local projection regression a la Jordà (2005). Specifically, we estimate:

$$y_{it+h} - y_{it-1} = \alpha_i + \alpha_{s(i)t} + \alpha_{c(i)t} + \beta_h \text{Issue}_{it} + \sum_{\tau=1}^{T} \gamma_\tau \text{Issue}_{it-\tau} + \varepsilon_{it}, \tag{3}$$

where y_{it} is the log of the outcome of interest for firm i in year t, α_i are firm fixed effects, and $\alpha_{s(i)t}$ and $\alpha_{c(i)t}$ are industry-year and country-year fixed effects, respectively. The variable Issue_{it} is a dummy equal to one if the firm issued bonds or equity in year t. We include $T = 5$ lags to control for prior issuance activity. We restrict the sample to post-1999 observations.

Variation in our estimates comes from contrasts between issuers and non-issuers within finely defined cells. Firm fixed effects α_i net out all time-invariant characteristics—size, age, managerial ability, liability structure—that could influence both the decision to issue and

Figure 3. Evolution of Sales, Assets, and MRPK Following an Issuance



Notes. The figure plots the estimated coefficients β_h for $h \in \{0, 1, 2, 3, 4, 5\}$ from Equation (3). The left panel shows the evolution of log physical assets (red) and log sales (blue); the right panel shows log MRPK. All regressions include firm and industry-country-year fixed effects and control for five lags of the issuance episode.

subsequent outcomes. Industry–year effects $\alpha_{s(i)t}$ absorb shocks common to firms operating in the same 4-digit industry during year t, such as sector-specific demand shifts. Country–year effects $\alpha_{c(i)t}$ purge any macroeconomic shocks. Our coefficient of interest, β_h, therefore captures the average change in the outcome at horizon h for issuing firms relative to non-issuers operating in the same industry and country, conditional on past issuance behavior.

Figure 3 displays the estimated cumulative effects of issuance for horizons $h = 0, 1, \ldots, 5$. Panel (a) shows the evolution of log sales and physical assets. Sales rise on impact ($h = 0$), peaking one year later with a cumulative increase of roughly 15%. The effect is persistent, lasting beyond five years. Physical assets also increase sharply—by around 10% on impact and up to 15% the following year. These patterns suggest that firms use issuance proceeds to expand production capacity. Panel (b) confirms this interpretation: MRPK declines by about 5% after one year, consistent with a relaxation of financial constraints.

While the previous evidence documents a strong association between issuance activity and expanding productive capacity—as reflected in rising sales and physical assets, and declining MRPK—it also raises several identification concerns. First, as shown in Figure 3, the estimated effects of issuance events are highly persistent, lasting up to five years. As a result, the control group used in standard event studies may be contaminated by firms

recently exposed to similar treatments. To see this, consider the following example. Consider Firm A, which issues in 2005, and Firm B, which issues in 2007. When we evaluate the two-year horizon for Firm A, 2007 lies within its adjustment window; yet a standard local projection would still classify Firm B in 2007 as untreated, which could lead to attenuation bias.

Second, while our analysis purges industry- and country-level shocks, it could be very well the case that issuers and non-issuers differ systematically in their observable characteristics. These differences may not only affect baseline levels but also the trajectories of key firm outcomes, potentially biasing comparisons across the two groups.

To address the first concern, we adopt a staggered-treatment type of estimator that eliminates this overlap by dropping any firm that issues within the estimation window. In particular, we use the LP-DID approach proposed by Dube et al. (2023), which extends the standard local projection framework to accommodate staggered treatments while avoiding biases arising from negative weighting in fixed effects event-study estimators (Roth, Sant'Anna, Bilinski, and Poe, 2023). The method relies on carefully selecting treatment and control groups based on the timing of issuances to ensure that estimates are not influenced by overlapping or adjacent events. As for the second concern, given that the characteristics of new participants differ from those of incumbents, we partition our sample and estimate effects separately by firm type. We also analyze for sign of pre-trends within each group.

To estimate the effect at horizon h, we define treatment and control groups based on firms' issuance timing in year t:

- *Treatment group*: For $h \geq 0$, we select firms that issued in year t and had no issuances between $t - L$ and $t - 1$, nor between $t + 1$ and $t + h$. For $h < 0$, we select firms that issued in t and had no issuance between $t + h - L$ and $t - 1$.

- *Control group*: For $h \geq 0$, we include firms with no issuance between $t - L$ and $t + h$. For $h < 0$, we include firms with no issuance between $t + h - L$ and t.

