Passive investors, active moves: ETF participation in IPOs

Haiqiang Chen, Xiaoqun Liu, Bo Ni, and Zhuo Zhong[1]

May 2026

Abstract

We examine the pervasive participation of index ETFs in IPOs in the Chinese stock market, where ETFs exploit underpricing to generate returns of approximately 4.56% per annum for investors. However, this discretionary activity also increases non-fundamental volatility and short-term return reversals among constituent stocks, constituting a pecuniary externality. Exploiting a policy shock as a quasi-natural experiment, we construct an instrumental variable to establish causality for both the private benefits and market-wide costs. Our findings highlight the dual nature of index ETF activeness: discretionary strategies can enhance investor returns while imposing costs on the broader market.

JEL Classification: G15; G18; P43
Keywords: Exchange traded funds, Chinese stock market, IPOs

[1]We are grateful for helpful comments and suggestions from Shiyang Huang, Zhe Shen, Yao Zeng, and seminar participants at Xiamen University, Fudan University, Shanghaitech University, RMIT, Monash University, University of Sydney, Queensland Unversity of Technology, University of Queensland, Deakin University, University of Melbourne, Central University of Finance and Economics, Southwestern University of Finance and Economics, Southern University of Science and Technology, and China Europe International Business School. Haiqiang Chen (hc335@szu.edu.cn) is at the Shenzhen Audencia Financial Technology Institute, Shenzhen University, China; Xiaoqun Liu (liuxiaoqun22@hainanu.edu.cn) is at the Department of Finance, Hainan University, China; Bo Ni (brankolnea@szu.edu.cn)is at the Shenzhen Audencia Financial Technology Institute, Shenzhen University, China; Zhuo Zhong (zhuo.zhong@unimelb.edu.au) is at the Department of Finance, the University of Melbourne, Australia.

Passive investors, active moves: ETF participation in IPOs

May 2026

Abstract

We examine the pervasive participation of index ETFs in IPOs in the Chinese stock market, where ETFs exploit underpricing to generate returns of approximately 4.56% per annum for investors. However, this discretionary activity also increases non-fundamental volatility and short-term return reversals among constituent stocks, constituting a pecuniary externality. Exploiting a policy shock as a quasi-natural experiment, we construct an instrumental variable to establish causality for both the private benefits and market-wide costs. Our findings highlight the dual nature of index ETF activeness: discretionary strategies can enhance investor returns while imposing costs on the broader market.

JEL Classification: G15; G18; P43
Keywords: Exchange traded funds, Chinese stock market, IPOs

1. Introduction

The rise of exchange-traded funds (ETFs) has revolutionized financial markets, yet they are often perceived as largely passive due to their index-tracking mandate. Nonetheless, many index ETFs actively manage their portfolios by allocating a portion of their assets outside the underlying index—for example, by holding cash (Koont, Ma, Pastor, and Zeng, 2025) or investing in futures.[2] Such strategic discretion raises questions about whether, and how, it truly serves investors' interests. More importantly, it prompts consideration of the broader market consequences of these actions, even if they benefit ETF investors. Understanding both the economic benefits and wider ripple effects is important for practitioners and regulators, who seek to grasp the evolving role of ETFs in financial markets. To investigate the implications of index ETFs' discretionary allocation, we focus on a distinct setting in China, where index ETFs directly subscribe to shares in initial public offerings (IPOs). This pronounced form of discretionary portfolio activity enables us to assess how index ETFs' off-benchmark allocation benefits investors, while also providing a clean setting to study spillover effects on the broader market.

We find that index equity ETFs in the Chinese A-share market actively subscribe to IPOs. Approximately 90% of all index equity ETFs participate in IPOs between January 2016 and December 2021. IPO participation in this setting reflects a discretionary choice rather than benchmark-tracking behavior. First, these ETFs almost never retain IPO shares until index inclusion. Instead, these ETFs liquidate positions shortly after the lockup period expires. Second, industry ETFs frequently subscribe to IPOs outside their benchmark industries, further confirming that these investments are not motivated by anticipated changes in index

[2]From iShares Russell 1000 ETF prospectus: *"The Fund seeks to track the investment results of the Russell 1000® Index (the 'Underlying Index') … The Fund generally will invest at least 80% of its assets in the component securities of its Underlying Index and may invest up to 20% of its assets in certain futures, options and swap contracts, cash and cash equivalents, including shares of money market funds ... as well as in securities not included in the Underlying Index, but ... will help the Fund track the Underlying Index..."*

composition. Taken together, these patterns indicate that index ETF managers pursue short-term profit opportunities arising from IPO underpricing rather than long-horizon benchmark alignment.

Our empirical analysis is guided by three hypotheses.

Hypothesis 1 (Private Benefits): IPO participation generates benefits for both ETF investors and ETFs.

Our empirical results show that index ETFs pass their gains from IPO investments to investors by outperforming their underlying indices. Specifically, the excess return of an ETF over its underlying index is positively associated with its IPO-related gains. Although IPO holdings represent only 0.017% of total net assets on average, the substantial underpricing in the Chinese A-share market—with average first-day returns of 105.35%—translates this modest allocation into economically meaningful gains. On average, these gains amount to approximately 38 basis points per month (about 4.56% annually), which is more than three times the risk-free rate during the same period and comparable to the average monthly ETF excess return of 31 basis points. However, this outperformance comes at the cost of a significantly larger tracking error.

Despite the larger tracking error, investors appear undeterred: ETF flows increase in tandem with gains from IPO participation. We also find that ETF creations are positively associated with IPO returns, consistent with increased flows being accompanied by the creation of more ETF units. Together, we show that IPO participation delivers substantial private benefits—enhanced performance for ETF investors and increased flows and fund size for ETF managers. Our flow results further suggest that, despite the small share of IPO holdings in total net assets, the resulting gains are meaningful not only in magnitude but also in their ability to materially influence investor flow decisions.

In our cross-sectional study, we investigate how differences in ETF type moderate these relationships. We find that the effects of IPO returns on excess returns, tracking error, flows,

and creations are more pronounced among industry ETFs compared to broad-market index ETFs.

We use the launch of the Science and Technology Innovation Board (STAR) on the Shanghai Stock Exchange as a quasi-natural experiment to test the causal impact of ETF IPO participation on excess returns, tracking error, flows, and creations. The STAR launch is a policy-driven event, which is not influenced by ETFs. The introduction of the STAR significantly increased the number of IPOs on the Shanghai Stock Exchange relative to its main competitor, the Shenzhen Stock Exchange. As a result, 21 ETFs tracking indices composed solely of Shanghai-listed stocks (our treatment group) gained additional IPO opportunities, while 25 ETFs tracking indices composed solely of Shenzhen-listed stocks (our control group) did not. This distinction arises because investors in the Chinese A-share market must hold stocks listed on a given exchange to participate in that exchange's IPOs. We capture this exogenous shock using an interaction term—between a dummy for the STAR Board's launch event and a dummy for treatment group membership—as an instrumental variable in a two-stage least squares (2SLS) regression. Because the 2SLS specification includes ETF and time fixed effects, any time-invariant differences between stocks on the two exchanges and any common shocks are absorbed, leaving identification to rely on the differential change in IPO opportunities triggered by the STAR launch. Our 2SLS regression analysis confirms the causality of our findings, further supporting *Hypothesis 1*.

Hypothesis 2 (Not Benchmark-Tracking): Index equity ETF IPO participation is not driven by anticipated index inclusion or benchmark composition, but is a discretionary return-seeking strategy.

A competing explanation is that index equity ETFs subscribe to IPOs in anticipation of future index inclusion. Our second hypothesis directly addresses this possibility. We find that most index equity ETFs liquidate IPO positions shortly after the lockup period expires rather than holding them until index inclusion, and that industry ETFs frequently subscribe to IPOs

outside their benchmark industries. The evidence rejects benchmark-related motives and shows that IPO participation is a short-horizon, discretionary strategy aimed at harvesting underpricing gains.

Index equity ETFs rarely retain IPO shares long enough for index inclusion to be relevant. Specifically, among the 119,789 ETF-IPO pairs in which the lockup period had expired before the first available post-IPO holdings report, approximately 98% of the subscribed shares were no longer held, implying a retention rate of about 2%. For IPOs whose lockup periods extended beyond the first holdings report, the retention rate based on the second holdings disclosure is about 4%.

IPO participation is economically disconnected from benchmark composition. Over the sample period, we find that industry ETFs collectively participated in 23,811 IPOs, of which approximately 98% (23,281 cases) were in industries outside their benchmark industries. Post-IPO liquidation patterns are also uniform across benchmark and non-benchmark IPOs: ETFs rapidly unwind their positions around lockup expiration regardless of industry alignment.

Hypothesis 2 serves to rule out alternative explanations for ETF IPO participation—such as benchmark rebalancing, anticipated index inclusion, or industry-specific information—thereby sharpening the interpretation of *Hypothesis 1*. Having established that ETF IPO participation is primarily return-driven and opportunistic, rather than motivated by benchmark considerations, we next examine whether this privately optimal behavior has broader market consequences.

Hypothesis 3 (Market-Wide Externalities): Because ETF managers and investors internalize only the private benefits of IPO participation, but not its impact on underlying stocks, IPO-induced ETF flows generate non-fundamental price pressure—higher volatility and short-term return reversals—constituting a pecuniary externality.

Yet even if IPO participation benefits both ETF managers and their investors, it may still

generate broader market consequences. Because ETF managers and investors internalize only the private gains from IPO participation and not its impact on the underlying securities, the flows and creation activity triggered by IPO-related performance can transmit non-fundamental shocks to constituent stocks. This mechanism mirrors recent U.S. evidence linking ETF creations and redemptions to elevated volatility and price dislocations (Ben-David, Franzoni, and Moussawi, 2018; Brown, Davies, and Ringgenberg, 2021).

Consistent with this hypothesis, we find that index ETF IPO participation leads to higher contemporaneous stock-level volatility. This increase in stock volatility does not reflect changes in fundamental factors. Instead, it arises from a temporary demand shock caused by investor inflows and the resulting surge in ETF creations tied to IPO participation. The heightened volatility is relatively short-lived, reverting to normal levels the following month. This change in volatility is economically significant. It is over eight times the average monthly change in stock volatility. In other words, index ETF IPO participation generates increased ETF creations, which affect the trading of ETFs' constituent stocks and add substantial non-fundamental movements to stock returns.

We also find that trading related to ETF creations leads to short-term return reversals among ETF constituent stocks. This is consistent with inelastic demand or limited liquidity in the underlying securities. The temporary demand shock triggered by ETF creations intensifies buying pressure, briefly inflating prices and generating positive returns. As this pressure subsides, stock prices retreat, resulting in negative returns the following period. Notably, the short-term price run-up is comparable in magnitude to the stock's average monthly return, underscoring the economic significance of this effect.

To further quantify the economic magnitude of the price pressure induced by index ETF IPO participation, we estimate the demand elasticity of Chinese A-share stocks. This elasticity captures the slope of the inverse demand curve, measuring how sensitive stock prices are to exogenous shifts in demand unrelated to fundamentals. Estimating this elasticity allows us to

gauge the extent of ETF-induced non-fundamental price impact—that is, how strongly ETF flows transmit transitory demand shocks into equilibrium prices. We exploit variation in ETF trading activity generated by IPO participation to identify these flow-driven demand shocks. The resulting elasticity estimates, ranging from -5 to -6, indicate that Chinese stock prices respond to demand shocks with similar inelasticity to that documented for U.S. equities.

While ETF IPO participation induces flows that raise stock-level volatility, this volatility is largely diversifiable within the ETF portfolio. We find that ETF-level volatility does not increase commensurately. Consequently, ETF managers and investors do not internalize the volatility costs imposed on constituent stocks, even though those costs arise endogenously from ETF-flow-induced demand shocks.

We conduct a series of extensions and robustness analyses to further examine the flow channel through which index ETF IPO participation generates market externalities. Specifically, we examine daily ETF flows to assess the timing and nature of investor responses to IPO participation. Our daily flow analysis reveals that investor demand is related to both past ETF performance and expected future first-day returns from IPOs subscribed by the ETF. These daily flow reactions cumulate into the monthly inflows that underpin the externality channel. In contrast, a cross-vehicle comparison using open-end passive index mutual funds reveals no significant relationship between flows and mutual fund IPO participation, even though mutual fund IPO participation is also associated with higher tracking error. Finally, we confirm that our main results are robust to an alternative excess return measure that adjusts for the mechanical dividend-yield component arising from the use of price-return benchmark indices.

In sum, we find that the active IPO participation strategy adopted by Chinese index ETFs has a unique dual impact. It benefits investors, allowing them to share in the returns from IPO underpricing. At the same time, it creates non-trivial pecuniary externalities in the form of increased non-fundamental volatility and short-term return reversals among ETFs' constituent

stocks. Importantly, index ETF IPO participation does not mechanically generate these market externalities. Rather, it acts as a catalyst that induces investor flows and ETF share creations, which in turn transmit flow-driven demand shocks to the underlying stocks. The resulting increase in non-fundamental volatility constitutes a pecuniary externality borne by other market participants, even though it is not directly tied to the initial IPO participation decision.

One might wonder why focusing on ETF activity in China is relevant to understanding index ETF active management more broadly. In many respects, the Chinese market offers an extreme setting in which index ETFs exercise a high degree of active discretion, most notably through IPO participation. This distinct context serves as a magnifier, allowing us to observe the potential trade-offs of index ETF activeness in sharper relief. Crucially, the underlying channel—whereby discretionary strategies yield additional returns and attract investor inflows but also create non-fundamental volatility that distorts price signals—is not unique to China. As discretionary ETF management practices expand globally and grow alongside ETF size, understanding the implications of such activeness remains important for investors, regulators, and policymakers worldwide.

Our work contributes to the literature on financial innovation by analyzing the benefits and costs that ETFs bring to the market. Theoretical work by Gorton and Pennacchi (1993) shows that index-linked securities such as ETFs improve the welfare of uninformed investors by reducing their trading losses. Huang, O'Hara, and Zhong (2021) demonstrate that ETFs facilitate informed trading by allowing investors to hedge unwanted risks. Glosten, Nallareddy, and Zou (2021) find that ETFs help incorporate systematic earnings information in a timely manner. However, past studies examining the impact of ETFs on market quality reveal that they increase non-fundamental volatility (Ben-David, Franzoni, and Moussawi, 2018; Brown, Davies, and Ringgenberg, 2021), amplify return comovement (Da and Shive, 2018), and decrease informational efficiency (Israeli, Lee, and Sridharan, 2017; Bhojraj, Mohanram, and Zhang, 2020). Those are costs associated with the ETF innovation.

Past studies also indicate that index ETFs are not entirely passive, an aspect that has attracted growing interest. Cheng, Massa, and Zhang (2019) and Brogaard, Heath, and Huang (forthcoming) find that ETFs which do not fully replicate their underlying indices actively manage their holdings. Koont, Ma, Pastor, and Zeng (2025) observe that fixed-income ETFs actively manage their creation and redemption baskets. ETFs also time creations/redemptions to avoid taxes (Moussawi, Shen, and Velthuis, 2025). Additionally, Ben-David, Franzoni, Kim, and Moussawi (2023), as well as Huang, Song, and Xiang (2024), show that thematic or smart-beta ETFs are often launched to capture investor attention or time the market, but they tend to underperform after inception. Dannhauser and Dathan (2023) further demonstrate that bond ETFs participate in the primary corporate bond market even when these bonds are not yet included in the ETF's benchmark index. We contribute to this literature by examining index ETF IPO participation in China and investigating its impact on the market.

Our empirical work also contributes to the literature on IPOs in the Chinese stock market (Chan, Wang, and Wei, 2004; Cheung, Ouyang, and Tan, 2009; Tian, 2011; Chen, Wang, Li, Sun, and Tong, 2015; Zhang, Derrien, Wu, and Zeng, 2021; Cong and Howell, 2021; Qian, Ritter, and Shao, 2024). Hu, Liang, and Yuan (2024) also document persistent positive excess returns among Chinese ETFs and find a positive association between IPO underpricing and ETF alpha. Our paper differs in that we construct a fund-month-level measure of IPO returns from actual subscription allocations across 418 ETFs, which allows us to identify the specific channel through which IPO participation generates excess returns and to trace its downstream effects on investor flows and market quality. Their paper also uses a considerably smaller sample of 72 ETFs and does not clearly establish whether IPO underpricing is captured at the fund level or at the market level.

The remainder of the paper is organized as follows. Section 2 describes the regulatory background of the Chinese stock market and ETFs, and presents our data. Section 3 presents our main tests of *Hypothesis 1*, examining index ETF IPO participation, and employs an

instrumental-variables strategy to establish the causal effect of IPO participation on ETF outcomes. Section 4 tests *Hypothesis 2* by ruling out alternative motives for index ETF IPO participation, analyzing ETFs' post-IPO retention of shares and industry ETFs' cross-industry IPO subscriptions. Section 5 tests *Hypothesis 3*, investigating the broader market consequences of ETF IPO participation. Section 6 presents extensions and robustness analyses. Section 7 concludes.

2. Institutional background and data

Regulations have significantly impacted IPOs in the Chinese A-share market since its inception in the 1990s. The main regulatory body is the China Securities Regulatory Commission (CSRC), which was established in 1992 shortly after the launch of the Shanghai Stock Exchange (SSE) in December 1990 and the Shenzhen Stock Exchange (SZSE) in April 1991. Similar to the U.S. Securities and Exchange Commission (SEC), the CSRC serves as the principal regulatory authority responsible for formulating and enforcing rules in Chinese capital markets. In the following subsections, we elaborate on the IPO selling methods and participation processes during our sample period from 2016 to 2021 and provide detailed descriptive information on our data.[3]

2.1. Regulatory and institutional details regarding IPOs in China (2016-2021)

During our sample period, IPOs were conducted either through a hybrid of auction and fixed-price offering methods or solely through fixed-price offerings. There was an implicit uniform price control from 2016 to 2021, except for IPOs on the Science and Technology Innovation Board of the Shanghai Stock Exchange (also known as the STAR) and Growth Enterprise Market of the Shenzhen Stock Exchange (also known as the GEM). The CSRC's "window guidance" recommended a P/E cap of 23 for IPOs. This guidance, although not legally binding, was a policy tool used by the CSRC to direct financial institutions and market participants. The price control resulted in substantial initial IPO returns, averaging 105.35% during our sample period. Figure 1 summarizes the historical price control on IPOs in the Chinese stock market.

[Insert Figure 1 here]

The high initial returns attracted many investors to IPOs. The IPO subscription process, which remains in effect today, involves two tranches: the online tranche and the offline

[3]Qian, Ritter, and Shao (2024) provide a detailed description of the IPO regulations and their history in China.

tranche. The online tranche is available to both institutional and retail investors, while the offline tranche is limited to institutional investors. Typically, 50% or more of IPO shares are allocated to the online tranche (see Qian, Ritter, and Shao, 2024). The offering price is determined in the offline tranche and then used as the price for the online tranche. In the online tranche, investors are restricted to acquiring up to 0.1% of the shares available, while there is no such constraint in the offline tranche.

Additionally, investors must meet specific holding requirements to participate in IPOs. On the Shanghai Stock Exchange and Shenzhen Stock Exchange, the quota for online tranche IPO subscriptions is calculated based on the average daily holdings of non-restricted A-shares on the respective exchange over the previous 20 trading days. Specifically, every 10,000 Chinese yuan of market value corresponds to 1,000 IPO shares on the Shanghai Stock Exchange, and every 5,000 Chinese yuan of market value corresponds to 500 IPO shares on the Shenzhen Stock Exchange.[4]

2.2. Data

2.2.1. Data sources

Our sample consists of 418 index equity ETFs that acquired IPO shares in the Chinese A-share market between January 2016 and December 2021, representing 91% of all index equity ETFs active during this period.[5] Figure 2 illustrates the significant growth in Chinese index equity ETFs over the sample period.

[Insert Figure 2 here]

We construct the dataset by integrating fund-level, holdings, stock-level, and

[4]Non-restricted A-shares refer to publicly traded shares of Chinese companies that are available for both domestic and foreign investors. These shares are not subject to any restrictions on ownership or transfer, as opposed to restricted A-shares, which are limited to domestic investors and subject to certain ownership restrictions.

[5]There are 461 index equity ETFs during our sample period, and only 43 ETFs do not participate in any IPOs. These ETFs are mostly listed towards the end of the sample period and had not yet had the opportunity to participate in an IPO by December 2021.

primary-market information from several standard Chinese financial databases. At the fund level, we obtain daily data on ETFs and open-end passive index mutual funds from Wind, including closing prices, net asset value, returns, trading volume, turnover, and market capitalization. Daily market capitalization and share creation and redemption records from Wind are used to construct ETF fund flow measures at both the daily and monthly frequencies. For open-end passive index mutual funds, data on total assets are available only at the quarterly frequency. Hence, mutual fund flows are estimated at the quarterly frequency. Wind also provides basic fund characteristics—such as the benchmark index and listing date—and daily and monthly series for the Shanghai Composite Index.

ETF constituent holdings are sourced from the China Stock Market and Accounting Research (CSMAR) database, which reports the daily number of shares of each stock held by each ETF. These files do not, however, include IPO holdings acquired during the subscription process. Daily stock returns and Fama–French three-factor, five-factor, and Carhart four-factor portfolio returns for the Chinese market are also obtained from CSMAR.

Primary-market and IPO participation data are drawn from CSMAR, Wind, and EastMoney. IPO subscription allocations come from CSMAR's IPO allocation files, which report offline institutional allotments. We complement these with manually collected data from EastMoney's IPO inquiry database, which records ETF bids submitted during the book-building process. We further merge these sources with Wind to obtain listing dates, offer prices, and first-day opening prices for all newly listed A-share stocks.

Finally, we construct the prospectus-text dataset by matching ETF prospectuses obtained from the Shanghai and Shenzhen stock exchanges to the monthly ETF panel for January 2016 to December 2021. The prospectus-text dataset covers the 383 ETFs for which at least one prospectus document is available during the sample period.

2.2.2. ETF sample and summary statistics

Table 1 reports monthly summary statistics for our ETF-month panel. We measure fund size as the product of shares outstanding and net asset value at month-end, yielding a sample mean of Chinese yuan 1.80 billion (approximately USD 257 million). The average monthly fund flow is 0.822%, calculated as the monthly change in total net assets minus the fund's monthly return, following Dannhauser and Pontiff (2025). The average daily creation and redemption activity is 0.026%, estimated as the mean daily change in shares outstanding within each calendar month.

Tracking error is the standard deviation of the daily return difference between each ETF and its underlying index, computed within each calendar month. The sample average is 5.24 basis points. We contextualize the average tracking error using Figure 3, which summarizes the key prospectus information governing index-tracking ETFs in our sample. Panel A reports the average daily tracking-deviation cap disclosed in each fund's prospectus. The vast majority of ETFs (213 out of 243, or 87.7%) set this cap at 0.20%, with a cross-sectional mean of 0.201%. This indicates that our sample ETFs have their tracking error well within the limit. These prospectuses also disclose a minimum index investment requirement (see Panel B). Nearly all funds (323 out of 347, or 93.1%) require that at least 90% of net assets be invested in benchmark-index constituents at all times, yielding a cross-sectional mean of 90.33%. The remaining discretionary allocation of up to approximately 10% of net assets may be directed to non-index securities, including IPO subscriptions. Panel C documents the growing prevalence of IPO participation among sample ETFs. The number of funds explicitly disclosing IPO involvement in their prospectuses rises steadily from 15 (34.1% of funds with prospectuses) in 2016 to 105 (28.9%) in 2021, although the proportion declines slightly as the total number of ETFs grows faster.[6]

[6]An ETF is classified as disclosing IPO participation if its prospectus contains explicit references to IPO-related investment activity, including phrases such as "investing in new shares," "subscribing to new shares,"

[Insert Table 1 here]

[Insert Figure 3 here]

2.2.3. Returns from IPO participation

In practice, the tracking error budget operates as the binding constraint rather than the 10% allocation ceiling. To maintain tracking error within the 0.2% limit, ETF managers restrict the scale of IPO subscriptions. This constraint is visible in the summary statistics: sample ETFs hold an average of approximately 26 newly listed stocks per month, with IPO holdings representing on average 0.017% of total net assets.

Despite the modest scale of IPO positions, the return contribution from IPO participation can be economically significant: with average initial IPO returns of 105.35% in the Chinese A-share market during our sample period, even a small allocation to newly listed stocks can generate a meaningful contribution to the fund's monthly excess return.

To measure the return an ETF earns from IPO participation, we first estimate stock-level IPO returns for all 3,028 newly listed stocks over the sample period. We define *IPO_Ret* separately for shares subject to lockup restrictions and those exempt from them. For non-lockup shares, *IPO_Ret* equals the number of allocated shares multiplied by the difference between the aftermarket price, which is the average traded price on the first day of secondary-market trading, and the offering price, $\text{IPO_Ret} = (\ln \text{Avg.price@IPO.open.date} - \ln \text{Offer.price}) \times \text{Num.shares}$. For shares subject to a lockup restriction, during which the ETF may not liquidate its position until the expiration of the restriction period (typically six months), *IPO_Ret* is the number of shares multiplied by the difference between the month-end price at lockup expiry and the offering price, i. e., $\text{IPO_Ret} = (\ln \text{Price@End.of.month} - \ln \text{Offer.price}) \times \text{Num.shares}$. For each ETF *i* in month *t*, the

"participating in new-share subscription," "participating in stock subscription," "primary-market new issuance," "newly issued stocks," or "initial public offerings."

monthly return attributable to IPO participation, *ETF_IPO_Ret*, aggregates *IPO_Ret* across the set of *J* IPOs held by the fund at month-end $\text{ETF_IPO_Ret}_{i,t} = \sum_{j=1}^{J} \frac{\text{IPO_Ret}_{j,t}}{\text{Size}_{i,t-1}}$.

The average monthly *ETF_IPO_Ret* of 0.382% is comparable in magnitude to the average monthly *ETF_Excess_Ret* of 0.312%. *ETF_Excess_Ret* is defined as the difference between the ETF's return and that of its underlying index—a quantity often termed the tracking difference—and serves as our measure of ETF performance relative to the benchmark. The similar magnitudes of *ETF_IPO_Ret* and *ETF_Excess_Ret* support our earlier argument that high initial IPO returns allow even modest IPO allocations to generate economically meaningful excess returns.

2.2.4. A note on the excess return measure

ETF_Excess_Ret, our primary measure of ETF performance relative to the benchmark, warrants three brief comments before we proceed to the main analysis. We first distinguish it from the related concept of tracking error, then flag a mechanical component arising from the price-return nature of most Chinese benchmark indices, and finally clarify its relationship to the authorized participant (AP) arbitrage mechanism in the presence of dividend and IPO cash flows.

Tracking difference versus tracking error. We define the monthly excess return as the difference between the ETF's return and that of its underlying index, a quantity also termed the tracking difference. This concept is distinct from tracking error: tracking error captures the volatility of the daily return gap, measuring how consistently the ETF replicates its benchmark on a day-to-day basis, whereas tracking difference captures the cumulative level of that gap, reflecting whether the ETF systematically over- or underperforms its index. A fund can simultaneously exhibit low tracking error and a persistently positive tracking difference. The summary statistics confirm this is the pattern observed in our sample, with a

mean monthly tracking difference (or *ETF_Excess_Ret*) of 0.312% alongside a mean monthly tracking error of only 5.24 basis points.

The dividend-yield component. An important caveat is that most Chinese benchmark indices are price-return indices that do not incorporate dividend reinvestment, whereas ETFs collect and distribute dividends to investors. Consequently, a portion of the observed tracking difference (*ETF_Excess_Ret*) mechanically reflects the dividend yield of index constituents rather than ETFs' discretionary portfolio activity. However, this mechanical upward bias does not affect our analysis. The dividend yield of a given ETF's benchmark index is largely stable over our sample period, driven primarily by slow-moving cross-sectional variation in index composition. As a result, ETF fixed effects absorb the bulk of this mechanical component at the fund level, and any residual common time trend in dividend yields across funds is absorbed by time fixed effects. Together, the two-way fixed effects leave identification to rely on within-ETF, time-series variation in *ETF_Excess_Ret* that is orthogonal to the dividend-yield component. We return to this issue in Section 6.3, where we confirm that our main results are robust to measuring excess returns against total-return benchmark indices for the subsample of ETFs for which a total-return version of the benchmark index is available.

The AP arbitrage mechanism. This dividend-driven cash component also has implications for interpreting the AP arbitrage mechanism. The tracking difference is the sum of two distinct gaps: the ETF market price relative to net asset value (NAV)—the premium or discount that APs directly arbitrage through the creation and redemption mechanism—and the NAV relative to the index, which reflects the ETF's portfolio composition rather than any pricing inefficiency.

Because dividends are distributed as cash rather than as in-kind index securities, and because IPO gains are also realized in cash, the ETF's NAV mechanically diverges from the price-return index even when the market price of the ETF is perfectly aligned with NAV. Consequently, the tracking difference conflates a structural cash-flow wedge in the

NAV-to-index gap with genuine arbitrage-driven corrections in the price-to-NAV gap. APs close the price-to-NAV gap, which is unaffected by the NAV-to-index divergence driven by dividends and IPO cash flows, since both are held as cash within the ETF portfolio. Cash also serves as the mechanism through which off-benchmark IPO positions are accommodated in the creation and redemption basket.[7] The efficiency of AP arbitrage is preserved regardless of the scale of the ETF's activity in IPOs.

3. Index ETF IPO participation

IPOs in the Chinese A-share market are known for significant underpricing, with Qian, Ritter, and Shao (2024) reporting an average first-day IPO return of 172% between 1990 and 2021. This underpricing explains why Chinese index equity ETFs can generate positive returns from their IPO participation, averaging a 0.382% monthly return (or 4.56% per annum). This observation motivates our *Hypothesis 1*, which asks whether IPO participation generates benefits for both ETF investors and ETFs themselves. On the investor side, ETF IPO participation may allow retail investors, who typically face limited access to the IPO market, to indirectly capture IPO-related returns through ETF holdings. On the fund side, IPO participation may enhance ETF performance and attract investor flows. In this section, we test *Hypothesis 1* by examining how returns from an ETF's IPO participation relate to its excess return, tracking error, and investor flow.

3.1. IPO participation, ETF excess returns, and ETF tracking error

We begin our empirical analysis by examining the relationship between returns from ETF IPO participation and ETF excess returns. Since positive ETF excess returns indicate that ETF

[7]Among the 383 ETFs for which we have parsed prospectus data, 308 mention cash substitution in the subscription and redemption chapter.

investors benefit from their investments, analyzing this relationship will help us assess whether IPO returns are effectively transmitted to ETF investors.

To examine the relationship, we use a Panel OLS model as follows,

$$\text{ETF_Excess_Ret}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}, \quad (1)$$

where *ETF_Excess_Ret* represents the difference between returns from the ETF and the index it follows. *ETF_IPO_Ret* captures the return from the ETF's IPO participation. We include the natural logarithm of ETF size, *ETF_IPO_Num*, the age and reciprocal price of the ETF, and the return from the Shanghai Stock Exchange composite index as control variables. We consider regression models with and without ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. Results are reported in Table 2.

[Insert Table 2 here]

We find that *ETF_IPO_Ret* has a statistically significant positive impact on *ETF_Excess_Ret*, suggesting that the ETF's return from its IPO participation is positively associated with the ETF's excess return. The effect is also economically significant. The regression coefficient, which ranges from 0.339 to 0.487, when multiplied by the average return from ETF IPO participation (approximately 0.382%), accounts for almost half of the average ETF excess return (i.e., the mean of *ETF_Excess_Ret* is about 0.312%). The Panel OLS result remains consistent even when we consider various fixed effects.