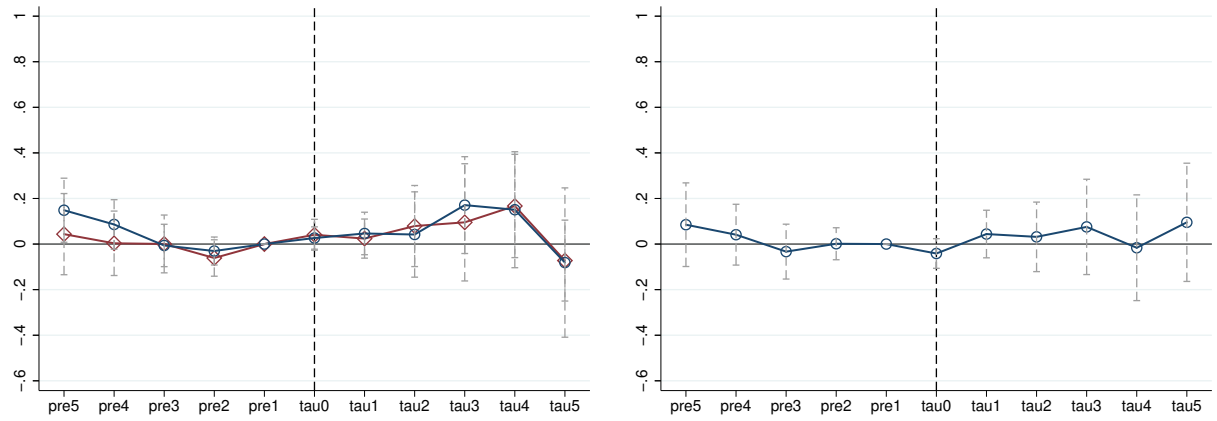
We set the window length L to 5 years, consistent with the persistence of the estimated effects in our baseline specification. For instance, to estimate β_3, we compare firms that issued in year t and were inactive from $t-5$ to $t-1$ and from $t+1$ to $t+3$, to firms with no

issuance between $t-5$ and $t+3$. Similarly, to estimate β_{-3}, we compare firms that issued in t with no issuance between $t-8$ and $t-1$, to firms that were inactive between $t-8$ and t.

Figure 4. Use of Proceeds by Firm Type, LP-DID

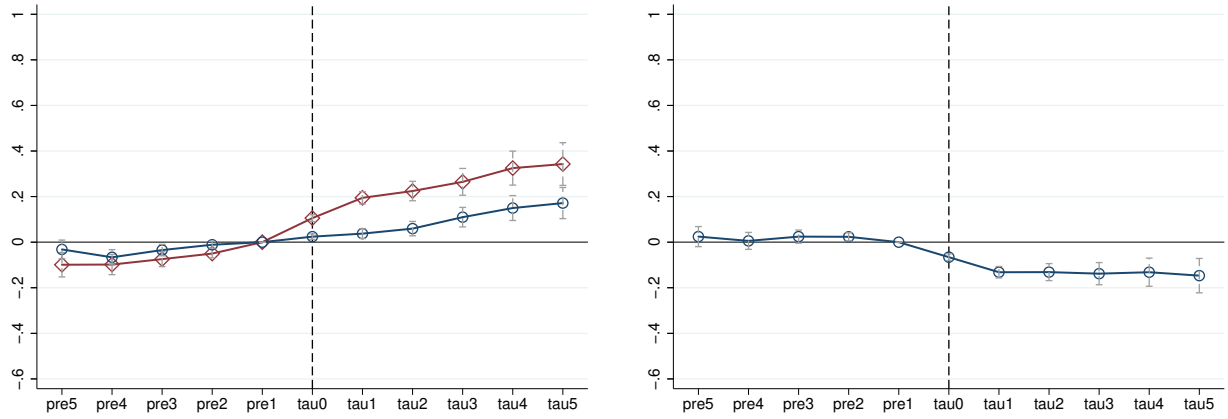
(a) Top Active Participants

Sales (blue) and physical assets (red) MRPK



(b) New participants

Sales (blue) and physical assets (red) MRPK



Notes. The figure shows the estimated coefficients β_h for $h \in \{0,1,2,3,4,5\}$ from Equation (3), based on LP-DID. Treatment and control groups are selected using the methodology of Roth et al. (2023), outlined in the text above. The left-hand side panels show the evolution of log physical assets (red) and log sales (blue) following an issuance. The right-hand side panel show the evolution of the log MRPK. All regressions include firm and 4-digit industry-country-year fixed effects.

The results are presented in Figure 4—we leave the results for a standard local projection to the Appendix. The analysis breaks down the results by firm type. That is, we re-estimate Equation (3) separately for new participants and for active firms in the top quartile of

issuance activity. In each case, the estimated coefficients capture the differential response between issuers and non-issuers within the corresponding group. The top panels present results for active firms, while the bottom panels focus on new participants.

Among top active participants, the estimated effects of an issuance event on sales and physical capital are small and not significant. Among new participants, the estimates are markedly stronger. As shown in the left panels, sales increase by 20 percentage points, and physical capital rises by 30 percentage points. The right panels show that MRPK remains largely unchanged for active firms, while it persistently declines by approximately 15 percentage points for new participants, indicating a clear easing of financial constraints.