Based on Table 2, we observe that ETFs pass their gains from IPO participation to investors through excess returns. However, these higher excess returns may also imply larger tracking error. To formally test this conjecture, we run the following Panel OLS model:

$$\text{Tracking_Error}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}, \quad (2)$$

where *Tracking_Error* is the monthly tracking error. The specification mirrors Eq. (1), replacing *ETF_Excess_Ret* with *Tracking_Error* as the dependent variable. Results are reported in Table 3.

[Insert Table 3 here]

Consistent with our conjecture, *ETF_IPO_Ret* has a statistically significant positive impact on *Tracking_Error*. Multiplying the regression coefficient (ranging from 0.020 to 0.032) by the average return from ETF IPO participation (roughly 0.382%) yields about one basis point. This amount is about one-fifth of the average ETF tracking error (the mean of *Tracking_Error* is about five basis points). The Panel OLS result remains consistent when we consider various fixed effects.

3.2. IPO participation and ETF flows

The IPO participation strategy poses a trade-off for ETF managers. While IPO returns can yield significant excess performance relative to the index that an ETF tracks, they can also increase tracking error. The increase in tracking error may deter investors who prioritize index tracking, potentially leading to a reduction in fund flow. Despite this risk, during our sample period, we observe that most ETFs (418 out of 461) participated in IPOs, suggesting that ETF managers generally believe that the benefit—enhanced performance—outweighs the cost associated with increased tracking error. To examine whether this is the case, we investigate the relationship between ETF fund flows and returns from ETF IPO participation.

Our Panel OLS model is as follows,

$$\text{Flow}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}, \tag{3}$$

where *Flow* is fund flows for ETF *i*, defined as the change in a fund's total net asset value (TNA) minus the return of the fund, i.e., $\text{Flow}_{i,t} = \frac{\text{TNA}_{i,t} - \text{TNA}_{i,t-1} \times (1 + \text{Ret}_{i,t})}{\text{TNA}_{i,t-1}}$. Control variables are the same as in Eq.(1), and we consider regression models with and without ETF and time fixed effects. Since ETF flows can be persistent, we include lagged *Flow* as an additional control variable. Standard errors are clustered at the ETF level and reported in parentheses. Results are reported in Table 4.

[Insert Table 4 here]

We find that ETF IPO participation has a positive and statistically significant effect on ETF flows, as indicated by the significant coefficients of *ETF_IPO_Ret*. The magnitude of the effect is economically significant. It is roughly 3.875×0.382%=1.48%, which is about two times the monthly average ETF flows. This suggests that while returns from ETF IPO participation may alienate some investors who prioritize index tracking, it also attracts other types of investors. Consequently, the overall effect of investors' responses to ETFs profiting from IPO participation is an increase in their investment, manifesting in a significant positive impact of *ETF_IPO_Ret* on *Flow*. Despite the small share of IPO holdings in total net assets, the resulting gains are economically meaningful—not only in magnitude but also in their ability to materially influence investor flow decisions.

3.3. IPO participation and ETF creations/redemptions

It is worth noting that, unlike flows to traditional mutual funds involving only cash exchanges, ETF flows are directly associated with in-kind creations or redemptions by APs. The creation (redemption) mechanism, known as the primary ETF market, involves the AP delivering a basket of the underlying constituents to the ETF sponsor in exchange for an ETF unit. For example, when investors chasing an ETF drive the price above its NAV, an AP may arbitrage by buying the underlying basket and delivering the basket to the ETF sponsor in exchange for creation units of ETF shares. The creation results in an inflow for the ETF. We show the results of regressing ETFs' *Flow* on *Creations/Redemptions* in Panel A of Table 5.

$$\text{Flow}_{i,t} = \beta_1 \text{Creations/Redemptions}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}, \quad (4)$$

where *Creations/Redemptions* are measured as the changes in the shares outstanding of the ETF. Columns [1] and [2] report the regression results at the fund-month and fund-day level, respectively. Control variables are the same as in Eq.(1) but measured at monthly and daily

intervals, respectively.[8] ETF and time fixed effects are applied. We find that *Flow* and *Creations/Redemptions* are positively correlated. The correlation is statistically significant at 1%. The adjusted *R-squared* is about one, indicating a near-perfect linear relationship between *Flow* and *Creations/Redemptions*.

Given the positive correlation between *Flow* and *Creations/Redemptions*, we hypothesize that ETF IPO participation should also affect ETF creations/redemptions. We examine our hypothesis with the following regression,

$$\text{Creations/Redemptions}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}, \quad (5)$$

and we find *that ETF_IPO_Ret* has a significant impact on ETF creations/redemptions. The coefficient, ranging from 0.139 to 0.193, is statistically significant. The impact is also economically significant, as the implied effect, ranging from 0.139×0.382%=0.05% to 0.193×0.382%=0.074% , is greater than the average ETF creations/redemptions of 0.026%.

The significant impact of *ETF_IPO_Ret* on *Creations/Redemptions* suggests that ETF IPO participation could spill over to the trading of ETFs' constituent stocks, creating an externality in the trading environment of underlying stocks. We investigate this externality and evaluate its implications in Section 5, after establishing causality and ruling out alternative explanations in Sections 3.5 and 4.

[Insert Table 5 here]

3.4. Cross-sectional results on ETF excess returns, tracking error, and flows

Although participating in IPOs may deter index-tracking investors, the allure of potentially high returns from such activities tends to attract investors who prioritize ETF excess returns over tracking error. Investors in industry ETFs, who often speculate on industry-level trends, are more likely to prioritize performance over tracking error. In contrast,

[8]We use the daily average *Creations/Redemptions* in a month as the monthly measure of *Creations/Redemptions*, which is why the coefficient of the monthly regression is about 20 times of the coefficient of the daily regression.

the investor base for broad-market index ETFs is more diverse and likely to include a significant portion of index-trackers. In comparison, the impact of IPO participation should be relatively subdued in broad-market index ETFs, and more pronounced in industry ETFs.

To examine the above-mentioned hypothesis, we sort our ETF sample into industry and broad-market index ETFs, then re-run regressions (Eqs. 1-3) for each category separately. We also include a category dummy variable (*Dum_Industry ETF*) interacting with the key independent variable *ETF_IPO_Ret*. The interaction term allows us to test if the relationship between excess returns (or tracking error, or flows, or creations/redemptions) and *ETF_IPO_Ret* is stronger for industry ETFs compared to broad-market index ETFs.

[Insert Table 6 here]

We report our regression results in Table 6. We find that the cross-sectional results largely confirm our hypothesis. Industry ETFs display a stronger positive relationship between *ETF_IPO_Ret* and *ETF_Excess_Ret* (0.659) compared to broad-market index ETFs (0.284). The difference between these two, as indicated by *ETF_IPO_Ret×Dum_Industry ETF*, remains statistically significant at 1%. This suggests that IPO participation in industry ETFs has a stronger association with excess returns than broad-market index ETFs. Similarly, for *Tracking_Error*, industry ETFs also show a higher positive association (0.052) than broad-market index ETFs (0.013), with the differential effect being statistically significant at the 1% level.

ETF_IPO_Ret has a very pronounced effect on *Flow* and *Creations/Redemptions* for industry ETFs (7.189 and 0.347) compared to a much milder effect for broad-market index ETFs (2.607 and 0.129). The interaction term further substantiates the pronounced differential effect on industry over broad-market index ETFs.

Cross-sectional analysis supports our hypothesis that returns from ETF IPO participation have a stronger effect for industry ETFs relative to broad-market index ETFs in terms of excess returns, tracking error, flows, and creations/redemptions.

3.5. Testing the causal relationship with the launch of the STAR market

We have demonstrated a positive association between the returns from ETF IPO participation and excess returns, tracking error, fund flows, and creations/redemptions. It is important to note that these positive relationships do not necessarily imply causation, as omitted variables may drive these relationships. For instance, certain sectors trending upwards may result in more IPOs in those sectors, leading to superior ETF performance and increased fund flows. To address potential endogeneity issues, we leverage the launch of the Science and Technology Innovation Board of the Shanghai Stock Exchange (also known as the STAR market) as a quasi-natural experiment to test for causal relationships.

The launch of the STAR market in July 2019 boosted the number of IPOs on the Shanghai Stock Exchange. In contrast, the Shenzhen Stock Exchange, which is the second-largest stock market in China, does not get significantly more IPOs in the same period. Compared to ETFs tracking indices on the Shenzhen Stock Exchange, ETFs tracking indices on the Shanghai Stock Exchange had more IPO participation as more IPOs became available following the launch of the STAR market. This distinction arises because investors must hold stocks listed on a specific exchange to participate in IPOs on the same exchange in the Chinese A-share market. By combining this institutional feature with the fact that the launch of the STAR market is not influenced by ETFs, we can create an instrumental variable (IV) to identify the increase in IPO participation for ETFs tracking indices from the Shanghai Stock Exchange. We then utilize returns from this exogenous IPO participation to identify causal relationships between the returns from ETF IPO participation and excess returns, tracking error, fund flows, and creations/redemptions.

Specifically, we estimate the IV-2SLS model on a subset of 46 ETFs whose holdings were purely from either the Shanghai or Shenzhen Stock Exchange from January 2016 to July 2020.[9] The regression model consists of two equations, as follows,

$$\text{ETF_IPO_Ret}_{i,t} = \gamma_1 \text{Post}_t \times \text{Treat}_i + \text{Controls} + \text{Fixed Effects} + \eta_{i,t}, \tag{6a}$$

$$\begin{aligned}\text{ETF_Excess_Ret}_{i,t} \text{ or } \text{Tracking_Error}_{i,t} \text{ or } \text{Flow}_{i,t} \text{ or } \text{Creations/Redemptions}_{i,t} \\ = \beta_1 \widehat{\text{ETF_IPO_Ret}}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.\end{aligned} \tag{6b}$$

Post is a time dummy variable, which equals one after July 2019 and zero otherwise. *Treat* is an ETF dummy variable, which equals one for ETFs that purely hold stocks from the Shanghai Stock Exchange and zero for ETFs that purely hold stocks from the Shenzhen Stock Exchange. Eq.(6a) is the first-stage regression, where we identify the effect of the exogenous increase in IPO participation due to the STAR market inception on *ETF_IPO_Ret*. Eq.(6b) is the second-stage regression, where we examine the relationship between the fitted value $\widehat{ETF_IPO_Ret}$ and *ETF_Excess_Ret*, *Tracking_Error*, *Flow*, and *Creations/Redemptions*.

The validity of our IV-2SLS hinges critically on satisfying the exclusion restriction, which requires that the IV impacts the dependent variables (e.g., ETF excess returns, tracking errors, flows, and creations/redemptions) exclusively through its effect on ETF IPO participation. In our setting, the exclusion restriction holds because the launch of the STAR market was driven by regulatory objectives aimed at improving technological innovation in China, rather than by factors directly related to ETF performance. Moreover, ETFs themselves neither influenced the establishment nor the timing of the STAR market launch, suggesting independence between our instrument and potential confounding factors affecting ETF outcomes.

To further strengthen the above-mentioned argument, we control for ETF fixed effects, capturing any time-invariant ETF characteristics that could simultaneously affect the dependent variables and correlate with our IV. We also control for time-variant ETF characteristics, i.e., ETF size, *ETF_IPO_Num*, the age and reciprocal price of the ETF, which may affect the dependent variables and correlate with our IV. Additionally, time fixed effects and the return from the Shanghai Stock Exchange composite index are included to control for

aggregate trends or shocks specific to the Shanghai Stock Exchange relative to the Shenzhen Stock Exchange, ensuring that our IV identifies variation solely through increased IPO returns due to the exogenous expansion of IPO availability following the STAR market's initiation. Finally, by restricting the sample to ETFs that hold stocks exclusively from a single exchange, we ensure that the primary distinction between the two sets of ETFs is driven by their utilization of IPO opportunities, further reinforcing the validity of our identification strategy. Our IV-2SLS results are reported in Table 7 where standard errors are clustered at the ETF level and reported in parentheses.

[Insert Table 7 here]

It is worth noting that our IV-2SLS specifications directly address the concern that stocks listed on the two exchanges are fundamentally different, and that these differences, rather than IPO participation, drive our results. ETF fixed effects absorb any time-invariant differences between the two groups (including the fact that stocks on the two exchanges may be fundamentally different in levels), while time fixed effects control for common shocks. For the concern to threaten identification, one would need to argue that something changed differentially for Shanghai ETFs relative to Shenzhen ETFs around July 2019 through a channel other than IPO participation. Although the STAR market attracted technology and innovation firms that may have generated sector-level attention on the Shanghai Stock Exchange, our 2SLS design addresses this: the second-stage regression uses only the fitted component of *ETF_IPO_Ret* from the first stage, so any direct effect of STAR-related attention on ETF outcomes that does not operate through IPO returns is excluded by construction.

Our IV-2SLS regression results show that returns from IPO participation, *ETF_IPO_Ret*, indeed cause the extra performance compared to the underlying index, *ETF_Excess_Ret*, and increase tracking error. *ETF_IPO_Ret* also causes positive flows and ETF creations/redemptions. Estimation results from the first-stage regression and *F-Test* indicate

that the *Post×Treat* is a valid instrumental variable.

The IV-2SLS results provide direct evidence demonstrating how index ETFs actively take advantage of IPO underpricing in China. Relative to ETFs tracking indices on the Shenzhen Stock Exchange, ETFs tracking indices on the Shanghai Stock Exchange are able to capture more profits from IPOs because: 1). the STAR market inception boosted IPOs; and 2). the Shanghai Stock Exchange requires IPO participants to hold stocks listed on it. The increase in *ETF_IPO_Ret* enables ETFs tracking indices on the Shanghai Stock Exchange to attract greater investor flows (as indicated by the positive impact of *ETF_IPO_Ret* on *Flow*).

4. Ruling out alternative motives for ETF IPO participation

Thus far, we have argued that index ETFs participate in IPO subscriptions primarily to exploit short-term return opportunities arising from IPO underpricing, thereby enhancing benchmark-adjusted performance and attracting investor flows. *Hypothesis 2* examines whether this behavior instead reflects alternative, non-return-seeking motives. In particular, ETF IPO participation could be driven by (i) index-compliance considerations, such as acquiring newly issued stocks that are expected to enter a broad-market index to avoid later overpaying, or (ii) active stock-selection or market-timing motives, which are characteristic of actively managed funds. In this section, we test *Hypothesis 2* by evaluating whether observed IPO participation patterns are consistent with these alternative explanations rather than short-term return exploitation.

We leverage a detailed analysis comparing ETF IPO subscription data with subsequent mandated holding disclosures (semi-annual or annual reports) to trace post-IPO retention patterns. Specifically, we examine whether index ETFs retain IPO shares beyond the initial lockup period—defined either as the stock's first trading day or a six-month horizon following the IPO.[10]

4.1. Transitory holding of IPO shares

If ETF IPO participation were motivated by a compliance requirement (e.g., an ETF tracking a complete market index acquiring all new listings) or persistent active stock picking (active management extending beyond the IPO profit), we would expect ETFs to hold newly issued shares for an extended period following the IPO.

We test this prediction using 158,362 IPO subscription records (i.e., ETF-IPO pairs) from our sample. Among the 119,789 cases in which the lockup period had expired before the first available post-IPO holdings report, approximately 98% of the subscribed shares were no longer held, implying a retention rate of about 2%. For IPOs whose lockup periods extended beyond the first holdings report, the retention rate based on the second holdings disclosure is about 4%. These statistics are summarized in Table 8.

This extremely low rate of post-lockup retention indicates that index ETF participation in IPOs is overwhelmingly transitory, inconsistent with motives such as long-term index compliance or active stock selection. This evidence supports *Hypothesis 2*, indicating that index ETF IPO participation is not primarily driven by benchmark composition or anticipated index inclusion, but rather by return-seeking behavior that targets short-lived opportunities arising from IPO underpricing.