Among top active participants, we find no evidence of pre-trends across any of the three variables analyzed. This is consistent with the notion that these firms are large, mature, and well-established, with relatively stable trajectories prior to issuance. For new participants, we detect mild pre-trends in sales and physical assets, suggesting that issuers were already growing somewhat faster than the average new participant within the same industry and country. However, we find no evidence of pre-trends in MRPK, indicating that issuers were not systematically more financially constrained than comparable non-issuers prior to accessing capital markets. This supports the interpretation that the observed post-issuance decline in MRPK reflects a genuine easing of financial frictions, rather than pre-existing differences in capital misallocation.

Despite the absence of clear pre-trends, the decision to issue remains endogenous, and the observed patterns may still reflect underlying firm characteristics or other confounding factors. As a result, the dynamics documented in Figures 3–4, while informative, may not support a fully causal interpretation. In the next section, we exploit a quasi-experiment in China, where staggered reforms during the 2000s granted firms access to foreign equity markets at different points in time. This variation allows us to compare the evolution of firm outcomes across groups with different access timelines. We find that the results are broadly consistent with the evidence presented in this section.

4 The Internationalization of Chinese Equity Markets

4.1 Institutional Background

We begin by outlining the institutional context in which China's equity market liberalization unfolded. The Shanghai and Shenzhen Stock Exchanges (SSE and SZSE, respectively) were established in the early 1990s, laying the foundation for the country's domestic capital markets. Throughout that decade, however, foreign access remained tightly restricted. It was only during the 2000s and 2010s that China initiated a gradual process of opening its equity markets, motivated by evolving policy priorities and increasing demand for global capital integration.

The first major step occurred in 2002 with the introduction of the Qualified Foreign Institutional Investor (QFII) program, which granted selected foreign financial institutions limited access to A-shares under strict quota arrangements. A related initiative, the Renminbi Qualified Foreign Institutional Investor (RQFII) program, followed in 2011, enabling investment through offshore renminbi accounts. Initially confined to Hong Kong–based subsidiaries of Chinese asset managers, the program was broadened in 2013 to include firms from other jurisdictions such as Singapore and the United Kingdom. At the same time, investment quotas under both QFII and RQFII were raised significantly. Nonetheless, access remained confined to a relatively small group of pre-approved investors.

A more decisive liberalization came with the launch of the Stock Connect programs. In 2014, China linked the Shanghai Stock Exchange to the Hong Kong Stock Exchange, and in 2016, a similar connection was established with Shenzhen. These new platforms allowed foreign investors to purchase mainland-listed equities directly through Hong Kong, bypassing the QFII framework completely. The expansion of access culminated in the inclusion of A-shares in the MSCI Emerging Markets Index starting in 2018. During this period, China's equity markets saw a substantial rise in both capitalization and international investor participation, offering a natural setting to study the effects of market liberalization on firm outcomes. Overall, the Shanghai and Shenzhen Stock Connect programs opened access to over 1,400 firms, accounting for more than half of China's domestic market capitalization

(see Meng, Xiong, Xiao, and Bai, 2023; Cortina et al., 2024).

4.2 Empirical Strategy and Results

We classify firms into treatment and control groups based on their access to international financial markets following the 2014 and 2016 liberalization episodes. The treatment group—*connected firms*—includes domestically listed companies whose shares became accessible to foreign investors under the Stock Connect reforms. The control group—*unconnected firms*—comprises firms whose shares remained available only to domestic investors. This classification follows Cortina et al. (2024). Among connected firms, we further distinguish between new and active participants, using the same criteria as in the previous section.

We begin by examining the impact of liberalization on firm-level financial activity and investment. Specifically, we estimate the following event-study specification:

$$y_{it} = \alpha_i + \alpha_{s(i)t} + \sum_{\tau \neq 0} \beta_\tau \cdot \mathbb{1}\{i = \text{Connected}\} \cdot \mathbb{1}\{\text{event\_time}_t = \tau\} + \varepsilon_{it} \tag{4}$$