[Insert Table 8 here]

4.2. Cross-industry holding of IPO shares

If index ETF IPO participation reflects active stock selection, then ETF managers deliberately subscribe to IPOs they perceive as underpriced, particularly within industries where they possess informational advantages or valuation expertise. Under this hypothesis, an

industry-focused ETF should be more likely to participate in IPOs within its own industry than in unrelated sectors. In contrast, if ETF IPO participation is primarily return-driven and opportunistic, the pattern of participation should not be systematically concentrated within the ETF's benchmark industry.

To test this prediction, we examine 42 industry ETFs and compare their IPO participation in within- versus out-of-industry offerings in Table 8. The evidence reveals no systematic preference for within-industry IPOs. Over the sample period, these ETFs collectively participated in $23,811$ IPOs, of which approximately 98% ($23,281$ cases) involved offerings outside their benchmark industries. Furthermore, post-IPO retention patterns indicate short-lived holdings and rapid liquidation around the lockup expiration, regardless of whether the subscribed IPOs belong to the ETF's benchmark industry. Specifically, for the 411 cases that involved offerings inside their benchmark industries and in which the lockup period had expired before the first available post-IPO holdings report, approximately 92.5% of the subscribed shares were no longer held. This implies a retention rate of about 7.5%. For within-industry IPOs whose lockup periods extended beyond the first holdings report, the retention rate based on the second holdings disclosure was about 25.2%, largely reflecting cases in which the newly listed stock was subsequently included in the benchmark index.

Overall, we find little evidence in support of the active stock-picking hypothesis. Industry ETFs do not appear to exploit informational advantages within their sectors when subscribing to IPOs. Instead, their participation is broadly opportunistic, consistent with a return-driven motive aimed at capturing short-term gains from IPO underpricing rather than long-term exposure to specific industries. These findings provide further support for *Hypothesis 2*.

5. The externality of index ETF IPO participation

In the previous section, we have shown that ETFs' active IPO participation strategy benefits their investors. Index ETF IPO participation enables investors to obtain returns from primary market investment which might otherwise be difficult to get. However, as ETF IPO participation increases, so do tracking error and ETF creations/redemptions. Studies on the U.S. ETF market have argued that ETF creations/redemptions can lead to volatility that is not driven by fundamental factors (see Ben-David, Franzoni, and Moussawi, 2018, and Brown, Davies, and Ringgenberg, 2021). This leads us to hypothesize that index ETF IPO participation can increase non-fundamental volatility in constituent stocks through the induced-flow channel. Because the affected stocks do not influence ETFs' IPO participation decisions or the resulting flow responses, any flow-driven increase in non-fundamental volatility borne by these stocks constitutes a pecuniary externality (*Hypothesis 3*).

5.1. Short-term increase in member stocks' non-fundamental volatility

To test our hypothesis, we apply a similar IV-2SLS regression around the launch of the STAR market (as in Section 3.5) to the constituent stocks of the 46 ETFs used in Section 3.5. Specifically, our regression model is as follows,

$$\text{ETF_Performance}_{s,t} = \gamma_1 \text{Post}_t \times \text{Treat}_s + \text{Controls} + \text{Fixed Effects} + \eta_{s,t}, \tag{7a}$$

$$\text{Volatility}_{s,t} = \beta_1 \widehat{\text{ETF_Performance}}_{s,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{s,t}. \tag{7b}$$

where *ETF_Performance* is the stock-level measurement summarizing the performance measure (e.g., *Excess_Ret*, *Tracking_Error*, and *Creations/Redemptions*) of ETFs in which stock *s* is included. Specifically, for each stock in the subset ETF sample used in Section 3.5, we take the weighted average of ETF performance measure for all ETFs that the stock *s* belongs to. The weight is each ETF's holding shares of the stock divided by total shares held by this subset of ETFs. We do not include ETF flows, as they are positively correlated with ETF creations/redemptions, which more directly and precisely capture the ETF's impact on

the trading of its constituent stocks. *Treat* is the stock dummy variable that equals one if the stock is held by ETFs holding stocks exclusively from the Shanghai Stock Exchange and zero if held by ETFs holding stocks exclusively from the Shenzhen Stock Exchange. *Post* is a time dummy variable, which equals one after July 2019 and zero otherwise.

Eq.(7a) tests if the launch of the STAR market impacts the stock-level ETF performance measure. Then in Eq.(7b), we regress the monthly volatility for all ETF member stocks on the fitted value $\widehat{ETF_Performance}$. Monthly volatility is defined as 100 times the annualized standard deviation of daily stock returns within each calendar month. For control variables, we include the commonly used time-variant characteristics, i.e., the natural logarithm of the market capitalization, leverage ratio, ROE, institutional ownership, PE ratio, turnover, and the natural logarithm of the trading volume. To account for potential autocorrelation in volatility, we control for the lagged *Volatility*, though excluding it does not alter the results. We include stock fixed effects to control for time-invariant characteristics and time fixed effects to control for any aggregate time trends. These controls support the plausibility of the exclusion restriction. Standard errors are clustered at the stock level and reported in parentheses. We report the results in Table 9.

[Insert Table 9 here]

We find that the fitted value $\widehat{ETF_Performance}$ leads to an increase in volatility for the ETF's constituent stocks. The effect is statistically significant at 1%. In terms of the economic magnitude, the effect is roughly $0.610 \times \underbrace{0.297\%}_{\text{Avg.ETF_Excess_Ret}} = 0.182\%$, which is over eight times the average monthly volatility change, i.e., $\Delta Volatility$ (about 0.022%).

Our findings in Table 9 are consistent with our hypothesis that index ETF IPO participation leads to non-fundamental volatility in the constituent stocks. Furthermore, if the change in volatility is not driven by fundamental factors but a temporary demand shock, it should be relatively short-lived and subsequently reverse. To test this prediction, we examine

the stock volatility in the subsequent *t+1* month, using the same regression specification as in Eq.(7a) and (7b), except that the dependent variable, *Volatility*, is measured at *t+1*.[11] Results are reported in Table 10.

[Insert Table 10 here]

Table 10 confirms our predictions, showing that the fitted value $\widehat{ETF_Performance}$ has a negative impact on the subsequent change in stock volatility. The effect is statistically significant at 1%.

Our findings from Tables 9 and 10 provide evidence supporting our hypothesis that index ETF IPO participation leads to a temporary increase in stock volatility. This is driven by the non-fundamental demand shocks from ETF creations/redemptions (column [6] in Tables 9 and 10). Trading related to ETF creations/redemptions introduces non-fundamental movement to stock returns.

5.2. Return reversal among member stocks

A related prediction concerns the directional impact of ETF creations/redemptions on stock returns. If stock demand is price-inelastic, the price pressure from the demand shock related to ETF creations/redemptions would lead to directional predictions on stock returns. Specifically, net ETF creations trigger a temporary surge in buying pressure, which would push up prices and result in temporary positive stock returns. Subsequently, as price pressure dissipates, stock prices fall, and returns turn negative.

We test the hypothesis that price pressure driven by index ETF IPO participation leads to return reversals with the following IV-2SLS regression:

$$\text{ETF_Performance}_{s,t} = \gamma_1 \text{Post}_t \times \text{Treat}_s + \text{Controls} + \text{Fixed Effects} + \eta_{s,t}, \quad (8a)$$

[11]Since we control for lagged volatility, the relevant lag in the volatility regressions for Table 10 is volatility at time *t*, which is a subtle but important difference from the control set used in Eqs. (9a)–(9b). This distinction generates minor discrepancies in the first-stage regression results reported in Tables 9 and 10.

$$\text{Return}_{s,t} = \beta_1 \widehat{\text{ETF_Performance}}_{s,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{s,t}. \quad (8b)$$

where *Return* is monthly stock returns. We consider both the market-adjusted (by subtracting the market return) and risk-adjusted (by using Fama-French three/five and Fama-French-Carhart four-factor adjustments) stock returns. Control variables are similar to Eqs.(7a) and (7b) except that lagged volatility is replaced with lagged returns to account for return autocorrelation. Stock and time fixed effects are also included. Standard errors are clustered at the stock level and reported in parentheses. We report the regression results in Table 11.

[Insert Table 11 here]

We see from Panels A to C in Table 11 that the ETF's constituent stocks exhibit a short-term reversal in their monthly returns. Specifically, the fitted value of $\widehat{ETF_Performance}$, i. e. , $\widehat{ETF_Excess_Ret}$, $\widehat{Tracking_Error}$, and $\widehat{Creations/redemptions}$, leads to a contemporaneous positive return, which turns negative in the following month. The effects are statistically significant. In terms of the economic magnitude of the reversal, the subsequent reversal erases positive returns accumulated in the contemporaneous month. For example, $\widehat{ETF_Excess_Ret}$ leads to roughly a Fama-French five-factor-adjusted return of $2.127 \times \underbrace{0.297\%}_{\text{Avg.ETF_Excess_Ret}} = 0.632\%$ in the current month, but a negative return of about $-0.925 \times \underbrace{0.297\%}_{\text{Avg.ETF_Excess_Ret}} = -0.275\%$ in the following month. Tables 9 to 11 confirm our hypothesis that index ETF IPO participation leads to stock return movements that are driven by non-fundamental factors.

5.3. The price elasticity of the Chinese stock market

We show in the preceding analysis that index ETF participation in IPOs induces transitory price movements, with returns exhibiting significant reversion. This pattern is

consistent with temporary price pressure rather than changes in fundamental valuations. To quantify the magnitude of this non-fundamental price impact, we next estimate the demand elasticity of stocks in the Chinese A-share market.

This exercise represents a novel contribution, as we are, to our knowledge, the first to provide direct elasticity estimates for the Chinese equity market—offering new evidence outside the predominantly U.S.-focused literature. Specifically, we examine how stock prices respond to exogenous demand shocks generated by ETF flows associated with IPO participation. The resulting elasticity parameter provides a structural measure of the slope of the inverse demand curve, linking the transitory price pressure documented earlier to the broader market externality created by ETFs' active management.

To estimate demand elasticity, we use a similar IV-2SLS framework to that in Section 5.2. Specifically,

$$\Delta\text{Demand}_{s,t} = \gamma_1 \text{Post}_t \times \text{Treat}_s + \text{Controls} + \text{Fixed Effects} + \eta_{s,t}, \tag{9a}$$

$$\text{Return}_{s,t} = \beta_1 \Delta\widehat{\text{Demand}}_{s,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{s,t}, \tag{9b}$$

where $\Delta\text{Demand}_s = \frac{\sum_{s\in\text{ETF(i)}} w_{s,i}\text{Creations/redemptions}_i}{\text{Shares outstanding}_s} \times 100$, s is the index of the ETF's constituent stock, i is the index of the ETF that s sits in, and $w_{s,i}$ is the weight. In words, *ΔDemand* captures the stock level trading induced by ETF flows. Control variables are similar to Eqs.(8a) and (8b). Stock and time fixed effects are included. Standard errors are clustered at the stock level and reported in parentheses. We report the regression results in Table 12.

[Insert Table 12 here]

We use Eq.(9a) to identify the exogenous component of stock-level demand arising from inflows to ETFs tracking Shanghai-based indices following the launch of the STAR Market. As shown in Section 3.5, the STAR introduction represents a regulatory change that differentially affected flows to ETFs tracking Shanghai- versus Shenzhen-based indices. This

differential impact arises from variation in ETF IPO participation rather than contemporaneous stock fundamentals, providing a plausibly exogenous source of variation in stock-level demand. We then use Eq.(9b) to trace the price response to this exogenous demand, yielding the slope of the inverse demand curve for stocks in the Chinese A-share market. The regression coefficient in Eq.(9b) thus quantifies the price sensitivity to flow-induced, non-fundamental demand shocks—our estimate of the Chinese stock market's demand elasticity.[12]

Looking at the market-adjusted return, we obtain a demand elasticity of approximately -6: a one-percentage-point increase in stock demand induced by ETF flows leads to a 0.165% increase in the stock's idiosyncratic monthly return. Similar magnitudes arise when using alternative measures of risk-adjusted returns—for instance, the Fama-French five-factor-adjusted return yields an elasticity of -5. All estimates are statistically significant at the 1% level. Overall, the implied price elasticity of stocks in the Chinese A-share market lies well within the range documented in prior studies. For comparison, Wurgler and Zhuravskaya (2002) report that most price elasticity estimates in past studies fall within the range of -1 to -20. Our results indicate that Chinese stock prices respond with similar inelasticity to demand shocks as documented in the literature, implying that ETF IPO participation can generate sizable but short-lived deviations from fundamental values.

5.4. Do ETFs internalize the externality? Evidence from ETF-level volatility

A defining feature of the externality is that the agents generating it do not internalize its equilibrium consequences. In our setting, we have so far posited, implicitly, that ETF managers and investors capture the private benefits of IPO participation while remaining

[12]Following Chang, Hong, and Liskovich (2014), we define the price elasticity as:

$$\text{Elasticity} = -\frac{1}{\text{Return}/\Delta\text{Demand}}$$

insulated from the short-term, non-fundamental volatility transmitted to the underlying stocks. This assumption is economically reasonable if the volatility increase induced by ETF flows manifests primarily at the individual-stock level and is largely idiosyncratic. When such shocks diversify away at the portfolio level, the ETF's own risk profile remains essentially unchanged even as IPO participation enhances its returns. In this case, neither ETF managers nor ETF investors bear the volatility costs imposed on constituent stocks, meaning that the excess volatility created by ETF IPO participation is not internalized and thus constitutes a pecuniary externality.

[Insert Table 13 here]

We test this implication by estimating whether index ETF IPO participation affects the volatility of the ETF itself. Table 13 reports results from panel OLS regressions and an IV specification that uses the launch of the STAR market to instrument for ETF-level IPO returns. Across all specifications, we find no statistically significant relationship between index ETF IPO participation (measured by *ETF_IPO_Ret*) and ETF-level volatility. The IV first-stage is strong (*F*-statistic = 457.35), yet the second-stage coefficient remains small and statistically insignificant. Our control variables include the natural logarithm of ETF size, the number of IPOs by the ETF, the age and reciprocal price of the ETF, the return from the Shanghai Stock Exchange composite index and the lagged ETF volatility. We also include both ETF and time fixed effects. Standard errors are clustered at the ETF level.

These null results confirm our implicit assumption that the volatility induced by ETF IPO participation in the underlying stocks is non-fundamental and trade-related, resembling transitory idiosyncratic return fluctuations. While such shocks elevate stock-level volatility, they are diversified within the ETF's portfolio. As a result, the ETF does not experience a corresponding increase in its own volatility and therefore does not internalize the externality it imposes on constituent stocks.

Taken together, our empirical evidence supports the presence of a pecuniary externality

associated with index ETF IPO participation: the agents who benefit from IPO participation do not bear the volatility costs imposed on the underlying market. Importantly, this externality does not arise mechanically from IPO participation itself. Rather, IPO participation acts as a catalyst for investor inflows and ETF share creations, which transmit flow-driven demand shocks to underlying stocks. The resulting increase in non-fundamental volatility is borne by other market participants and emerges only indirectly from the initial ETF IPO participation decision.

6. Extensions and robustness

In this section, we extend and stress-test our main findings along three dimensions. First, in Section 6.1, we examine ETF flows at the daily frequency to distinguish between performance-chasing and forward-looking investor behavior, shedding light on the timing and nature of the flow response to IPO participation. Second, in Section 6.2, we conduct a cross-vehicle comparison using open-end passive index mutual funds, showing that the excess return and flow patterns we document are specific to ETFs rather than a general feature of passive investing. Third, in Section 6.3, we address a measurement concern raised in Section 2.2.4 by confirming that our main results are robust to measuring excess returns against total-return benchmark indices.