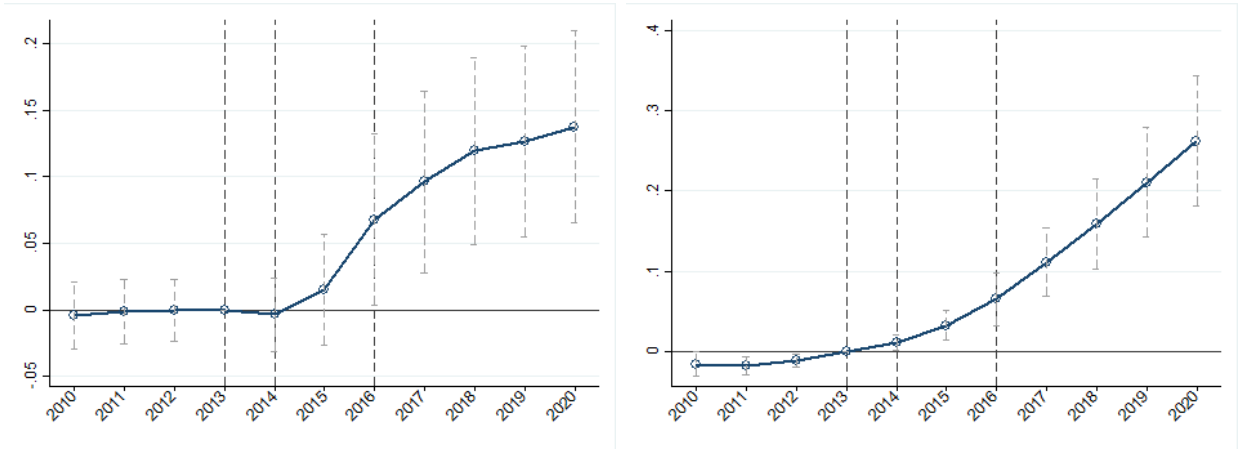
where y_{it} denotes the outcome of interest for firm i in year t (e.g., equity issuance or capital expenditures), α_i are firm fixed effects, and $\alpha_{s(i)t}$ are industry-by-year fixed effects. The variable $\mathbb{1}\{i = \text{Connected}\}$ indicates whether a firm is classified as connected, and event_time_t measures time relative to the liberalization event. The coefficients β_τ trace the dynamic response of connected firms relative to the unconnected group over event time. Identification relies on the assumption that, absent liberalization, trends in outcomes would have been similar across the two groups.

Figure 5 presents the estimated event-study coefficients for two key outcomes: cumulative equity issuance (left panel) and cumulative capital expenditures as a share of assets (right panel). Following liberalization, connected firms increase their issuance activity significantly more than unconnected firms. This increase in external financing is accompanied by a sizable rise in investment, suggesting a relaxation of financial constraints for the treated firms.

However, we also observe mild pre-trends in investment, which may raise concerns about non-random selection into treatment. In particular, connected firms may have been different from unconnected ones even before liberalization—potentially due to size, profitability, or

Figure 5. Chinese Liberalization: Connected versus Unconnected Firms

(a) Cumulative Equity **(b)** Cumulative CAPEX, over assets



Notes. The figure shows the estimated coefficients β_t from Equation (4). Left panel shows results for cumulative equity issued in capital markets relative to firms' assets. Right panel shows cumulative changes in capital expenditures (CAPEX) over assets.

prior engagement with financial markets. Moreover, among the connected firms, there exists substantial heterogeneity: some were already actively issuing in domestic capital markets prior to the reform, while others had long been excluded from them. For the former, the reform may have simply shifted the composition of financing from domestic to foreign sources, without materially altering their investment behavior.

To analyze this heterogeneity, we estimate a modified specification that separately identifies the dynamic responses of new and active participants:

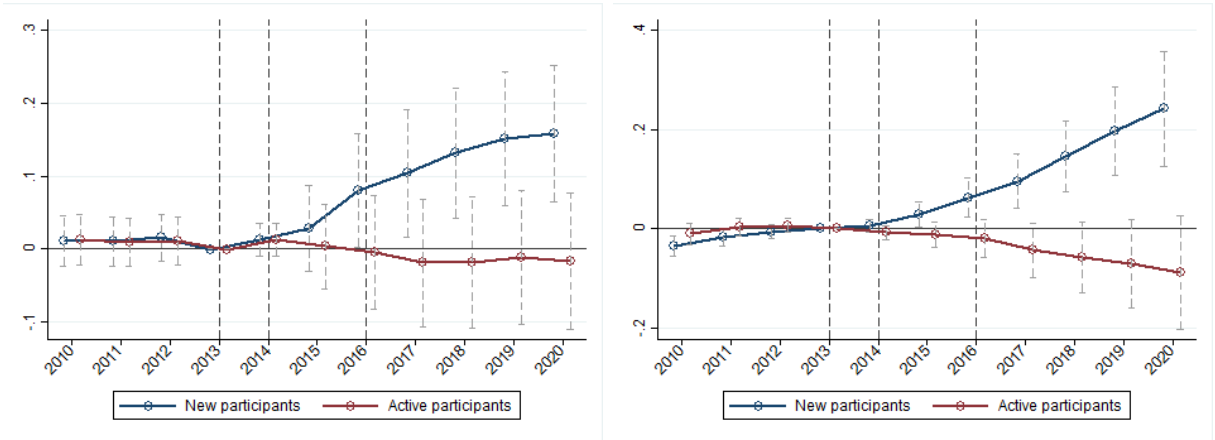
$$\begin{aligned} y_{it} = \alpha_i + \alpha_{s(i)t} &+ \sum_{\tau \neq 0} \gamma_{1,\tau} \cdot \mathbb{1}\{i = \text{NP}\} \cdot \mathbb{1}\{\text{event\_time}_t = \tau\} \\ &+ \sum_{\tau \neq 0} \gamma_{2,\tau} \cdot \mathbb{1}\{i = \text{Active Part}\} \cdot \mathbb{1}\{\text{event\_time}_t = \tau\} + \varepsilon_{it} \end{aligned} \tag{5}$$

where NP is an indicator for connected firms that are new participants—as defined in the previous section—while Active Part denotes connected firms with a history of issuance in the 1990s. Both groups are compared to unconnected firms.

Results are displayed in Figure 6. The estimates reveal a stark contrast between the two groups: new participants show large and persistent increases in both equity issuance and investment following liberalization, whereas active participants display no significant change

Figure 6. Chinese Liberalization: Role of New Participants

(a) Cumulative Equity **(b)** Cumulative CAPEX, over assets



Notes. The figure shows the estimated coefficients γ_t from Equation (5). Left panel shows results for cumulative equity issued in capital markets, relative to assets. Right panel shows cumulative changes in capital expenditures (CAPEX) over assets.

relative to the control group. This pattern suggests that liberalization primarily benefited previously excluded firms, enabling them to raise new funds and expand their operations, rather than simply reducing the cost of capital for already-active firms.

Taken together, these results reinforce the findings from the previous section. The liberalization of access to foreign capital markets appears to have relaxed financial constraints, but only for a subset of firms—namely, those that had limited access to external finance. By contrast, firms already integrated into domestic capital markets experienced little change, suggesting that they simply modified their liability structure. The documented heterogeneity highlights the importance of accounting for firms' prior financial access when evaluating the aggregate effects of capital market reforms. Future versions of this paper will examine the implicaitons of these results for firms' stock of capital, sales, and MRPK.

5 Aggregate Effects

Following Petrin and Levinsohn (2012) and Baqaee and Farhi (2019), we compute a first-order approximation of the change in the aggregate Solow residual induced by capital market

issuances. For a given country c and industry s, the change in TFP can be expressed as:

$$\Delta Solow_{s,c,t} \approx \sum_{i \in \{c,t\}} \lambda_{i,t} \Delta \ln A_{i,t} + \sum_{i \in \{c,t\}} \lambda_{i,t}\, \alpha^{k}_{s(i)} \left(1 - \frac{1}{1+\tau^{k}_{i,t}}\right) \widehat{\Delta \log k_{i,t}}, \tag{6}$$

where $\lambda_{i,t}$ denotes the firm's Domar weight, $\Delta \log A_{i,t}$ is the change in firm-level TFP, $\alpha^{k}_{s(i)}$ is the capital share under a Cobb–Douglas specification, $\tau^{k}_{i,t}$ is the capital wedge, and $\widehat{\Delta \log k_{i,t}}$ is the predicted change in firm capital following issuance.

This wedge-based decomposition is flexible and does not require strong assumptions on functional forms or productivity distributions, making it well suited to a cross-country setting. It separates TFP gains into two channels: within-firm productivity improvements and reductions in misallocation. The first term reflects firm-specific productivity changes, weighted by each firm's share in industry output. The second—the focus of this study—captures reallocation gains from relaxing capital distortions. The term $\left(1 - \frac{1}{1+\tau^{k}_{i,t}}\right)$ measures the distortion. When $\tau^{k}_{i,t} = 0$, the firm is unconstrained. A positive wedge indicates capital underutilization, such as that caused by credit frictions. In such cases, increasing $k_{i,t}$ raises aggregate TFP.

To estimate $\widehat{\Delta \log k_{i,t}}$, we use a regression similar to Equation (3), allowing for heterogeneity between new and incumbent firms:

$$\Delta \log k_{i,t} = \alpha_i + \alpha_{s(i)t} + \alpha_{c(i)t} + \beta_1 x_{it} + \beta_2 x_{it} \times \mathbb{1}\{i = \text{NP}\} + \sum_{\tau=1}^{T} \gamma_\tau \text{Issue}_{it-\tau} + \varepsilon_{it}, \tag{7}$$

where x_{it} is log amount issued, and $\mathbb{1}\{i = \text{NP}\}$ identifies new participants. Unlike Equation (3), this specification captures differential capital responses to issuance across active firms and new participants.

We then compute country-level changes in aggregate capital and misallocation using Equation (6), combining predicted values from Equation (7) with industry weights to construct national aggregates.