6.1. Daily ETF flow analysis

So far, we have argued and shown that the channel through which ETF IPO participation generates externalities operates through flows. To understand when and how ETF flows respond to IPOs, it is essential to observe both the timing of investor demand for the ETF and the accompanying price signals. Monthly data are too coarse for this purpose. We therefore

turn to the daily frequency, which enables us to pinpoint the exact IPO date for shares subscribed by the ETF, track net share creations in the days that follow, and relate these flow responses to both the IPO's first-day return and the ETF's own performance (its excess return).

We run the following OLS on the ETF-day panel,

$$\text{Flow}_{i,\tau+1} = \beta_1 \text{ETF_Excess_Ret}_{i,\tau} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,\tau+1}, \tag{10a}$$

$$\begin{aligned}\text{Flow}_{i,\tau+1} = {} & \beta_1 \text{ETF_Excess_Ret}_{i,\tau} + \beta_2 \text{Realized_IPO_Ret}_{i,\tau} \\ & + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,\tau+1},\end{aligned} \tag{10b}$$

$$\begin{aligned}\text{Flow}_{i,\tau+1} = {} & \beta_1 \text{ETF_Excess_Ret}_{i,\tau} + \beta_2 \text{Realized_IPO_Ret}_{i,\tau} \\ & + \beta_3 \text{Expected_IPO_Ret}_{i,\tau} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,\tau+1},\end{aligned} \tag{10c}$$

$$\begin{aligned}\text{Flow}_{i,\tau+1} = {} & \beta_1 \text{ETF_Excess_Ret}_{i,\tau} + \beta_2 \text{Realized_IPO_Ret}_{i,\tau} \\ & + \beta_3 \text{Expected_IPO_Ret}_{i,\tau} + \beta_4 \text{Expected_Excess_Ret}_{i,\tau} \\ & + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,\tau+1},\end{aligned} \tag{10d}$$

Flow and *ETF_Excess_Ret* are constructed analogously to those in Sections 3.1 and 3.2, but measured at the daily frequency, i.e., day τ. *Realized_IPO_Ret* is the weighted sum of first-day returns of IPOs subscribed by ETF i on day τ, where the weight equals the subscribed value of the IPO stock divided by the market value of the ETF. *Expected_IPO_Ret* is constructed in the same manner as *Realized_IPO_Ret* except it is measured on day τ+2, the next trading day following the τ+1 *Flow* observation. In other words, *Expected_IPO_Ret* is the future *Realized_IPO_Ret*. We use this future *Realized_IPO_Ret* as a proxy for investors' expectations of future first-day returns of IPOs held by the ETF. Likewise, we use the future realized *ETF_Excess_Ret* to capture investors' expectations of subsequent ETF performance. These two variables, *Expected_IPO_Ret* and *Expected_Excess_Ret*, are designed to capture investors' forward-looking behavior.

Using Eqs. (10a)-(10d), we examine how ETF flows respond to ETF performance and IPO first-day returns. The coefficient on *ETF_Excess_Ret* captures whether ETF investors engage in performance chasing. That is, it captures whether they increase their demand for an ETF following positive excess returns. The horse-race regression that includes *Realized_IPO_Ret* allows us to assess which signal investors rely on more strongly when

allocating capital to ETFs. The subsequent inclusion of *Expected_IPO_Ret* tests whether investors are forward-looking. Specifically, it tests whether they increase ETF demand in anticipation of higher first-day returns from upcoming IPOs held by the ETF. Finally, by adding *Expected_Excess_Ret* to the regression, we can disentangle whether investors' forward-looking behavior is primarily driven by expectations of future IPO returns or by expectations of future ETF performance.

In these regressions, we control for the lagged flow, the natural logarithm of daily ETF size, the turnover ratio, and the natural logarithm of ETF trading volume. We also include both ETF and time fixed effects. Standard errors are clustered at the ETF level. Our regression results are reported in Table 14.

[Insert Table 14 here]

We find a clear next-day response of ETF flow to performance. Across columns [1]-[4], we find that *ETF_Excess_Ret* is always positive (centered around 0.59) and statistically significant at the 1% level. This is consistent with ETF investors' performance-chasing behavior, which is also documented in the U.S. market (see Dannhauser and Pontiff, 2025). In addition to the common performance-chasing behavior, we find that Chinese ETF investors change their demand in response to first-day returns of IPOs that the ETF held. In particular, ETF flow is negatively related to realized first-day returns (*Realized_IPO_Ret*) but positively related to future expected first-day returns (*Expected_IPO_Ret*). Coefficients are statistically significant at the 10% and 1% level. Although the coefficient on *Expected_IPO_Ret* drops about 30% after we include *Expected_Excess_Ret*, it remains statistically significant. Taken together, these results suggest that ETF flow reflects the behavior of both naive and sophisticated investors. Naive investors react primarily to ETF-level performance, chasing past winners and speculating on future winners. Sophisticated investors trade on returns from the ETF's IPO subscription. They sell, after IPO gains are realized; and buy, in anticipation of

future IPO-related profits.

Our daily analysis unpacks the mechanism behind the monthly flow patterns documented earlier.[13] We find that ETF daily flow reacts both to ETF-level performance and to the first-day returns of IPOs subscribed by the ETF. These daily responses accumulate over time, generating the aggregate monthly inflow caused by ETF IPO participation. This daily flow analysis reinforces the earlier finding that ETF IPO participation systematically attracts investor demand, thereby confirming the externality channel through which index ETFs' active management transmits non-fundamental shocks to the broader market.

6.2. Comparing index ETFs with index mutual funds

Our main results show that ETF IPO participation generates excess returns and attracts investor flows into the fund. A natural question is whether these patterns are specific to ETFs or whether other passive vehicles, such as index mutual funds, would exhibit similar behavior. We collect a sample of 244 open-end index mutual funds over the sample period and compare them with our ETF sample.

To capture index mutual fund IPO participation, we construct a similar *ETF_IPO_Ret* measure for passive index mutual funds, referred to as *Fund_IPO_Ret*. We then examine how it relates to *Fund_Excess_Ret*, *Tracking_Error*, and *Flow* for index mutual funds. The first two fund-level performance measures are constructed in the same manner as their ETF counterparts. *Flow* measure is constructed at the quarterly frequency, as total net assets for mutual funds are reported only at that frequency. Following this, we re-run Eqs. (1)-(3) with the index mutual fund sample and report our results in Table 15.

[Insert Table 15 here]

[13]We also replicate our main monthly panel regressions (Tables 2–5) at the daily frequency. The results, reported in Appendix Table 2, are consistent with our monthly findings.

The results reveal a striking contrast with our ETF findings. Similar to ETFs, index fund IPO participation is associated with elevated tracking error. The coefficient on *Fund_IPO_Ret* is positive and statistically significant in column [2] of Table 15. However, unlike ETFs, mutual fund IPO participation does not translate into higher excess returns or stronger investor flows. The coefficients on *Fund_IPO_Ret* are statistically insignificant for both *Fund_Excess_Ret* (column [1]) and *Flow* (columns [3] and [4]). These results suggest that the excess return and flow patterns we document are specific to ETFs rather than a general feature of passive vehicles that participate in the IPO market.

6.3. *ETF_Excess_Ret* based on total return of the index

In Section 2.2.4, we note that most Chinese benchmark indices are price-return indices that do not incorporate dividend reinvestment, so a portion of *ETF_Excess_Ret* mechanically reflects the dividend yield of index constituents. We argue that this mechanical component does not affect our analysis because it varies little within funds over time and is therefore absorbed by ETF and time fixed effects. We now provide direct evidence supporting this argument.

For the subsample of ETFs with an available total-return benchmark, we measure the dividend component directly as the difference between *ETF_Excess_Ret*, computed against the price-return index, and *ETF_Excess_Ret_Tr*, computed against the total-return index. Panel A of Table 16 reports the results of this absorption test. The mean dividend wedge is 9.0 basis points per month, confirming that the mechanical component is present but modest. However, after including ETF and time fixed effects, this wedge is fully absorbed. This is consistent with the argument in Section 2.2.4 that the dividend component represents a cross-sectional level difference across funds and a common time trend, rather than within-fund time-series variation in the excess return.

Panel B of Table 16 replicates our main specifications using *ETF_Excess_Ret_Tr* in

place of *ETF_Excess_Ret* as the dependent variable. The coefficient on *ETF_IPO_Ret* remains positive and statistically significant across all specifications, confirming that the positive association between IPO participation and ETF excess returns is not an artifact of the mechanical dividend component in the price-return-based measure.

[Insert Table 16 here]

7. Conclusion

In summary, our findings demonstrate that Chinese index ETFs' IPO participation offers significant benefits to investors by providing access to IPO returns that might otherwise be unattainable. This discretionary portfolio activity by index ETFs (distinct from actively managed ETFs, which do not track a benchmark) enhances the benefits for investors. However, our analysis also reveals that increased IPO participation by ETFs is associated with a rise in tracking error and ETF flows and creations. These activities contribute to a non-trivial increase in non-fundamental volatility and short-term return reversals in the ETF's constituent stocks, while leaving the ETF's own volatility unchanged.

Although, at first glance, index ETF IPO participation in China seems like a unique example of index ETFs' active management, the distinct context does help us understand the trade-offs of ETF activeness. While such discretionary activity yields additional returns and attracts investor inflows for ETFs, the success of index ETFs' discretionary activity also creates non-fundamental price movements that could distort prices. This economic trade-off of index ETF activeness is by no means exclusive to the Chinese setting. As ETFs continue to expand globally, discretionary ETF management practices will likely grow in tandem. Understanding the long-term implications of such activeness remains paramount for investors, regulators, and policymakers worldwide.

Reference

Ben-David, I., Franzoni, F., & Moussawi, R. (2018). Do ETFs increase volatility?. Journal of Finance, 73(6), 2471-2535.

Ben-David, I., Franzoni, F., Kim, B., & Moussawi, R. (2023). Competition for attention in the ETF space. Review of Financial Studies, 36(3), 987-1042.

Bhojraj, S., Mohanram, P., & Zhang, S. (2020). ETFs and information transfer across firms. Journal of Accounting and Economics, 70(2-3), 101336.

Brogaard, J., Heath, D., & Huang, D. (2025). ETF sampling and index arbitrage. Journal of Financial and Quantitative Analysis, forthcoming.

Brown, D. C., Davies, S. W., & Ringgenberg, M. C. (2021). ETF arbitrage, non-fundamental demand, and return predictability. Review of Finance, 25(4), 937-972.

Chan, K., Wang, J., & Wei, K. J. (2004). Underpricing and long-term performance of IPOs in China. Journal of Corporate Finance, 10(3), 409-430.

Chang, Y., Hong, H. & Liskovich, I. (2014). Regression discontinuity and the price effects of stock market indexing. Review of Financial Studies, 28, 212-246.

Chen, Y., Wang, S. S., Li, W., Sun, Q., & Tong, W. H. (2015). Institutional environment, firm ownership, and IPO first-day returns: Evidence from China. Journal of Corporate Finance, 32, 150-168.

Cheng, S., Massa, M., & Zhang, H. (2019). The unexpected activeness of passive investors: A worldwide analysis of ETFs. Review of Asset Pricing Studies, 9(2), 296-355.

Cheung, Y. L., Ouyang, Z., & Tan, W. (2009). How regulatory changes affect IPO underpricing in China. China Economic Review, 20(4), 692-702.

Cong, L. W., & Howell, S. T. (2021). Policy uncertainty and innovation: Evidence from initial public offering interventions in China. Management Science, 67(11), 7238-7261.

Dannhauser, C. D., & Dathan, M. (2023). Passive investors in primary bond markets. Available at SSRN 4673698.

Dannhauser, C. D., & Pontiff, J. (2025). Flow. Available at SSRN 3428702.

Da, Z., & Shive, S. (2018). Exchange traded funds and asset return correlations. European Financial Management, 24(1), 136-168.

Glosten, L., Nallareddy, S., & Zou, Y. (2021). ETF activity and informational efficiency of underlying securities. Management Science, 67(1), 22-47.

Gorton, G. B. & Pennacchi, G. G. (1993). Security baskets and index-linked securities. Journal of Business, 66(1), 1-27.

Hu, D., Liang, H. & Yuan, Z. (2024). Excess return and tracking errors of Chinese ETFs.

Finance Research Letter, 67.

Huang, S., O'Hara, M., & Zhong, Z. (2021). Innovation and informed trading: Evidence from industry ETFs. Review of Financial Studies, 34(3), 1280-1316.

Huang, S., Song, Y., & Xiang, H. (2024). The smart beta mirage. Journal of Financial and Quantitative Analysis, 59(6), 2515-2546.

Israeli, D., Lee, C. M., & Sridharan, S. A. (2017). Is there a dark side to exchange traded funds? An information perspective. Review of Accounting Studies, 22, 1048-1083.

Koont, N., Ma, Y. M., Pastor, L., & Zeng, Y. (2025). Steering a ship in illiquid waters: Active management of passive funds. Review of Financial Studies, 38(10), 2887-2935.

Moussawi, R., Shen, K., & Velthuis, R. (2025). The role of taxes in the rise of ETFs. Review of Financial Studies, 38(10), 2988-3039.

Qian, Y., Ritter, J. R., & Shao, X. (2024). Initial public offerings Chinese style. Journal of Financial and Quantitative Analysis, 59(1), 1-38.

Tian, L. (2011). Regulatory underpricing: Determinants of Chinese extreme IPO returns. Journal of Empirical Finance, 18(1), 78-90.

Wurgler, J. & Zhuravskaya, E. (2002). Does arbitrage flatten demand curves for stocks? Journal of Business, 75, 583–608.

Zhang, Y., Derrien, F., Wu, X., & Zeng, Q. (2021). The unintended consequences of regulations in emerging financial markets: Evidence from the Chinese IPO market. Emerging Markets Finance and Trade, 57(9), 2583-2603.

Table 1: Summary statistics for the sample

Table 1 provides the summary statistics on the (ETF and month) panel data of our sample. The size of the ETF is calculated as its outstanding shares times the net asset value at the end of each month. The monthly tracking error is the standard deviation of daily tracking error in the month, where daily tracking error is calculated as the difference between daily returns from the ETF and index it follows. Fund flow is calculated as the monthly change in total net assets minus the fund's monthly return. Daily creation and redemption activity is estimated as the daily change in shares outstanding. *ETF_IPO_Num* is the number of newly listed stocks in the ETF's monthly holdings. *ETF_IPO/ETF Size* is the ratio of the value of an ETF's IPO holdings to its total net assets at the month-end. The *ETF_IPO_Ret* is calculated with the following two steps: First, compute the stock-level IPO return, *IPO_Ret*, that is calculated as (a). For shares that are not subject to lockup, we consider the number of shares times the difference between the aftermarket price (the average traded price on the first trading date since the IPO) and the offering price as the total IPO return, i.e., IPO_Ret = (ln Avg.price IPO.open.date − ln Offer.Price)×Num.shares; (b). For shares subject to lockup, since the ETF cannot sell the newly listed shares until the lockup period has expired (typically six months), we consider the number of shares times the difference between the end-of-month price and the offer price as the total IPO return for the first six months since the IPO, i.e., IPO_Ret = (ln End.of.month Price − ln Offer.price)×Num.shares. Then, for each ETF, we define the monthly return from its IPO participation (*ETF_IPO_Ret*) as $\mathrm{ETF_IPO_Ret}_{i,t} = \sum_{j=1}^{J} \frac{\mathrm{IPO_Ret}_{j,t}}{\mathrm{Size}_{i,t-1}}$, where J is the total number of IPOs the ETF i has subscribed to by the end of month t. The ETF monthly excess return is defined as the difference between monthly returns from the ETF and the index it follows.

	Mean	Std	5%	25%	50%	75%	95%
Size (billion RMB)	1.797	4.058	0.022	0.027	0.306	1.284	9.951
100×Tracking_Error (%)	5.236	5.676	0.874	1.993	3.550	6.064	15.505
Flow(%)	0.822	17.949	-21.784	-5.224	-0.453	3.239	26.743
Creations/Redemptions(%)	0.026	0.829	-1.078	-0.244	-0.016	0.177	1.283
ETF_IPO_Num	26.283	28.349	0	4	15	43	85
ETF_IPO/ETF Size (%)	0.017	0.070	0	0.001	0.005	0.015	0.056
ETF_IPO_Ret (%)	0.382	0.636	0	0.019	0.142	0.459	1.561
ETF_Excess_Ret (%)	0.312	0.637	-0.266	-0.020	0.146	0.462	1.496

Table 2: The impact of IPO participation on excess return

Table 2 reports the Panel OLS results analyzing the impact of ETF IPO participation on excess return, i.e.,

$$\text{ETF_Excess_Ret}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

The dependent variable *ETF_Excess_Ret* represents the monthly return differential between the ETF and its benchmark index. *ETF_IPO_Ret* quantifies returns specifically from IPO participation. For each ETF, we define the monthly return from its IPO participation as $\text{ETF_IPO_Ret}_{i,t} = \sum_{j=1}^{J} \frac{\text{IPO_Ret}_{j,t}}{\text{Size}_{i,t-1}}$, where *J* is the total number of IPOs the ETF *i* has subscribed to by the end of month *t*. *IPO_Ret* is the IPO return. *Size* is the market capitalization of the ETF calculated as its outstanding shares times the net asset value at the end of each month. Controls include the natural logarithm of ETF size, the number of IPOs by the ETF, the age and reciprocal price of the ETF, and the return from the Shanghai Stock Exchange composite index. We include specifications both with and without ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. ***, **, and *, represent significance levels at 1%, 5%, and 10%, respectively.

DepVar.	*ETF_Excess_Ret*			
	[1]	[2]	[3]	[4]
ETF_IPO_Ret	**0.408*** **	**0.339*** **	**0.487*** **	**0.398*** **
	(0.044)	**(0.039)**	**(0.045)**	**(0.038)**
Controls	Yes	Yes	Yes	Yes
Fixed.Effects		Time	ETF	ETF, Time
Adj. R-squared	0.232	0.424	0.213	0.421
Num.Obs.	9,772			

Table 3: The impact of IPO participation on tracking error

Table 3 reports the Panel OLS results analyzing the impact of ETF IPO participation on tracking error, i.e., $\text{Tracking_Error}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}$.

The dependent variable *Tracking_Error* represents the monthly tracking error defined as the standard deviation of the daily tracking error in the month. The daily tracking error is the difference between the return from the ETF and its benchmark index. *ETF_IPO_Ret* quantifies returns specifically from IPO participation. For each ETF, we define the monthly return from its IPO participation as $\text{ETF_IPO_Ret}_{i,t} = \sum_{j=1}^{J} \frac{\text{IPO_Ret}_{j,t}}{\text{Size}_{i,t-1}}$, where *J* is the total number of IPOs the ETF *i* has subscribed to by the end of month *t*. *IPO_Ret* is the IPO return. *Size* is the market capitalization of the ETF calculated as its outstanding shares times the net asset value at the end of each month. Controls include the natural logarithm of ETF size, the number of IPOs by the ETF, the age and reciprocal price of the ETF, and the return from the Shanghai Stock Exchange composite index. We include specifications both with and without ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. ***, **, and *, represent significance levels at 1%, 5%, and 10%, respectively.

DepVar.	*Tracking_Error*			
	[1]	[2]	[3]	[4]
ETF_IPO_Ret	**0.026*** **	**0.020*** **	**0.032*** **	**0.025*** **
	(0.005)	**(0.004)**	**(0.005)**	**(0.005)**
Controls	Yes	Yes	Yes	Yes
Fixed.Effects		Time	ETF	ETF, Time
Adj. R-squared	0.121	0.197	0.121	0.232
Num.Obs.	9,772			

Table 4: The impact of IPO participation on fund flows

Table 4 reports the Panel OLS results analyzing the impact of ETF IPO participation on fund flows, i.e.,

$$\text{Flow}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \beta_2 \text{Flow}_{i,t-1} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

The dependent variable *Flow* represents monthly fund flows for ETFs, which is the monthly change in the ETF's total net asset value net of its monthly return. *ETF_IPO_Ret* quantifies returns specifically from IPO participation. For each ETF, we define the monthly return from its IPO participation as $\text{ETF_IPO_Ret}_{i,t} = \sum_{j=1}^{J} \frac{\text{IPO_Ret}_{j,t}}{\text{Size}_{i,t-1}}$, where *J* is the total number of IPOs the ETF *i* has subscribed to by the end of month *t*. *IPO_Ret* is the IPO return. *Size* is the market capitalization of the ETF calculated as its outstanding shares times the net asset value at the end of each month. Controls include the natural logarithm of ETF size, the number of IPOs by the ETF, the age and reciprocal price of the ETF, and the return from the Shanghai Stock Exchange composite index. We add the lagged *Flow* to control for the fund flow persistence. We include specifications both with and without ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. ***, **, and *, represent significance levels at 1%, 5%, and 10%, respectively.

Dep Var.	*Flow*			
	[1]	[2]	[3]	[4]
ETF_IPO_Ret	**3.007*** **	**2.870*** **	**3.980*** **	**3.875*** **
	(0.504)	**(0.517)**	**(0.668)**	**(0.647)**
Lag Flow	0.206***	0.207***	0.127***	0.125***
	(0.019)	(0.020)	(0.021)	(0.022)
Controls	Yes	Yes	Yes	Yes
Fixed.Effects		Time	ETF	ETF, Time
Adj. R-squared	0.062	0.085	0.038	0.064
Num.Obs.	9,771			

Table 5: The impact of IPO participation on ETF creations/redemptions

Table 5 Panel A reports the Panel OLS results on the contemporaneous correlation between ETF flows and creations/redemptions, i.e.,

$$\text{Flow}_{i,t} = \beta_1 \text{Creations/Redemptions}_{i,t} + \beta_2 \text{Flow}_{i,t-1} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

The dependent variable *Flow* represents the monthly fund flow for an ETF, which is the monthly (or daily) change in the ETF's total net asset value net of its return. *Creations/Redemptions* is the mean value (or the value) of daily changes in ETF shares outstanding (*ΔShares_Outstanding*) in month *t*. Control variables in column [1] are the same as those in Table 4. Control variables in column [2] are the natural logarithm of daily ETF size, the turnover ratio, the natural logarithm of ETF trading volume, and lagged daily ETF flows. Table 5 Panel B reports the Panel OLS results analyzing the impact of ETF IPO participation on creations/redemptions, i.e.,

$$\text{Creations/Redemptions}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \beta_2 \text{Creations/Redemptions}_{i,t-1} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

ETF_IPO_Ret quantifies returns specifically from IPO participation. For each ETF, we define the monthly return from its IPO participation as $\text{ETF_IPO_Ret}_{i,t} = \sum_{j=1}^{J} \frac{\text{IPO_Ret}_{j,t}}{\text{Size}_{i,t-1}}$, where *J* is the total number of IPOs the ETF *i* has subscribed to by the end of month *t*. *IPO_Ret* is the IPO return. *Size* is the market capitalization of the ETF calculated as its outstanding shares times the net asset value at the end of each month. Controls include the natural logarithm of ETF size, the number of IPOs by the ETF, the age and reciprocal price of the ETF, and the return from the Shanghai Stock Exchange composite index. We add the lagged *Creations/Redemptions* to control for autocorrelation in ETF creations/redemptions. We include specifications both with and without ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. ***, **, and *, represent significance levels at 1%, 5%, and 10%, respectively.

Panel A: Correlations between ETF flows and creations/redemptions

Dep. Var	*Flow*	
	[1]	[2]
Creations/Redemptions	20.850***	0.946***
	(0.256)	(0.009)
Lag Flow	0.012***	0.040***
	(0.004)	(0.005)
Controls	Yes	Yes
Fixed.Effects	ETF, Time	ETF, Time
Adj. R-squared	0.929	0.872
Num.Obs	9,771	199,545

Panel B: The impact of IPO participation on ETF creations/redemptions

DepVar.	*Creations/Redemptions*			
	[1]	[2]	[3]	[4]
ETF_IPO_Ret	**0.139*** **	**0.145*** **	**0.179*** **	**0.193*** **
	(0.020)	**(0.021)**	**(0.028)**	**(0.027)**
Lag Creations/Redemptions	0.193***	0.191***	0.119***	0.112***
	(0.016)	(0.016)	(0.018)	(0.018)
Controls	Yes	Yes	Yes	Yes
Fixed.Effects		Time	ETF	ETF, Time
Adj. R-squared	0.064	0.087	0.040	0.067
Num.Obs.			9,772	

Table 6: Cross-sectional comparison: Industry ETFs vs. broad-market index ETFs

Table 6 reports the Panel OLS results for

$$\text{ETF_Excess_Ret}_{i,t}, \text{Tracking_Error}_{i,t}, \text{Flow}_{i,t}, \text{Creations/Redemptions}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

on a subsample of industry and broad-market index ETFs, in which industry ETFs are categorized by WIND and broad-market index ETFs are the ones that track the main stock market index. *ETF_Excess_Ret* is defined as the difference between monthly returns from the ETF and the index it follows. *Tracking_Error* is the monthly tracking error. *Flow* is the fund flow for an ETF. *ETF_IPO_Ret* captures the return from ETF IPO participation. To test the cross-sectional variation of ETF IPO participation and its performance, this table also reports the Panel OLS results for

$$\text{ETF_Excess_Ret}_{i,t}, \text{Tracking_Error}_{i,t}, \text{Flow}_{i,t}, \text{Creations/Redemptions}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \beta_2 \text{ETF_IPO_Ret}_{i,t} \times \text{Dum_industry_ETF}_i + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

Dum_industry_ETF equals one if the ETF is an industry ETF. We include the lagged natural logarithm of ETF size, *ETF_IPO_Num*, the age and reciprocal price of the ETF, and the return from the Shanghai Stock Exchange composite index as control variables. We also include ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. *** is significant at 1%, ** is significant at 5%, and * is significant at 10%.

DepVar.	*ETF_Excess_Ret*			*Tracking Error*		
	Industry	*Market*	*Diff*	*Industry*	*Market*	*Diff*
	[1]	[2]	[3]	[4]	[5]	[6]
ETF_IPO_Ret	0.659***	0.284***	0.289***	0.052***	0.013**	0.012**
	(0.062)	(0.039)	(0.037)	(0.005)	(0.006)	(0.006)
ETF_IPO_Ret ×Dum_industry_ETF			0.360***			0.036***
			(0.059)			(0.007)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed.Effects	ETF, Time	ETF, Time	ETF, Time	ETF, Time	ETF, Time	ETF, Time
Adj. R-squared	0.420	0.436	0.408	0.384	0.190	0.230
Num.Obs	1,699	3,072	4,771	1,699	3,072	4,771

DepVar.	*Flow*			*Creations/Redemptions*		
	Industry	*Market*	*Diff*	*Industry*	*Market*	*Diff*
	[1]	[2]	[3]	[4]	[5]	[6]
ETF_IPO_Ret	7.189***	2.607***	2.530***	0.347***	0.129***	0.126***

	(2.301)	(0.816)	(0.767)	(0.098)	(0.035)	(0.033)
ETF_IPO_Ret ×Dum_industry_ETF			6.262***			0.271***
			(2.064)			(0.086)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed.Effects	ETF, Time	ETF, Time	ETF, Time	ETF, Time	ETF, Time	ETF, Time
Adj. R-squared	0.113	0.095	0.087	0.112	0.107	0.094
Num.Obs	1,699	3,071	4,770	1,699	3,074	4,773

Table 7: Identifying causality with the IV-2SLS regression

Table 7 reports the IV-2SLS results testing the causal relationship between the index ETF's return from IPO participation and the ETF's excess return (or tracking error, or fund flow). The sample period is from January 2016 to July 2020, consisting of a subset of 46 ETFs. These ETFs hold stocks only from either the Shanghai or Shenzhen Stock Exchange. The regression model is as follows,

$$\text{ETF_IPO_Ret}_{i,t} = \gamma_1 \text{Post}_t \times \text{Treat}_i + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

$$\text{ETF_Excess_Ret}_{i,t}, \text{Tracking_Error}_{i,t}, \text{Flow}_{i,t}, \text{Creations/redemptions}_{i,t} = \beta_1 \widehat{\text{ETF_IPO_Ret}}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

Post is a time dummy variable, which equals one after July 2019 and zero otherwise. *Treat* is an ETF dummy variable, which is one for ETFs that only hold stocks on the Shanghai Stock Exchange and zero for ETFs that only hold stocks on the Shenzhen Stock Exchange. We include the natural logarithm of ETF size, *ETF_IPO_Num*, the age and reciprocal price of the ETF, and the return from the Shanghai Stock Exchange composite index as control variables. For the regression on *Flow*, we add lagged *Flow* as an additional control variable. We also include ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. *** is significant at 1%, ** is significant at 5%, and * is significant at 10%.

Dep.Var	1st stage	2nd stage			
	ETF_IPO_Ret	*ETF_Excess_Ret*	*Tracking_Error*	*Flow*	*Creations/ Redemptions*
	[1]	[2]	[3]	[4]	[5]
Post×Treat	1.224***				
	(0.057)				
$\widehat{ETF_IPO_Ret}$		**0.619*** **	**0.064*** **	**8.758*** **	**0.386*** **
		(0.046)	**(0.005)**	**(1.535)**	**(0.069)**
Lag Flow				0.071***	
				(0.027)	
Lag Creations/Redemptions					0.059**
					(0.026)
Controls	Yes		Yes		
Fixed.Effects	ETF, Time		ETF, Time		
Num.Obs.	1,638		1,638		
F-Test of Excluded Instruments	454.05				

Table 8: Index ETF retention of IPO shares

Table 8 reports the retention behavior of index equity ETFs following their participation in IPOs. For each ETF-IPO pair, we identify whether the IPO lockup period ends before the first available post-IPO holdings report and, in such cases, record whether the ETF continues to hold the IPO shares. For IPOs whose lockup periods expire between the first and second available holdings reports, we examine whether the shares appear in the second report. In addition to the full sample of index equity ETFs, we separately report the retention behavior of industry ETFs participating in IPOs within their benchmark industries and in unrelated industries.

Sample		**ETF-IPO pairs**	**Num.of.pairs lockup date < 1st post-IPO holdings report date**	Lockup date ∈ [0, 1st report date] and IPO shares ∈ 1st post-IPO holdings report	**Num.of.pairs lockup date > 1st post-IPO holdings report date**	Lockup date ∈ [1st, 2nd report date] and IPO shares ∈ 2nd post-IPO holdings report	**Retention rate** Lockup date ∈ [0, 1st report date]	**Retention rate** Lockup date ∈ [1st, 2nd report date]
All index ETFs participating in IPOs		158,362	119,789	2,168	38,573	1,523	1.8%	3.9%
Industry ETFs participating in	Within-industry IPOs	530	411	31	119	30	7.5%	25.2%
	Out-of-industry IPOs	23,281	19,093	309	4,628	122	1.6%	2.6%

Table 9: Index ETF IPO participation on current stock volatility

Table 9 reports the IV-2SLS results analyzing the causal relationship between the index ETF's performance of IPO participation and the contemporaneous volatility of the member stocks. The sample period is from January 2016 to July 2020, consisting of a subset of 46 ETFs. These ETFs hold stocks only from either the Shanghai or Shenzhen Stock Exchange. The regression model is as follows,

$$\text{ETF_Performance}_{s,t} = \gamma_1 \text{Post}_t \times \text{Treat}_s + \text{Controls} + \text{Fixed Effects} + \eta_{s,t}.$$

$$\text{Volatility}_{s,t} = \beta_1 \widehat{\text{ETF_Performance}}_{s,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{s,t}.$$

ETF_Performance includes the weighted sum of excess return, tracking error, fund flows and creation and redemption activities of the index ETF *i* that holds the stock, and the weight is each ETF's holdings of the stock divided by total holdings across all 46 ETFs. *Volatility* is the monthly volatility that is 100 times the annualized standard deviation of the daily stock return in a month. *Post* is a time dummy variable, which equals one after July 2019 and zero otherwise. *Treat* is an ETF dummy variable, which is one for the constituent stock from ETFs that only hold stocks on the Shanghai Stock Exchange and zero for constituent stocks from ETFs that purely hold stocks on the Shenzhen Stock Exchange. For the stock level control variables, we include the lagged *Volatility* and the commonly used characteristics, such as the natural logarithm of market capitalization, leverage ratio, ROE, institutional ownership, PE ratio, turnover, and natural logarithm of trading volume. We also include stock and time fixed effects. Standard errors are clustered at the stock level and reported in parentheses. *** is significant at 1%, ** is significant at 5%, and * is significant at 10%.