To recover capital wedges $\tau^{k}_{i,t}$, we follow two approaches. The first is the *traditional*

method, which infers wedges from observed MRPK levels prior to an issuance event:

$$\tau^k_{i,t-1} = \frac{\text{MRPK}_{i,t-1}}{R} - 1, \tag{8}$$

where R denotes the market return to capital. This approach assumes that the entire gap between the marginal return and the market rate reflects distortions in capital allocation. A key limitation is that the estimated wedge is highly sensitive to the choice of R, since $\tau^k_{i,t-1}$ decreases with R. Studies such as Hsieh and Klenow (2009) (for China and India) and Bau and Matray (2023) (for India) adopt a fixed rate of 10%. In our context, with a broad set of countries, applying a single global R would likely lead to over- or underestimation of misallocation in some cases and underestimation in others. Pinning down a country-specific return R_c is empirically challenging and beyond the scope of this paper.

Given these issues, we instead implement the *lower-bound* approach in Bau and Matray (2023), which infers ex-ante wedges from the estimated drop in MRPK following an issuance. The underlying assumption is that an issuance fully relaxes financial constraints, so the change in MRPK captures the size of the initial wedge. Using the estimated coefficients $\hat{\beta}_1$ and $\hat{\beta}_2$, we first compute the predicted change in MRPK:

$$\Delta\log\widehat{\text{MRPK}}_{i,t} = \exp\left(\hat{\beta}_1 x_{it+1} + \hat{\beta}_2 x_{it+1} \cdot \mathbb{1}\{i = \text{NP}\}\right). \tag{9}$$

Since $\log\frac{1+\tau^k_{i,t}}{1+\tau^k_{i,t-1}} = \log\frac{\text{MRPK}_{i,t}}{\text{MRPK}_{i,t-1}}$, and under the assumption that $\tau^k_{i,t} = 0$, we can then solve directly for the pre-treatment wedge:

$$\tau^k_{i,t-1} = e^{-\Delta\log\widehat{\text{MRPK}}_{i,t}} - 1 \tag{10}$$

Since the method assumes that financial constraints are fully relaxed, the post-issuance MRPK reflects an unconstrained level. For instance, a 10% decline in MRPK after an issuance implies an ex-ante capital wedge of 10.5%. Importantly, this approach provides a lower bound: if constraints are only partially relaxed and $\tau^k_{i,t}$ remains positive, the observed MRPK decline will understate the true wedge, and thus the implied gains from reducing misallocation.

Table 3. Annual increase in capital predicted by issuance activity

	All firms	1990s participants	New participants
HICs	4.9	4.2	0.7
LMICs	6.2	2.2	4.0

Notes: Based on the estimates from Equation (7), the table reports the average annual change in capital stock (K) attributable to issuance activity over the 2000–2022 period. Results are expressed in percentage points and are disaggregated by income group (HICs vs. LMICs) and firm type.

5.1 Effects on Capital and Misallocation

We begin by examining the change in aggregate capital predicted by issuance activity between 2001 and 2022. Table 3 shows the average annual contribution to capital growth across different firm types. On average, capital market activity predicts a 4.9% annual increase in capital for HICs, and a larger 6.2% for LMICs. Among incumbent firms active in the 1990s, the contribution is 4.2% in HICs and just 2.2% in LMICs. In contrast, new participants account for only 0.7% of capital growth in HICs but 4.0% in LMICs.

These differences are driven by both the prevalence of new participants and their responsiveness to capital market access. In LMICs, new entrants made up a larger share of issuance and showed a higher elasticity of capital with respect to issuance. The implication is clear: the expansion of capital markets in LMICs reached the firms most likely to expand capital and contributed significantly to aggregate growth.

We next turn to misallocation. Table 4 reports the predicted effect of issuance activity on the Solow residual, using both the *lower-bound* and *traditional* approaches. The lower-bound method, which relies on observed declines in MRPK, implies an overall decrease in misallocation of 3.6% in LMICs and 1.7% in HICs over the 2000–2022 period. In LMICs, most of the gains are driven by new participants; in HICs, active participants played a more important role.

In contrast, the traditional approach—which infers capital wedges from ex ante MRPK levels—implies substantially larger effects. For LMICs, the estimated cumulative TFP gain is 43.7%, with new participants contributing 23.6% and 1990s participants 16.4%. For HICs, the traditional method suggests a gain of 32.9%, driven mainly by incumbent firms. These magnitudes are difficult to reconcile with aggregate growth patterns and likely overstate the

Table 4. Effects of issuance activity on misallocation

	LMICs				HICs			
	Per year	*Cumulative (2000–22)*			*Per year*	*Cumulative (2000–22)*		
	All	All	NPs	1990s Ps	All	All	NPs	1990s Ps
Lower bound	0.15	3.57	3.11	0.44	0.07	1.67	0.85	0.81
Traditional	1.52	43.70	23.63	16.37	1.19	32.94	5.26	26.37

Notes: The table reports the predicted contribution of issuance activity to the Solow residual over the 2000–2022 period, expressed in percentage points. "Traditional" refers to the traditional approach that infers capital wedges from MRPK levels, while "Lower bound" denotes the lower-bound method based on observed MRPK declines. "NPs" are new participants, and "1990s Ps" are incumbent firms with issuance prior to 2000. Results are presented separately for LMICs and HICs.

true effects of capital reallocation. The gap between the two methods—roughly a factor of ten—is notably larger than that found in Bau and Matray (2023), who report a ratio closer to 2.5. This divergence underscores the potential limitations of the traditional approach in capturing realistic misallocation dynamics.

Taken together, the results show that capital market access generated substantial gains in both capital deepening and aggregate TFP, with particularly large effects on the extensive margin. New participants in LMICs—firms that were previously excluded—contributed disproportionately to growth. These patterns align with the misallocation literature and highlight the role of market access in improving aggregate efficiency.

6 Conclusion

This paper examines the implications of the global expansion of capital markets over the past three decades for investment and misallocation. Using a novel dataset linking firm-level balance sheets with bond and equity issuance data across 100 countries, we show that the growth in market-based financing has been disproportionately driven by *new participants*—firms that did not tap capital markets in the 1990s. These firms are systematically smaller, younger, and more financially constrained—particularly in low- and middle-income countries. Following an issuance event, they exhibit sharp increases in investment and persistent declines in marginal revenue products of capital (MRPK), consistent with a relaxation of financing constraints.

Using the estimated firm-level responses, we quantify the aggregate implications of capital market participation. Our conservative lower-bound estimates imply a decline in misallocation of 3.6% in low- and middle-income countries and 1.7% in high-income countries, with new participants accounting for most of the gain in the former. These results highlight the macroeconomic importance of the extensive margin in linking financial development to productivity growth.

The results from this draft will be expanded in future versions of the paper. Among other things, we will provide more details across countries for different income groups and sets of firms. We will also examine the performance of physical capital and MRPK for different firms in China, as they responded to the equity market liberalization. In addition, we will better link our results with related results from the literature.

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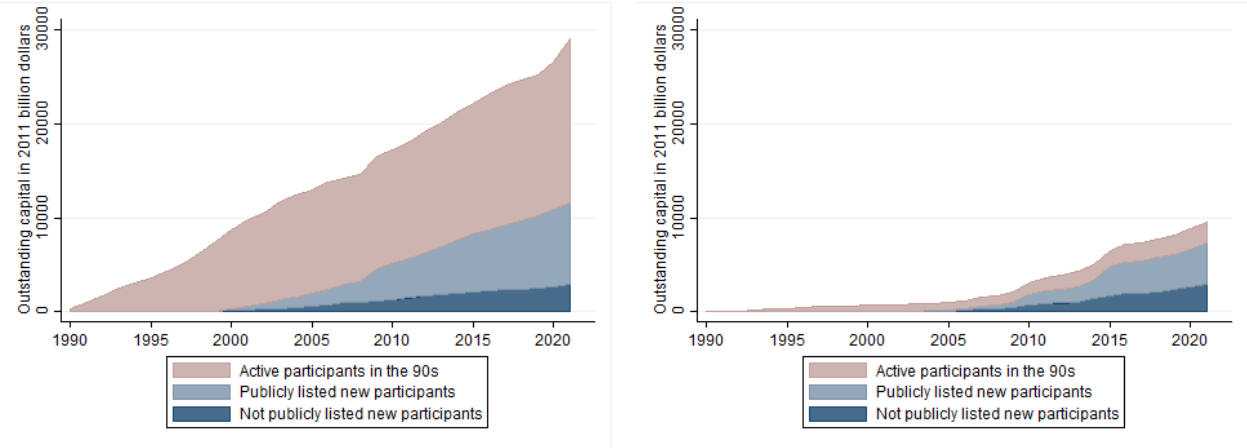
Appendix