Dep.Var.	1st Stage			2nd Stage		
	ETF_Excess_Ret	*Tracking Error*	*Creations/ Redemptions*	*Volatility(t)*		
	[1]	[2]	[3]	[4]	[5]	[6]
Post×Treat	0.379***	5.366***	0.057***			
	(0.014)	(0.256)	(0.007)			
$\widehat{ETF_Excess_Ret}$				**0.610*** **		
				(0.168)		
$\widehat{Tracking_Error}$					**0.043*** **	
					(0.012)	
$\widehat{Creations/Redemptions}$						**4.068*** **
						(1.212)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed.Effects			Stock, Time			
Num.Obs		53,019			53,019	
F-Test of Excluded Instruments	765.86	440.35	71.13			

Table 10: Index ETF IPO participation on subsequent stock volatility

Table 10 reports the IV-2SLS results analyzing the causal relationship between the index ETF's performance of IPO participation and the subsequent volatility of the member stocks. The main difference between Tables 9 and 10 is that the latter uses next month's stock volatility as the dependent variable in the second-stage regression. The specification is identical to Table 9 except that the dependent variable, *Volatility*, is measured at *t+1*. All variable definitions, controls, and fixed effects follow Table 9.

Dep.Var.	1st Stage			2nd Stage		
	ETF_Excess_Ret	*Tracking Error*	*Creations/ Redemptions*	*Volatility(t+1)*		
	[1]	[2]	[3]	[4]	[5]	[6]
Post×Treat	0.379***	5.361***	0.056***			
	(0.014)	(0.255)	(0.007)			
$\widehat{ETF_Excess_Ret}$				**-0.607*** **		
				(0.176)		
$\widehat{Tracking_Error}$					**-0.043*** **	
					(0.013)	
$\widehat{Creations/Redemptions}$						**-4.084*** **
						(1.256)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed.Effects			Stock, Time			
Num.Obs		53,019			53,019	
F-Test of Excluded Instruments	766.84	440.55	69.86			

Table 11: Index ETF IPO participation and stock returns

Table 11 reports the IV-2SLS results analyzing the causal relationship between the index ETF's performance of IPO participation and the contemporaneous or subsequent returns of the member stocks. The sample period is from January 2016 to July 2020, consisting of a subset of 46 ETFs. These ETFs hold stocks only from either the Shanghai or Shenzhen Stock Exchange. The regression model is as follows,

$$\text{ETF_Performance}_{s,t} = \gamma_1 \text{Post}_t \times \text{Treat}_s + \text{Controls} + \text{Fixed Effects} + \eta_{s,t}.$$

$$\text{Returns}_{s,t}, \text{Returns}_{s,t+1} = \beta_1 \widehat{\text{ETF_Performance}}_{s,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{s,t}.$$

ETF_Performance includes the weighted sum of excess return, tracking error, fund flows and creation and redemption activities of the index ETF *i* that holds the stock, and the weight is each ETF's holdings of the stock divided by total holdings across all 46 ETFs. *Return* includes the monthly market-adjusted return (subtracting monthly market return) and its adjusted form by Fama-French 3 Factors Model, Carhart 4 Factors Model and Fama-French 5 Factor Model of the member stocks. *Post* is a time dummy variable, which equals one after July 2019 and zero otherwise. *Treat* is an ETF dummy variable, which is one for the constituent stock from ETFs that only hold stocks on the Shanghai Stock Exchange and zero for constituent stocks from ETFs that purely hold stocks on the Shenzhen Stock Exchange. For the stock level control variables, we include the lagged return and the commonly used characteristics, such as the natural logarithm of market capitalization, leverage ratio, ROE, institutional ownership, PE ratio, turnover, and natural logarithm of trading volume. We also include stock and time fixed effects. Standard errors are clustered at the stock level and reported in parentheses. *** is significant at 1%, ** is significant at 5%, and * is significant at 10%.

Panel A: Index ETF excess returns and its constituent stocks' returns

Dep. Var	*Return*				*Return(t+1)*			
	Mkt-adj	*FF3*	*CH4*	*FF5*	*Mkt-adj*	*FF3*	*CH4*	*FF5*
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$\widehat{ETF_Excess_Ret}$	1.416***	1.048***	1.394***	2.127***	-1.462***	-1.716***	-1.450***	-0.925***
	(0.429)	(0.403)	(0.414)	(0.592)	(0.463)	(0.433)	(0.430)	(0.419)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed.Effects	Stock, Time				Stock, Time			
Num.Obs	53,019	53,016	53,019	53,019	53,019	53,019	53,019	53,019

Panel B: Index ETF tracking error and its constituent stocks' returns

Dep. Var	*Return*				*Return(t+1)*			
	Mkt-adj	*FF3*	*CH4*	*FF5*	*Mkt-adj*	*FF3*	*CH4*	*FF5*
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]

$\widehat{Tracking_Error}$	0.113***	0.084***	0.112***	0.150***	-0.117***	-0.137***	-0.116***	-0.076***
	(0.034)	(0.032)	(0.033)	(0.043)	(0.037)	(0.035)	(0.035)	(0.034)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed.Effects	Stock, Time				Stock, Time			
Num.Obs	53,019	53,016	53,019	53,019	53,019	53,019	53,019	53,019

Panel C: Index ETF creations/redemptions and its constituent stocks' returns

Dep. Var	***Return***				***Return(t+1)***			
	Mkt-adj	***FF3***	***CH4***	***FF5***	***Mkt-adj***	***FF3***	***CH4***	***FF5***
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$\widehat{Creations/Redemptions}$	6.925***	5.112***	6.804***	8.521***	-7.147***	-8.395***	-7.095***	-4.628**
	(2.146)	(1.989)	(2.064)	(2.130)	(2.304)	(2.183)	(2.149)	(2.089)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed.Effects	Stock, Time				Stock, Time			
Num.Obs	53,019	53,016	53,019	53,019	53,019	53,019	53,019	53,019

Table 12: ETF-flow-induced trading on stock returns

Table 12 reports the IV-2SLS results analyzing the causal relationship between ETF-flow-induced trading (ΔDemand) and the contemporaneous returns of the member stocks. The sample period is from January 2016 to July 2020, consisting of a subset of 46 ETFs. These ETFs hold stocks only from either the Shanghai or Shenzhen Stock Exchange. The regression model is as follows,

$$\Delta\text{Demand}_{s,t} = \gamma_1 \text{Post}_t \times \text{Treat}_s + \text{Controls} + \text{Fixed Effects} + \eta_{s,t}.$$

$$\text{Return}_{s,t} = \beta_1 \Delta\widehat{\text{Demand}}_{s,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{s,t}.$$

$$\Delta\text{Demand}_s = \frac{\sum_{s\in\text{ETF(i)}} w_{s,i}\text{Creation/redemption}_i}{\text{Shares outstanding}_s} \times 100$$

where s is the index of the ETF constituent stock, and e is the index of the ETF that s sits in, the weight is each ETF's holdings of the stock divided by total holdings across all 46 ETFs. *Return* includes the monthly market-adjusted return (subtracting monthly market return) and its adjusted form by Fama-French 3 Factors Model, Carhart 4 Factors Model and Fama-French 5 Factor Model of the member stocks. *Post* is a time dummy variable, which equals one after July 2019 and zero otherwise. *Treat* is an ETF dummy variable, which is one for the constituent stock from ETFs that only hold stocks on the Shanghai Stock Exchange and zero for constituent stocks from ETFs that purely hold stocks on the Shenzhen Stock Exchange. For the stock level control variables, we include the lagged return and the commonly used characteristics, such as the natural logarithm of market capitalization, leverage ratio, ROE, institutional ownership, PE ratio, turnover, and natural logarithm of trading volume. We also include stock and time fixed effects. Standard errors are clustered at the stock level and reported in parentheses. *** is significant at 1%, ** is significant at 5%, and * is significant at 10%.

	1st stage	2nd Stage			
Dep. Var	***ΔDemand***	***Return***			
		Mkt-adj	***FF3***	***CH4***	***FF5***
	[1]	[2]	[3]	[4]	[5]
Post×Treat	4.420***				
	(0.472)				
$\Delta\widehat{Demand}$		**0.165*** **	**0.122*** **	**0.162*** **	**0.203*** **
		(0.054)	**(0.048)**	**(0.050)**	**(0.052)**
Lag Return		-0.145***	-0.130***	-0.134***	-0.119***
		(0.006)	(0.006)	(0.006)	(0.006)
Controls	Yes	Yes	Yes	Yes	Yes
Fixed.Effects			Stock, Time		
Num.Obs	53,019	53,019	53,016	53,019	53,019
F-Test of Excluded Instruments		87.78	81.54	87.82	87.78

Table 13: The impact of IPO participation on index ETF volatility

Table 13, column [1] reports the Panel OLS results analyzing the impact of index ETF IPO participation on index ETF volatility, i.e.,

$$\text{ETF_Volatility}_{i,t} = \beta_1 \text{ETF_IPO_Ret}_{i,t} + \beta_2 \text{ETF_Volatility}_{i,t-1} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

The dependent variable *ETF_Volatility* represents the monthly standard deviation of the ETF's daily return. *ETF_IPO_Ret* quantifies returns specifically from IPO participation. For each index ETF, we define the monthly return from its IPO participation as $\text{ETF_IPO_Ret}_{i,t} = \sum_{j=1}^{J} \frac{\text{IPO_Ret}_{j,t}}{\text{Size}_{i,t-1}}$, where *J* is the total number of IPOs the index ETF *i* has subscribed to by the end of month *t*. *IPO_Ret* is the IPO return. *Size* is the market capitalization of the ETF calculated as its outstanding shares times the net asset value at the end of each month. Table 13, columns [2] and [3] report the IV-2SLS results testing the causal relationship between the ETF's return from IPO participation and the ETF's volatility. The sample period is from January 2016 to July 2020, consisting of a subset of 46 ETFs. Those ETFs hold stocks only from either the Shanghai or Shenzhen Stock Exchange. The regression model is as follows,

$$\text{ETF_IPO_Ret}_{i,t} = \gamma_1 \text{Post}_t \times \text{Treat}_i + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

$$\text{ETF_Volatility}_{i,t} = \beta_1 \widehat{\text{ETF_IPO_Ret}}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

Post is a time dummy variable, which equals one after July 2019 and zero otherwise. *Treat* is an ETF dummy variable, which is one for ETFs that only hold stocks on the Shanghai Stock Exchange and zero for ETFs that only hold stocks on the Shenzhen Stock Exchange. Controls include the natural logarithm of ETF size, the number of IPOs by the ETF, the age and reciprocal price of the ETF, the return from the Shanghai Stock Exchange composite index and the lagged *ETF_Volatility*. We include both ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. ***, **, and *, represent significance levels at 1%, 5%, and 10%, respectively.

Regression model:	**Panel OLS**	**IV 1st stage**	**IV 2nd stage**
Dep.Var.	*ETF Volatility*	*ETF_IPO_Ret*	*ETF Volatility*
	[1]	[2]	[3]
Post×Treat		1.225***	
		(0.057)	
ETF_IPO_Ret $(\widehat{ETF_IPO_Ret})$	**-0.010**		**0.001**
	(0.013)		**(0.041)**
Lagged_ETF_Volatility	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Fixed.Effects	ETF, Time	ETF,Time	ETF,Time
Adj. R-squared	0.645		0.641
Num.Obs	9,771		1,637
F-Test of Excluded Instruments		457.35	

Table 14: Daily index ETF flow

Table 14 reports the Panel OLS results analyzing the daily index ETF flow dynamics, i.e.,

$$\begin{aligned}\text{Flow}_{i,\tau+1} = {} & \beta_1 \text{ETF_Excess_Ret}_{i,\tau} + \beta_2 \text{Realized_IPO_Ret}_{i,\tau} \\ & + \beta_3 \text{Expected_IPO_Ret}_{i,\tau} + \beta_4 \text{Expected_Excess_Ret}_{i,\tau} \\ & + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,\tau+1},\end{aligned}$$

Flow and *ETF_Excess_Ret* are index ETF flow and excess return constructed at the daily frequency. *Realized_IPO_Ret* represents the weighted sum of IPO returns of stocks that have been subscribed to by ETF *i* on day τ, where the weight equals the subscribed value of the IPO stock divided by the market value of the ETF. *Expected_IPO_Ret* and *Expected_Excess_Ret* are future *Realized_IPO_Ret* and *ETF_Excess_Ret*, respectively, measured on day τ+2. Controls include the natural logarithm of daily ETF size, the turnover ratio, the natural logarithm of ETF trading volume, and lagged daily ETF flow. We include both ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. ***, **, and *, represent significance levels at 1%, 5%, and 10%, respectively.