A Additional Figures

Figure A1. The role of new participants in the boom in capital markets

(a) High-Income countries **(b)** Low-and-Middle-Income countries



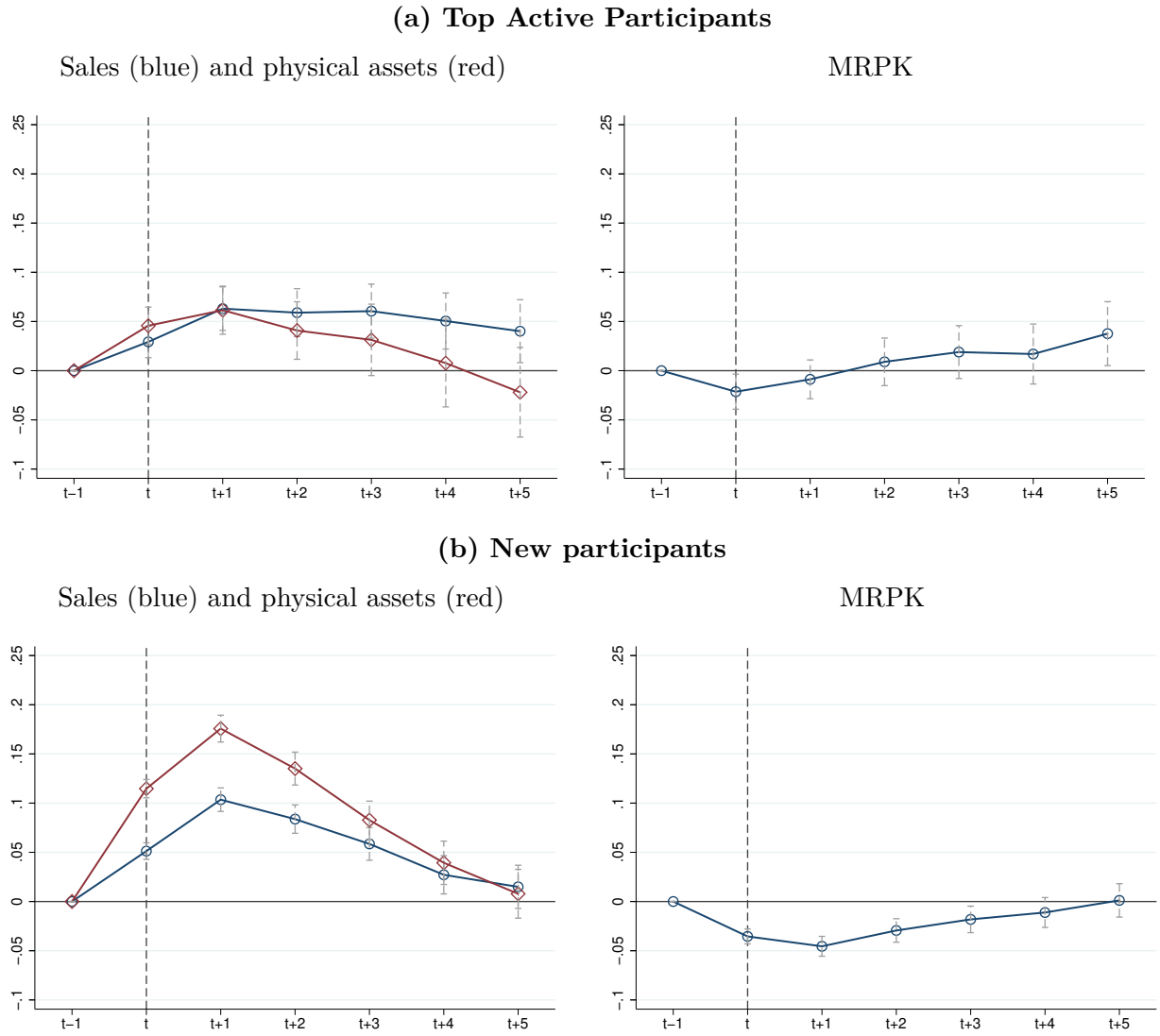
Notes. Figure A1 shows the outstanding amount of bonds and equity in capital markets, distinguishing between those issued by active participants in the 1990s, in red, and new participants in the 2000s, in blue. The darker shade of blue represents privately held companies while the lighter shade represents publicly listed new participants. The maturity of bonds is taken from the data while equity is assumed to stay in capital markets by default. Amounts are expressed in 2011 US billion dollars.

Figure A2 complements the analysis in Section 3.2 by presenting estimates across firm types—new participants and top active issuers—using the standard local projection (LP) framework. We re-estimate Equation (3) separately for each group, where the coefficients β_h capture the average difference in outcomes between issuers and non-issuers within the corresponding subsample. The top panels display results for active firms, while the bottom panels focus on new participants.

The results based on LP are broadly consistent with the findings based on the LP-DID estimator: issuance events generate significantly stronger responses among new participants. As shown in the left panels, sales increase by roughly 10 percentage points—more than twice the response observed for active firms. Physical capital rises by about 15 percentage points, more than three times the corresponding increase for incumbents. The effects, however,

are smaller than those reported in the main text, reflecting attenuation due to overlapping treatment episodes. The right panels show that MRPK remains flat for active firms, while it declines by approximately 5 percentage points for new participants, consistent with a relaxation of financial constraints.

Figure A2. The heterogeneous response of active and new participants



Notes. The figure shows estimated coefficients β_h for $h \in \{0, 1, 2, 3, 4, 5\}$ from Equation (3), capturing responses to issuance episodes for active (Panels a–b) and new participants (Panels c–d). Left panels show log physical assets (red) and log sales (blue); right panels show log MRPK. All regressions include firm and industry-country-year fixed effects and control for five lags of the issuance.