Dep.Var	*Flow(τ+1)*			
	[1]	[2]	[3]	[4]
ETF_Excess_Ret(τ)	0.552***	0.598***	0.597***	0.592***
	(0.163)	(0.180)	(0.180)	(0.180)
Realized_IPO_Ret(τ)		-0.399	-0.593*	-0.627*
		(0.332)	(0.332)	(0.336)
Expected_Excess_Ret(τ+2)				0.340***
				(0.102)
Expected_IPO_Ret(τ+2)			1.034***	0.752**
			(0.322)	(0.339)
Flow(τ)	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Fixed.Effects	ETF, Time			
Adj. R-squared	0.108	0.108	0.108	0.109
Num.Obs	199,622	199,622	199,622	193,849

Table 15: IPO participation of index mutual funds and their performance

Table 15 reports the results of panel OLS regressions examining the impact of IPO participation by passive index mutual funds on fund excess returns, tracking error, and fund flows. The sample covers the period from January 2016 to December 2021 and consists of 244 index mutual funds. The regression model is specified as follows:

$$\text{Fund_Excess_Ret}_{i,t} \text{or} \text{Fund_Tracking_Error}_{i,t} = \beta_1 \text{Fund_IPO_Ret}_{i,t} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$
$$\text{Fund_Flow}_{i,q} = \beta_1 \text{Fund_IPO_Ret}_{i,q} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,q}$$

The control variables include the natural logarithm of fund size, Fund_IPO_Num, fund age, the reciprocal of fund price, and the return on the Shanghai Stock Exchange Composite Index. For regressions using *Flow* as the dependent variable, the analysis is conducted at the quarterly level because total assets data for passive index mutual funds are available only at a quarterly frequency. In these regressions, lagged *Flow* is additionally included to control for autocorrelation in fund flows. We include fund and time fixed effects. Standard errors are clustered at the fund level and reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

DepVar.	*Fund_Excess_Ret*	*Tracking_Error*	*Flow(q)*	*Flow(q+1)*
	[1]	[2]	[3]	[4]
Fund_IPO_Ret	0.002	0.110***	-0.246	-0.190
	(0.003)	(0.029)	(0.167)	(0.177)
Controls	Yes	Yes	Yes	Yes
Lag Flow	No	No	Yes	Yes
Fixed.Effects		Fund, Time		
Adj. R-squared	0.259	0.109	0.058	0.070
Num.Obs.	7,296	7,296	2,477	2,477

Table 16: Results for the ETF subsample with total-return-index benchmarks

This table reports results for the ETF subsample with available total-return-index benchmarks. The subsample contains 2,925 ETF-month observations from 79 ETFs. Panel A compares the price-index-based and total-return-index-based definitions of ETF excess return. It reports the main fixed-effect absorption test for the difference between the two measures of ETF excess return, based on the following specification:

$$\text{ETF_Excess_Ret}_{i,t} - \text{ETF_Excess_Ret_Tr}_{i,t} = \alpha_1 + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,t}.$$

where *ETF_Excess_Ret* is the excess return computed using the price-index benchmark and *ETF_Excess_Ret_Tr* is the excess return computed using the total-return-index benchmark. Panel B reports the panel OLS regression results corresponding to specifications Eqs.(1)-(3) or Tables 2-5 for the ETF subsample with available total-return-index benchmarks. ETF and time fixed effects are included where indicated. Standard errors are clustered at the ETF level and reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Main FE absorption test for excess return

DepVar.	*ETF_Excess_Ret − ETF_Excess_Ret_Tr*		
	[1]	[2]	[3]
Const	0.090***	0.113	-0.585
	(0.021)	(0.132)	(0.373)
Controls	No	Yes	Yes
Fixed Effects	No	ETF	ETF,Time
Adj. R-squared	0.000	0.022	0.273
Num. obs.		3,047	

Panel B: The impact of ETF IPO participation on ETF performance

DepVar.	*ETF_Excess_Ret*		*Tracking_Error*		*Flow*
	Price Index	*Total Ret Index*	*Price Index*	*Total Ret Index*	
	[1]	[2]	[3]	[4]	[5]
ETF_IPO_Ret	**0.274*** **	**0.295*** **	**0.013***	**0.013***	**2.684*** **
	(0.040)	**(0.053)**	**(0.007)**	**(0.007)**	**(0.866)**
Lag Flow	No	No	No	No	Yes
Controls	Yes	Yes	Yes	Yes	
Fixed.Effects			ETF, Time		
Adj. R-squared	0.417	0.307	0.186	0.124	0.080
Num.Obs.			3,103		

Appendix Table 1: Summary statistics for the IV-2SLS panel

Panel A: Summary statistics for the ETF-month panel

	Mean	Std	5%	25%	50%	75%	95%
Size (billion RMB)	0.828	2.922	0.018	0.047	0.096	0.242	5.137
100×Tracking_Error (%)	0.057	0.068	0.008	0.020	0.036	0.063	0.185
ETF_Excess_Ret (%)	0.234	0.615	-0.304	-0.066	0.067	0.367	1.382
ETF_IPO_Num	4.276	5.704	0	0	2	7	17
ETF_IPO_Ret (%)	0.292	0.689	0.000	0.000	0.011	0.205	1.676
Flow(%)	1.720	16.763	-15.256	-3.390	0.000	2.481	26.814
Creations/Redemptions(%)	0.066	0.746	-0.731	-0.160	0.000	0.129	1.230

Panel B: Summary statistics for the stock-month panel

	Mean	Std	5%	25%	50%	75%	95%
100×Tracking_Error (%)	5.933	6.367	1.223	2.123	3.567	7.048	18.309
ETF_Excess_Ret (%)	0.297	0.536	-0.223	-0.020	0.148	0.423	1.313
Flow(%)	-0.161	6.243	-7.745	-2.876	-0.955	1.043	10.910
Creations/Redemptions(%)	-0.006	0.305	-0.407	-0.137	-0.043	0.057	0.503
Volatility(%)	7.952	3.685	3.205	5.176	7.219	10.098	15.211
Return(%)	-0.153	10.314	-15.432	-6.159	-0.829	5.040	18.326
Return Mkt-adj (%)	-0.092	8.431	-12.200	-5.370	-1.150	4.080	15.650
Return FF3(%)	-0.523	8.144	-12.850	-5.390	-1.236	3.467	14.316
Return CH4(%)	-0.513	8.127	-12.850	-5.360	-1.180	3.462	14.259
Return FF5(%)	-0.487	8.083	-12.799	-5.309	-1.127	3.533	14.060

Appendix Table 2: The impact of IPO participation on daily ETF performance

This table reports the Panel OLS results analyzing the impact of index ETF IPO participation on daily performance, i.e.,

$$\text{ETF_Performance}_{i,\tau} = \beta_1 \text{ETF_IPO_Ret}_{i,\tau} + \text{Controls} + \text{Fixed Effects} + \epsilon_{i,\tau}.$$

The dependent variable *ETF_Performance* includes: (1) daily excess return that is the daily return differential between the index ETF and its benchmark index; (2) daily flow that is the daily change in the ETF's total net asset value minus its daily return; and (3) daily creations and redemptions which are daily changes in ETF shares outstanding (*ΔShares_Outstanding*). *ETF_IPO_Ret* quantifies returns specifically from IPO participation. For each ETF, we define the return from its IPO participation as:

$$\text{ETF_IPO_Ret}_{i,\tau} = \sum_{j=1}^{J} \frac{\text{IPO_Ret}_{j,\tau}}{\text{Size}_{i,\tau-1}}$$

, where *J* is the total number of IPOs the ETF *i* has subscribed to by the end of day τ. *IPO_Ret* is the IPO return. *Size* is the market capitalization of the ETF calculated as its outstanding shares times the net asset value at the end of each day. Controls include the natural logarithm of daily ETF size, the turnover ratio, the natural logarithm of ETF trading volume, and lagged daily ETF flow or creations/redemptions. We include both ETF and time fixed effects. Standard errors are clustered at the ETF level and reported in parentheses. ***, **, and *, represent significance levels at 1%, 5%, and 10%, respectively.

DepVar.	*ETF_Excess_Ret*	*Flow*	*Creations/Redemptions*
	[1]	[2]	[3]
ETF_IPO_Ret	**0.064*** **	**0.243*** **	**0.324*** **
	(0.004)	**(0.048)**	**(0.045)**
Lag Flow or		0.250***	0.251***
Lag Creations/Redemptions		(0.011)	(0.010)
Controls	Yes	Yes	Yes
Fixed.Effects		ETF, Time	
Adj. R-squared	0.213	0.106	0.073
Num.Obs.	212,323	199,636	206,508

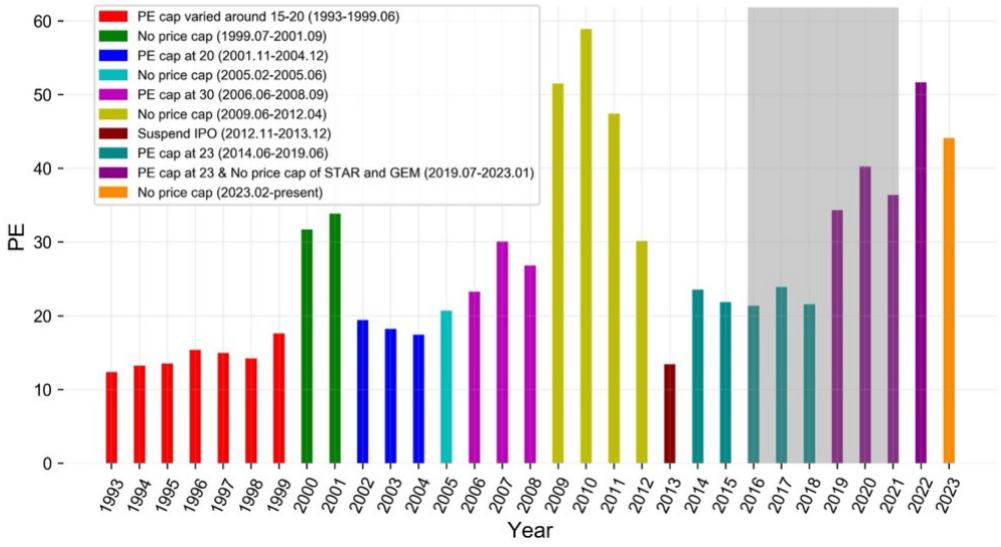


Figure 1: Pricing regulation on Chinese IPOs

Figure 1 summarizes the evolution of IPO pricing regulations since the establishment of the China Securities Regulatory Commission (CSRC). The vertical axis represents the price-earnings (PE) ratio cap imposed on IPO pricing. From 1993 to June 1999, the PE cap ranged from 15 to 20. A binding PE cap of 23 was in effect from June 2014 to June 2019. The CSRC relaxed restrictions on IPO pricing under the new registration system, removing the price cap for IPOs on the Science and Technology Innovation Board (STAR market, starting July 2019) and the Growth Enterprise Market (GEM, starting August 2020). Since February 2023, no price cap has been imposed under the full registration system.

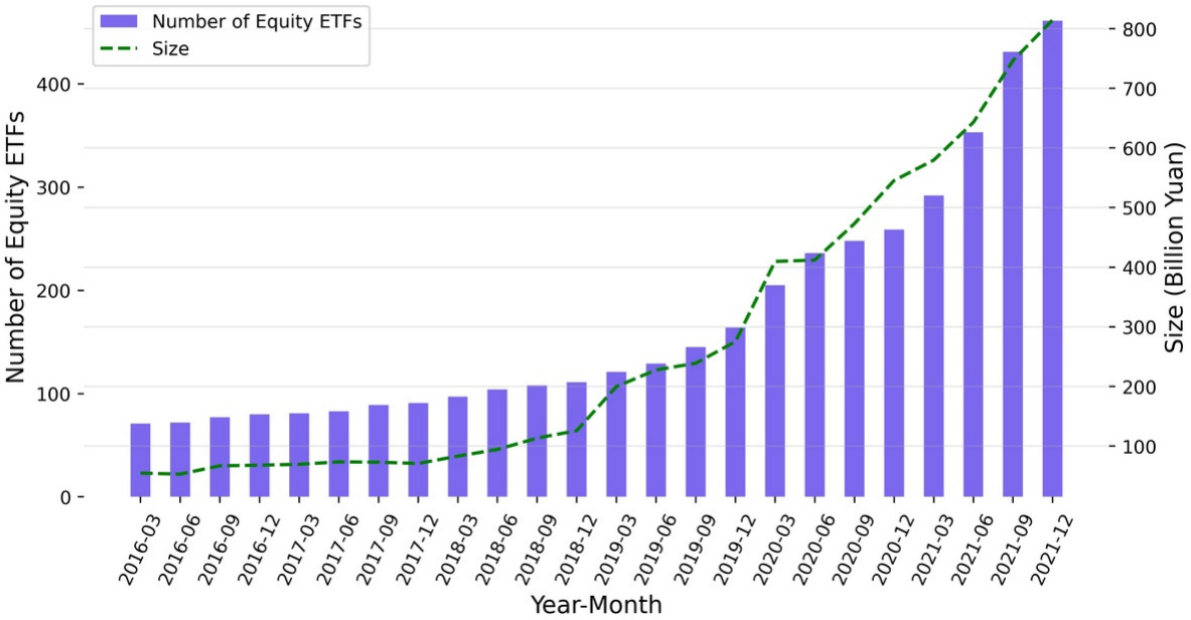


Figure 2: The growth of index equity ETFs in China

Figure 2 shows the growth of index equity ETFs in China during our sample period. The left vertical axis is the number of index equity ETFs, and the right vertical axis is the size (in billions of RMB). We have 461 index equity ETFs as of December 2021.

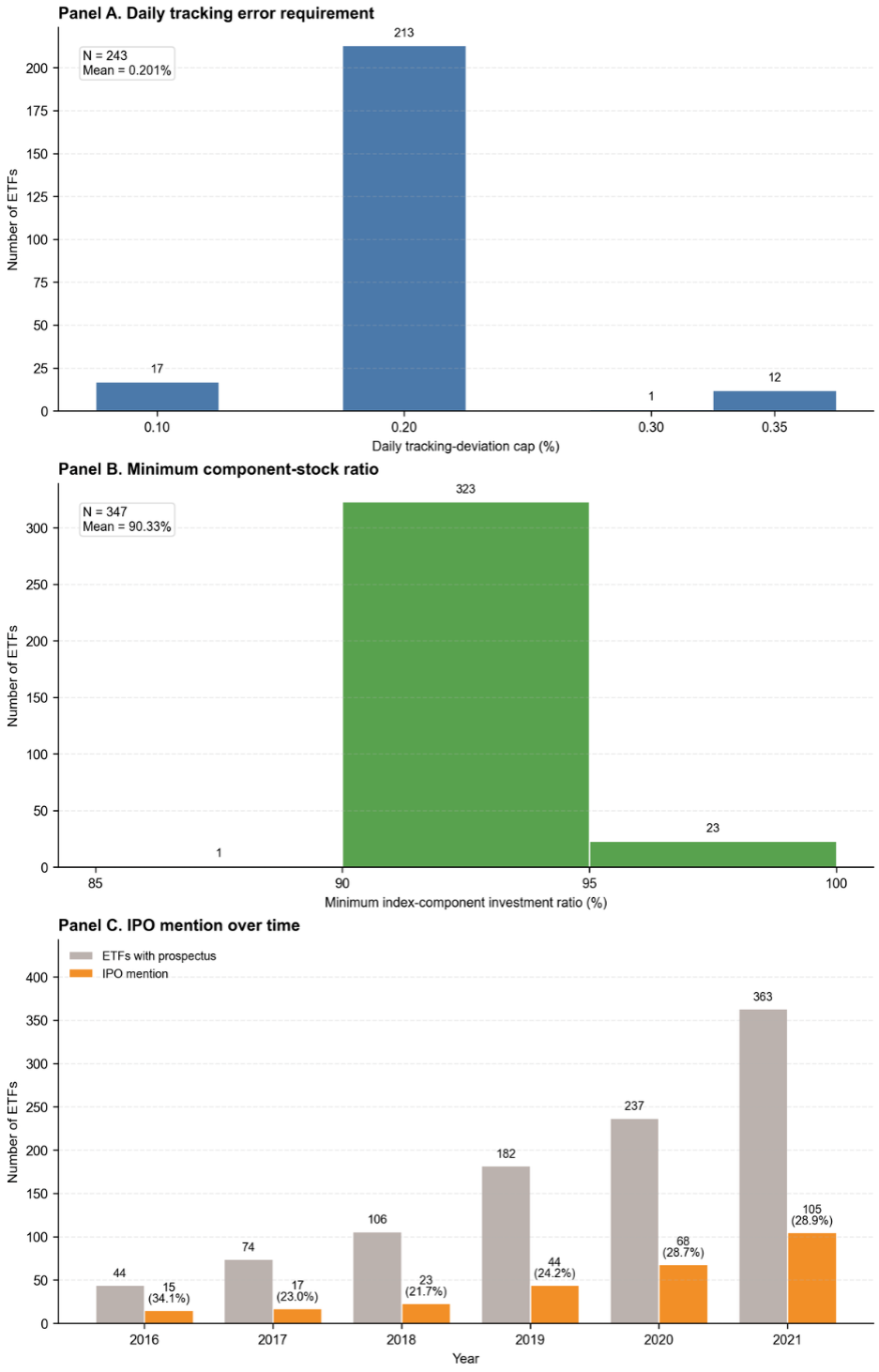


Figure 3: Summary from ETF prospectus

We construct the prospectus-text data by matching ETF prospectus obtained from the Shanghai and Shenzhen exchanges to the monthly ETF panel for January 2016 to December 2021. We focus on the 383 ETFs that have at least one retained prospectus document during the period. Panels A and B present the histogram of ETFs regarding the requirement on average daily tracking error and minimum index-component investment ratio. The index-component investment ratio is extracted from prospectus clauses mandating that combined investment in index constituent stocks must not fall below a specified percentage of fund net assets, and averaged across prospectuses for each ETF. Panel C displays the year-by-year count of ETFs that explicitly mention IPO participation in their prospectuses, along with each year's total ETF sample, over the period 2016–2021.